Draft
Environmental Impact Report

SCH # 2019011010

Volume 2

Appendices A through L

JOHE RANCH MINING PROJECT
By Diatom, LLC

CUP 17, Map 117

Kern County
Planning and Natural Resources Department
Bakersfield, California

November 2020

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Appendix A

Notice of Preparation/Initial Study and Comment Letters

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Lorelei H. Oviatt, AICP, Director
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Bakersfield, CA 93301-2323
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PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

NOTICE OF PREPARATION

DATE: January 8, 2018

To: See Attached Mailing List

FROM: Kern County Planning and Natural Resources Department
Attn: Randall Cates
2700 "M" Street, Suite 100
Bakersfield, CA 93301
(661) 862-8612; CatesR@kerncounty.com

SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

The Kern County Planning and Natural Resources Department as Lead Agency (per CEQA Guidelines Section 15052) has required that an Environmental Impact Report (per CEQA Guidelines Section 15161) be prepared for the project identified below. The Planning and Natural Resources Department solicits the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval of projects.

Due to the limits mandated by State law, your response must be received by **February 7, 2019 at 5:00 pm.** In addition, comments can be submitted at a **scoping meeting** that will be held at the Kern County Planning and Natural Resources Department on **January 30, 2019 at 1:30pm** at the address shown above.

PROJECT TITLE: EIR 09-17; Johe Ranch Mining Project by Diatom, LLC (PP12316); CUP 17, Map 117.

PROJECT LOCATION: North and south sides of State Route 58, 8.5 miles west of the unincorporated community of McKittrick; also being a portion of Section 7 of Township 30 South, Range 21 East, MDBM, County of Kern, State of California.

PROJECT DESCRIPTION: A Conditional Use Permit (CUP) for a 93.67-acre surface mining operation and development of a reclamation plan on approximately 331-acre project site, in accordance with the Surface Mining and Reclamation Act (SMARA) of 1975.

Access to the site is obtained via State Route 58. The project proponent proposes to employ open pit mining techniques to mine diatomaceous earth (a mineral suitable for industrial uses including the production of cement) and overburden material (earth overlying the diatomaceous earth, proposed to be sold for use as a landfill liner, and to solidify liquid waste after it is deposited in a landfill). As proposed, all overburden material (typically considered as non-marketable waste in the mining industry) which is excavated will be exported from the project site and sold; as such, no waste is proposed to be generated.

The life of the operation is estimated at 50 years, however, considering it may take longer than 50 years to extract the proposed quantity of material, the project is proposed to be operated until the proposed quantity of the material is fully extracted (i.e. the life of the reserve). The maximum annual removal of material is estimated to be 330,000 tons (310,000 tons of diatomaceous earth, 20,000 tons of overburden material), and the maximum total is estimated to be 6,600,000 tons (6,200,000 tons of diatomaceous earth, 400,000 tons of overburden material). Proposed maximum depth of operation is 162 feet for Mine Area 1, 125 feet for Mine Area 2, and 40 feet for Mine Area 3. Although there are three proposed mine areas, the project consists of a single phase. Maximum operational slopes will be 2:1 (horizontal:vertical). Maximum final

reclaimed slopes for the mining areas, and the blending and screening site for diatomaceous earth as shown on Figure 5, will be 3:1 (horizontal:vertical); maximum final reclaimed cut and fill slopes for proposed access roads will be 2:1 (horizontal:vertical). The mine is scheduled to operate from 6:00am to 7:30pm, Monday through Friday, with a maximum of ten employees on site at any one time.

The 331-acre project site consists of grazing land and four abandoned wells (all of which are identified as abandoned gas wells with the exception of the well titled Lynn 1) as shown on Figure 5, although none of the aforementioned wells are within the proposed 93.67-acre reclamation plan area. Approximately 1.4 acres of the project site has been previously disturbed as a result of existing roads used in conjunction with ranching operations. A 2.42 acre area is proposed as a blending and screening site for diatomaceous earth, to blend and screen the material as necessary to meet customer demand.

Document can be viewed online at: https://kernplanning.com/planning/notices-of-preparation

Signature: _____ January 7, 2019
Name: Randall Cates, Planner III

CUP #17, Map #117 (EIR 09-17)
WO #PP12316
I:\Planning\WORKGRPS\WP\LABELS\eir09-17rpc.nop.doc
Sc 12/18/18

City of Arvin
P.O. Box 548
Arvin, CA 93203

Bakersfield City Planning Dept
1715 Chester Avenue
Bakersfield, CA 93301

Bakersfield City Public Works Dept
1501 Truxtun Avenue
Bakersfield, CA 93301

California City Planning Dept
21000 Hacienda Blvd.
California City, CA 93515

Delano City Planning Dept
P.O. Box 3010
Delano, CA 93216

City of Maricopa
P.O. Box 548
Maricopa, CA 93252

City of McFarland
401 West Kern Avenue
McFarland, CA 93250

City of Ridgecrest
100 West California Avenue
Ridgecrest, CA 93555

City of Shafter
336 Pacific Avenue
Shafter, CA 93263

City of Taft
Planning & Building
209 East Kern Street
Taft, CA 93268

City of Tehachapi
Attn: John Schlosser
115 South Robinson Street
Tehachapi, CA 93561-1722

City of Wasco
764 E Street
Wasco, CA 93280

Inyo County Planning Dept
P.O. Drawer "L"
Independence, CA 93526

Kings County Planning Agency
1400 West Lacey Blvd, Bldg 6
Hanford, CA 93230

Los Angeles Co Reg Planning Dept
320 West Temple Street
Los Angeles, CA 90012

San Bernardino Co Planning Dept
385 North Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415-0182

San Luis Obispo Co Planning Dept
Planning and Building
976 Osos Street
San Luis Obispo, CA 93408

Santa Barbara Co Resource Mgt Dept
123 East Anapamu Street
Santa Barbara, CA 93101

Tulare County Planning & Dev Dept
5961 South Mooney Boulevard
Visalia, CA 93291

Ventura County RMA Planning Div
800 South Victoria Avenue, L1740
Ventura, CA 93009-1740

U.S. Bureau of Land Management
Caliente/Bakersfield
3801 Pegasus Drive
Bakersfield, CA 93308-6837

U. S. Fish & Wildlife Service
Division of Ecological Services
2800 Cottage Way #W-2605
Sacramento, CA 95825-1846

North West Kern Resource Cons Dist
5080 California Avenue, Suite 150
Bakersfield, CA 93309

Environmental Protection Agency
Region IX Office
75 Hawthorn Street
San Francisco, CA 94105

U.S. Dept of Agriculture/NRCS
5080 California Avenue, Ste 150
Bakersfield, CA 93309-0711

U.S. Army Corps of Engineers
Regulatory Division
1325 "J" Street, #1350
Sacramento, CA 95814-2920

U.S. Postal Service
Address Management Systems
28201 Franklin Parkway
Santa Clarita, CA 91383-9321

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California State University of Bkfd
9001 Stockdale Highway
Bakersfield, CA 93311

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Planning/Land Bank Bldg.
P.O. Box 12616
Fresno, CA 93778

Caltrans/Dist 9
Planning Department
500 South Main Street
Bishop, CA 93514

State Clearinghouse
Office of Planning and Research
1400 - 10th Street, Room 222
Sacramento, CA 95814

State Dept of Conservation
Division of Oil & Gas
4800 Stockdale Highway, Ste 108
Bakersfield, CA 93309

Office of the State Geologist
Headquarters
801 "K" Street, MS 12-30
Sacramento, CA 95814

State Dept of Conservation
Office of Land Conservation
801 "K" Street, MS 18-01
Sacramento, CA 95814

State Dept of Conservation
Office of Mine Reclamation
801 "K" Street MS 09-06
Sacramento, CA 95814-3529

State Dept of Conservation
Div Recycling Cert. Sec.
801 "K" Street, MS 19-01
Sacramento, CA 95814

State Mining and Geology Board
801 K Street, MS 20-15
Sacramento, CA 95814

California State University
Bakersfield - Library
9001 Stockdale Highway
Bakersfield, CA 93309

California Fish & Wildlife
1234 East Shaw Avenue
Fresno, CA 93710

California Highway Patrol
Planning & Analysis Division
P.O. Box 942898
Sacramento, CA 94298-0001

California Regional Water Quality
Control Board/Central Valley Region
1685 E Street
Fresno, CA 93706-2020

Kern County
Agriculture Department

Kern County Administrative Officer

Kern County Public Works Department/
Building & Development/Floodplain

Kern County Public Works Department/
Building & Development/Survey

Kern County
Env Health Services Department

Kern County Fire Dept
Brian Marshall, Fire Chief

Kern County Fire Dept
Cary Wright, Fire Marshall

Kern County Library/Beale
Local History Room

Kern County Library/Beale
Andie Sullivan

Kern County Library
Buttonwillow Branch
116 Buttonwillow Avenue
Buttonwillow, CA 93206

Kern County Sheriff's Dept
Administration

Kern County Public Works Department/
Building & Development/Development
Review

Kern County Public Works
Department/Operations &
Maintenance/Regulatory Monitoring &
Reporting

Kern County Public Works Department/
Building & Development/Code
Compliance

McKittrick School Dist
P.O. Box 277
McKittrick, CA 93251

Taft City School Dist
820 North 6th Street
Taft, CA 93268

Kern High School Dist
5801 Sundale Avenue
Bakersfield, CA 93309

Kern County Superintendent of Schools
Attention Mary Baker
1300 17th Street
Bakersfield, CA 93301

KernCOG
1401 19th Street - Suite 300
Bakersfield, CA 93301

Rosedale-Rio Bravo Water Dist
P.O. Box 20820
Bakersfield, CA 93390-0820

Kern County Water Agency
P.O. Box 58
Bakersfield, CA 93302-0058

West Side Rec & Parks Dist
P.O. Box 1406
Taft, CA 93268

San Joaquin Valley
Air Pollution Control District
1990 East Gettysburg Avenue
Fresno, CA 93726

West Side Mosquito
Abatement Dist.
P.O. Box 205
Taft, CA 93268

Adams, Broadwell, Joseph & Cardozo
Attention: Janet M. Laurain
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Kern Audubon Society
Attn: Harry Love, President
13500 Powder River Avenue
Bakersfield, CA 93314

Center on Race, Poverty
& the Environment
Attn: Marissa Alexander
1999 Harrison Street – Suite 650
San Francisco, CA 94612

Center on Race, Poverty
& the Environmental/
CA Rural Legal Assistance Foundation
1012 Jefferson Street
Delano, CA 93215

Construction Materials Assoc of CA
1029 "J" Street, Suite 420
Sacramento, CA 95814

Defenders of Wildlife/
Kim Delfino, California Dir
980 - 9th Street, Suite 1730
Sacramento, CA 95814

Native American Heritage Council
of Kern County
Attn: Gene Albitre
3401 Aslin Street
Bakersfield, CA 93312

Pacific Gas & Electric Co
Land Projects
650 "O" Street, First Floor
Fresno, CA 93760-0001

Sierra Club/Kern Kaweah Chapter
P.O. Box 3357
Bakersfield, CA 93385

Southern California Gas Co
1510 North Chester Avenue
Bakersfield, CA 93308

Southern California Gas Co
Transportation Dept
9400 Oakdale Avenue
Chatsworth, CA 91313-6511

Verizon California, Inc.
Attention Engineering Department
520 South China Lake Boulevard
Ridgecrest, CA 93555

Chumash Council of Bakersfield
2421 "O" Street
Bakersfield, CA 93301-2441

David Laughing Horse Robinson
P.O. Box 20849
Bakersfield, CA 93390

Kern Valley Indian Council
Attn: Robert Robinson, Chairperson
P.O. Box 401
Weldon, CA 93283

Kern Valley Indian Council
Historic Preservation Office
P.O. Box 401
Weldon, CA 93283

Santa Rosa Rancheria
Ruben Barrios, Chairperson
P.O. Box 8
Lemoore, CA 93245

Tejon Indian Tribe
Kathy Morgan, Chairperson
1731 Hasti-acres Drive, Suite 108
Bakersfield, CA 93309

Kitanemuk & Yowlumne Tejon Indians
Chairperson
115 Radio Street
Bakersfield, CA 93305

Tubatulabals of Kern County
Attn: Robert Gomez, Chairperson
P.O. Box 226
Lake Isabella, CA 93240

Tule River Indian Tribe
Neal Peyron, Chairperson
P.O. Box 589
Porterville, CA 93258

Joyce LoBasso
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Bakersfield, CA 93386

LIUNA
Attn: Danny Zaragoza
2201 "H" Street
Bakersfield, CA 93301

Lozeau Drury LLP
410 – 12th Street, Suite 250
Oakland, CA 94607

WZI, Inc.
Attn. Allen Waggoner
1717 28th Street
Bakersfield, CA 93301

Diatom LLC
Attn. David Cooper
7260 Reward Road
McKittrick, CA 93251

GF Industries
Attn. Steve Gentile
122 N. Harbor Blvd., #201
Fullerton, CA 92832

Kern County Parks & Recreation

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # _____

Project Title: EIR 09-17; Johe Ranch Mining Project by Diatom, LLC

Lead Agency: Kern County Planning and Natural Resources Department — Contact Person: Randall Cates

Mailing Address: 2700 "M" Street Suite 100 — Phone: 661-862-8612

City: Bakersfield — Zip: 93301-2323 — County: Kern

Project Location: County: Kern — City/Nearest Community: McKittrick

Cross Streets: The project site is located on the north and south sides of State Route 58, approximately 8.5 miles west of the unincorporated community of McKittrick, being a portion of Section 7 of T30S, R21E, MDB&M, County of Kern, State of California

Lat. / Long.: 35° 19'56.2655" N/ 119° 46'4.2659" W — Total Acres: approximately 331 acres

Assessor's Parcel No.: portions of 156-070-01, 156-070-02 & 156-070-10 — Section: 7 — Twp.: 30S — Range: 21E — Base: MDB&M

Within 2 Miles: State Hwy #: 58 — Waterways: multiple intermittent drainage channels

Airports: N/A — Railways: N/A — Schools: N/A

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) _____ Other _____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other _____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☒ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other _____

Development Type:

☐ Residential: Units _____ Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
☐ Educational _____
☐ Recreational _____

☐ Water Facilities: Type _____ MGD _____
☐ Transportation: Type _____
☒ Mining: Mineral: diatomaceous earth and overburden material
☐ Power: Type _____ MW _____
☐ Waste Treatment: Type _____ MGD _____
☐ Hazardous Waste: Type _____
☐ Other: _____

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☒ Economic/Jobs
☒ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☒ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Wildlife
☒ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☒ Other Greenhouse Gas Emissions, Tribal Cultural Resources

Present Land Use/Zoning/General Plan Designation:

Present Land Use: Grazing Land / *Zoning:* A (Exclusive Agriculture) / *Kern County General Plan:* 8.3 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract)), 8.3/2.4 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract) / steep slope overlay), 8.4 (mineral and petroleum (min. 5 acre parcel size)), 8.4/2.2 (mineral and petroleum (min. 5 acre parcel size) / landslide overlay), 8.4/2.4 (mineral and petroleum (min. 5 acre parcel size) / steep slope overlay)

Project Description: *(please use a separate page if necessary)*

A Conditional Use Permit (CUP) for a 93.67-acre surface mining operation and development of a reclamation plan on approximately 331-acre project site, in accordance with the Surface Mining and Reclamation Act (SMARA) of 1975.

Access to the site is obtained via State Route 58. The project proponent proposes to employ open pit mining techniques to mine diatomaceous earth (a mineral suitable for industrial uses including the production of cement) and overburden material (earth overlying the diatomaceous earth, proposed to be sold for use as a landfill liner, and to solidify liquid waste after it is deposited in a landfill). As proposed, all overburden material (typically considered as non-marketable waste in the mining industry) which is excavated will be exported from the project site and sold; as such, no waste is proposed to be generated.

The life of the operation is estimated at 50 years, however, considering it may take longer than 50 years to extract the proposed quantity of material, the project is proposed to be operated until the proposed quantity of the material is fully extracted (i.e. the life of the reserve). The maximum annual removal of material is estimated to be 330,000 tons (310,000 tons of diatomaceous earth, 20,000 tons of overburden material), and the maximum total is estimated to be 6,600,000 tons (6,200,000 tons of diatomaceous earth, 400,000 tons of overburden material). Proposed maximum depth of operation is 162 feet for Mine Area 1, 125 feet for Mine Area 2, and 40 feet for Mine Area 3. Although there are three proposed mine areas, the project consists of a single phase. Maximum operational slopes will be 2:1 (horizontal:vertical). Maximum final reclaimed slopes for the mining areas, and the blending and screening site for diatomaceous earth as shown on Figure 5, will be 3:1 (horizontal:vertical); maximum final reclaimed cut and fill slopes for proposed access roads will be 2:1 (horizontal:vertical). The mine is scheduled to operate from 6:00am to 7:30pm, Monday through Friday, with a maximum of ten employees on site at any one time.

The 331-acre project site consists of grazing land and four abandoned wells (all of which are identified as abandoned gas wells with the exception of the well titled Lynn 1) as shown on Figure 5, although none of the aforementioned wells are within the proposed 93.67-acre reclamation plan area. Approximately 1.4 acres of the project site has been previously disturbed as a result of existing roads used in conjunction with ranching operations. A 2.42 acre area is proposed as a blending and screening site for diatomaceous earth, to blend and screen the material as necessary to meet customer demand.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

_____	Air Resources Board	_____	Office of Emergency Services
_____	Boating & Waterways, Department of	_____	Office of Historic Preservation
S	California Highway Patrol	_____	Office of Public School Construction
_____	CalFire	_____	Parks & Recreation
S	Caltrans District # 6 & 9	_____	Pesticide Regulation, Department of
_____	Caltrans Division of Aeronautics	_____	Public Utilities Commission
_____	Caltrans Planning (Headquarters)	S	Regional WQCB # Central Valley Region
_____	Central Valley Flood Protection Board	_____	Resources Agency
_____	Coachella Valley Mountains Conservancy	_____	S.F. Bay Conservation & Development Commission
_____	Coastal Commission	_____	San Gabriel & Lower L.A. Rivers and Mtns Conservancy
_____	Colorado River Board	_____	San Joaquin River Conservancy
S	Conservation, Department of	_____	Santa Monica Mountains Conservancy
_____	Corrections, Department of	_____	State Lands Commission
_____	Delta Protection Commission	_____	SWRCB: Clean Water Grants
_____	Education, Department of	_____	SWRCB: Water Quality
_____	Energy Commission	_____	SWRCB: Water Rights
S	Fish & Game Region # Fresno	_____	Tahoe Regional Planning Agency
_____	Food & Agriculture, Department of	_____	Toxic Substances Control, Department of
_____	General Services, Department of	_____	Water Resources, Department of
_____	Health Services, Department of		
_____	Housing & Community Development	S	Other So. San Joaquin Arch. Info. Ctr.
_____	Integrated Waste Management Board	S	Other DOGGR - Bakersfield

_____ Native American Heritage Commission

Local Public Review Period (to be filled in by lead agency)

Starting Date January 8, 2019 Ending Date February 7, 2019

Lead Agency (Complete if applicable):

Consulting Firm: _____
Address: _____
City/State/Zip: _____
Contact: _____
Phone: _____

Applicant: _____
Address: _____
City/State/Zip: _____
Phone: _____

Signature of Lead Agency Representative: Randall Cates **Date:** January 7, 2019

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

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INITIAL STUDY/NOTICE OF PREPARATION

Johe Ranch Mining Project
by Diatom, LLC

Conditional Use Permit 17, Map 117

(PP12316)

LEAD AGENCY:

Kern County Planning and Natural Resources Department
2700 M Street, Suite 100
Bakersfield, CA 93301-2370

Contact: Mr. Randall Cates
(661) 862-8612
CatesR@kerncounty.com

January 2019

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1. PROJECT DESCRIPTION

1.1 Project Location

The proposed Johe Ranch Mine Project (proposed project) site is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the unincorporated community of McKittrick, California. The project site is covered on the United States Geological Survey USGS 7.5–minute McKittrick Summit quadrangle and is a portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The project site contains approximately 331 acres. The project site is identified as portions of Kern County Assessor's Parcel Number (APN) 156-070-01, 156-070-02 and 156-070-10. **Figure 1** illustrates the project location, and **Figures 5, 6 and 7** illustrate the proposed site plan.

The project is accessible from State Route 58. Traffic in conjunction with the proposed project will access the site at a gate where the proposed access road will meet State Route 58 (**Figure 1**). Within the project site, vehicles and equipment will traverse proposed access roads (i.e. not existing access roads, except where the area of a proposed access road and existing access road overlap). Traffic in conjunction with ranching operations will continue to traverse existing access roads. Dirt surfacing is used on all existing onsite roads, and will be the surfacing used for all proposed onsite roads.

According to the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR), four abandoned wells are located on the 331 acre project site, as shown on the attached site plan. The wells are located outside the proposed disturbance areas. The wells are as follows:

1) Baker 1, (abandoned gas well)
2) Seaboard-Honolulu 14-7, (abandoned gas well)
3) Lizbet Gilbert 1, (abandoned gas well)
4) Lynn 1 (abandoned well)

All applicable DOGGR regulations will be followed on the project site. There are no surface plugs (the top of an abandoned well), or any other components of abandoned wells, which protrude above ground on the project site. If any abandoned or unrecorded wells are uncovered or damaged during mining or reclamation operations, the Division of Oil, Gas, and Geothermal Resources will be contacted and remedial plugging operations will be conducted as needed. No structures will be built over, or in proximity to, an abandoned well.

Additionally, there are six exploratory drill holes on the project site, as shown on the attached site plan. The six drillholes were all drilled for diatomite evaluation in 2006, and the holes were all backfilled after drilling. No open holes are present on the site.

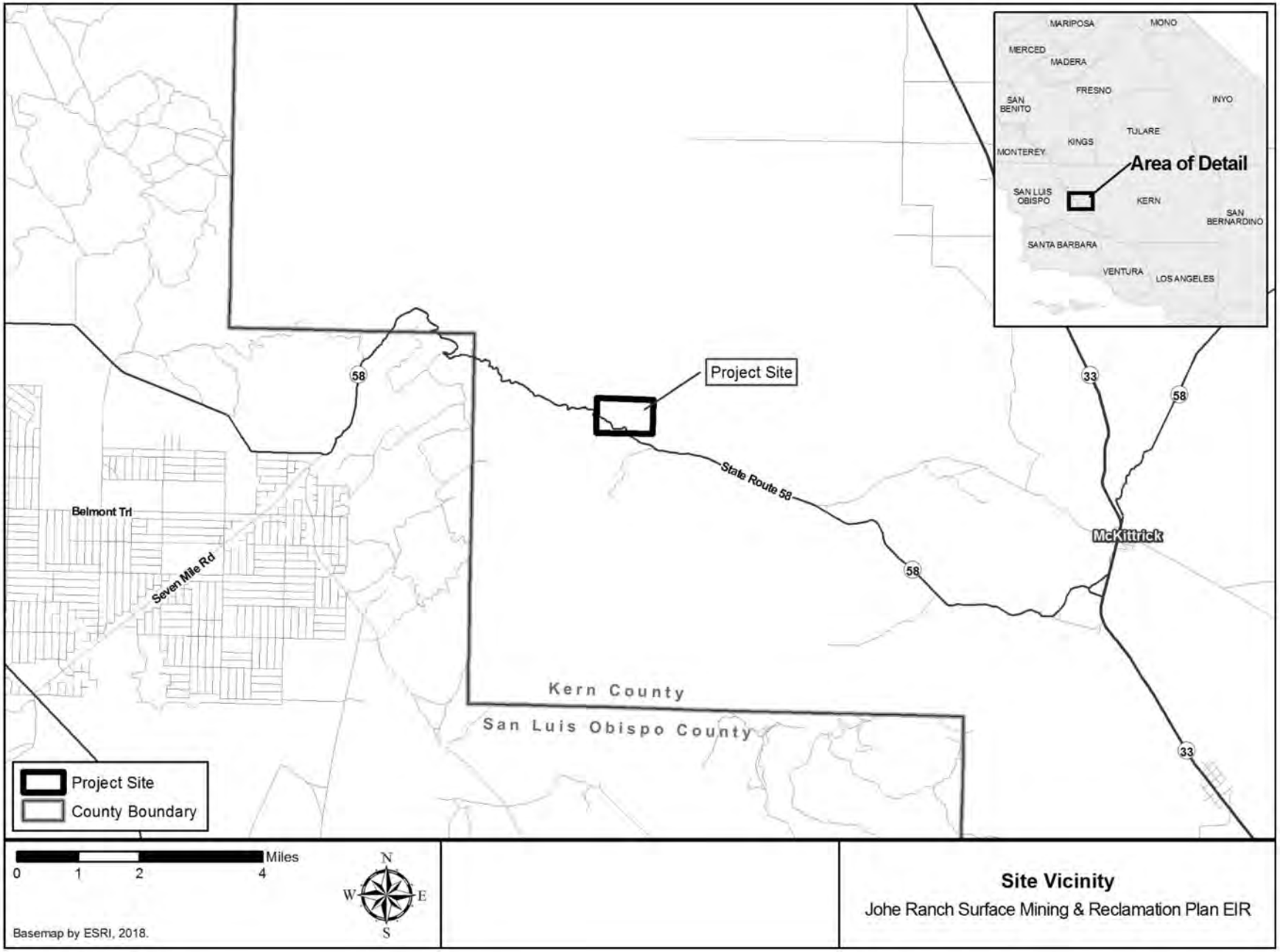


Figure 1: Site Vicinity

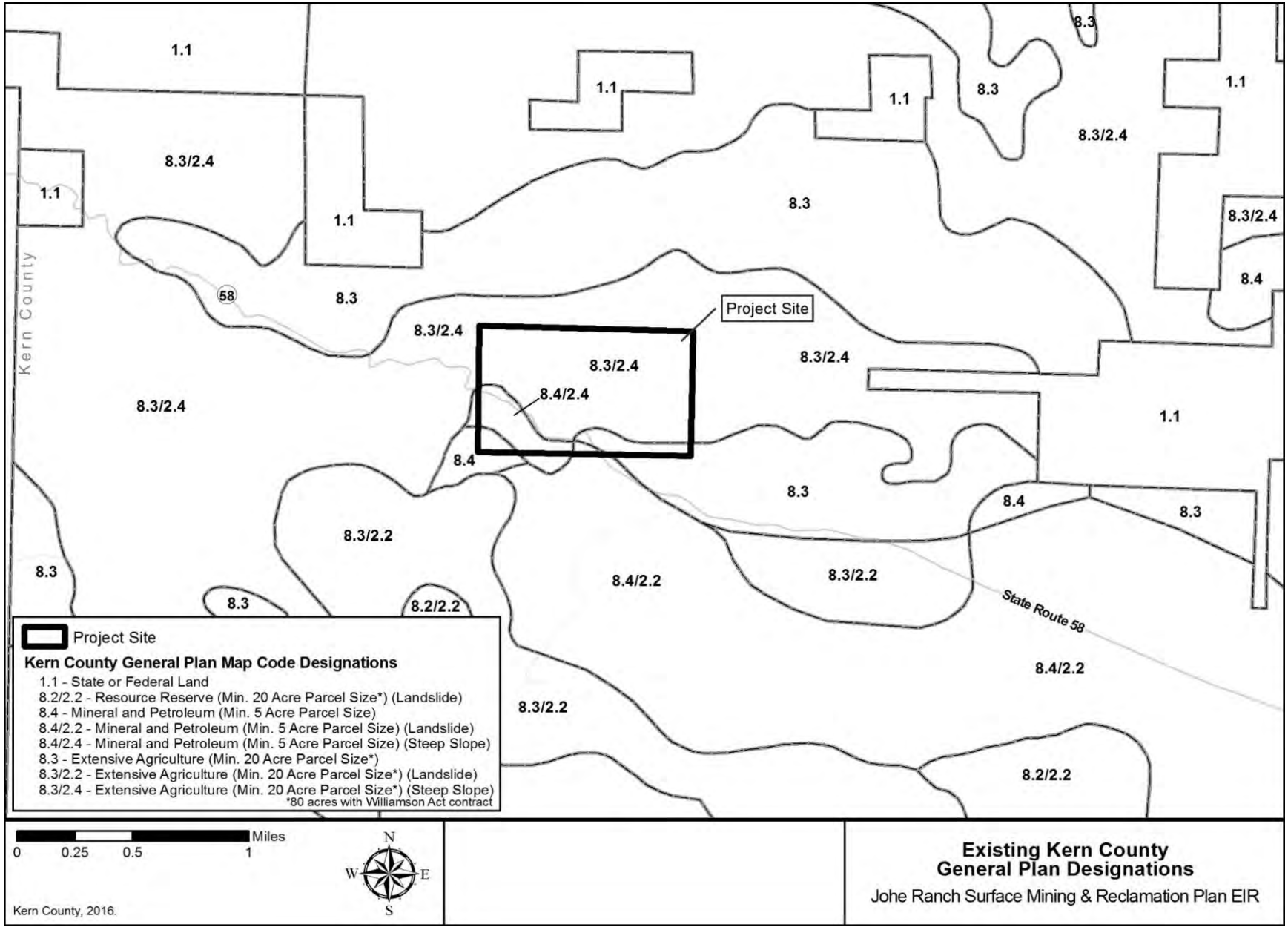


Figure 2: Existing Kern County General Plan Designations

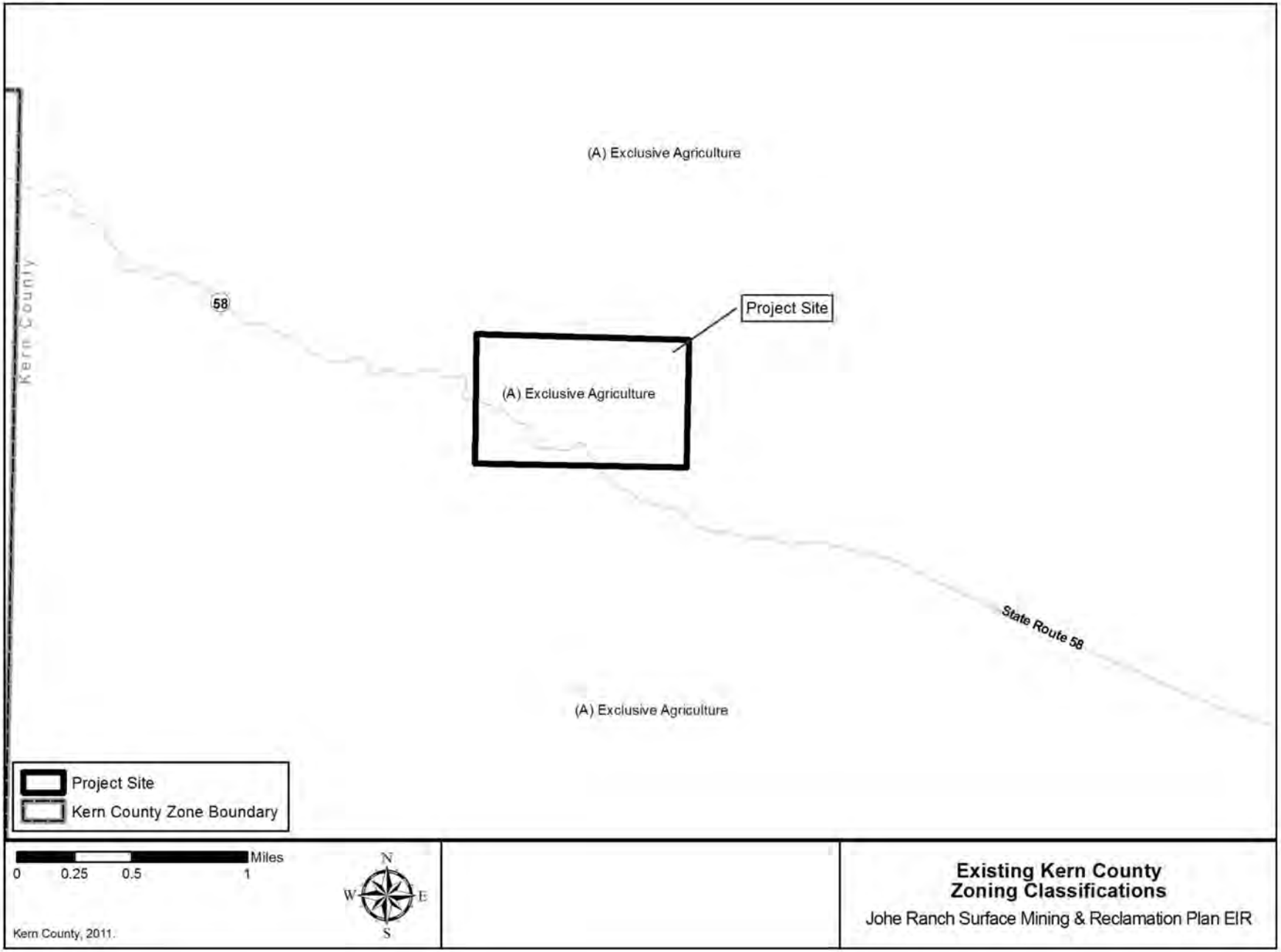


Figure 3: Existing Kern County Zoning Classifications

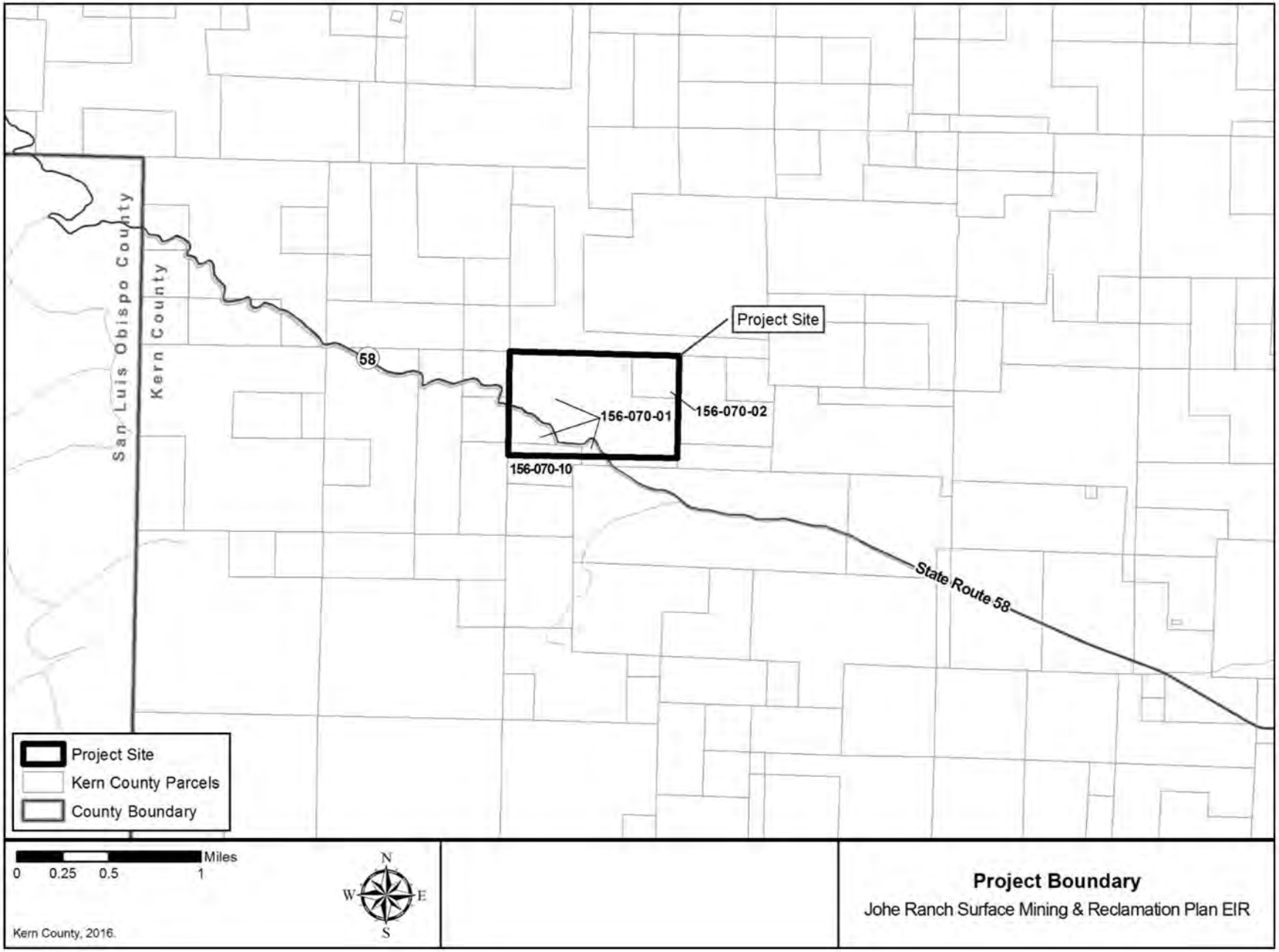
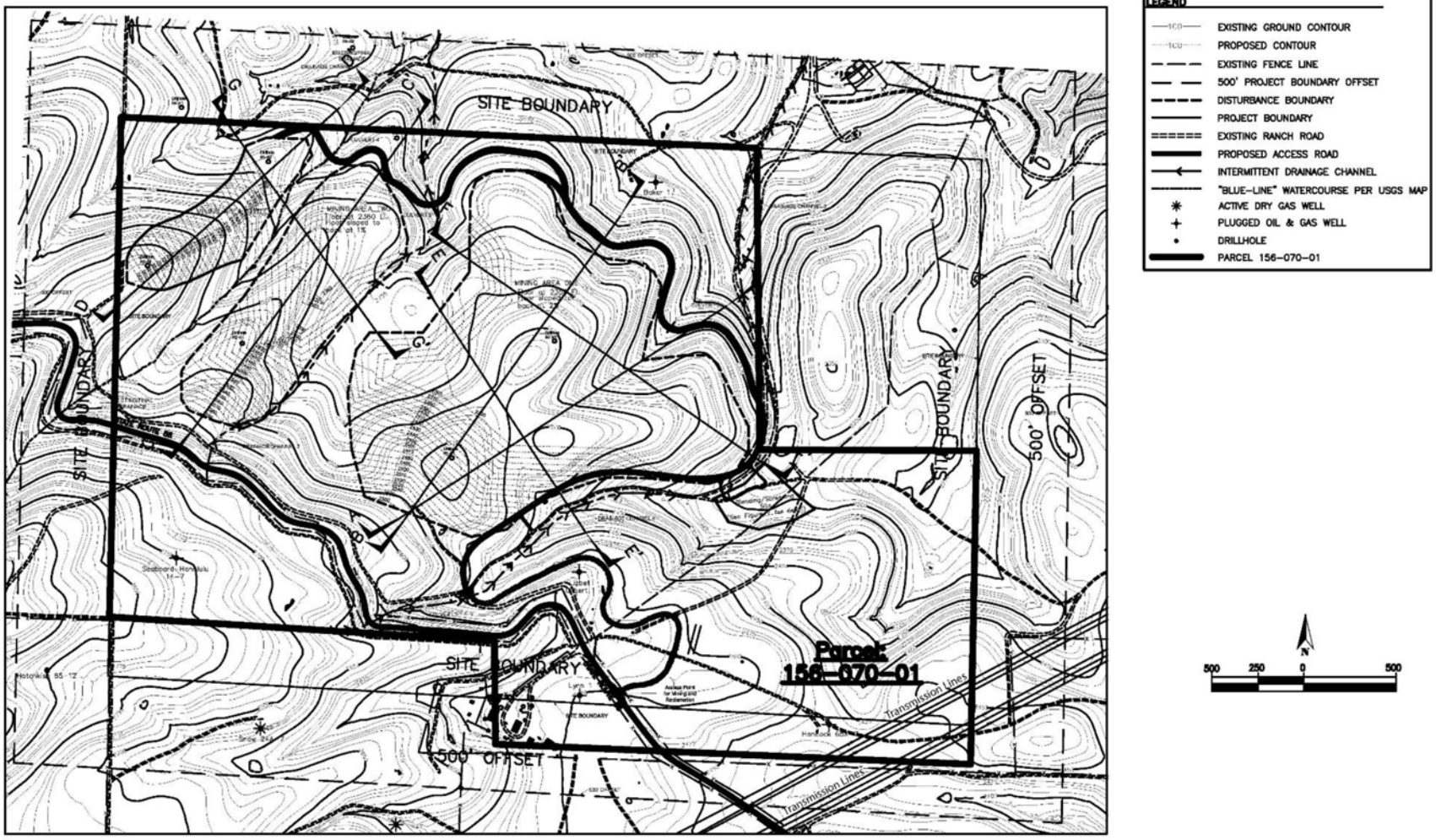


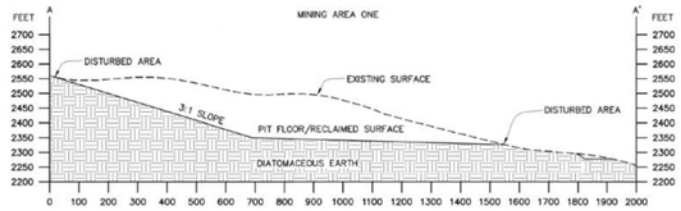
Figure 4: Project Boundary



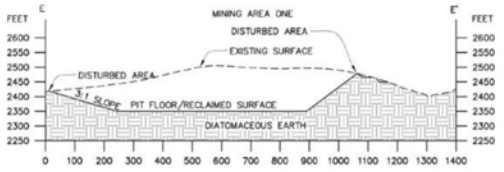
Source: WZI Inc, Bakersfield, 2018.

Site Plan
Johe Ranch Surface Mining & Reclamation Plan EIR

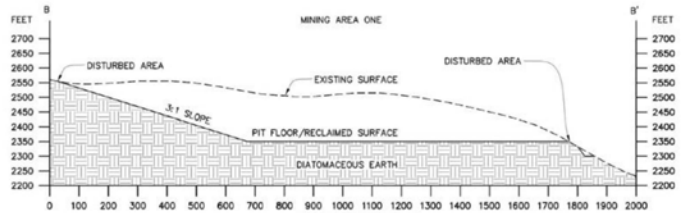
Figure 5: Site Plan



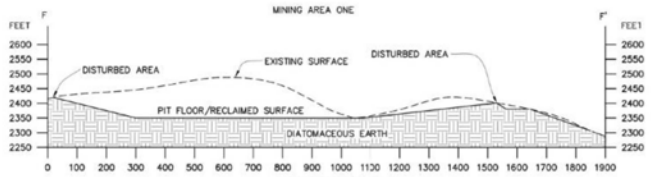
CROSS SECTION A–A'



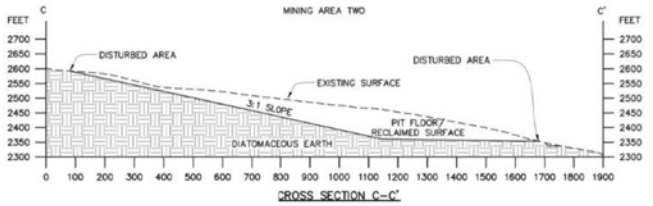
CROSS SECTION E–E'



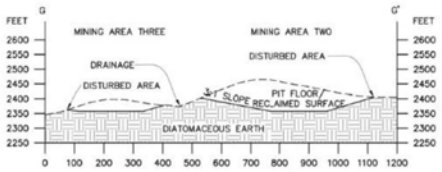
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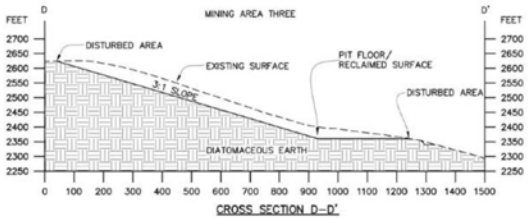
CROSS SECTION F–F'



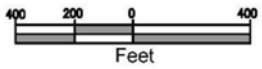
CROSS SECTION C–C'



CROSS SECTION G–G'



CROSS SECTION D–D'



Source: WZI Inc, Bakersfield, 2017.

Cross Sections

Johe Ranch Surface Mining & Reclamation Plan EIR

Figure 6: Cross Sections

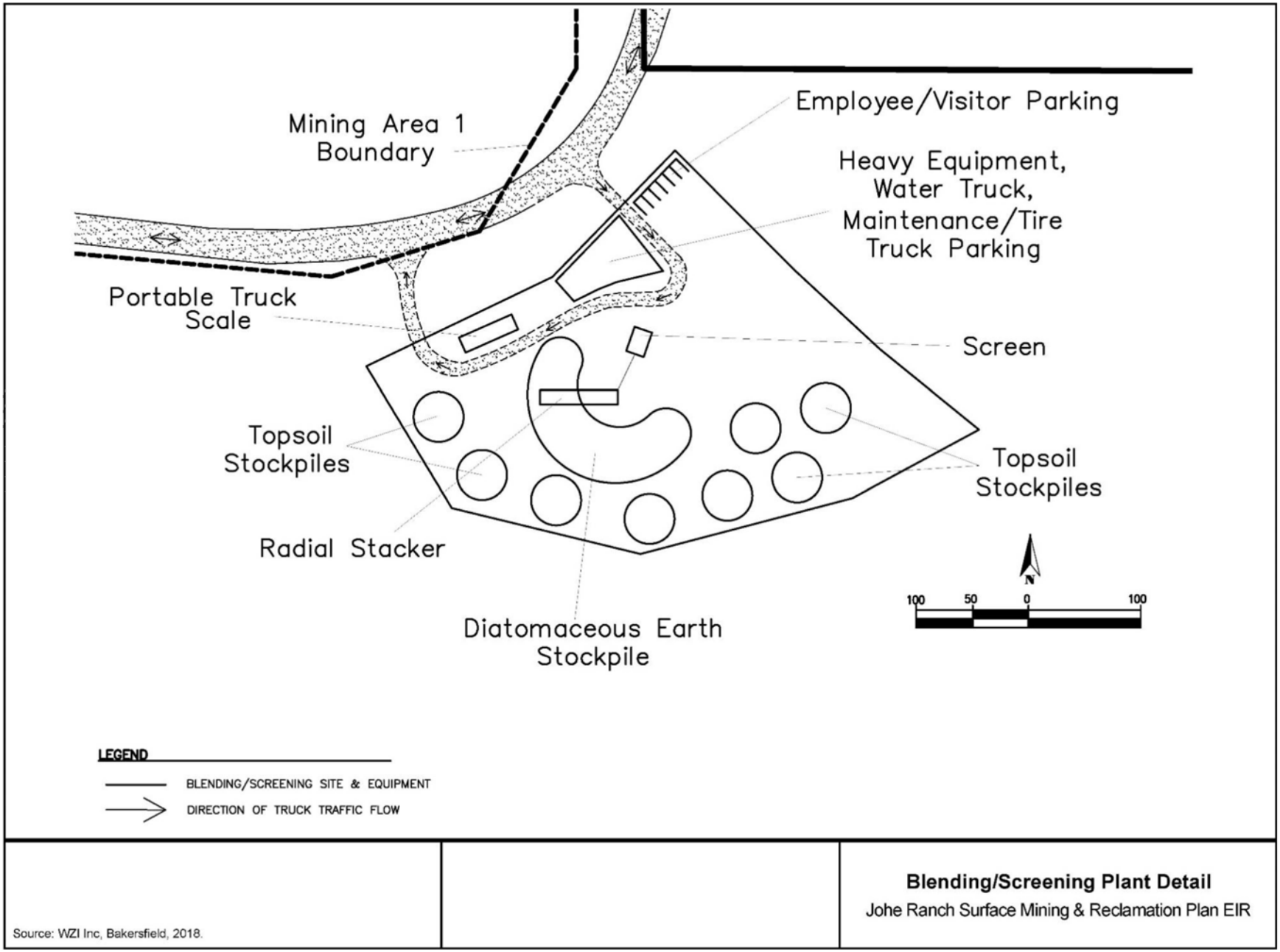


Figure 7: Blending and Screening Plant Detail

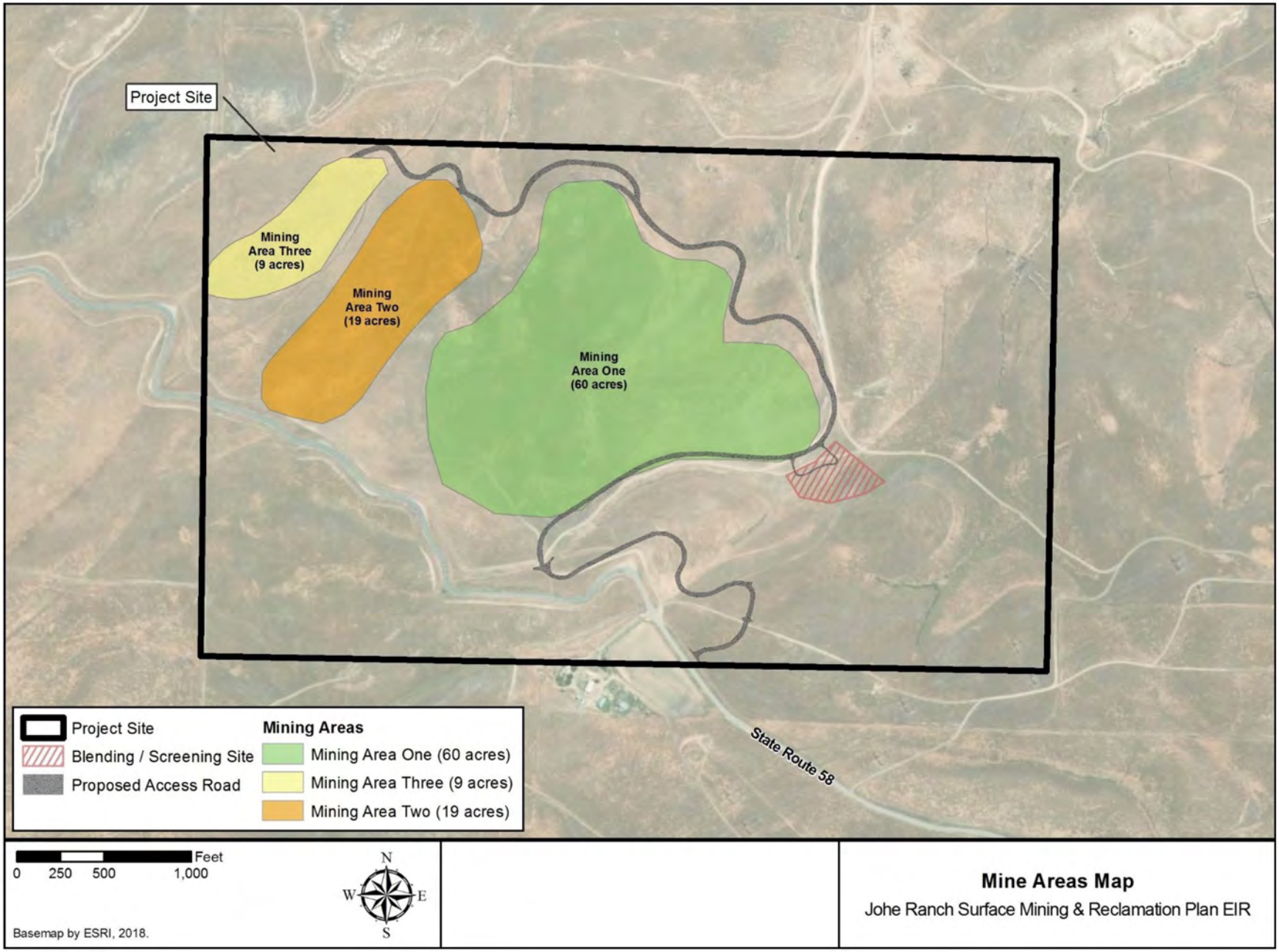


Figure 8: Mine Areas Map

1.2 Environmental Setting

The site consists primarily of rolling topography with some steep slopes and incised drainages. The elevation of the project site varies from approximately 2,800 feet above sea level near the southwestern corner to approximately 2,100 feet above sea level near the northeast corner. Historically, the project site has been used for farming, grazing, and some gas production. Historically, the vicinity has been used for farming, grazing, some oil and gas production, and diatomaceous earth mining. There are two approved surface mining operations located in the vicinity: State Mine ID #91-15-0036 (CUP 14, Map 117) located approximately 2.5 miles east of the project site, and State Mine ID #91-15-0038 (CUP 4, Map 96) located approximately 1.4 miles north of the project site. There is a residence located to the south of the project site on the south side of State Route 58.

Portions of the site (i.e. those within the boundaries of APN 156-070-01 & 156-070-10) are currently under a Williamson Act Contract. The property owner is not proposing to cancel the Williamson Act contract; consequently, reclamation will return the land to its current use as grazing.

Table 1 depicts the existing land use, existing zoning (also see **Figure 3)**, and existing General Plan designations (also see **Figure 2**) for the project site.

Table 1: Proposed Project Site and Surrounding Land Uses, General Plan Designations and Zoning

Direction from Project Site	Existing Land Use	Existing Zoning	Existing Map Code Designation
Portion of the Project Site on APN 156-070-01	Grazing	A	8.3 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract)), 8.3/2.4 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract) / steep slope overlay), 8.4 (mineral and petroleum (min. 5-acre parcel size)), 8.4/2.2 (mineral and petroleum (min. 5-acre parcel size) / landslide overlay), 8.4/2.4 (mineral and petroleum (min. 5-acre parcel size) / steep slope overlay)
Portion of the Project Site on APN 156-070-02	Grazing	A	8.3/2.4
Portion of the Project Site on APN 156-070-10	Grazing	A	8.4
North	Grazing, diatomaceous earth mining operation	A	8.3/2.4
East	Grazing	A	8.3, 8.3/2.4
South	Grazing, residence, shop building, agricultural storage buildings, chicken coop	A	8.3, 8.3/2.2 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract) / landslide overlay), 8.4, 8.4/2.2, 8.4/2.4
West	Grazing	A	

Soils occurring within or near the Project Site include: Reward shaly loam, Mendi-Hillbrick-Kilmer association, Reward channery loam, and Pottinger very shaly clay loam (Biological Resources Report, Padre Associates Inc., December 2014). The Reward shaly loam comprises the majority of the soil types present on the Project site. This soil type is a loam type that occurs on hill slopes. These are well drained soils formed from weathered sandstone shale.

The habitat type and/or plant community that dominated the Project Site was California annual grassland series (Biological Resources Report, Padre Associates Inc., December 2014). This community is dominated by herbaceous plants that are both non-native and native. Non-native species that typically dominate this community are red brome (*Bromus rubens*), ripgut (*B. diandrus*), soft chess (*B. hordeaceus*) and foxtail (*Bromus* sp. Or *Hordeum* sp.). This vegetation type was observed through the majority of the areas planned for mining.

A relatively small portion of the site also contained alkali goldenbush (*Isocoma acradenia*) scrub (Biological Resources Report, Padre Associates Inc., December 2014). Alkali goldenbush is the dominant plant species in the shrub canopy of this vegetation type. The canopy is usually open to continuous with an open to continuous herbaceous layer. Stands are typically found in flat areas but can occur on gently sloping hills with saline to alkali soils. This vegetation type was observed on a lower slope on the north side of the Project Site.

The mining site is located on Miocene diatomite siliceous shale, outside of the San Joaquin Valley groundwater basin. There is no known groundwater at the site and no known water wells have been drilled on the project site.

Water will be conveyed to the project site by water truck, and will be obtained from the West Kern Water District as well as produced water from adjacent oil field operations. Water used on the site will be used primarily for dust control, with the exception of domestic drinking water supply which would be from bottled water. The produced oil field water will be applied in accordance with a Waste Discharge Requirement Order that will be obtained from the California Regional Water Quality Control Board, Central Valley Region.

The site is not located within a Flood Plain Safety Overlay District or Dam Inundation Overlay. The following are drainage channels existing on the project site:

1) Blue line drainage channel (channel 1), located between Mine Area 2 and Mine Area 3.
2) Intermittent drainage channel (channel 2), located between Mine area 2 and Mine area 1.
3) Intermittent drainage channel (channel 3), located on the east side just north of Mine area one.
4) Intermittent drainage channel (channel 4), located between the project site entrance and Mine area 1.

As proposed, at a minimum, impacts to drainage channels will be mitigated with the installation of culverts to allow for natural drainage to continue. There are no diversion structures or erosion control facilities currently onsite.

The climate in the area is semi-arid with total annual precipitation over the past 30 years averaging about 5.70 inches with a range of 1 to 14 inches. The rainfall occurs generally between the months of January and March. Occasional thunderstorms may occur in August, but do not account for much of the annual precipitation. Winter months are mild with temperatures averaging 20° F. to 50° F. Summers are harsh and dry with temperatures ranging from 60° to over 100° F. The topography of the project site ranges from approximately 2,100 feet above mean seal level to approximately 2,800 feet above mean sea level. **Table 2** shows the average high and low temperatures in the community of Buttonwillow by month.

Table 2: Average High and Low Temperature by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. High	56	63	69	76	85	92	97	96	91	81	66	56
Avg. Low	37	41	45	49	56	62	67	65	59	50	41	35

Source: U.S Climate Data, 2017.

The project would be served by the Kern County Sheriff's Office for law enforcement and public safety.

The closest sheriff station is the Buttonwillow Substation, located approximately 17.5 miles east of the project site, at 181 E. 1st Street in the community of Buttonwillow. The Kern County Fire Department (KCFD) provides fire protection and emergency medical and rescue services for the project area. The closest KCFD fire station is Station #24, located approximately 8.4 miles east of the project site at 23252 Blue Star Memorial Highway in the community of McKittrick. The closest school is McKittrick Elementary School, located approximately 8.24 miles east of the project site in the community of McKittrick.

1.3 Project Site History

Diatomaceous earth occurs throughout much of western Kern County in a series of hills of the Monterey formation. These deposits trend northwest, are moderately to tightly folded and locally faulted. The Johe Ranch Mine is located in the Monterey Formation (Maricopa Shale) in the Trembler Range where the thickest and purest deposits of diatomaceous earth occur. Historically, the site has been used for farming, grazing, and gas production. Historically, the vicinity has been used for farming, grazing, oil and gas production, and diatomaceous earth mining. There are two approved surface mining operations located in the vicinity of the proposed project site: State Mine ID #91-15-0036 (CUP 14, Map 117) located approximately 2.5 miles east, and State Mine ID #91-15-0038 (CUP 4, Map 96) located approximately 1.4 miles north of the project site. Both of the aforementioned mining operations are owned and operated by the project proponent of the proposed project.

A Conditional Use Permit application for a Surface Mining and Reclamation Plan pertaining to the project site was first submitted to this Department, by John Heter of Pacific Industrial Minerals, LLC, on behalf GF Industries, on December 30, 2008. On July 5, 2012, following reviews and edits, the aforementioned application was deemed complete and assigned the case number CUP 17, Map 117. An Early Consultation review was circulated from August 3, 2012 through August 24, 2012, to assist this Department in determining an appropriate CEQA document to prepare to address the project's impacts. At the conclusion of the aforementioned Early Consultation circulation period, the Lead Agency determined that the preparation of a Mitigated Negative Declaration would be appropriate.

On May 19, 2016 a new Conditional Use Permit application for a Surface Mining and Reclamation Plan, pertaining to the project site, was received by the Lead Agency, by WZI, Inc. on behalf of Diatom, LLC. Following reviews and edits, the aforementioned application was formally accepted and deemed complete for processing, by the lead agency in correspondence of February 9, 2017.

1.4 Proposed Project

1.4.1 Project Characteristics

1.4.1.1 Project Summary

As discussed in more detail in the following sections, the project proponent is requesting the following discretionary action from Kern County:

(a) A Conditional Use Permit (CUP) for a new surface mining operation and development of a reclamation plan on the project site which is approximately 331 acres in size. Within the approximate 331-acre project site, disturbance would be confined to 93.67 acres. Approximately 1.4 acres of the proposed 93.67-acre disturbance area has already been disturbed as a result of existing roads.

The requested CUP allowing for a new surface mining operation and development of a reclamation plan on the project site would allow for the extraction of up to 330,000 tons of material (310,000 tons of diatomaceous earth and 20,000 tons of overburden material). The maximum depth of excavation would be 162 feet for Mine Area 1, 125 feet for Mine Area 2, and 40 feet for Mine Area 3. Maximum operational slopes will be 2:1 (horizontal:vertical). Maximum final reclaimed slopes for the mining areas, and the blending and screening site, will be 3:1 (horizontal:vertical); maximum final reclaimed cut and fill slopes for proposed access roads will be 2:1 (horizontal:vertical).

It is not anticipated that any waste material will be generated on-site. A processing screener will be utilized on an as-needed basis according to customer demand for refined product. Blending, of different types of diatomaceous earth mined on the project site, will be conducted as necessary with the use of a loader. Trucks will be weighed before leaving the site on a portable scale located within the boundaries of the blending and screening site.

The project site is currently being used for cattle grazing, and will be reclaimed and returned to its current use as grazing land. During the life of the proposed project, it is proposed that cattle grazing will continue on the project site; however, onsite fencing will be installed as necessary to exclude cattle from mining and processing areas, and areas undergoing reclamation. The 1.4 acres of existing road access disturbance will not be reclaimed, as these roads will continue to be needed in conjunction with the grazing operations. As such, reclamation will encompass 92.27 acres (93.67 total acres of disturbance minus 1.4 acres of existing road access disturbance).

In accordance with the Reclamation plan, disturbed areas will be re-seeded with an approved seed mix, and protected from erosion until natural germination occurs. The proposed 92.27-acre area to be reclaimed will be decompacted by ripping to depths of between 6 and 18 inches, each rip spaced no more than 18 inches apart, followed by the site being disked and left in a rough condition prior to seeding. As proposed, less than 6 inches of top soil will applied to reclamation areas. Grasses and forbs will be planted and/or seeded between October and December to coincide with the onset of winter rains in the vicinity of the project site.

The following table summarizes the proposed water use:

Table 3: Johe Ranch (CUP 17, Map 117), Proposed Water Usage

	Annual Water Usage (gallons)	Total Water Usage (gallons)
Produced Water from Adjacent Oil Field Operations	7,800,000	156,000,000 total gallons (over project lifespan) obtained from produced water from adjacent oil field operations.
West Kern Water District	325,780	6,515,600 total gallons (over the project lifespan) obtained from West Kern Water District.
Total	**8,125,780**	**162,515,600 total gallons (over project lifespan).**

Prior to application of produced water from oil field operations on the project site, all necessary permits and approvals will be obtained from the California Regional Water Quality Control Board, Central Valley Region. The water obtained from the West Kern Water District, will be in accordance with a will serve letter, obtained from a nearby water supply line, and will be conveyed to the project site by water truck. The water obtained from the produced water from adjacent oil field operations will be conveyed to the project site by water truck. The domestic drinking water supply would be from bottled water. Portable toilets serviced by a contractor will be used for domestic sewage.

Surface mining and reclamation operations would be conducted from 6:00 am to 7:30 pm, Monday through Friday. The maximum number of employees on site at any one time will be ten.

Access to the site will be from State Route (SR) 58, which is designated by the Circulation Element of the Kern County General Plan as an "Arterial/Major Highway" alignment. Project traffic, including haul trucks, supply delivery trucks, and employee vehicles, would exit and enter the project site at the point where the proposed access road meets SR-58.

1.4.1.2 Mining Plan

The diatomaceous earth will be excavated by a single loader. The loader will either load material directly into trucks; or move the material so as to form it into small temporary stockpiles then load it on to dump trucks. For loosening the shale in the exposure process, the necessary equipment including dozer or ripper will be rented for a short duration. Diatomaceous earth will undergo processing (i.e. blending and/or screening) in the 2.42-acre blending and screening site, as previously described, prior to being exported from the project site.

As proposed, the project proponent shall adhere to the following measures, as project design features, to comply with the assumptions made for emissions calculations per the Air Quality Impact Assessment (WZI, Inc., June 2015); these assumptions are listed on Page 55 of the Air Quality Impact Assessment, and state in part:

9. Maximum exposed land is 20 acres at any given time (SMARA)

    a. Disturbed land not being mined daily (15 acres) will be covered in dust palliative to prevent wind erosion during periods of inactivity

    b. Disturbed land being mined daily (5 acres) will be watered 3x/day

Any product stockpiles made within the Mining Areas will be a maximum of 20 feet in height, and will have a maximum slope of 2:1 (horizontal:vertical). Any Product stockpiles (for any product which may be

processed through the blending and screening site) will be a maximum of 10 feet in height, and will have a maximum slope of 2:1 (horizontal:vertical). Upon final reclamation of the project site, no stockpiles will remain.

1.4.1.3 Reclamation Plan

The site is currently used as grazing land and will be returned to that use, in accordance with the approved reclamation plan. The project site is fenced with barbed wire to exclude the public from entering, and a locked gate will prevent unauthorized entry. The property will remain fenced with barbed wire to exclude the public from entering and locked following completion of the project.

The areas to be reclaimed will be de-compacted by ripping to a depths of between 6 and 18 inches, each rip spaced no more than 18 inches apart, followed by the site being disked and left in a rough condition prior to seeding. Prior to mining activities, up to six inches of topsoil will be removed. Less than six (6) inches of topsoil will be applied to disturbed areas for revegetation. Success criteria for revegetation is: (a) vegetation cover of 67.5%, and (b) a species richness of five species per square meter. Upon final reclamation of the project site, no stockpiles will remain. The proposed reclamation seed mix is as follows:

Table 4: Proposed Seed Mix

Common Name (Seeds)	Species	Pounds Per Acre
Blando brome	*Bromus hordeaceus*	12
Rose Clover	*Trifolium hirtum*	16
Big squirrel tail	*Elymus multisetus*	3
Nodding needle grass	*Stipa cernua*	3
Lupine	*Lupinus microcarpus*	2

Currently 1.4 acres of the project site are disturbed, due to existing access roads; this 1.4-acre area will not be reclaimed, as these roads will continue to be needed in conjunction with grazing operations after the site has been deemed fully reclaimed. The area to be reclaimed will consist of: (a) 88 acres proposed mine area disturbance, (b) 1.85 acres proposed road access disturbance, and (c) 2.42 acres proposed blending and screening site disturbance.

1.5 Applicant Project Objectives

The proposed project is intended to achieve the following objectives as identified by the project proponent:

- Obtain a Conditional Use Permit (CUP) for a new surface mining operation and development of a reclamation plan on the project site which is approximately 331 acres in size. Within the approximate 331-acre project site, disturbance would be confined to 93.67 acres. Approximately 1.4 acres of the proposed 93.67-acre disturbance area has already been disturbed as a result of existing roads.

- Establish a new, long-term supply of diatomaceous earth reserves for industrial uses which include the production of cement.

- Provide for the use of processing screener on an as-needed basis according to customer demand for refined product.

- Provide for a maximum annual production level of 310,000 tons of diatomaceous earth and 20,000 tons of overburden material to meet local and regional market demand.

- Mine materials in a location that contains sufficient land with adequate amounts of surrounding grazing land to serve as a buffer between mining and land uses which are incompatible with mining.

1.6 Proposed Discretionary Actions/Required Approvals

The County as Lead Agency for the Project has discretionary authority over the primary Project proposal.

To implement this Project, the Applicant would need to obtain, at a minimum, the following discretionary permits/approvals:

1.6.1 Local

- Kern County
    - Approval of Conditional Use Permit
    - Approval of an Environmental Impact Report
    - Approval of a project Mitigation Measure Monitoring Program (MMMP)
    - Approval of CEQA Findings pursuant to State CEQA Guidelines Section 15091
    - Kern County Public Works Department – Approval of grading permits
    - Kern County Fire Department – Approval of Fire Safety Plan

1.6.2 Regional

- San Joaquin Valley Air Pollution Control District (SJVAPCD)
    - Authority to Construct
    - Permit to Operate

1.6.3 State

- California Department of Fish and Wildlife
    - Water System Permit

- Central Valley Regional Water Quality Control Board (Central Valley RWQCB)
    - 401 Water Quality Certification
    - National Pollution Discharge Elimination System Construction General Permit and stormwater pollution prevention plan
    - Permit to Operate

- State Water Resources Control Board
    - General Industrial Activity Stormwater Permit
    - Spill Prevention Control and Countermeasures Plan

1.6.4 Federal

- U.S. Fish and Wildlife Service – Approval of appropriate permits

2. KERN COUNTY ENVIRONMENTAL CHECKLIST FORM

2.1 Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ Aesthetics	☒ Agriculture and Forest Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology and Soils
☒ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials	☒ Hydrology and Water Quality
☒ Land Use and Planning	☒ Mineral Resources	☒ Noise
☒ Population and Housing	☒ Public Services	☐ Recreation
☒ Transportation and Traffic	☒ Tribal Cultural Resources	☒ Utilities and Service Systems
☒ Mandatory Findings of Significance		

2.2 Determination. (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (a) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (b) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENT IMPACT REPORT (EIR) is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Randall Cates — January 7, 2019

Signature — Date

Randall Cates, Planner III

Printed Name — For

3. EVALUATION OF ENVIRONMENTAL IMPACTS:

(1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a Lead Agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

(2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

(3) Once the Lead Agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.

(4) Negative Declaration: "Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The Lead Agency must describe the mitigation measure and briefly explain how they reduce the effect to a less than significant level (mitigation measures from, "Earlier Analyses," as described in item (5) below, may be cross-referenced).

(5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or Negative Declaration, Section 15063(c) (3) (D). In this case, a brief discussion should identify the following:

   (a) Earlier Analysis Used. Identify and state where they are available for review.

   (b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   (c) Mitigation Measures. For effects that are "Less Than Significant With Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

(6) Lead Agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

(7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

(8) This is only a suggested form, and lead agencies are free to use different formats; however, Lead Agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

(9) The explanation of each issue should identify:

   (a) The significance criteria or threshold, if any, used to evaluate each question; and

   (b) The mitigation measure identified, if any, to reduce the impact to a less-than-significant level.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

Discussion

(a) The project site is situated within an area of rolling topography in a rural area of Kern County. The proposed mining area will be visible from SR 58. At the time of preparation of this initial study, the presence or absence of scenic vistas from which the project site may be visible has not been verified. Therefore, this impact is considered potentially significant for the purposes of this initial study and the EIR visual impact evaluation will assess the potential for the project to have substantial adverse effect on a scenic vista.

(b) The nearest eligible state scenic highways within Kern County are located over 25 miles away from the project site (SR 41 in northwest Kern County, and SR 58 and SR 14 in eastern Kern County). No designated or eligible state scenic highways are within the county from which the project site is visible. Thus, no impact would result from damage to scenic resources within a state scenic highway and no further analysis is warranted.

(c) Implementation of the proposed project would result in new mining disturbance areas. The project site currently includes undeveloped land and is surrounded by a rural, grazing land. Views of the project site could be adversely affected as a result of the proposed mining operation; however, the degree of this impact has not been determined for this initial study. Therefore, for the purposes of this initial study it is determined that the proposed project could result in the degradation of character/quality at the project site or in the surrounding area. This potentially significant impact will be evaluated in the EIR.

(d) Though the proposed project will be operating primarily during daylight hours (6:00 am to 7:30 pm) nighttime lighting for security, safety, and operational purposes will be utilized. Because the proposed project would result in nighttime lighting emitted at the project site, and may result in adverse nighttime views in the surrounding area, further analysis of the project's lighting requirements and the effects of the project's nighttime light are warranted. This potentially significant impact will be evaluated in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
AGRICULTURE AND FOREST RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and the forest carbon measurement methodology provided in the Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or Williamson Act contract?	☒	☐	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined in Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use?	☒	☐	☐	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
AGRICULTURE AND FOREST RESOURCES. (Continued)				
f) Result in the cancellation of an open space contract made pursuant to the California Land Conservation Act of 1965 or Farmland Security Zone Contract for any parcel of 100 or more acres (Section 15206(b)(3) Public Resources Code?	☒	☐	☐	☐

Discussion:

(a) The California Department of Conservation (DOC) designates the project site as "Grazing" and "Vacant or Disturbed" lands. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is designated within the project site. Therefore, construction and/or operation of the proposed project would not result in the conversion of designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a nonagricultural use. No impact would result in this regard and no further analysis is warranted.

(b) Assessor's Parcel Numbers 156-070-01 and 156-070-10 (which encompass a portion of the project site) are subject to an Agricultural Preserve Contract, under the California Land Conservation Act of 1965 (Williamson Act). The property owner is not proposing to cancel the Williamson Act contract; consequently, the land will be returned to its current use as grazing land upon final reclamation. For the purposes of this initial study is it determined that the project could conflict with existing agricultural zoning, open space, or Williamson Act contracts, and additional analysis of this potentially significant impact will be conducted and presented in the EIR.

(c)/(d) No lands within or immediately adjacent to the proposed project are designated forest land or timberland. No impacts resulting in the loss of forest land or conversion of forest land to non-forest use are expected to occur with the project, and no further analysis of this issue is warranted.

(e) The project would temporarily convert existing grazing lands with agricultural zoning to a non-grazing/nonagricultural use (i.e. mining), however, as proposed the land disturbed by the proposed project would be reclaimed to grazing land. Therefore, for the purposes of this initial study additional analysis of this potentially significant impact will be conducted and presented in the EIR.

(f) Implementation of the project would not result in the cancellation of an open space contract made

pursuant to the California Land Conservation Act of 1965 or Farmland Security Zone Contract for any parcel of 100 or more acres (Public Resources Code Section 15206(b)(3)). The property owner is not proposing to cancel the Williamson Act contract; consequently, the land will be returned to its current use as grazing land upon final reclamation. Nonetheless, this issue will be further analyzed in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard as adopted in (c)i, (c)ii, or as established by EPA or air district or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? Specifically, would implementation of the project exceed any of the following adopted thresholds:	☒	☐	☐	☐
i. San Joaquin Valley Unified Air Pollution Control District:				
<u>Operational and Area Sources</u>				
Reactive Organic Gases (ROG) 10 tons per year.	☒	☐	☐	☐
Oxides of Nitrogen (NO_x) 10 tons per year.	☒	☐	☐	☐
Particulate Matter (PM_{10}) 15 tons per year.	☒	☐	☐	☐
<u>Stationary Sources as determined by District Rules</u>				
Severe Nonattainment 25 tons per year.	☒	☐	☐	☐
Extreme Nonattainment 10 tons per year.	☒	☐	☐	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
AIR QUALITY. (Continued)				
ii. Eastern Kern Air Pollution Control District.				
Operational and Area Sources				
Reactive Organic Gases (ROG) 25 tons per year.	☒	☐	☐	☐
Oxides of nitrogen (NO_x) 25 tons per year.	☒	☐	☐	☐
Particulate Matter (PM_{10}) 15 tons per year.	☒	☐	☐	☐
Stationary Sources - determined by District Rules				
25 tons per year.	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Discussion:

(a)/(b) The project would be located entirely within the jurisdiction of the SJVAPCD in the San Joaquin Valley Air Basin (SJVAB). The SJVAB is designated nonattainment for both the State and Federal ozone standards, the standards for state and federal particulate matter of less than 2.5 microns in size (PM2.5), and the standard for state particulate matter of less than 10 microns in size (PM10). To meet federal Clean Air Act requirements, the SJVAPCD has adopted an Ozone Attainment Demonstration Plan (2007), a PM10 Attainment Demonstration Plan (2006), and a PM2.5 Attainment Demonstration Plan (2008). In addition, to meet California Clean Air Act requirements, the SJVAPCD has also adopted an Air Quality Attainment Plan (1991) and corresponding updates to address the California ozone standard.

Proposed project construction and operations would generate emissions of criteria pollutants that could result in significant impacts to air quality in the area. Equipment usage and activities during construction, mining activities, and reclamation would result in emissions of PM_{10} and ozone precursors, including oxides of nitrogen and volatile organic compounds, which could result in significant impacts to air quality in the area. The project's contribution of these air pollutant emissions to regional air pollutant emissions could result in a potentially significant impact. Further analysis of air quality impacts is warranted to determine whether the proposed project would conflict with or obstruct implementation of the applicable plans for attainment and, if so, to determine the reasonable and feasible mitigation measures that could be imposed. These impacts are potentially significant and will be evaluated further in the EIR.

(c) The SJVAPCD is a nonattainment area for the State and Federal ozone standards, and the State and Federal $PM_{2.5}$ standards, and the state PM_{10} standard. The SJVAPCD rules and regulations apply to all proposed project activities. Cumulative contributions to air pollutant emissions in the SJVAB are considered potentially significant in the absence of additional analysis. Construction and operational emissions will be analyzed in the EIR as related to SJVAPCD.

(d) Land uses determined to be "sensitive" to air quality include residential areas, schools, convalescent and acute care hospitals, parks and recreational areas, and churches. Project construction and operational emissions would occur in proximity to a sensitive receptor, i.e. a residence located approximately 1,000 feet south of Mining Area 1. As such, diesel exhaust emissions and dust (particulate matter) emissions from project activities could adversely affect air quality for the nearest sensitive receptor. Mitigation Measures for diesel equipment and dust control that are recommended by the SJVAPCD will be evaluated as part of the EIR to avoid or reduce the impacts to air quality.

(e) The proposed project would involve the excavation and transport of diatomaceous earth and overburden material. Such excavation and transport would result in odors from vehicle exhaust and construction equipment engines. However, these odors would not affect a substantial number of people because the site is located in a sparsely inhabited area. Consequently, it is not anticipated there would be an impact; therefore, further analysis is not warranted in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion:

(a)-(d) Biological studies were conducted on the project site by Paul Pruett & Associates (2008) and by Padre Associates, Inc. (2014, 2015). A San Joaquin Valley kit fox survey was also conducted for the site by Padre Associates, Inc. (2015). Field surveys will be conducted on the project site for

special-status plant and animal species, species listed as either threatened or endangered by either the State or Federal government, riparian habitat, and sensitive natural communities and potential impacts on special-status species and their habitat, wetlands habitat, and potential movement corridors will be determined and presented in the EIR. For the purposes of this initial study, impacts to these biological resources are considered potentially significant.

(e) The Kern County General Plan includes oak tree conservation policies. The submitted Biota Report (Paul Pruett & Associates, 2008) and Biological Resources Report (Padre, December 2014) both state in part that no trees exist on the project site. Nonetheless, further analysis is warranted to determine whether oak woodland plant communities are present on the project site and to evaluate the potential for impacts to occur.

(f) There are no existing Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan which encompass the project site. Therefore the project would have no impact on a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?	☒	☐	☐	☐
c) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	☒	☐	☐	☐
d) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
e) Disturb any human remains, including those interred outside of dedicated cemeteries?	☒	☐	☐	☐

Discussion:

(a)-(c) A Cultural Resources Assessment of the project site, dated May 2008, was conducted by Catherine Lewis Pruett of Three Girls and a Shovel, LLC. According to the assessment, no prehistoric or historic archaeological sites were located as a result of the survey and no further archaeological work is necessary unless cultural resources are unearthed during development. Nonetheless, further evaluation in the EIR is warranted to identify potential impacts to historical, archaeological resources and tribal cultural resources and to formulate avoidance or mitigation measures, if applicable.

(d) Kern County is rich in paleontological resources. If paleontologically sensitive formations are located underground on the project site, ground disturbance could result in potentially significant impacts to paleontological resources. Thus, submittal of a paleontological resources review, for the project is required. Further evaluation in the EIR is warranted to identify potential impacts and to formulate avoidance or mitigation measures, if applicable.

(e) If human burial grounds are identified in any part of the project area, the project would be redesigned to avoid them. The EIR will evaluate this potential impact and identify measures to be implemented if any are unexpectedly uncovered during the course of development.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
TRIBAL CULTURAL RESOURCES.				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☒	☐	☐	☐
ii. A resource determined by the lead agency in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☒	☐	☐	☐

Discussion:

(a)(i-ii) The submitted Biological Resources Report (Padre Associates, Inc., December 2014) states in part that the project site has been used for farming, which has the potential to disturb any cultural resources, including tribal cultural resources. All tribes with possible cultural affiliation and interest within the project area will be notified, per Assembly Bill 52. The potential for tribal cultural resources to be encountered will be evaluated further in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic groundshaking?	☒	☐	☐	☐
iii. Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv. Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, sub-sidence, liquefaction, or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (194), creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Discussion:

(a)(i) Construction of the project would be subject to applicable ordinances of the Kern County Building Code (Chapter 17.08). Kern County has adopted the California Building Code, 2016 Edition (CCR Title 24), effective January 17, 2017, which imposes substantially the same requirements as the International Building Code (IBC), 2015 Edition, with some modifications and amendments. The

entirety of Kern County is located in a seismic Zone 4, a designation previously used in the Uniform Building Code (UBC) (the predecessor to the IBC) to denote the areas of highest risk to earthquake ground motion. Adherence to all applicable regulations would mitigate any potential impacts associated with the project. Impacts would be less than significant; however, further analysis in the EIR is warranted.

The project is not crossed by an Alquist-Priolo Special Studies Zone; however, study zones are located approximately 5 miles southwest of the proposed project. Significant seismic activity in the area could adversely affect and workers on the project site. No structures are existing or proposed on the project site, nonetheless, if any structures were to be built on the project site, significant seismic activity in the area could adversely affect them. This issue will be evaluated in the EIR.

(ii) Strong seismic ground shaking could occur at the project site, resulting in damage to structures that are not properly designed to withstand strong ground shaking. The project would potentially be subject to moderate to strong ground shaking from local and regional earthquakes. This potential impact will be evaluated in the EIR.

(iii) The potential for substantial adverse effects due to seismic-related ground failure, including liquefaction, will be examined in a geotechnical report being prepared to for the project site. Related potential impacts will be presented in the EIR.

(iv) The potential for substantial adverse effects due to landslides or slope failure within the project site will be examined in a geotechnical and slope stability report being prepared for the project site. Related potential impacts will be presented in the EIR.

(b) Grading associated with the proposed project (i.e. construction of proposed access roads), excavation associated with mining, and overburden and topsoil stockpiling would occur as a result of the project. These activities could create conditions under which substantial soil erosion could occur if topsoil is not appropriately managed. The handling and reapplication of topsoil will be described in the detailed project description to be prepared for the EIR, and impacts associated with the potential loss of topsoil will be evaluated. These impacts are potentially significant and the potential for increased erosion will be evaluated in the EIR.

(c) The project would be designed such that it would not degrade the stability of the underlying soils. A geotechnical and slope stability report currently being prepared will examine the stability of the soils, overburden, and mineral resources that underlie the project area and the findings of that report, including slope stability recommendations, will be evaluated in the EIR. These impacts are potentially significant and the potential for degradation of soil stability will be evaluated in the EIR.

(d) Expansive soils generally result from specific clay minerals that expand when saturated and that shrink when dry. A geotechnical analysis will be prepared for the project and will confirm the presence or absence of expansive soils within the project area and those results will be evaluated in the EIR.

(e) As proposed, sewage requirements for the project will be met by the use of portable toilet(s) which will be serviced by a contractor. As proposed, the project will not include septic systems or wastewater disposal facilities and there would be no impact. Therefore, further evaluation in the EIR is not warranted.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

Discussion:

(a)/(b) Global Climate change is an international phenomenon, and the regulatory background and scientific data are changing rapidly. In 2006, the California state legislature adopted AB 32, the California Global Warming Solutions Act of 2006. Assembly Bill (AB) 32 describes how global climate change would affect the environment in California. The impacts described in AB 32 include changing sea levels, changes in snow pack and availability of potable water, changes in storm flows and flood inundation zones, and other impacts.

As required by AB 32, California Air Resources Board (CARB) determined what the statewide greenhouse gas (GHG) emissions level was in 1990 and the approved a statewide GHG emissions limit that is equivalent to that level, which is to be achieved by 2020. CARB approved the 2020 limit on December 6, 2007. CARB's GHG inventory estimated the 1990 emissions level in California to be 427 million metric tons carbon dioxide equivalent (MMTCO2e). In 2004, the emissions were estimated to be 480 MMTCO2e.

The proposed project would generate GHG emissions from onsite operation of the following vehicles/equipment: a rubber tired loader, tire truck, portable screening plant (such as Extec S5 5X10), and a radial stacker. The proposed project would generate GHG emissions from operation of the following vehicles which will generate average daily trips (ADT) as follows: one water truck (12 ADT), three employee vehicles (six ADT), and 50 haul trucks (100 ADT). Not all GHGs exhibit the same ability to induce climate change; therefore, GHG contributions are commonly quantified in carbon dioxide equivalencies. The carbon dioxide equivalent (CO2e) portion of GHGs from the project is being estimated in an air quality impact analysis using the latest air pollution modeling programs. Impacts related to GHGs and climate stemming from the project, and potential conflicts with any applicable plan or policy relative to GHGs, will be evaluated in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 1/4 mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within the adopted Kern County Airport Land Use Compatibility Plan, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☒	☐	☐	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS. (Continued)				
i) Would implementation of the project generate vectors (flies, mosquitoes, rodents, etc.) or have a component that includes agricultural waste? Specifically, would the project exceed the following qualitative threshold: The presence of domestic flies, mosquitoes, cockroaches, rodents, and/or any other vectors associated with the project is significant when the applicable enforcement agency determines that any of the vectors:				
i. Occur as immature stages and adults in numbers considerably in excess of those found in the surrounding environment; and	☒	☐	☐	☐
ii. Are associated with design, layout, and management of project operations; and	☒	☐	☐	☐
iii Disseminate widely from the property; and	☒	☐	☐	☐
iv. Cause detrimental effects on the public health or well being of the majority of the surrounding population.	☒	☐	☐	☐

Discussion:

(a)-(b) The use, transport, and disposal of these materials would be subject to existing local, state, and federal regulations that require a hazardous materials management plan (approved by the Kern County Public Health Services Department/Environmental Health Services Division, acting as the Certified Unified Program Agency [CUPA] designee). During the life of the proposed project, there would be some hazardous materials on the project site, such as diesel fuel, hydraulic oil, grease, solvents, adhesives, paints, and other petroleum-based products. Compliance with all applicable safety standards for the safe handling and use of these materials would be required and the project proponent/operator would be required to develop and implement a spill prevention control and countermeasures plan. Although it is anticipated that compliance with applicable regulations will minimize the potential for creating a significant risk to the public or release of materials to the environment, for the purposes of this initial study, this impact is considered potentially significant.

More specific identification of the types of hazardous materials, and their transport, use, and disposal will be provided in the EIR.

(c) The nearest school to the project site is McKittrick Elementary School, located approximately 8 miles to the east of the project site. The project would not emit hazardous materials or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Therefore, no impacts would occur, and further analysis is not warranted.

(d) The project site is not included in a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. No impact would result in this regard and no further analysis is warranted.

(e) The project area is not located within two miles of a public or private-use airport and the site is not within the sphere of influence of any airport as identified by the Kern County Airport Land Use Compatibility Plan (ALUCP). Therefore, there are no anticipated safety hazards for people residing or working in the project area with respect to the proposed project's proximity to the public or a public-use airport. Therefore, no impacts would occur, and further analysis is not warranted.

(f) No private airstrips have been identified within 10 miles of the project site. Based upon the record to date, there are no anticipated safety hazards for people residing or working in the project area with respect to the project's proximity to private airstrips and further analysis is not warranted.

(g) The project development is not anticipated to physically impede the existing emergency response plans, emergency vehicle access, or personnel access to the site. The site is located along SR 58, which provides access to the site in the event of an emergency. Therefore, no impacts related to impairment of the implementation of, or physical interference with, an adopted emergency response plan or emergency evacuation plan is anticipated. Therefore, no impacts would occur, and further analysis is not warranted.

(h) The project site is under the jurisdiction of the Kern County Wildland Fire Management Plan. This plan documents wildland fire conditions within the County. The portion of the project site in the vicinity of the access gate along Highway 58 is located within an area of moderate fire hazard severity per the State Responsibility Area (SRA) map maintained by the California Department of Forestry and Fire Protection (CAL FIRE); the remainder of the project site (including the areas in which all mining and material screening is proposed) is located within an area of high fire hazard severity per the SRA map. The potential for the development and operation of the project to result in exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires will be evaluated in the EIR. The evaluation will include a review of the most recent version of the Kern County Fire Department Wildland Fire Management Plan and CAL FIRE's and Kern County Fire Department's prevention measures for wildland fires. With implementation of mitigation to reduce wildfire ignitions and prevent the spread of wildfires, the project is not expected to result in significant impacts to the exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires. Nevertheless, the EIR will discuss this issue.

(i)(i-iv) The proposed project would have the potential to create areas of open water during operations in water containment basins, mining areas, and other areas where stormwater could collect. Reclamation could also result in areas of standing or ponded water. If not drained or otherwise appropriately managed, areas of standing water could create the potential for mosquito habitat. It is anticipated that best management practices would be implemented to avoid the creation of mosquito habitat. Additionally, a standard Mitigation Measures will be incorporated for the project, requiring approval of a Pest Management Plan from the Kern County Public Health Services

Department/Environmental Health Service Department. Nonetheless, further evaluation is necessary to identify potential impacts and to formulate avoidance or mitigation measures, if applicable.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☒	☐	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on site or off site?	☒	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on site or off site?	☒	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide sub-stantial additional sources of polluted runoff?	☒	☐	☐	☐
f) Otherwise substantially degrade water quality?	☒	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
HYDROLOGY AND WATER QUALITY. Would the project:				
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Contribute to inundation by seiche, tsunami, or mudflow?	☒	☐	☐	☐

Discussion:

(a) The project would be subject to County, State, and Federal water quality regulations. This includes, but is not limited to, required adherence to the Federal Clean Water Act, National Pollutant Discharge Elimination System requirements, the National Flood Insurance Act, requirements of the California Department of Water Resources, the California Fish and Game Code, the California Water Code, the Kern County General Plan and the Kern County Zoning Ordinance. Development of the project would result in a significant impact to hydrology and water quality if associated construction activities, operations, or mining areas would create conditions that would result in the violation of any water quality or waste discharge standards. Such violations could occur through the creation of erosion, sedimentation, and/or polluted runoff, through the accidental release of potentially hazardous materials required during operational activities, or through the discharge of contaminated groundwater during dewatering activities. It is anticipated that appropriate best management practices and compliance with applicable regulations would reduce potential water quality impacts to a less-than-significant level; however, this potential impact will be evaluated fully in the EIR.

(b) Water utilized on the project site will be obtained from the West Kern Water District, and from produced water from adjacent oil field operations. All water used on the project site is proposed to be used for dust control. The produced oil field water will be applied in accordance with a Waste Discharge Requirement Order that will be obtained from the California Regional Water Quality Control Board, Central Valley Region. The water obtained from the West Kern Water District, will be in accordance with a will serve letter, from a nearby water supply line, and will be conveyed to the project site in a water truck. No groundwater, or surface stormwater which may accumulate in the mine pits, will be used at the site. Nonetheless, ground compaction in conjunction with road construction, mining and reclamation, could reduce the amount of groundwater recharge that occurs onsite. These impacts are considered potentially significant, and will be evaluated in the EIR.

(c) The proposed project would potentially alter the existing drainage patterns of the site or area. This impact is potentially significant. Evaluation of impacts to existing drainage patterns onsite, as well as the potential for increased erosion and/or siltation, will therefore be evaluated in the EIR.

(d) Ground compaction could increase surface water runoff both within and discharged from the project site, creating an increased potential for flooding. An increase in impervious surfaces (and/or surfaces with reduced permeability as a result of ground compaction) could increase storm water

runoff, and the resulting impacts would be potentially significant. Therefore, an evaluation of impacts resulting from the project's potential alteration of drainage patterns of the site will be provided in the EIR.

(e) Ground compaction on soils could increase surface water runoff both within and discharged from the project site and could create the potential to exceed the capacity of stormwater facilities. Therefore, an evaluation of potential flooding-related impacts will be evaluated in the EIR.

(f) Ground disturbing activities associated with the project could potentially degrade water quality through erosion and subsequent sedimentation of streams. Additionally, accidental release of potentially harmful materials, such as engine oil and diesel fuel, could degrade the water quality of nearby streams. Implementation of best management practices would likely reduce the impact of project activities on surrounding water quality. However, further analysis in the EIR is required to identify appropriate mitigation/design measures and evaluate their effectiveness.

(g) The project does not propose development of any housing. Therefore, no impact would occur, and no further analysis is warranted.

(h) The project site is not located within an area designated by the County as a Flood Hazards Overlay. Therefore, no impact would occur, and no further analysis is warranted.

(i) The project is not located within an area that is subject to flooding due to failure of a levee or dam. Therefore, the project would not expose people or structures to a significant risk of loss, injury, or death due to flooding. No impact would occur and no further analysis is warranted.

(j) The proposed project is not located near an ocean or enclosed body of water and would not be subject to inundation by seiche or tsunami. Mudflows are a type of mass wasting and landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result of this super-saturation, soil and rock materials become unstable and eventually slide away from their existing location. The project site is situated on sloping topography, which may potentially be subject to mudflows. As such, further analysis in the EIR is required to identify appropriate mitigation/design measures to address potential mudflows, and evaluate their effectiveness.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion:

(a) The project would be developed on grazing land, and the surrounding area is primarily grazing land. No established communities are located within or adjacent to the project. Therefore, no impact would occur and no further analysis is warranted.

(b) The project site is zoned A (Exclusive Agriculture), as shown in Figure 3. According to the Kern County Zoning Ordinance, mining and mineral extraction, pursuant to Chapter 19.100 of the Kern County Zoning Ordinance, is a conditionally permitted use.

The project site is located within the Kern County General Plan (KCGP) area and has a land use designation of 8.3 (Extensive Agriculture (Minimum 20 Acre Parcel Size, 80 Acres with Williamson Act Contract)), 8.3/2.4 (Extensive Agriculture (Minimum 20 Acre Parcel Size, 80 Acres with Williamson Act Contract) / Steep Slope Overlay), 8.4 (Mineral and Petroleum (Minimum 5 Acre Parcel Size)), 8.4/2.2 (Mineral and Petroleum (Minimum 5 Acre Parcel Size) / Landslide Overlay), and 8.4/2.4 (Mineral and Petroleum (Minimum 5 Acre Parcel Size) / Steep Slope Overlay). Mineral extraction is an allowable use under the 8.3 and 8.4 map code designations.

The KCGP contains an implementation measure requiring that new developments will not be sited on land that is physically or environmentally constrained (which includes Map Code 2.2 (Landslide)) to support such development unless appropriate studies establish that such development will not result in unmitigated significant impact. Additionally, the KCGP contains an implementation measure requiring that development proposed in areas with steep slopes (Map Code 2.4) will be reviewed for conformity to Chapter 19.88 Hillside Development Ordinance or Chapter 19.52 Special Planning (SP) District to ensure that appropriate soil stability, drainage, and sewage treatment will result. Further evaluation is warranted to identify potential impacts and formulate avoidance or mitigation measures.

The appropriateness of the project with regard to its consistency with the policies of the KCGP Plan adopted for the purpose of avoiding or mitigating an environmental effect will be evaluated in the EIR.

(c) As noted in above in the Biological Resources Section, response to question (f), there is no existing Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan which encompass the project site. Therefore, no impact would occur and no further analysis is warranted.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☒	☐	☐	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☒	☐

Discussion:

(a) Implementation of the surface mining and reclamation plan will allow for recovery of diatomaceous earth and overburden material. No significant impacts have been noted regarding exploitation of diatomaceous earth and overburden material.

The project site is located within the boundaries of an oil or gas field, and the site is in an area that may potentially contain mineral deposits of oil and gas. In addition, there are areas of the project site that have been identified for subsurface exploration and extraction by subsurface mineral rights holders, and adequate provisions will be made to ensure access to mineral rights. If mining damages any abandoned wells or uncovers any previously unknown oil, gas or injection wells, the California Department of Conservation/Division of Oil, Gas, and Geothermal Resources (DOGGR) will need to be notified. Notification of DOGGR will be addressed with inclusion of a standard Mitigation Measure in the EIR. Nonetheless, this issue will be further analyzed in the EIR.

The project does not contain locally important mineral resources recovery sites as delineated in the Kern County General Plan. Impacts are anticipated to be less than significant; however, this issue will be analyzed further in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
NOISE. Would the project result in:				
a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?	☒	☐	☐	☐
b) Exposure of persons to, or generation of, excessive ground borne vibration or ground borne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within the Kern County Airport Land Use Compatibility Plan, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion:

(a) Land uses determined to be "sensitive" to noise as defined by the Kern County General Plan include residential areas, schools, convalescent and acute care hospitals, parks and recreational areas, and churches. Noise from the proposed use would be generated during mining, processing operations and reclamation, as well as by the operation of haul trucks. The Kern County General Plan Noise Element sets a 65-decibel limit on exterior noise levels for stationary sources (i.e., non-transportation) at sensitive receptors and the County's Noise Control Ordinance (County Code Section 8.36.020 et seq.) prohibits a variety of nuisance noises. A noise evaluation will be conducted for the project, and potential impacts will be presented within the EIR. Further evaluation is warranted to identify potential impacts and formulate avoidance or mitigation measures, if applicable.

(b) Groundborne vibration and groundborne noise could originate from earth movement during mining and reclamation. The project would be expected to comply with all applicable requirements for long-term operation, as well as with measures to reduce excessive groundborne vibration and noise

to ensure that the project would not expose persons or structures to excessive groundborne vibration. Further analysis of groundborne vibration and groundborne noise will be included in the EIR.

(c) The project would introduce new noise sources from mining, processing operations, and increased haul truck trips. This impact is potentially significant. Therefore, further analysis of ambient noise levels and the project's potential operational impacts on those levels will be included in the EIR.

(d) Heavy equipment used during the life of the operation would generate noise levels that could represent a substantial increase over ambient conditions. This impact is potentially significant. Project-related construction and other temporary source noise levels will be quantified and evaluated in the EIR.

(e) The project area is not located within the sphere of influence of any airport as identified by the ALUCP. The nearest airport to the project site is the Elk Hills/Buttonwillow Airport, which is a public airport/public use airport, located approximately 15 miles to the southeast. Considering the proximity of the Elk Hills/Buttonwillow Airport, the project is not expected to expose individuals working in the project area to excessive noise levels resulting from any airports located within the ALUCP, and no further analysis related to public airports is warranted.

(f) No private airstrips have been identified within 10 miles of the project site, and the project would not create a noise-sensitive land use. No further noise analysis related to private airstrips is warranted.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☒	☐	☐	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion:

(a) Typical established local thresholds of significance for housing and population growth pursuant to the CEQA Guidelines, Section 15064.7, include effects that would induce substantial growth or concentration of a population beyond County projections; alter the location, distribution, density, or growth rate of the population beyond that projected in the Kern County General Plan Housing Element; result in a substantial increase in demand for additional housing; or create a development that significantly reduces the ability of the County to meet housing objectives set forth in the Kern County General Plan Housing Element.

The project could create a small increase in employment through the addition of approximately 10 new full-time jobs that could be created as a result of mining and processing operations. Increased jobs provided by the project would not be expected to result in a substantial change in the demand for new housing; therefore, no environmental impacts associated with the provision of new housing would occur as a result of the project. The project could require the development and extension of infrastructure facilities located in and/or adjoining the project site. Although it is not anticipated that the project would extend infrastructure to serve adjacent parcels or expand infrastructure capacity beyond the level necessary to serve the project, additional analysis will be included in the EIR following the development of a detailed project description for the project that identifies all proposed infrastructure improvement. Therefore, this impact is potentially significant.

(b) No residential uses are within the project site. One residence is located on the south side of SR 58 adjacent to the project site. No housing would be displaced as a result of the proposed project. Thus, no impacts would result in this regard and no further analysis is warranted.

(c) No residential uses are within the project site. One residence is located on the south side of SR 58 adjacent to the project site. No population would be displaced as a result of the proposed project. Thus, no impacts would result in this regard and no further analysis is warranted.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
PUBLIC SERVICES.				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or to other performance objectives for any of the public services:				
Fire Protection?	☒	☐	☐	☐
Police Protection?	☒	☐	☐	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other Public Facilities?	☐	☐	☒	☐

Discussion:

(a) **Fire Protection:** The Kern County Fire Department provides fire suppression and medical emergency services. The nearest fire station from the project site is Station No. 24 (McKittrick), which is located approximately 8 miles east of the project site. The station has direct access to the project site access road along SR 58. The project would increase the number of ignition sources in an undeveloped area of Kern County, and include the storage and use of fuels and other hazardous materials. These sources of potential fire hazards could result in additional fire calls for service. The project's impact on fire services is potentially significant and will be evaluated in the EIR.

Police Protection: the Kern County Sheriff's Department provides police protection services in the project area. The nearest Sheriff's Department substation is the Buttonwillow Substation, located about 17 miles east of the project site. The EIR will discuss whether the proposed project would increase calls for service to the County Sheriff's Department.

Schools: As proposed, there would be a maximum of 10 employees onsite at any given time during the life of the proposed project. Given the number of employees, it is not anticipated that such a workforce will have enough school aged children to appreciably affect local school populations. The project's potential to result in substantial adverse impacts on school services or in the need for new or physically altered school facilities is considered less than significant.

Parks: Given the number of individuals to be employed and that some may already be a part of the local workforce, implementation of the project is not expect to result in additional demands on park facilities. The project's potential to result in substantial adverse impacts on park services or in the need for new or physically altered parks is considered less than significant.

Other Public Facilities: The proposed project is not expected to result in significant impacts on other public services such as courts, libraries, public health, probation, and behavioral health. Nevertheless, potential impacts associated with increased demands or on the need for improvements to any other public facilities will be evaluated in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
RECREATION.				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

Discussion:

(a) The project area does not include any neighborhood or regional parks or other recreational facilities. Given the relatively small number of individuals to be employed through the project, and that some may already be a part of the local workforce, implementation of the project is not expected to result in a significant increase in the use of existing parks or recreational facilities such that adverse impacts on the facilities would occur. Potential impacts are considered to be less than significant.

(b) The project does not include recreational facilities or propose the construction or expansion of recreational facilities, nor does it envision recreational uses onsite after reclamation has been completed. Potential impacts are considered to be less than significant.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
TRANSPORTATION AND TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to, Level of Service standard and travel demand measures, or other standards established by the County congestion management agency for designated roads or highways?				
i. Metropolitan Bakersfield General Plan LOS "C"?	☐	☐	☒	☐
ii. Kern County General Plan LOS "D"?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐
e) Result in inadequate emergency access?	☒	☐	☐	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

Discussion:

(a) The project site can be accessed from SR 58 via interconnecting roads, including Interstate-5 and SR 33. All roads within the boundaries of the project site (with the exception of Highway 58) are surfaced with dirt; all proposed onsite access roads are proposed to be surfaced with dirt.. The proposed project would generate additional traffic on the existing roadway network. These new vehicle trips would include additional workers traveling to the site, delivery trips associated materials and supplies needed for operations, and diatomaceous earth and overburden material hauling. These additional trips may decrease the existing levels of service (LOS) on area freeways, roadways, and intersections. Trip generation and distribution forecasts will be prepared for the project and a detailed traffic impact analysis will be prepared to evaluate potential impacts on study area roadway segments and at study area intersections. For the purposes of this initial study, project impacts to traffic and circulation, including motor vehicles and as transit, bicycle, and pedestrian facilities, are potentially significant, and this issue will be further evaluated in the EIR.

(b)(i) Some project workers may come from the metropolitan Bakersfield area and some deliveries of diatomaceous earth and overburden material may be made to the metropolitan Bakersfield area. Nonetheless, the project is not located in or near the metropolitan Bakersfield area. Potential impacts are considered to be less than significant.

(ii) The proposed project would generate vehicle trips on local roadways that could cause or contribute to exceedances of LOS D on some study area roadway segments or at study area intersections. This impact is potentially significant and potential impacts of these conditions on LOS of area roadways will be evaluated in the EIR.

(c) The proposed project would not generate air traffic and would not involve activities that would create a potential for changes in air traffic patterns or increased risk to air traffic. No impacts in this regard are anticipated, and no further analysis is warranted.

(d) The proposed project would result in increased traffic at the project access road intersection with SR 58. In the absence of appropriate design and signage, increased ingress and egress at this location could increase hazards. Potential traffic-related design hazards will be evaluated in the EIR as a component of the traffic impact analysis.

(e) The proposed project would generate operational traffic increases that would increase traffic volumes on local roadways and intersections, thereby impeding emergency access. The potential for project-related traffic to result in inadequate emergency access will be evaluated in the EIR.

(f) The project is not located along an existing bus route and few bus stops exist on the roadways likely to be used during construction and operation. The project would not house residents or employees and therefore would not have characteristics that could influence alternative means of transportation. Impacts would be less than significant; however, further analysis is warranted in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, State, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion:

(a) The project would generate a minimal volume of wastewater. A maximum of 10 employees would be onsite at any given time. Portable toilets will be used during project operations and the domestic drinking water supply would be from bottled water. Wastewater generated during the life of the project would be contained within portable toilet facilities which would be serviced by a contractor. The Kern County Environmental Health Services Division is responsible for monitoring the use of portable toilet facilities, and a condition of approval would require the project proponent to provide

documentation of a portable toilet pumping contract. Therefore, the project would not exceed wastewater treatment requirements of the Central Valley RWQCB. Impacts would be less than significant and no further analysis is warranted in the EIR.

(b) The project would not require new water or wastewater disposal systems to be constructed, as a maximum of 10 employees would be onsite at any given time. Potable water would be brought to the site for drinking. Water for use to control dust will be delivered to the project site by truck. Although the project is not proposing construction of any new or expanded water or wastewater treatment facilities, this issue will be addressed in the EIR.

(c) Implementation of the project would result in an increase in impervious surface at the project site. The existing pattern and concentration of runoff could potentially be altered by the proposed project. Further evaluation of the proposed project's potential impact to the capacity of existing stormwater drainage systems in the area or potential to create substantial additional sources of polluted runoff will be provided in the EIR to determine the need for appropriate stormwater mitigation/design measures, if necessary. This impact is considered potentially significant and will be evaluated in the EIR.

(d) Water consumption would occur as result of dust suppression at the site during mining and reclamation operations. Water for operations will be obtained from adjacent oil field operations and the West Kern Water District; it is proposed that a total of 162,515,600 gallons will be utilized over the project lifespan. The water obtained from the West Kern Water District, will be in accordance with a will serve letter, from a nearby water supply line, and will be conveyed to the project site in a water truck. The project is not anticipated to impact water supplies and no new or expanded entitlements would be required. Although impacts are expected to be less than significant, further analysis is warranted in the EIR.

(e) The project is located in an area with no wastewater treatment provider. As noted in (a) and (b) above, the project is not expected to generate a significant amount of wastewater. Wastewater produced during the life of the project would be collected in portable toilet facilities and disposed of at an approved facility. The project is not within an area serviced by a water treatment provider and no further analysis is warranted in the EIR.

(f) The project is not expected to generate a substantial amount of solid waste that would exceed the capacity of local landfills. Impacts are anticipated to be less than significant; however, further analysis of this issue will be included in the EIR.

(g) The 1989 California Integrated Waste Management Act (AB 939) requires the County to attain specific waste diversion goals. In addition, the California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires expanded or new development projects to incorporate storage areas for recycling bins into the project design. The project would comply with the 1989 California Integrated Waste Management Act and the 1991 California Solid Waste Reuse and Recycling Access Act of 1991, as amended. Therefore, impacts are anticipated to be less than significant but will be further analyzed in the EIR.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Discussion:

(a) Biological studies for the proposed project were conducted by Paul Pruett & Associates (2008), and Padre Associates, Inc. (2014, 2015). The EIR's biological resources section will discuss of specific project impacts on plants and wildlife including avian and bat species. The EIR will also evaluate the project's contribution to cumulative biological resources impacts and propose mitigation that will reduce the impacts. Additionally, the potential exists for as-yet undiscovered archeological/paleontological resources to be encountered during proposed project construction. Therefore, the EIR will evaluate the proposed project's potential to affect biological resources or eliminate important examples of the major periods of California history or prehistory.

(b) The project has the potential to contribute to cumulative impacts to aesthetics, air quality, biological resources, and cultural resources, and utilities and public services, among others. The EIR will evaluate the project's contribution to cumulative impacts in these and other areas as further impacts are identified.

(c) Although there may be significant air quality impacts during construction, the long term air quality impacts could be beneficial if fossil fuel use is reduced overall; however, potential health impacts from the project's short-term cumulative contribution to air quality impacts will be evaluated in the EIR.

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Gavin Newsom
Governor

Notice of Preparation

January 8, 2019

To: Reviewing Agencies

Re: EIR 09-17; Johe Ranch Mining Project by Diatom, LLC
SCH# 2019011010

Attached for your review and comment is the Notice of Preparation (NOP) for the EIR 09-17; Johe Ranch Mining Project by Diatom, LLC draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Randall Cates
Kern County
2700 M Street, Suite 100
Bakersfield, CA 93301

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2019011010
Project Title EIR 09-17; Johe Ranch Mining Project by Diatom, LLC
Lead Agency Kern County

Type NOP Notice of Preparation

Description A CUP for a 93.67-acre surface mining operation and development of a reclamation plan on approx 331-acre project site, in accordance with the Surface Mining and Reclamation Act of 1975.
Access to the site is obtained via SR 58. The project proponent proposes to employ open pit mining techniques to mine diatomaceous earth (a mineral suitable for industrial uses including the production of cement) and overburden material (earth overlying the diatomaceous earth, proposed to be sold for use as a landfill liner, and to solidify liquid waste after it is deposited in a landfill). As proposed, all overburden material (typically considered as non-marketable waste in the mining industry) which is excavated will be exported from the project site and sold; as such, no waste is proposed to be generated.
Note: See NOP for full description.

Lead Agency Contact

Name Randall Cates
Agency Kern County
Phone (661) 862-8612 **Fax**
email
Address 2700 M Street, Suite 100
City Bakersfield **State** CA **Zip** 93301

Project Location

County Kern
City
Region
Cross Streets north and south sides of SR 58, approx 8.5 mi W of McKittrick
Lat / Long 35° 19' 56.2655" N / 119° 46' 4.2659" W
Parcel No. portions of 156-070-01, -02, -10
Township 30S **Range** 21E **Section** 7 **Base** MDBM

Proximity to:

Highways 58
Airports
Railways
Waterways Multiple intermittent drainage channels
Schools
Land Use PLU: Grazing land; Z: A/Kern County GP: 8.3 (extensive ag (min. 20-acre parcel size, 80 acres with Williamson Act Contract)), 8.3/2.4 (extensive ag (min20-acre parcel size, 80 acres with Williamson Act Contract) / steep slove overlay), 8.4 (mineral and petroleum (min 5 acre parcel size)), 8.4/2.2 (mineral and petroleum (min 5 acre parcel size)/landslide overlay), 8.4/2.4 (mineral and petroleum (min 5 acre parcel size)/steep slope overlay)

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Economics/Jobs; Fiscal Impacts; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Growth Inducing; Landuse; Minerals; Noise; Other Issues; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Tribal Cultural Resources; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Wildlife

Note: Blanks in data fields result from insufficient information provided by lead agency.

Document Details Report
State Clearinghouse Data Base

Reviewing Agencies	Resources Agency; Department of Conservation; Cal Fire; Central Valley Flood Protection Board; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Wildlife, Region 4; California Energy Commission; Native American Heritage Commission; California Highway Patrol; Air Resources Board; State Water Resources Control Board, Division of Drinking Water; Department of Toxic Substances Control; Regional Water Quality Control Bd., Region 5 (Fresno)

Date Received 01/08/2019 ***Start of Review*** 01/08/2019 ***End of Review*** 02/06/2019

Note: Blanks in data fields result from insufficient information provided by lead agency.

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2019011013

Project Title: EIR 09-17; Johe Ranch Mining Project by Diatom, LLC

Lead Agency: Kern County Planning and Natural Resources Department — Contact Person: Randall Cates

Mailing Address: 2700 "M" Street Suite 100 — Phone: 661-862-8612

City: Bakersfield — Zip: 93301-2323 — County: Kern

Project Location: County: Kern — City/Nearest Community: McKittrick

Cross Streets: The project site is located on the north and south sides of State Route 58, approximately 8.5 miles west of the unincorporated community of McKittrick, being a portion of Section 7 of T30S, R21E, MDB&M, County of Kern, State of California

Lat. / Long.: 35° 19'56.2655" N/ 119° 46'4.2659" W — Total Acres: approximately 331 acres

Assessor's Parcel No.: portions of 156-070-01, 156-070-02 & 156-070-10 — Section: 7 — Twp.: 30S — Range: 21E — Base: MDB&M

Within 2 Miles: State Hwy #: 58 — Waterways: multiple intermittent drainage channels

Airports: N/A — Railways: N/A — Schools: N/A

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ☐ Other

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI Other: ☐ Joint Document ☐ Final Document ☐ Other

Governor's Office of Planning & Research

JAN 08 2019

STATE CLEARINGHOUSE

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan ☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan ☐ Rezone ☐ Prezone ☒ Use Permit ☐ Land Division (Subdivision, etc.) ☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational ____
☐ Recreational ____

☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☒ Mining: Mineral: diatomaceous earth and overburden material
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☒ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☐ Coastal Zone ☒ Drainage/Absorption ☒ Economic/Jobs ☒ Fiscal ☒ Flood Plain/Flooding ☒ Forest Land/Fire Hazard ☒ Geologic/Seismic ☒ Minerals ☒ Noise ☒ Population/Housing Balance ☒ Public Services/Facilities ☒ Recreation/Parks ☒ Schools/Universities ☒ Septic Systems ☒ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☒ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation ☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☒ Wetland/Riparian ☒ Wildlife ☒ Growth Inducing ☒ Land Use ☒ Cumulative Effects
☒ Other Greenhouse Gas Emissions, Tribal Cultural Resources

Present Land Use/Zoning/General Plan Designation:

Present Land Use: Grazing Land / *Zoning:* A (Exclusive Agriculture) / *Kern County General Plan:* 8.3 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract)), 8.3/2.4 (extensive agriculture (min. 20-acre parcel size, 80 acres with Williamson Act Contract) / steep slope overlay), 8.4 (mineral and petroleum (min. 5 acre parcel size)), 8.4/2.2 (mineral and petroleum (min. 5 acre parcel size) / landslide overlay), 8.4/2.4 (mineral and petroleum (min. 5 acre parcel size) / steep slope overlay)

Project Description: *(please use a separate page if necessary)*

NOP Distribution List

County: Kern

SCH# 2019011010

Resources Agency

- [ ] **Resources Agency**
  Nadell Gayou
- [ ] **Dept. of Boating & Waterways**
  Denise Peterson
- [ ] **California Coastal Commission**
  Allyson Hitt
- [ ] **Colorado River Board**
  Elsa Contreras
- [ ] **Dept. of Conservation**
  Crina Chan
- [ ] **Cal Fire**
  Dan Foster
- [ ] **Central Valley Flood Protection Board**
  James Herota
- [ ] **Office of Historic Preservation**
  Ron Parsons
- [ ] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve Goldbeck
- [ ] **Dept. of Water Resources**
  Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Wildlife**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Wildlife Region 1**
  Curt Babcock
- [ ] **Fish & Wildlife Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Wildlife Region 2**
  Jeff Drongesen
- [ ] **Fish & Wildlife Region 3**
  Craig Weightman
- [ ] **Fish & Wildlife Region 4**
  Julie Vance
- [ ] **Fish & Wildlife Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6**
  Tiffany Ellis
  Habitat Conservation Program
- [ ] **Fish & Wildlife Region 6 I/M**
  Heidi Calvert
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Wildlife M**
  William Paznokas
  Marine Region

Other Departments

- [ ] **California Department of Education**
  Lesley Taylor
- [ ] **OES (Office of Emergency Services)**
  Monique Wilber
- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Dept. of General Services**
  Cathy Buck
  Environmental Services Section
- [ ] **Housing & Comm. Dev.**
  CEQA Coordinator
  Housing Policy Division

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Erik Vink
- [ ] **Delta Stewardship Council**
  Anthony Navasero
- [ ] **California Energy Commission**
  Eric Knight
- [ ] **Native American Heritage Comm.**
  Debbie Treadway
- [ ] **Public Utilities Commission**
  Supervisor
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [ ] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Cal State Transportation Agency CalSTA

- [ ] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans – Planning HQ LD-IGR**
  Christian Bushong
- [ ] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Susan Zanchi
- [ ] **Caltrans, District 4**
  Patricia Maurice
- [ ] **Caltrans, District 5**
  Larry Newland
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Dianna Watson
- [ ] **Caltrans, District 8**
  Mark Roberts
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Maureen El Harake

Cal EPA

Air Resources Board

- [ ] **Airport & Freight**
  Jack Wursten
- [ ] **Transportation Projects**
  Nesamani Kalandiyur
- [ ] **Industrial/Energy Projects**
  Mike Tollstrup
- [ ] **California Department of Resources, Recycling & Recovery**
  Kevin Taylor/Jeff Esquivel
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Cindy Forbes – Asst Deputy
  Division of Drinking Water
- [ ] **State Water Resources Control Board**
  Div. Drinking Water #_____
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [ ] **Dept. of Toxic Substances Control Reg. #**_____
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [ ] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
- [ ] **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- [ ] **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
- [ ] **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____
  _____
  _____
- [ ] _____
  Conservancy

Last Updated 5/22/18

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DEPARTMENT OF TRANSPORTATION
DISTRICT 6
1352 WEST OLIVE AVENUE
P.O. BOX 12616
FRESNO, CA 93778-2616
PHONE (559) 445-5421
FAX (559) 488-4088
TTY 711
www.dot.ca.gov

Making Conservation a California way of life.

January 17, 2019

06-KER-58-5.93
SCH #2019011010
JOHE RANCH MINE

Mr. Randall Cates
Kern County
2700 M Street, Suite 100
Bakersfield, CA 93301

Dear Mr. Cates:

Thank you for the opportunity to review the Environmental Impact Report (EIR) for Conditional Use Permit #17, Map #117 for a 93.67-acre surface mining operation and development of a reclamation plan on an approximately 331-acre project site. The project is located north and south of State Route (SR) 58, west of the community of McKittrick.

The mission of the California Department of Transportation (Caltrans) is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. To ensure a safe and efficient transportation system, we encourage early consultation and coordination with local jurisdictions and project proponents on all development projects that utilize the multimodal transportation network.

Caltrans provides the *following comments* consistent with the State's smart mobility goals that support a vibrant economy and sustainable communities:

1. Caltrans recommends the project proponent to conduct a Traffic Impact Study (TIS) to fully assess the potential impacts to the intersection, given that this segment of SR 58 is a 2-lane conventional highway with no plans in widening.

2. Caltrans has not located the encroachment permit that authorized the existing access to the State right of way. The owner needs to provide a copy of the encroachment permit or submit an application requesting approval for driveway access. Any new access will need to be approved by this agency. Furthermore, a new encroachment permit is needed if ownership has changed.

3. Encroachment permits are not a property right and do not transfer with the property to the new owner. Only the legal property owner or his/her authorized agent can pursue obtaining an encroachment permit.

4. Please call the **Caltrans Encroachment Permit Office District 6: 1352 W. Olive, Fresno, CA 93778, at (559) 488-4058** to locate the existing encroachment permit or file a new encroachment permit authorizing access for the new and existing parcels to the State Highway System.

If you have any further questions, contact Scott Lau at (559) 445-5763 or scott.lau@dot.ca.gov.

Sincerely,

Lorena Mendibles

LORENA MENDIBLES, Chief
Transportation Planning - South

Pacific Gas and Electric Company

Plan Review Team
Land Management

PGEPlanReview@pge.com

6111 Bollinger Canyon Road 3370A
San Ramon, CA 94583

January 23, 2019

Randall Cates
Kern County Planning
2700 M Street, Suite 100
Bakersfield, Ca 93301

Ref: Gas and Electric Transmission and Distribution

Dear Mr. Cates,

Thank you for submitting EIR 09-17; Johe Ranch Mining Project plans for our review. PG&E will review the submitted plans in relationship to any existing Gas and Electric facilities within the project area. If the proposed project is adjacent/or within PG&E owned property and/or easements, we will be working with you to ensure compatible uses and activities near our facilities.

Attached you will find information and requirements as it relates to Gas facilities (Attachment 1) and Electric facilities (Attachment 2). Please review these in detail, as it is critical to ensure your safety and to protect PG&E's facilities and its existing rights.

Below is additional information for your review:

1. This plan review process does not replace the application process for PG&E gas or electric service your project may require. For these requests, please continue to work with PG&E Service Planning: https://www.pge.com/en_US/business/services/building-and-renovation/overview/overview.page.

2. If the project being submitted is part of a larger project, please include the entire scope of your project, and not just a portion of it. PG&E's facilities are to be incorporated within any CEQA document. PG&E needs to verify that the CEQA document will identify any required future PG&E services.

3. An engineering deposit may be required to review plans for a project depending on the size, scope, and location of the project and as it relates to any rearrangement or new installation of PG&E facilities.

Any proposed uses within the PG&E fee strip and/or easement, may include a California Public Utility Commission (CPUC) Section 851 filing. This requires the CPUC to render approval for a conveyance of rights for specific uses on PG&E's fee strip or easement. PG&E will advise if the necessity to incorporate a CPUC Section 851filing is required.

This letter does not constitute PG&E's consent to use any portion of its easement for any purpose not previously conveyed. PG&E will provide a project specific response as required.

Sincerely,

Plan Review Team
Land Management

Attachment 1 – Gas Facilities

There could be gas transmission pipelines in this area which would be considered critical facilities for PG&E and a high priority subsurface installation under California law. Care must be taken to ensure safety and accessibility. So, please ensure that if PG&E approves work near gas transmission pipelines it is done in adherence with the below stipulations. Additionally, the following link provides additional information regarding legal requirements under California excavation laws: http://usanorth811.org/wp-content/uploads/2017/05/CA-LAW-English.pdf

1. Standby Inspection: A PG&E Gas Transmission Standby Inspector must be present during any demolition or construction activity that comes within 10 feet of the gas pipeline. This includes all grading, trenching, substructure depth verifications (potholes), asphalt or concrete demolition/removal, removal of trees, signs, light poles, etc. This inspection can be coordinated through the Underground Service Alert (USA) service at 811. A minimum notice of 48 hours is required. Ensure the USA markings and notifications are maintained throughout the duration of your work.

2. Access: At any time, PG&E may need to access, excavate, and perform work on the gas pipeline. Any construction equipment, materials, or spoils may need to be removed upon notice. Any temporary construction fencing installed within PG&E's easement would also need to be capable of being removed at any time upon notice. Any plans to cut temporary slopes exceeding a 1:4 grade within 10 feet of a gas transmission pipeline need to be approved by PG&E Pipeline Services in writing PRIOR to performing the work.

3. Wheel Loads: To prevent damage to the buried gas pipeline, there are weight limits that must be enforced whenever any equipment gets within 10 feet of traversing the pipe.

Ensure a list of the axle weights of all equipment being used is available for PG&E's Standby Inspector. To confirm the depth of cover, the pipeline may need to be potholed by hand in a few areas.

Due to the complex variability of tracked equipment, vibratory compaction equipment, and cranes, PG&E must evaluate those items on a case-by-case basis prior to use over the gas pipeline (provide a list of any proposed equipment of this type noting model numbers and specific attachments).

No equipment may be set up over the gas pipeline while operating. Ensure crane outriggers are at least 10 feet from the centerline of the gas pipeline. Transport trucks must not be parked over the gas pipeline while being loaded or unloaded.

4. Grading: PG&E requires a minimum of 36 inches of cover over gas pipelines (or existing grade if less) and a maximum of 7 feet of cover at all locations. The graded surface cannot exceed a cross slope of 1:4.

5. Excavating: Any digging within 2 feet of a gas pipeline must be dug by hand. Note that while the minimum clearance is only 12 inches, any excavation work within 24 inches of the edge of a pipeline must be done with hand tools. So to avoid having to dig a trench entirely with hand tools, the edge of the trench must be over 24 inches away. (Doing the math for a 24 inch wide trench being dug along a 36 inch pipeline, the centerline of the trench would need to be at least 54 inches [24/2 + 24 + 36/2 = 54] away, or be entirely dug by hand.)

Water jetting to assist vacuum excavating must be limited to 1000 psig and directed at a 40° angle to the pipe. All pile driving must be kept a minimum of 3 feet away.

Any plans to expose and support a PG&E gas transmission pipeline across an open excavation need to be approved by PG&E Pipeline Services in writing PRIOR to performing the work.

6. Boring/Trenchless Installations: PG&E Pipeline Services must review and approve all plans to bore across or parallel to (within 10 feet) a gas transmission pipeline. There are stringent criteria to pothole the gas transmission facility at regular intervals for all parallel bore installations.

For bore paths that cross gas transmission pipelines perpendicularly, the pipeline must be potholed a minimum of 2 feet in the horizontal direction of the bore path and a minimum of 12 inches in the vertical direction from the bottom of the pipe with minimum clearances measured from the edge of the pipe in both directions. Standby personnel must watch the locator trace (and every ream pass) the path of the bore as it approaches the pipeline and visually monitor the pothole (with the exposed transmission pipe) as the bore traverses the pipeline to ensure adequate clearance with the pipeline. The pothole width must account for the inaccuracy of the locating equipment.

7. Substructures: All utility crossings of a gas pipeline should be made as close to perpendicular as feasible (90° +/- 15°). All utility lines crossing the gas pipeline must have a minimum of 12 inches of separation from the gas pipeline. Parallel utilities, pole bases, water line ‘kicker blocks’, storm drain inlets, water meters, valves, back pressure devices or other utility substructures are not allowed in the PG&E gas pipeline easement.

If previously retired PG&E facilities are in conflict with proposed substructures, PG&E must verify they are safe prior to removal. This includes verification testing of the contents of the facilities, as well as environmental testing of the coating and internal surfaces. Timelines for PG&E completion of this verification will vary depending on the type and location of facilities in conflict.

8. Structures: No structures are to be built within the PG&E gas pipeline easement. This includes buildings, retaining walls, fences, decks, patios, carports, septic tanks, storage sheds, tanks, loading ramps, or any structure that could limit PG&E’s ability to access its facilities.

9. Fencing: Permanent fencing is not allowed within PG&E easements except for perpendicular crossings which must include a 16 foot wide gate for vehicular access. Gates will be secured with PG&E corporation locks.

10. Landscaping: Landscaping must be designed to allow PG&E to access the pipeline for maintenance and not interfere with pipeline coatings or other cathodic protection systems. No trees, shrubs, brush, vines, and other vegetation may be planted within the easement area. Only those plants, ground covers, grasses, flowers, and low-growing plants that grow unsupported to a maximum of four feet (4’) in height at maturity may be planted within the easement area.

11. Cathodic Protection: PG&E pipelines are protected from corrosion with an “Impressed Current” cathodic protection system. Any proposed facilities, such as metal conduit, pipes,

service lines, ground rods, anodes, wires, etc. that might affect the pipeline cathodic protection system must be reviewed and approved by PG&E Corrosion Engineering.

12. Pipeline Marker Signs: PG&E needs to maintain pipeline marker signs for gas transmission pipelines in order to ensure public awareness of the presence of the pipelines. With prior written approval from PG&E Pipeline Services, an existing PG&E pipeline marker sign that is in direct conflict with proposed developments may be temporarily relocated to accommodate construction work. The pipeline marker must be moved back once construction is complete.

13. PG&E is also the provider of distribution facilities throughout many of the areas within the state of California. Therefore, any plans that impact PG&E's facilities must be reviewed and approved by PG&E to ensure that no impact occurs which may endanger the safe operation of its facilities.

Attachment 2 – Electric Facilities

It is PG&E's policy to permit certain uses on a case by case basis within its electric transmission fee strip(s) and/or easement(s) provided such uses and manner in which they are exercised, will not interfere with PG&E's rights or endanger its facilities. Some examples/restrictions are as follows:

1. Buildings and Other Structures: No buildings or other structures including the foot print and eave of any buildings, swimming pools, wells or similar structures will be permitted within fee strip(s) and/or easement(s) areas. PG&E's transmission easement shall be designated on subdivision/parcel maps as "**RESTRICTED USE AREA – NO BUILDING."**

2. Grading: Cuts, trenches or excavations may not be made within 25 feet of our towers. Developers must submit grading plans and site development plans (including geotechnical reports if applicable), signed and dated, for PG&E's review. PG&E engineers must review grade changes in the vicinity of our towers. No fills will be allowed which would impair ground-to-conductor clearances. Towers shall not be left on mounds without adequate road access to base of tower or structure.

3. Fences: Walls, fences, and other structures must be installed at locations that do not affect the safe operation of PG&'s facilities. Heavy equipment access to our facilities must be maintained at all times. Metal fences are to be grounded to PG&E specifications. No wall, fence or other like structure is to be installed within 10 feet of tower footings and unrestricted access must be maintained from a tower structure to the nearest street. Walls, fences and other structures proposed along or within the fee strip(s) and/or easement(s) will require PG&E review; submit plans to PG&E Centralized Review Team for review and comment.

4. Landscaping: Vegetation may be allowed; subject to review of plans. On overhead electric transmission fee strip(s) and/or easement(s), trees and shrubs are limited to those varieties that do not exceed 15 feet in height at maturity. PG&E must have access to its facilities at all times, including access by heavy equipment. No planting is to occur within the footprint of the tower legs. Greenbelts are encouraged.

5. Reservoirs, Sumps, Drainage Basins, and Ponds: Prohibited within PG&E's fee strip(s) and/or easement(s) for electric transmission lines.

6. Automobile Parking: Short term parking of movable passenger vehicles and light trucks (pickups, vans, etc.) is allowed. The lighting within these parking areas will need to be reviewed by PG&E; approval will be on a case by case basis. Heavy equipment access to PG&E facilities is to be maintained at all times. Parking is to clear PG&E structures by at least 10 feet. Protection of PG&E facilities from vehicular traffic is to be provided at developer's expense AND to PG&E specifications. Blocked-up vehicles are not allowed. Carports, canopies, or awnings are not allowed.

7. Storage of Flammable, Explosive or Corrosive Materials: There shall be no storage of fuel or combustibles and no fueling of vehicles within PG&E's easement. No trash bins or incinerators are allowed.

8. Streets and Roads: Access to facilities must be maintained at all times. Street lights may be allowed in the fee strip(s) and/or easement(s) but in all cases must be reviewed by PG&E for

proper clearance. Roads and utilities should cross the transmission easement as nearly at right angles as possible. Road intersections will not be allowed within the transmission easement.

9. Pipelines: Pipelines may be allowed provided crossings are held to a minimum and to be as nearly perpendicular as possible. Pipelines within 25 feet of PG&E structures require review by PG&E. Sprinklers systems may be allowed; subject to review. Leach fields and septic tanks are not allowed. Construction plans must be submitted to PG&E for review and approval prior to the commencement of any construction.

10. Signs: Signs are not allowed except in rare cases subject to individual review by PG&E.

11. Recreation Areas: Playgrounds, parks, tennis courts, basketball courts, barbecue and light trucks (pickups, vans, etc.) may be allowed; subject to review of plans. Heavy equipment access to PG&E facilities is to be maintained at all times. Parking is to clear PG&E structures by at least 10 feet. Protection of PG&E facilities from vehicular traffic is to be provided at developer's expense AND to PG&E specifications.

12. Construction Activity: Since construction activity will take place near PG&E's overhead electric lines, please be advised it is the contractor's responsibility to be aware of, and observe the minimum clearances for both workers and equipment operating near high voltage electric lines set out in the High-Voltage Electrical Safety Orders of the California Division of Industrial Safety (https://www.dir.ca.gov/Title8/sb5g2.html), as well as any other safety regulations. Contractors shall comply with California Public Utilities Commission General Order 95 (http://www.cpuc.ca.gov/gos/GO95/go_95_startup_page.html) and all other safety rules. No construction may occur within 25 feet of PG&E's towers. All excavation activities may only commence after 811 protocols has been followed.

Contractor shall ensure the protection of PG&E's towers and poles from vehicular damage by (installing protective barriers) Plans for protection barriers must be approved by PG&E prior to construction.

13. PG&E is also the owner of distribution facilities throughout many of the areas within the state of California. Therefore, any plans that impact PG&E's facilities must be reviewed and approved by PG&E to ensure that no impact occurs that may endanger the safe and reliable operation of its facilities.

Randall Cates

From: Ness, William W CIV USARMY CESPK (US) <William.W.Ness@usace.army.mil>
Sent: Thursday, January 24, 2019 3:40 PM
To: Randall Cates
Subject: NOP for Johe Ranch Mining, (PP12316), SPk-2019-00060

Mr. Cates,

We are responding to your request for comments on the Johe Ranch Mining project.

The Corps of Engineers' jurisdiction within the study area is under the authority of Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps. Project features that result in the discharge of dredged or fill material into waters of the United States will require Department of the Army authorization prior to starting work.

To ascertain the extent of waters on the project site, the applicant should prepare a wetland delineation, in accordance with the "Minimum Standards for Acceptance of Preliminary Wetlands Delineations" and "Final Map and Drawing Standards for the South Pacific Division Regulatory Program" under "Jurisdiction" on our website at the address below, and submit it to this office for verification. A list of consultants that prepare wetland delineations and permit application documents is also available on our website at the same location.

The range of alternatives considered for this project should include alternatives that avoid impacts to wetlands or other waters of the United States. Every effort should be made to avoid project features which require the discharge of dredged or fill material into waters of the United States. In the event it can be clearly demonstrated there are no practicable alternatives to filling waters of the United States, mitigation plans should be developed to compensate for the unavoidable losses resulting from project implementation.

Please refer to identification number SPK-2019-00060 in any correspondence concerning this project. If you have any questions, please contact me at the below address.

Sincerely,

William Ness
Senior Project Manager
Regulatory Division, California South Section U.S. Army Corps of Engineers
1325 J Street, Room 1350
Sacramento, California 95814-2922
916-557-5268, fax: 916-930-9506
e-mail: william.w.ness@usace.army.mil
* We want your feedback! Take the survey: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey
* Need information on the Regulatory Program? Visit our website:
http://www.spk.usace.army.mil/Missions/Regulatory.aspx

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STATE OF CALIFORNIA
NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

Gavin Newsom, Governor

January 25, 2019

Randall Cates
Kern County
2700 M Street, Suite 100
Bakersfield, CA 93301

RE: SCH# 2019011010 EIR 09-17; Johe Ranch Mining Project by Diatom, LLC, Kern County

Dear Mr. Cates:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

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JAN 30 2019
Kern County Planning &
Natural Resources Dept.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Sharaya.Souza@nahc.ca.gov.

Sincerely,

for

Sharaya Souza
Staff Services Analyst

cc: State Clearinghouse

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COUNTY OF KERN
PUBLIC WORKS DEPARTMENT
Office Memorandum

To: Lorelei Oviatt, Director
Planning & Natural Resources Department
Attn: Randall Cates, Planner III

January 28, 2019

From: Warren D. Maxwell, Development Review Engineer
Administration and Engineering Division

Subject: 7-5.3 Notice Of Preparation of Draft Environmental Impact Report for Johe Ranch Mining Project by Diatom, LLC.

This Department has reviewed the Notice of Preparation Draft Environmental Impact Report for the subject project and have the following comments:

1. Provide this department with a copy of the traffic engineering study for the Draft Environmental Impact Report for this project for review and comment.

Thank you for the opportunity to comment on this project, if you have any questions or comments please contact Paul Candelaria at 862-8869.

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California
Department of Conservation
Division of Oil, Gas, and Geothermal Resources

Gavin Newsom, Governor
David Bunn, Director

January 31, 2019

Mr. Randall Cates
Kern County Planning and Natural Resources Department
2700 M Street, Suite 100
Bakersfield, CA 93301

Subject: EIR 09-17; Johe Ranch Mining Project by Diatom, LLC. (PP12316)
SCH#: 2019011010

Dear Mr. Cates:

The Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division) regulates oil and gas production facilities in addition to supervising the drilling, maintenance, and plugging and abandonment of oil, gas, and geothermal wells in California. All oil and gas well operations are subject to the Division's well permitting process, and all oil and gas operations must abide by any pertinent Division statute or regulation. The Division has received and reviewed the above referenced notice and submits the following evaluation.

The project is located in Kern County, outside of any of the Division's oil field administrative boundaries. Division records indicate there are **six** known abandoned and **two** active oil and gas wells located on the project site. According to records, the abandoned wells should not be visible at surface, and the Active wells should be visible at surface.

The wells are potential conduit to strata deeper than the aquifer(s) being recharged, representing a possible loss of water intended for recharge or banking purposes. The Division does not have authority to approve introduction of this water into deeper strata. Therefore, the Division recommends locating, uncovering, leak testing, and surveying the location of this well. Re-abandonment operations are recommended. Please see the enclosed Well Review Report for additional information about this well.

The well may have had a mud pit/drilling sump associated with drilling operations. The Division recommends soil testing and remediation of any contamination found. Please see comment 8 in the enclosed Well Review Report.

According to Section 3208.1 (a) of the Public Resources Code (PRC), the supervisor or district deputy may order the reabandonment of any previously abandoned well if the supervisor or district deputy has reason to question the integrity of the previous abandonment. Depending on circumstances described in PRC 3208.1 (b) (1), (2), (3), and PRC 3208.1 (c), the landowner, developer, or project owner could be responsible for reabandonment operations.

The developer/project owner is required to consult with the Division prior to the commencement of any work to uncover a known abandoned well.

If during project operations, any unrecorded wells are encountered the project developer or property owner shall immediately notify the Division's Inland District office for consultation. Remedial plugging and abandonment operations may be required.

Thank you for the opportunity to comment on this project. Should you have any questions, please contact Emily Loera at Emily.Loera@conservation.ca.gov or at (661) 334-3650.

Sincerely,

Cameron Campbell
District Deputy
Inland District

Well Review Report

The Division of Oil, Gas, and Geothermal Resources (Division) possesses records regarding oil and gas wells drilled and operated in the State of California. (Cal. Public Res. Code, §§ 3215, 3126.) Based on the Division's records and expertise, the Division has undertaken review of the well(s) referenced below at the request of a party either having jurisdiction over the use of the parcel referenced above, or a party having control over, or an interest in, the use of the parcel. This request is considered by the Division as voluntary participation in the Division's Well Review Program. The Division provides the information below to facilitate local permitting agencies' exercise of local land use authority regarding use of land where oil and gas wells are situated. In contrast, the Division does not possess local land use decision authority, but alternatively has authority for permitting any necessary work on any well in the state. (Cal. Public Res. Code, §§ 3106 and 3203.)

The Division has conducted a record review of the known well(s) located on the above-referenced parcel(s). The record review process consists of determining the possible location, last known operator, and abandonment status of any known well on the property by examining records previously submitted to the Division, and then comparing the abandonment status with current abandonment standards.

In general, a well may be considered adequately abandoned when both the record review and on-site evaluation process reflect that steps have been taken to isolate all oil-bearing or gas-bearing strata encountered in the well, and to protect underground or surface water suitable for irrigation or farm or domestic purposes from the infiltration or addition of any detrimental substance, and to prevent damage to life, health, property, and other resources. (Cal. Public Res. Code, § 3208.)

The local permitting agency, property owner, and/or developer should be aware of, and fully understand, that significant and potentially dangerous issues may be associated with development near oil and gas wells. These issues are non-exhaustively identified in the following comments and are provided by the Division for consideration by the local permitting agency, in conjunction with the property owner and/or developer, on a parcel-by-parcel or well-by-well basis. As stated above, the Division provides the above well review information solely to facilitate decisions made by the local permitting agency regarding potential development near oil or gas wells.

1. The Division recommends that access to any well located on the property be maintained in the event abandonment or re-abandonment of the well becomes necessary in the future. Impeding access to a well could result in the need to remove any structure or obstacle that prevents or impedes access. This includes, but is not limited to, buildings, housing, fencing, landscaping, trees, pools, patios, sidewalks, and decking.

2. Nothing guarantees that wells abandoned to current standards will not start leaking oil, gas, and/or water in the future. It always remains a possibility that any well may start to leak oil, gas, and/or water after abandonment, no matter how thoroughly the well was plugged and abandoned. The Division acknowledges wells that are presently abandoned to current standards have a lower probability of leaking oil, gas, and/or water in the future, but makes no guarantees as to the adequacy of the abandonment or the potential need for future re-abandonment.

3. Based on comments 1 and 2 above, the Division makes the following general recommendations:

   a. Maintain physical access to all oil and gas wells.

   b. Ensure that the abandonment of all oil and gas wells is to current standards.

If the local permitting agency, property owner, and/or developer chooses not to follow recommendation b for each well located on the development site property, the Division believes that the importance of following

recommendation a for each well located on the subject property increases. If recommendation a cannot be followed for each well located on the subject property, then the Division advises the local permitting agency, property owner, and/or developer to consider any and all alternatives to proposed construction or development on the site (see comment 4 below).

4.Sections 3208 and 3255(a)(3) of the Public Resources Code give the Division the authority to order the re-abandonment of any well that is hazardous, or that poses a danger to life, health, or natural resources. Responsibility for re-abandonment costs for any well may be affected by the choices made by the local permitting agency, property owner, and/or developer in considering the general recommendations set forth in this letter. (Cal. Public Res. Code, § 3208.1.)

5. Maintaining sufficient access to an oil or gas well may be generally described as maintaining "rig access" to the well. Rig access allows a well servicing rig and associated necessary equipment to reach the well from a public street or access way, solely over the parcel on which the well is located. A well servicing rig, and any necessary equipment, should be able to pass unimpeded along and over the route, and should be able to access the well without disturbing the integrity of surrounding infrastructure.

6. The Division recommends that a local permitting agency consider the use of surface mitigation measures as a condition for project approval, if and when appropriate. Examples of surface mitigation measures include venting systems for wells, venting systems for parking lots, patios, and other hardscape, methane barriers for building foundations, methane detection systems, and collection cellars for well fluids. The Division does not regulate the design, installation, operation, or adequacy of such measures. The Division recommends that such surface mitigation measures are designed, installed, and operated by qualified engineers. The permitting of surface mitigation measures falls under the jurisdiction of the local permitting agency.

7. If during the course of development of a parcel any unknown wells are discovered, the Division should be notified immediately so that the newly discovered well(s) can be incorporated into the Well Review processes.

8. The Division recommends that any soil containing significant amounts of hydrocarbons be disposed of in accordance with local, state, and federal laws. Please notify the appropriate authorities if soil containing significant amounts of hydrocarbons is discovered during development.

9. The Division recommends that the information contained in this Well Review Report, and any pertinent information obtained after the issuance of this report, be communicated to the appropriate county recorder for inclusion in the title information of the subject real property. This is to ensure that present and future property owners are aware of (1) the wells located on the property, and (2) potentially significant issues associated with any improvements near oil or gas wells.

10. The Division further recommends that no structure be built over or in proximity to an abandoned well location. Section 3208.1 of the Public Resources Code authorizes the State Oil and Gas Supervisor to order the reabandonment of a previously abandoned well when construction of any structure over or in the proximity of a well could result in a hazard. The cost of reabandonment operations is the responsibility of the owner or developer of the project upon which the structure will be located. In addition, flow lines from the two active dry gas wells ("Snow" 25A-7 and 36-7) to gas storage vessels should be located, marked if necessary, and avoided.

No well work may be performed on any oil or gas well without written approval from the Division in the form of an appropriate permit. This includes, but is not limited to, mitigating leaking fluids or gas from abandoned wells, modifications to well casings, and/or any other re-abandonment work. NOTE: The Division regulates the

depth of any well below final grade (depth below the surface of the ground). Title 14, Section 1723.5 of the California Code of Regulations states that all well casings shall be cut off at least 5 feet but no more than 10 feet below grade. If any well needs to be lowered or raised (i.e. casing cut down or casing riser added) to meet this grade regulation, a permit from the Division is required before work can start.

To reiterate, the local permitting agency, property owner, and/or developer should be aware of, and fully understand, that the above comments are made by the Division with the intent to encourage full consideration of significant and potentially dangerous issues associated with development near oil or gas wells.

Total number of known wells on development site: **8**

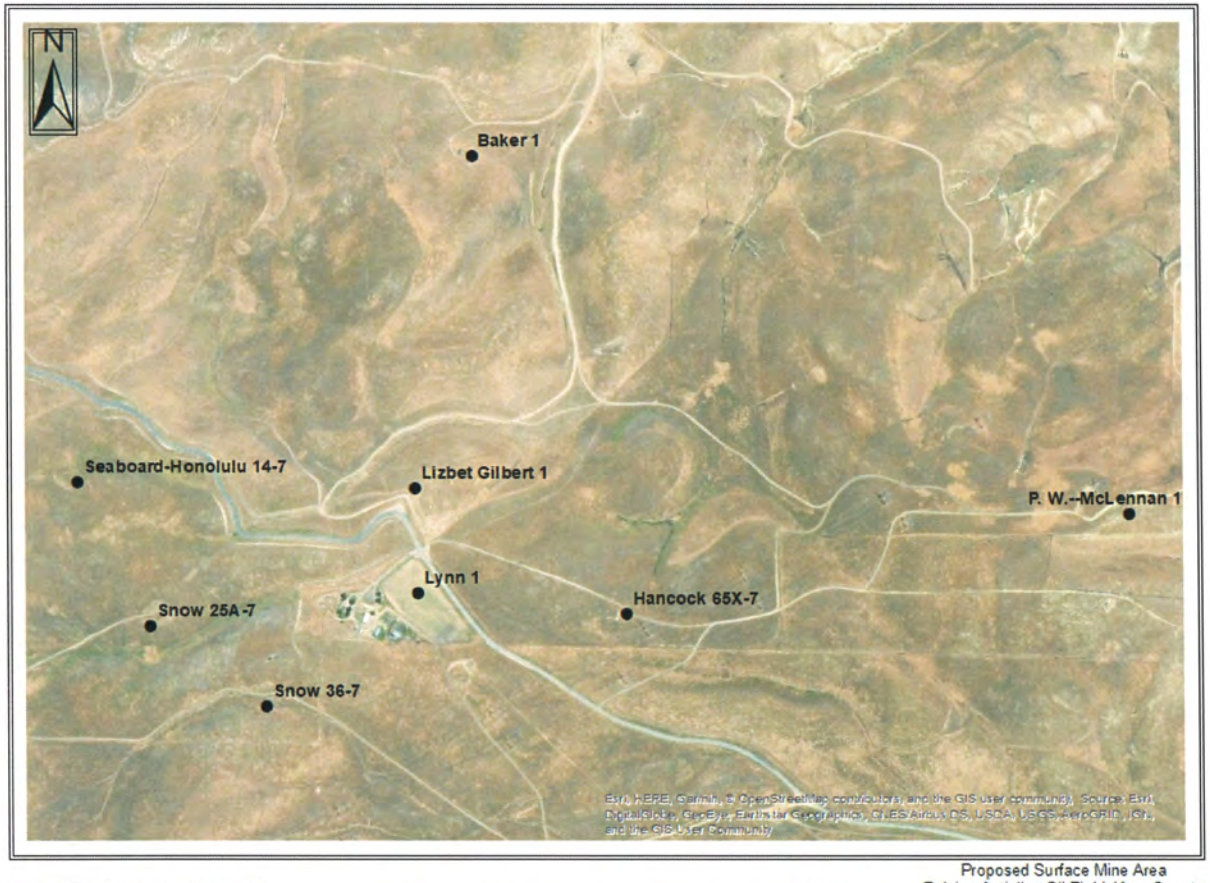
Well	Status
CalResources LLC P. W.–McLennan 1 029-13537	The record review process shows that the subject well is not abandoned to current Division standards as of August 29, 2018. Section 7, T. 30S, R. 21E, MD Based on well records: 1. The well does not meet plugging and abandonment requirements for hole fluid. CCR 1723 (b) 2. The well does not meet plugging and abandonment requirements for plugging in an open hole. CCR 1723.1 (a) Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review
Union Oil Company of California Seaboard-Honolulu 14-7 029-25390	The record review process shows that the subject well is not abandoned to current Division standards as of August 29, 2018. Section 7, T. 30S, R. 21E, MD Based on well records: 1. The well does not meet plugging and abandonment requirements for hole fluid. CCR 1723 (b) 2. The well does not meet plugging and abandonment requirements for plugging in an open hole. CCR 1723.1 (a) Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review

Well	Status
CalResources LLC Baker 1 029-13535	The record review process shows that the subject well is not abandoned to current Division standards as of August 29, 2018. Section 7, T. 30S, R. 21E, MD Based on well records: 1. The well does not meet plugging and abandonment requirements for hole fluid. CCR 1723 (b) 2. The well does not meet plugging and abandonment requirements for plugging in an open hole. CCR 1723.1 (a) Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review
R. B. Watkins Lynn 1 029-37726	The record review process shows that the subject well is not abandoned to current Division standards as of August 29, 2018. Section 7, T. 30S, R. 21E, MD Based on well records: 1. The well does not meet plugging and abandonment requirements for hole fluid. CCR 1723 (b) 2. The well does not meet plugging and abandonment requirements for plugging in an open hole. CCR 1723.1 (a) Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review

Well	Status
Stanley Johnson Lizbet Gilbert 1 029-37652	The record review process shows that the subject well is not abandoned to current Division standards as of August 29, 2018. Section 7, T. 30S, R. 21E, MD Based on well records: 1. The well does not meet plugging and abandonment requirements for hole fluid. CCR 1723 (b) 2. The well does not meet plugging and abandonment requirements for plugging in an open hole. CCR 1723.1 (a) Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review
Union Oil Company of California Hancock 65X-7 029-23697	The record review process shows that the subject well is not abandoned to current Division standards as of August 29, 2018. Section 7, T. 30S, R. 21E, MD Based on well records: 1. The well does not meet plugging and abandonment requirements for hole fluid. CCR 1723 (b) 2. The well does not meet plugging and abandonment requirements for plugging in an open hole. CCR 1723.1 (a) Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review

Well	Status
E & B Natural Resources Management Corporation Snow 25A-7 029-13538	The record review process shows that the subject well is **active** as of January 31, 2019. Section 7, T. 30S, R. 21E, MD Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review
E & B Natural Resources Management Corporation Snow 36-7 029-13539	The record review process shows that the subject well is **active** as of January 31, 2019. Section 7, T. 30S, R. 21E, MD Please refer to the enclosed map and the Division's online Well Finder map for well location at *http://www.conservation.ca.gov/dog/Pages/Wellfinder.aspx* California Code of Regulations (CCR) and PRC may be found at https://www.conservation.ca.gov/index/Documents/DOGGR-SR-1%20Web%20Copy.pdf CCR accessed on January 30, 2019 for this review

Location Map
Johe Ranch Mining Project by Diatom



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Central Region
1234 East Shaw Ave.
Fresno, CA 93710
(559) 243-4005
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

February 5, 2019

Randall Cates
Kern County
2700 M Street, Suite 100
Bakersfield, California 93301

Subject: Johe Ranch Mining Project by Diatom, LLC (Project), Notice of Preparation (NOP), Environmental Impact Report (EIR) 09-17, SCH No: 2019011010

Dear Mr. Cates:

The California Department of Fish and Wildlife (CDFW) received an NOP from Kern County for the Project pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, CDFW appreciates the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code. Although the comment period for your request has passed, CDFW would appreciate if you would still consider the following comments.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish and Game Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (*Id.*, § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's Lake and Streambed Alteration (LSA) regulatory authority (Fish and Game Code, § 1600 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish and Game Code, § 2050 et seq.), the project proponent may seek related take authorization as provided by the Fish and Game Code.

Fully Protected Species: CDFW has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code sections 3511, 4700, 5050, and 5515. Take of any fully protected species is prohibited and CDFW cannot authorize their incidental take. For example, the State and federally endangered blunt-nosed leopard lizard (*Gambelia sila*) is a fully protected species that occurs within the general project vicinity and may occur within the immediate project area.

Water Pollution: Pursuant to Fish and Game Code Section 5650, it is unlawful to deposit in, permit to pass into, or place where it can pass into "Waters of the State" any substance or material deleterious to fish, plant life, or bird life, including non-native species. It is possible that without mitigation measures implemented within the Johe Ranch Mining Project, the Project could result in pollution of Waters of the State from storm water runoff or construction-related erosion. Potential impacts to the wildlife resources that utilize these watercourses include the following: increased sediment input from road or structure runoff; toxic runoff associated with development activities and implementation; and/or impairment of wildlife movement along riparian corridors. The Regional Water Quality Control Board and United States Army Corps of Engineers (USACE) also have jurisdiction regarding discharge and pollution to Waters of the State.

PROJECT DESCRIPTION SUMMARY

Proponent: Diatom, LLC

Objective: The objective of the Project is to obtain a Conditional Use Permit (CUP) for a new surface diatomaceous earth mining operation and development of a reclamation plan on a 331-acre project site. Site disturbance would be approximately 93.67-acres and would provide for a maximum annual production level of 310,000 tons of diatomaceous earth and 20,000 tons of overburden material employing open pit mining techniques. Site disturbance includes development of access roads and a 2.42-acre area proposed as a blending and screening site.

Location: The Project site is in an unincorporated area of western Kern County, approximately 8.5 miles west of the unincorporated community of McKittrick, California, off State Route 58. The Project is within United States Geological Survey McKittrick Summit quadrangle and is in a portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The Project is identified as portions of Kern County Assessor's Parcel Numbers 156-070-01, 156-070-02 and 156-070-10.

Timeframe: Undetermined.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist Kern County in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the document.

Based on aerial imagery, California Natural Diversity Database (CNDDB) species occurrence records, and the soils present on the site, the Project site is known to and/or has high potential to support numerous special-status species, including CESA-listed species (CDFW 2019). Therefore, the Project has the potential to significantly impact these species. Specifically, CDFW is concerned about the potential of the Project to significantly impact the State fully protected and State and federally endangered blunt-nosed leopard lizard (*Gambelia sila*); the State threatened and federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*); the State and federally endangered giant kangaroo rat (*Dipodomys ingens*); the State threatened San Joaquin antelope squirrel (*Ammospermophilus nelsoni*); the federally endangered Kern mallow (*Eremalche kernensis*); and the State Species of Special Concern burrowing owl (*Athene cunicularia*) and Le Conte's thrasher (*Toxostoma lecontei*).

Please note that the CNDDB is populated by and records all voluntary submissions of species detections. As a result, species may be present in locations not depicted in the CNDDB but where there is potentially suitable habitat and features capable of supporting species. Therefore, a lack of an occurrence record in the CNDDB is not tantamount to a negative species finding. In order to adequately assess any potential Project-related impacts to biological resources, surveys need to be conducted by a qualified wildlife biologist/botanist during the appropriate survey period(s) and using the appropriate protocol survey methodology in order to determine whether or not any special status species are present at or near the Project area.

CDFW recommends that focused, protocol-level surveys for these species be conducted to evaluate impacts of the Project on these species. CDFW further recommends that the results of these surveys be considered during the preparation of the Project's CEQA document. Additionally, when an EIR is prepared, mitigation

measures must be specific and clearly defined and cannot be deferred to a future time. The specifics of mitigation measures may be deferred, provided the lead agency commits to mitigation and establishes performance standards for implementation, when an EIR is prepared. The CEQA document must provide quantifiable and enforceable measures as needed that will reduce impacts to less than significant levels.

I. Environmental Setting and Related Impact

Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or United States Fish and Wildlife Service (USFWS)?

COMMENT 1: San Joaquin kit fox (SJKF)

Issue: SJKF have been documented to occur within the vicinity of the Project area (CDFW 2019). Presence/absence in any one year is not necessarily a reliable indicator of SJKF potential to occur on a site. SJKF may be attracted to project areas due to the type and level of ground-disturbing activities and the loose, friable soils resulting from intensive ground disturbance. As a result, there is potential for SJKF to colonize the Project area or to occupy adjacent grassland.

Specific impact: Without appropriate avoidance and minimization measures for SJKF, potential significant impacts associated with the Project include den collapse, inadvertent entrapment, reduced reproductive success, reduction in health and vigor of young, and direct mortality of individuals.

Evidence impact would be significant: SJKF are endemic to California and were historically distributed throughout the San Joaquin Valley, adjacent foothills, and valleys in the coastal mountains of central California (CDFG 1995). Habitat loss resulting from agricultural, urban, and industrial development is the primary threat to SJKF (Cypher et al. 2013). Therefore, ground-disturbing activities within the Project have the potential to significantly impact local SJKF populations.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to SJKF associated with Project development, CDFW recommends conducting the following evaluation of project areas prior to EIR development and including the following mitigation measures as conditions of approval for the Project.

Recommended Mitigation Measure 1: SJKF Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in

advance of EIR development, to determine if the project area or its immediate vicinity contains suitable habitat for SJKF.

Recommended Mitigation Measure 2: SJKF Surveys

CDFW recommends assessing presence/absence of SJKF by conducting surveys following the USFWS "Standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance" (2011). Specifically, CDFW advises conducting these surveys in all areas of potentially suitable habitat prior to EIR development and again no less than 14 days and no more than 30 days prior to beginning of ground disturbing activities. In addition, CDFW advises that these surveys extend out to 200-feet from the Project area boundaries.

Recommended Mitigation Measure 3: SJKF Take Authorization

SJKF detection warrants consultation with CDFW to discuss how to avoid take, or if avoidance is not feasible, to acquire an Incidental Take Permit (ITP) prior to ground-disturbing activities, pursuant to Fish and Game Code Section 2081(b).

COMMENT 2: Blunt-nosed leopard lizard (BNLL)

Issue: BNLL have been documented to occur within the vicinity of the Project area (CDFW 2019). Suitable BNLL habitat includes areas of grassland, upland scrub, and intermittent washes that contain requisite habitat elements, such as small mammal burrows. BNLL also use open space patches between suitable habitats, including disturbed sites and unpaved access roadways. Therefore, ground disturbance within the Project has the potential to significantly impact local BNLL populations, a Fully Protected Species.

Specific impact: Without appropriate avoidance and minimization measures for BNLL, potentially significant impacts associated with ground-disturbing activities associated with construction of the Project include burrow collapse, nest abandonment, reduced nest success, reduced health and vigor of eggs and/or young, in addition to direct mortality in violation of Fish and Game Code.

Evidence impact is potentially significant: The BNLL, endemic to California, historically occurred throughout the San Joaquin Valley and adjacent foothills of central California. The species now inhabits only scattered locations within the Valley, less than 15% of their former range (USFWS 2010). Threats to the BNLL include habitat destruction, fragmentation, and degradation; pesticides; alterations of vegetation communities including spread of invasive plants that restrict movement of the BNLL (USFWS 2010). Habitat loss resulting from agricultural, urban, and industrial development, including petroleum and mineral extraction, is the primary

threat to BNLL (ESRP 2019a). Therefore, ground disturbance within the Project has the potential to significantly impact local BNLL populations.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to BNLL associated with Project development, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures as conditions of approval for the Project.

Recommended Mitigation Measure 4: BNLL Surveys

Prior to initiating any vegetation- or ground-disturbance activities, CDFW recommends conducting surveys in accordance with the "Approved Survey Methodology for the Blunt-nosed Leopard Lizard" (CDFG 2004). This recommended survey protocol, designed to optimize BNLL detectability, reasonably assures CDFW that ground-disturbance will not result in take of this fully protected species.

CDFW advises completion of BNLL surveys no more than one year prior to initiation of ground disturbance. Please note that protocol-level surveys must be conducted on multiple dates during late spring, summer, and fall and that within these time periods there are specific protocol-level date, temperature, and time parameters which must be adhered to. As a result, protocol-level surveys for BNLL are not synonymous with 30-day "preconstruction surveys" often recommended for other wildlife species. In addition, the BNLL protocol specifies different survey effort requirements based on whether the disturbance results from maintenance activities or if the disturbance results in habitat removal (CDFG 2004).

Recommended Mitigation Measure 5: BNLL Take Avoidance

BNLL detection during protocol level surveys warrants consultation with CDFW to discuss how to implement ground-disturbing activities and avoid take.

COMMENT 3: San Joaquin Antelope Squirrel (SJAS)

Issue: SJAS have been documented to occur within the vicinity of the Project area (CDFW 2019). Suitable SJAS habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows. Therefore, ground disturbance within the Project has the potential to significantly impact local SJAS populations.

Specific impact: Without appropriate avoidance and minimization measures for SJAS, potential significant impacts include nest abandonment, which may result in reduced reproductive success such as reduced health or vigor of young, in addition to direct mortality in violation of Fish and Game Code.

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development, including petroleum and mineral extraction, is the primary threat to SJAS. Very little suitable habitat for this species remains along the western floor of the San Joaquin Valley (ESRP 2019b). As a result, ground-disturbing activities within the Project area have the potential to significantly impact local populations of SJAS.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to SJAS associated with Project development, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures as conditions of approval for the Project.

Recommended Mitigation Measure 6: SJAS Surveys

In areas of suitable habitat, CDFW recommends that a qualified biologist conduct focused daytime visual surveys for SJAS using line transects with 10- to 30-meter spacing. CDFW further advises that these surveys be conducted between April 1 and September 20, during appropriate conditions. Conditions considered appropriate for SJAS include daytime temperatures between 68–86° F (CDFG 1990).

Recommended Mitigation Measure 7: SJAS Avoidance

If suitable habitat is present and surveys or trapping are not feasible, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrows of suitable size for SJAS.

Recommended Mitigation Measure 8: SJAS Take Authorization

SJAS detection warrants consultation with CDFW to discuss how to avoid take, or if avoidance is not feasible, to acquire an ITP prior to ground-disturbing activities, pursuant to Fish and Game Code Section 2081(b).

COMMENT 4: Giant kangaroo rat (GKR)

Issue: Review of aerial imagery reveals that suitable habitat for GKR may be present both within and in the vicinity of the Project area. GKR inhabit sandy-loam soils located in open grassland habitat containing widely-scattered desert shrubs. Habitat both within and bordering the Project area, supports grassland habitat. Therefore, there is potential for GKR to colonize the Project site.

Specific impact: Without appropriate avoidance and minimization measures for GKR, significant impacts resulting from ground-and vegetation-disturbing activities associated with construction of the Project include burrow collapse, inadvertent

entrapment, reduced reproductive success, reduction in health and vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development, including petroleum and mineral extraction is the primary threat to GKR. Very little suitable habitat for GKR remains along the western edge of the San Joaquin Valley (USFWS 1998). As a result, if the Project area is occupied by GKR, Project activities have the potential to significantly impact local populations of the species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to GKR associated with Project development, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures as conditions of approval for the Project.

Recommended Mitigation Measure 9: GKR Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of EIR development, to determine if the project area or its immediate vicinity contains suitable habitat for GKR.

Recommended Mitigation Measure 10: GKR Trapping Surveys

If suitable habitat for GKR is identified on the Project site CDFW recommends that a trapping plan for determining presence of GKR be submitted to and approved by CDFW prior to subsequent trapping efforts. CDFW recommends these surveys be conducted by a qualified biologist who holds a Memorandum of Understanding for GKR. CDFW further recommends that these surveys be conducted between April 1 and October 31, when GKR are most active and well in advance of ground-disturbing activities in order to determine if impacts to GKR could occur.

Recommended Mitigation Measure 11: GKR Avoidance

If suitable habitat is present and trapping is not feasible, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrows of suitable size for GKR.

Recommended Mitigation Measure 12: GKR Take Authorization

If GKR are found within the Project area during preconstruction surveys or construction activities, consultation with CDFW is advised to discuss how to implement the Project and avoid take; or if avoidance is not feasible, to acquire an ITP prior to any ground-disturbing activities, pursuant to Fish and Game Code Section 2081(b).

COMMENT 5: Burrowing Owl (BUOW)

Issue: Review of aerial imagery reveals that suitable habitat for BUOW is present both within and in the vicinity of the Project area. BUOW inhabit open grassland containing small mammal burrows, a requisite habitat feature used by BUOW for nesting and cover. Habitat both within and bordering the Project area, supports grassland habitat. Therefore, there is potential for BUOW to colonize the Project site.

Specific impact: Potentially significant direct impacts associated with Project construction include burrow collapse, inadvertent entrapment, nest abandonment, reduced reproductive success, reduction in health and vigor of eggs and/or young, and direct mortality of individuals.

Evidence impact is potentially significant: BUOW rely on burrow habitat year-round for their survival and reproduction. Habitat loss and degradation are considered the greatest threats to BUOW in California's Central Valley (Gervais et al. 2008). Therefore, subsequent ground-disturbing activities associated with the Project have the potential to significantly impact local BUOW populations. In addition, and as described in CDFW's "*Staff Report on Burrowing Owl Mitigation*" (CDFG 2012), excluding and/or evicting BUOW from their burrows is considered a potentially significant impact under CEQA.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to BUOW, CDFW recommends conducting the following evaluation of the Project area and including the following mitigation measures as condition of approval for the Project.

Recommended Mitigation Measure 13: BUOW Surveys

CDFW recommends assessing presence/absence of BUOW by having a qualified biologist conduct surveys following the California Burrowing Owl Consortium's (CBOC) "*Burrowing Owl Survey Protocol and Mitigation Guidelines*" (CBOC 1993) and CDFW's *Staff Report on Burrowing Owl Mitigation*" (CDFG 2012). Specifically, CBOC and CDFW's Staff Report suggest three or more surveillance surveys conducted during daylight with each visit occurring at least three weeks apart during the peak breeding season (April 15 to July 15), when BUOW are most detectable. In addition, CDFW advises that surveys include a 500-foot buffer around the Project area.

Recommended Mitigation Measure 14: BUOW Avoidance

Should a BUOW be detected, CDFW recommends no-disturbance buffers, as outlined in the "*Staff Report on Burrowing Owl Mitigation*" (CDFG 2012), be

implemented prior to and during any ground-disturbing activities. Specifically, CDFW's Staff Report recommends that impacts to occupied burrows be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Recommended Mitigation Measure 15: BUOW Passive Relocation and Mitigation

If BUOW are found within these recommended buffers and avoidance is not possible, it is important to note that according to the Staff Report (CDFG 2012), exclusion is not a take avoidance, minimization, or mitigation method and is considered a potentially significant impact under CEQA. However, if necessary, CDFW recommends that burrow exclusion be conducted by qualified biologists and only during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty through non-invasive methods, such as surveillance. CDFW recommends replacement of occupied burrows with artificial burrows at a ratio of 1 burrow collapsed to 3 artificial burrows constructed (3:1) as mitigation for the potentially significant impact of evicting BUOW. Because BUOW may attempt to colonize or re-colonize an area that will be impacted, CDFW recommends ongoing surveillance at a rate that is sufficient to detect BUOW if they return.

COMMENT 6: Other State Species of Special Concern and Watch List Species

Issue: LeConte's thrasher, prairie falcon (*Falco mexicanus*), short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*), Tulare grasshopper mouse (*Onychomys torridus tularensis*), San Joaquin coachwhip (*Masticophis flagellum ruddocki*), California legless lizard (*Anniella* spp.), coast horned lizard (*Phrynosoma blainvillii*), and American badger (*Taxidea taxus*) can inhabit grassland and upland scrub habitats (Shuford and Gardali 2008, Thomson et al. 2016). All of the species mentioned above have been documented to occur in the vicinity of the Project area, which supports requisite habitat elements for these species (CDFW 2019).

Specific impact: Without appropriate avoidance and minimization measures for these species, potentially significant impacts associated with ground disturbance

include nest/den/burrow abandonment, which may result in reduced health or vigor of eggs and/or young, and direct mortality.

Evidence impact is potentially significant: Habitat loss threatens all of the species mentioned above (Shuford and Gardali 2008, Thomson et al. 2016). As a result, ground-and vegetation-disturbing activities associated with development of the Project have the potential to significantly impact local populations of these species.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to special-status species associated with subsequent development, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 16: Habitat Assessment

CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if project areas or their immediate vicinity contain suitable habitat for the species mentioned above.

Recommended Mitigation Measure 17: Surveys

If suitable habitat is present, CDFW recommends that a qualified biologist conduct focused surveys for applicable species and their requisite habitat features to evaluate potential impacts resulting from ground- and vegetation-disturbance.

Recommended Mitigation Measure 18: Avoidance

Avoidance whenever possible is encouraged via delineation and observance a 50-foot no-disturbance buffer around dens of mammals like the American badger as well as burrows which can provide refuge for small mammals, reptiles, and amphibians, and 100 feet around nests of special-status bird species.

COMMENT 7: Special-Status Plants

Issue: A number special-status plants meeting the definition of rare or endangered under CEQA Section 15380 are known to occur in the vicinity of the Project area including, but not limited to, the federally endangered Kern Mallow and San Joaquin woollythreads (*Monolopia congdonii*).

Specific impact: Without appropriate avoidance and minimization measures for special-status plants, potential significant impacts associated with the Project include inability to reproduce and direct mortality.

Evidence impact would be significant: Kern Mallow and San Joaquin woollythreads are threatened by grazing and agricultural, urban, and energy development. Many historical occurrences of these species are presumed extirpated (CNPS 2019). Though new populations have recently been discovered, impacts to existing populations have the potential to significantly impact populations of these species. Many of the other special-status species known to occur in the Project area are also threatened by the activities mentioned above.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to special-status plants associated with Project development, CDFW recommends conducting the following evaluation of project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 19: Special-Status Plant Surveys

CDFW recommends that individual project sites be surveyed for special-status plants by a qualified botanist following the "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities" (CDFW 2018). This protocol, which is intended to maximize detectability, includes the identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period. In the absence of protocol-level surveys being performed, additional surveys may be necessary.

Recommended Mitigation Measure 20: Special-Status Plant Avoidance

CDFW recommends special-status plant species be avoided whenever possible by delineation and observing a no-disturbance buffer of at least 50-feet from the outer edge of the plant population(s) or specific habitat type(s) required by special-status plant species. If buffers cannot be maintained, then consultation with CDFW is warranted to determine appropriate minimization and mitigation measures for impacts to special-status plant species.

Recommended Mitigation Measure 21: Special-Status Plant Take Authorization

If a State-listed plant species is identified during botanical surveys, consultation with CDFW is warranted to determine if the Project can avoid take. If take cannot be avoided, take authorization may be warranted. Take authorization would occur through issuance of an ITP by CDFW, pursuant to Fish and Game Code Section 2081(b).

COMMENT 8: Lake and Streambed Alteration

Issue: The Project site contains numerous intermittent waterways and subsequent development within the Project site has the potential to involve temporary and permanent impacts to the bed, bank, and channels of these features. These features may be subject to CDFW's LSA regulatory authority, pursuant to Fish and Game Code Section 1600 et seq.

Specific impact: Work within stream channels has the potential to result in substantial diversion or obstruction of natural flows; substantial change or use of material from the bed, bank, or channel (including removal of riparian vegetation); deposition of debris, waste, sediment, toxic runoff or other materials into water causing water pollution and degradation of water quality.

Evidence impact is potentially significant: The Project site includes features potentially subject to CDFW's LSA regulatory authority. Construction activities within these features has the potential to impact downstream waters.

Recommended Potentially Feasible Mitigation Measure(s)
To evaluate potential impacts to waterways, CDFW recommends conducting the following evaluation of the subject parcel and implementing the following mitigation measures.

Recommended Mitigation Measure 22: Wetland Delineation and Lake and Stream Notification

CDFW recommends a formal wetland delineation be conducted by a qualified biologist to determine the location and extent of wetlands and waterways on parcels slated for development. Please note that, while there is overlap, State and Federal definitions of wetlands as well as what activities require Notification pursuant to Fish and Game Code Section 1602 differ. Therefore, it is advised that the delineation identify both State and Federal wetlands on the Project site as well as what activities may require Notification to comply with Fish and Game Code. Fish and Game Code Section 2785 (g) defines wetlands; further Section 1600 et seq. applies to any area within the bed, channel, or bank of any river, stream, or lake (including riparian vegetation). It is important to note that while accurate delineations by qualified individuals have resulted in more rapid review and response from USACE and CDFW, substandard or inaccurate delineations have resulted in unnecessary time delays for applicants due to insufficient, incomplete, or conflicting data. CDFW advises that site map(s) designating wetlands as well as the location of any activities that may affect a lake or stream be included with any Project site evaluations.

Recommended Mitigation Measure 23: Notification of Lake or Streambed Alteration

Project-related activities that have the potential to change the bed, bank, and channel of streams and other waterways, may be subject to CDFW's regulatory authority pursuant to Fish and Game Code Section 1600 et seq., therefore notification is recommended. Fish and Game Code Section1600 et seq. requires an entity to notify CDFW prior to commencing any activity that may (a) substantially divert or obstruct the natural flow of any river, stream, or lake; (b) substantially change or use any material from the bed, bank, or channel of any river, stream, or lake (including the removal of riparian vegetation); (c) deposit debris, waste or other materials that could pass into any river, stream, or lake. "Any river, stream, or lake" includes those that are ephemeral or intermittent as well as those that are perennial. CDFW is required to comply with CEQA in the issuance of an LSA Agreement. For additional information on notification requirements, please contact our staff in the LSA Program at (559) 243-4593.

II. Editorial Comments and/or Suggestions

Federally Listed Species: CDFW recommends consulting with the USFWS on potential impacts to federally listed species including, but not limited to, Kern Mallow, BNLL, GKR, and SJKF. Take under the federal Endangered Species Act (ESA) is more broadly defined than CESA; take under ESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding, foraging, or nesting. Consultation with the USFWS to comply with ESA is advised well in advance of any ground-disturbing activities.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special status species and natural communities detected during Project surveys to CNDDB. The CNDDB field survey form can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp.

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment

of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final (Cal. Code Regs, tit. 14, § 753.5; Fish and Game Code, § 711.4; Pub. Resources Code, § 21089).

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP to assist Kern County in identifying and mitigating Project impacts on biological resources.

Questions regarding this letter or further coordination should be directed to Brandon Sanderson, Environmental Scientist, at the address provided on this letterhead, by telephone at (805) 594-6141, or by email at Brandon.Sanderson@wildlife.ca.gov.

Sincerely,

Julie A. Vance
Regional Manager

ec: Randall Cates
Kern County
CatesR@kerncounty.com

Timothy Ludwick
United States Fish and Wildlife Service
timothy_ludwick@fws.gov

Office of Planning and Research, State Clearinghouse, Sacramento:
State.Clearinghouse@opr.ca.gov

California Department of Fish and Wildlife:
Craig Bailey
Brandon Sanderson

REFERENCES

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DEPARTMENT OF CALIFORNIA HIGHWAY PATROL
Buttonwillow Area CHP
29449 Stockdale Highway
Bakersfield, CA 93314
(661) 764-5580
(800) 735-2929 (TT/TDD)
(800) 735-2922 (Voice)

February 6, 2019

File No.: 426.13507.16364

Kern County Planning Natural Resources Department
Attn: Randall Cates
2700 "M" Street, Suite 100
Bakersfield, CA 93301
CatesR@kerncounty.com

RE: SCH# 2019011010

The California Highway Patrol (CHP), Buttonwillow Area recently received a "Notice of Preparation" Environmental Impact Report for the proposed *Johe Ranch Mining Project by Diatom, LLC*, State Clearing House (SCH) #2019011010. After our review, we have concerns with the potential impact this project could have on traffic congestion.

The project description outlines the maximum annual removal of material, estimated to be 330,000 tons (310,000 tons of diatomaceous earth, 20,000 tons of overburden material). With the removal of the aforementioned material, and any other trips associated with the project, there is a significant potential the project will have an impact on traffic and should be further evaluated.

Heavy truck traffic on local roadways and state routes will increase as materials and products are transported to, and from the plant. The increased truck traffic has the potential to increase traffic congestion and collisions. Traffic enforcement, education, and additional traffic control measures should be utilized to mitigate the potential increase in traffic collisions. We are hopeful plant operators will diligently establish, monitor and enforce plant rules related to vehicle safety as CHP personnel work to assure compliance with the provisions of the California Vehicle Code.

Sincerely,

S. C. CROSSWHITE, Lieutenant
Commander

cc: CHP Central Division
CHP Special Projects Section

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Randall Cates

From: Summers, Carly <csummers@blm.gov>
Sent: Thursday, February 7, 2019 8:55 AM
To: Randall Cates
Subject: BLM comments - Johe Ranch Mining Project by Diatom

Hi Randall,

The Bureau of Land Management (BLM) reviewed this project and would like to advise the county that BLM manages the oil and gas mineral estate under the parcels that will be developed. Should the leasee of the fluid minerals wish to develop the lease in the future, the BLM oil and gas rights would be superior to the surface mining operations. This is something the project proponent should be aware of. If you or the project applicant have any questions, I would encourage you to get in touch with Kevin Coodey <kcoodey@blm.gov>, Assistant Field Manager for Minerals in the Bakersfield Field Office.

Thank you for the opportunity to provide review and input,
Carly

Carly Summers
Supervisory Natural Resources Specialist
BLM - Bakersfield Field Office
3801 Pegasus Drive
Bakersfield, CA 93308
661.391.6146 (o)
661.369.0608 (c)
661.391.6041 (f)
csummers@blm.gov

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Mike Campisi
Pipeline Planning Assistant

9400 Oakdale Ave
Chatsworth, CA 91311

Tel: 213-231-6081

February 25, 2019

Randall Cates
Kern County Planning and Natural Resources Department
2700 "M" Street, Suite 100
Bakersfield, CA 93301
CatesR@kerncounty.com

Subject: **PP12316**

DCF: **0178-19NC141**

The Transmission Department of SoCalGas does not operate any facilities within your proposed improvement. However, the Distribution Department of SoCalGas may maintain and operate facilities within your project scope.

To assure no conflict with the Distribution's pipeline system, please e-mail them at:

NorthwestDistributionUtilityRequest@semprautilities.com

Sincerely,

Mike Campisi
Pipeline Planning Assistant
SoCalGas Transmission Technical Services
SoCalGasTransmissionUtilityRequest@semprautilities.com

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Randall Cates

From: NorthwestDistributionUtilityRequest <NorthwestDistributionUtilityRequest@semprautilities.com>
Sent: Friday, March 1, 2019 12:13 PM
To: Randall Cates
Subject: RE: Johe Ranch Mining Project by Diatom, LLC (PP12316); CUP 17, Map 117

SoCalGas Distribution does not maintain facilities within that project area..

From: Randall Cates <CatesR@kerncounty.com>
Sent: Wednesday, February 27, 2019 11:51 AM
To: NorthwestDistributionUtilityRequest <NorthwestDistributionUtilityRequest@semprautilities.com>
Subject: [EXTERNAL] Johe Ranch Mining Project by Diatom, LLC (PP12316); CUP 17, Map 117

To: Distribution Department of SoCalGas

This Department prepared and circulated a Notice of Preparation (NOP). An electronic copy is available online at https://psbweb.co.kern.ca.us/planning/pdfs/notices/johe_ranch_nop.pdf and a hard copy is available upon request. Among the comments received in response was the attached letter from the Transmission Department of SoCalGas. As referenced in the aforementioned letter, this email is being sent to the Distribution Department of SoCalGas. Please review the NOP, and submit any comments you may have.

Randall Cates
Kern County Planning and
Natural Resources Department
2700 M Street, Suite 100, Bakersfield, CA 93301
(661)862-8612
CatesR@kerncounty.com

This email originated outside of Sempra Energy. Be cautious of attachments, web links, or requests for information.

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Appendix B

Surface Mining and Reclamation Plan

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INSTRUCTIONS FOR PREPARATION OF APPLICATION FORM FOR SURFACE MINING PERMIT AND RECLAMATION PLAN

KERN COUNTY PLANNING AND
COMMUNITY DEVELOPMENT DEPARTMENT
2700 "M" Street, Suite 100
Bakersfield, CA 93301
(661) 862-8600

Specific instructions are given below for certain items in the suggested model plan:

Item 1. Applicant. Answer Items 3 - 7, where applicable, as "Same as applicant." If the actual reclamation is to be conducted by a person other than the applicant or operator, name and address of said person shall be indicated.

Item 3. If more than one owner, enter name and address of each. If more than one parcel is included in the operation, enter the owners of each parcel. This information is needed under Item 25 below. If the surface and mineral rights are separated, show the owners of surface rights under this item. On federal land, enter USA as owner, with administrating agency (e.g., USFS, BLM, NPS).

Item 4. Owner of Mineral Rights. List, if separate from surface owner. If a mining claim, indicate the owner(s) of the possessory rights (claim owner).

Item 6. Operator. List as individual, partnership, corporation, etc. If a joint venture, also show name of managing person or concern.

Item 8. Brief description, including legal, of the mined lands (see definition in Guidelines or Act - Section 2729) in either metes and bounds or by land office subdivisions. Show section(s), township, and range.

Item 10. Location and Vicinity Map. It is suggested that this be shown on a USGS 7 1/2-minute topographic quadrangle sheet (Scale: l" = 2000') unless larger-scale maps are available. If these are not available, or if the operation is extensive, 15-minute sheets (Scale: 1" = 1 mile) may be used. Contours, roads, drainage, adjacent towns, etc., should be shown, as well as the site of the operation.

Item 12. A brief and concise answer is requested for this item, including only essential data on geologic formations, structures, rocks, and minerals, and nature of the mineral deposit.

Item 13. If an Environmental Impact Report (EIR) has been or is being filed for the project, the answer to this item may be very brief in outline form, with reference to the EIR. Reference to the EIR may be used to simplify answers to other pertinent items also. Note that soil conditions will be covered in more detail in Item 32.

Item 14. If the applicant's surface mine was already in operation on January 1, 1976, or the operation was conducted prior to that date, so state. If applicant has elected to "phase" his operation, indicate duration of first phase. For anticipated life of long-term operations, show estimated range (e.g., 35 - 50 years).

Items 15. If more than one individual pit or quarry is included in the plan, answer these items for each such operation. Note that either tons, or cubic yards (in-place), are requested. The unit not used should be crossed out. Include all ore, minerals, over-burden, and waste as one total quantity in answering.

Items 18, 19 and 20. In the case of large, integrated operations with several separate mines or pits, it will be to the advantage of the applicant to answer these items in sufficient detail not only for clarifying the nature of his operation, but also for protecting his vested rights under the provisions of the Act. The principal map should be of a scale sufficient to show the required details clearly. For a large operation, a smaller-scale, overall map with larger-scale detail maps of the critical areas may be more practical. In long-range operations, precision of detail is not as important as a clear exposition of the operation. The use of symbols or map overlays is recommended to simplify the map preparation. Aerial photographs may be substituted for maps where they adequately indicate the required information.

Item 21. Applicant shall consult with the Lead Agency before completing this item.

Items 24 through 35. Refer to the referenced section of SMARA for specific requirements. The applicant may contact Staff for further clarification.

A checklist has been prepared for items to be discussed in all reclamation plans and is attached to these instructions. Please be sure the proposed reclamation plan addresses all the items included in the checklist. Applicants are encouraged to make copies of the application and checklist before using them. Having a sufficient amount of the necessary forms will enable the applicant to formulate and self-review an initial draft before submitting the final version. It is not necessary to return a completed checklist with an application.

The State Office of Mine Reclamation will be sent a complete copy of the application. Applicants are encouraged to attach additional pages, if necessary, to ensure that all reclamation plan submittal requirements are satisfied. ***Typically, a surface mining permit and/or reclamation plan will require approximately four to five months to process from the date the application is deemed complete, unless an Environmental Impact Report is required, in which case approximately one year will be required for processing.*** Please note, Public Resources Code Section 2207 and California Code of Regulations Section 3697 require a new mining operation to submit an initial report to the Department of Conservation before one of the following occurs:

(1) Commencement of operations; or
(2) 30 days from permit approval

These requirements apply to all mining operations in the State, including operations on federal lands. For mining operations outside of incorporated city jurisdictions, Kern County is defined as the lead agency by SMARA. Copies of the New Mining Operation Report form (MRRC-3) can be obtained from the Department of Conservation. As stated in the MRRC-3 instructions, the completed report with the required reporting fee should be sent to the following address:

Department of Conservation
Office of Mine Reclamation
801 K Street, MS 09-06
Sacramento, CA. 95814-3529

The telephone number for the Department of Conservation is (916) 323-8567.

APPLICATION FOR
SURFACE MINING PERMIT AND RECLAMATION PLAN

KERN COUNTY PLANNING AND COMMUNITY DEVELOPMENT DEPARTMENT

OWNER, OPERATOR, AND AGENT:

1. Applicant:

   Name Diatom LLC
   David Cooper
   Address 7260 Reward Road
   McKittrick, CA 92351
   Telephone (661) 762-7491

---

2. Name (if any) of Mineral Property:

   Johe Ranch Mine

---

3. Property Owner(s) or Owner(s) of Surface Rights (list all owners):

   Name Diatom LLC
   Attn: David Cooper
   Address 7260 Reward Road
   McKittrick, CA 92351
   Telephone (661) 762-7491

---

4. Owner(s) of Mineral Rights:

   Name Diatom LLC
   Attn: David Cooper
   Address 7260 Reward Road
   McKittrick, CA 92351
   Telephone (661) 762-7491

---

5. Lessee:
   Name Not Applicable
   Address
   Telephone

---

6. Operator:
   Name GF Industries
   Attn: Steve Gentile
   Address 122N. Harbor Blvd., #201
   Fullerton, CA 92832
   Telephone (714) 525-8816

OWNER, OPERATOR, AND AGENT: (continued)

7. Agent of Process (person designated by operator as his agent for the service of process):
   Name David Cooper
   Address 7260 Reward Road, McKittrick, CA 92351
   Telephone (661) 762-7491

(Reference SMARA 2772(C)(1))

LOCATION:

8. Brief description, including legal, of the extent of the mined lands (to be) involved by this operation, including total acreage:

   Section(s) portion of 7, Township T30S, Range R21E, MD B&M

   Assessor's Parcel Number (APN) portions of 156-070-01, 156-070-02 and 156-070-10

   The project proposes to mine diatomaceous earth on a site composed of approximately 331 acres, of which 93.67 will be disturbed. Of the 93.67-acre disturbance area, approximately 93.42 acres are located in 156-070-01 and approximately 0.25 acres are located in 156-070-02. Of the 88-acre mined area, all 88 acres are located in 156-070-01. Approximately 1.4 acres of the 93.67 acre area has been previously disturbed as a result of existing roads. A legal description is as follows:

   Parcel of land lying in Section 7, Township 30 South, Range 21 East, Mount Diablo Meridian, Kern County, California, according to the official plat of the survey of said Section 7 made by H.B. Carpenter in 1893 and returned to the general land office by the surveyor-general, more particularly described as an approximately 331-acre area described as follows:

   1. Government Lots: 2, 3, 4, 5, 6, 7 and 8, per G.L.O. Plat of April 26, 1897;
   2. The north ½ of Government Lots: 10, 11, and 12, per G.L.O. Plat of April 26, 1897;
   3. The north ½ of the north ½ Government Lot 13, per G.L.O. Plat of April 26, 1897;
   4. The north ½ of the north ½ of Government Lot 14, per G.L.O. Plat of April 26, 1897;
   5. The northeast ¼ of the northwest ¼, per G.L.O. Plat of April 27, 1869;
   6. The southeast ¼ of the northwest ¼, per G.L.O. Plat of April 27, 1869;
   7. The southwest ¼ of the northeast ¼, per G.L.O. Plat of April 27, 1869

(Reference SMARA 2772(C)(5))

---

9. Description of the access route to the operation site:

   The Johe Ranch Mine is located in the Temblor Range foothills approximately 8.5 miles west of the town of McKittrick, CA. From McKittrick, take CA-58 west for 8.5 miles to the Project Site gate on the north side of the highway (See Figures 1, 2 and 3). All figures referenced in this application are figures generated by WZI, Inc.

(Reference SMARA 2772(C)(11))

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10. Attach Location and Vicinity Map.

    See Figures 1 (Project Location Map) and 2 (Regional & Access Map).

(Reference SMARA 2772(C)(11))

DESCRIPTION:

11. Mineral commodity (to be) mined:

    Diatomaceous earth and overburden material.

(Reference SMARA 2772(C)(2))

---

12. Geologic description, including brief general geologic setting, more detailed geologic description of the mineral deposit (to be) mined, and principal minerals or rock types present:

Diatomaceous earth occurs throughout much of western Kern County in a series of hills of the Monterey formation. These deposits trend northwest, are moderately to tightly folded and locally faulted. The Johe Ranch Mine is located in the Monterey Formation (Maricopa Shale) in the Trembler Range where the thickest and purest deposits of diatomaceous earth occur as shown in Figure 6. Outcrops steeper than 2:1 are naturally occurring on-site.

The site is almost entirely comprised of Mendi-Hillbrick-Kilmer association, 9 to 30 percent slopes, and Reward shaly loam, 30 to 50 percent slopes. A very small area of the southeast corner contains Aramburu very shaly clay loam, 15 to 30 percent slopes, and Pottinger very shaly clay loam, 2 to 9 percent slopes.

The Mendi-Hillbrick-Kilmer association is on hillsides, ridge tops, and mountains. The 9 to 30 percent slopes are 50 percent Mendi loam, 20 percent Hillbrick loam, and 15 percent Kilmer loam. It includes outcrops of Bluestone clay, Aido clay, Choice clay, and Rock outcrops. The Mendi soil is deep and well drained, formed from sandstone or shale. The surface layer is pale brown loam about 20 inches thick. The next 20 inches is a light yellowish brown loam and then a light yellow brown silt loam to 72 inches. Permeability is moderate, available water capacity is high, and runoff is medium with moderate hazard of water erosion. The Hillbrick soil is shallow and well drained, formed from sandstone or shale. The surface layer is a pale brown loam to about 15 inches. Permeability is moderately rapid, water availability is very low, runoff is medium, and hazard of water erosion is high. The Kilmer soils are moderately deep and well drained and derived from shale or sandstone, the surface layer is pale brown loam for about 14 inches and the underlying material is a pale brown loam over shale for about 18 inches. Permeability is moderately slow and water capacity is low or moderate. Runoff is rapid and hazard of water erosion is moderate.

Reward shaly loam, 30 to 50 percent slopes, is a deep, well-drained soil primarily derived from calcareous shale or sandstone. It is associated with hills and mountains of the area. The dominant vegetation type of this soil is annual grasses and forbs. The surface is grayish brown shaly loam to about 24 inches. About 15 inches of the underlying material is also a grayish brown shaly loam with pale brown loam below to a depth of about 60 inches. Permeability is moderate and runoff is rapid. The hazard erosion is high with this soil.

Aramburu very shaly clay loam is also a deep, well-drained soil found on hills and mountains of the area. Vegetation of the site is dominated by annual grasses and forbs. Permeability is moderate and available water capacity is low. Most areas of this soil type are used for grazing.

Pottinger very shaly clay loam is derived from shale and found on alluvial fans and Terraces. Vegetation of this soil type is almost entirely comprised of annual grasses and forbs.

13. Brief description of environmental setting of the site and the surrounding areas, including existing area land use, soil, vegetation, groundwater elevation, surface water characteristics, average annual rainfall, and/or any other factors pertaining to environmental impacts and their mitigation and reclamation:

Historically, the site has been used for farming, grazing, and some gas production. Historically, the vicinity has been used for farming, grazing, some oil and gas production, and diatomaceous earth mining. There are two approved surface mining operations located in the vicinity (State Mine ID #91-15-0036 and 91-15-0038). These mining operations are located approximately 2.5 miles to the east and 1.4 miles to the north, respectively, and are on property owned and operated by the surface fee owner identified in the response to Question 3 above. There is a residence located to the south of the project site; an Air Quality Impact Assessment (WZI, Inc., June 2015, updated June 2019) was prepared for the the proposed project, which includes a Health Risk Analysis of the project on Existing Sensitive Receptors to account for this sensitive receptor. A letter from the California Department of Conservation, Department of Oil, Gas and Geothermal Resources (DOGGR), dated January 31, 2019, references the following wells within the approximately 331-acre project site:

1) Baker 1, (abandoned gas well)
2) Seaboard-Honolulu 14-7, (abandoned gas well)
3) Lizbet Gilbert 1, (abandoned gas well)
4) Lynn 1 (abandoned well)

Additionally, the following are identified on the property and labeled on Figure 3:

1) DRILLHOLE R1-H1
2) DRILLHOLE R1-H2
3) DRILLHOLE R2-H1
4) DRILLHOLE R2-H2
5) DRILLHOLE R3-H1
6) DRILLHOLE R3-H2

The drillholes identified on the property were all drilled for diatomite evaluation in 2006. The holes were all backfilled after drilling. No open holes are present on the site.

The four wells listed above are all abandoned, and have been located within the project boundary and are shown in Figure 3. The wells are located outside the proposed disturbance areas. There are no surface plugs (the top of an abandoned well), or any other components of abandoned wells, which protrude above ground on the project site. All applicable California Department of Conservation, Geologic Energy Management Division (formerly Division of Oil, Gas, and Geothermal Resources) regulations will be followed on the project site.

Soil

Soils occurring within or near the Project Site include: Reward shaly loam, Mendi-Hillbrick-Kilmer association, Reward channery loam, and Pottinger very shaly clay loam (Biological Resources Report, Padre Associates Inc., December 2014, Revised June 2019). The Reward shaly loam comprises the majority of the soil types present on the Project site. This soil type is a loam type that occurs on hill slopes. These are well drained soils formed from weathered sandstone shale. A soil map is included as Figure 6.

Vegetation

The habitat type and/or plant community that dominated the Project Site was California annual grassland series (Biological Resources Report, Padre Associates Inc., December 2014, revised June 2019). This community is dominated

by herbaceous plants that are both non-native and native. Non-native species that typically dominate this community are red brome (*Bromus rubens*), ripgut (*B. diandrus*), soft chess (*B. hordeaceus*) and foxtail (*Bromus* sp. or *Hordeum* sp.). This vegetation type was observed through the majority of the areas planned for mining.

A relatively small portion of the site also contained alkali goldenbush (*Isocoma acradenia*) scrub (Biological Resources Report, Padre Associates Inc., December 2014, revised June 2019). Alkali goldenbush is the dominant plant species in the shrub canopy of this vegetation type. The canopy is usually open to continuous with an open to continuous herbaceous layer. Stands are typically found in flat areas but can occur on gently sloping hills with saline to alkali soils. This vegetation type was observed on a lower slope on the north side of the Project Site.

Groundwater Elevation

The mining site is located on Miocene diatomite siliceous shale, outside of the San Joaquin Valley groundwater basin. There is no known groundwater at the site and no water wells have been drilled on the property.

In addition to water from the West Kern Water District, produced water from adjacent oil field operations will be utilized on the project site. All water used on the project site is proposed to be used for dust control. The produced oil field water will be applied in accordance with a Waste Discharge Requirement Order that will be obtained from the California Regional Water Quality Control Board, Central Valley Region.

Surface Water Characteristics

The site is not located within a Flood Plain Safety Overlay District or Dam Inundation Overlay. The following are drainage channels existing on the property, as shown on Figure 3:

1. Blue line drainage channel 1, located between Mine Area 2 and Mine Area 3.
2. Intermittent drainage channel 2, located between mine area 2 and mine area 1.
3. Intermittent drainage channel 3, located on the east side just to the east of mine area one.
4. Intermittent drainage channel 4, located between the Highway 58 entrance to Johe Ranch and mine area 1.

There are no diversion structures or erosion control facilities onsite. Appropriate measures will be undertaken to mitigate any potential impacts to drainage channels (e.g. installation of culverts to allow for natural drainage to continue).

Average Annual Rainfall

The climate in the area is semi-arid with total annual precipitation over the past 30 years averaging about 5.70 inches with a range of 1 to 14 inches. The rainfall occurs generally between the months of January and March. Occasional thunderstorms may occur in August, but do not account for much of the annual precipitation. Winter months are mild with temperatures averaging 20° F. to 50° F. Summers are harsh and dry with temperatures ranging from 60° to over 100° F. The topography of the site ranges from approximately 2,100 feet above mean seal level to approximately 2,800 feet above mean sea level.

(Reference SMARA 3502 (b)(1))

PROPOSED (EXISTING) SURFACE MINING OPERATION:

14. Time Frame of Project

    a. Proposed Starting Date of Operation: Upon receiving necessary authorization.
    Estimated to be March 1, 2021

Estimated Life of Operation: 50 years, however, a project time frame corresponding to the life of the reserve is proposed

Duration of First Phase: Although there are three proposed mine areas, the project consists of a single phase

b. Operation will be (is):

Continuous X Seasonal _____ Intermittent____

Developed, Not Yet in Operation X Temporarily Deactivated _____ Stockpile in Mine _____

(Reference SMARA 2772(C)(3))

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15. Project Production

a. Annual production will be (is):

Under 5,000 tons/cubic yds/yr _____

5,000 - 50,000 tons/cubic yds/yr _____

50,000 - 250,000 tons/cubic yds/yr _____

250,000 - 1,000,000 tons/cubic yds/yr Maximum 330,000 tons.
It is estimated that the ratio of diatomaceous earth to overburden material will be 15.5:1; however, the above referenced 330,000 tons figure represents total anticipated annual production, which has not been itemized by diatomaceous earth and overburden material.

Over 1,000,000 tons/cubic yds/yr _____

b. Total anticipated production:

Mineral commodities to be removed - (circle one) tons / cubic yds) Maximum 6,600,000 tons. It is estimated that the ratio of diatomaceous earth to overburden material will be 15.5:1; however, the above referenced 6,600,000 tons figure represents total anticipated production, which has not been itemized by diatomaceous earth and overburden material.

Waste retained on the site - (circle one) tons / cubic yds) 0

Waste disposed off site - (circle one) tons / cubic yds) 0

Maximum anticipated depth 162 ft for Mine Area 1
2512 asl – 2350 asl = 162 feet
Maximum anticipated depth 125 ft for Mine Area 2
2475 asl – 2350 asl = 188 feet
Maximum anticipated depth 40 ft for Mine Area 3
2400 asl – 2360 asl = 137 feet

(Reference SMARA 2772(C)(2) and (4))

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16. Mining Method (check all applicable):

a.

Open Pit	X	Gravel/Sand Pit	
Single Bench		Drill and Blast	
Quarry:		Clay Pit	
Hill Top	X	Truck to Processing	
Multibench		Plant (to RR)	X
Side Hill	X	Borrow Pit	
Dragline		Tailings Ponds	
Low Level		Slurry Pump	
Shovel		Waste Dump	
Underground		Rail	
Gravel Bar Skimming		Other	

GF Industries (GFI) intends to conduct blending, which would be undertaken with the use of a loader, as necessary to meet customer demand. Specifically, blending of different types of diatomaceous earth mined on the project site. GFI intends to also conduct screening, using a processing screener on an as-needed basis according to customer demand for refined product. As a result, a screening unit was included in the Air Study with conservative processing values in order to cover this process. A screen will only be physically present onsite when it is required and will operate within the parameters set forth in the permit issued by the San Joaquin Valley Air Pollution Control District (permit to be determined). No additional processing will be performed onsite. If a specific project requires that the material be further processed, this action will take place offsite at a location that is approved for such a use.

b. Identify the number and types of vehicles and equipment used in addition to their ADT (average daily trips).

Type of Equipment	**Quantity**
Rubber Tired Loaders	2 on the project site, however, only 1 would be operating at any given time.
Tire Truck	1
Portable screening plant, such as, Extec S5 5X10, will be brought on-site during the special order periods and then removed	1
Radial Stacker	1
Grader (primarily for grading of haul roads, and a pad for the blending and screening site)	1
Portable truck scale	1

Type of Equipment	**Count**	**ADT**
Water Truck	1	12
Employee Vehicles	3	6
Haul Trucks	50	100
Contractor vehicles servicing portable toilets	1	.28 (one round trip per week)

For loosening the shale in the exposure process, the necessary equipment including dozer or ripper will be rented for a short duration. This equipment is not needed for more than a few days and will not remain onsite regularly.

Barbed wire fencing exists to exclude the public from entering the project site. Signage will be posted for security and safety of both the operators and public. The two front-end loaders, grader, water truck, portable screening plant, radial stacker, portable truck scale and tire truck will be stored onsite, either within the mining areas or at the 2.42-acre blending and screening site, as identified on Figure 3. All dump (haul) trucks and employee vehicles will be removed on a daily basis and will not remain on-site overnight.

Surface mining operations will be conducted from 6:00 am to 7:30 pm, Monday through Friday.

c. Maximum number of employees on site at any one time 10

(Reference SMARA 2772(C)(11))

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17. Processing:

a. If processing of the ores or minerals mined is planned to be conducted at or adjacent to the site, briefly describe the nature of the processing and explain disposal method of the tailings or waste from processing.

The diatomaceous earth will be excavated by a single loader. The loader will either load material directly into trucks; or move the material so as to form it into small temporary stockpiles then load it on to dump trucks. The location of load out areas within the active mine operation will vary based on the location of mining activity on any given day. The trucks will be weighed before leaving the site on a portable scale located in the blending and screening site, and sent out for delivery and/or additional processing. If there is a special order of material requiring sizing other than the normal run-of-mine, a portable screening plant, such as, Extec S5 5X10, will be brought on-site during the special order period and then removed. The screening will occur at the blending and screening site, as shown in Figure 3.

Any material considered "overburden" or "waste" will be exported from the site; such material is anticipated to be sold to Waste Management Inc. Typical uses for such material include a lining material for landfills, and an additive to liquid waste for the purpose of solidifying such waste after it has been deposited in a landfill.

b. Estimate quantity (gallons per day) and quality of water required by the proposed operation, specifying proposed sources of this water and method of its conveyance to this property and the quantity and quality and method of disposal of used and/or surplus water.

Johe Ranch (CUP 17, Map 117), Proposed Water Usage		
	Annual Water Usage (gallons)	**Total Water Usage (gallons)**
Produced Water From Adjacent Oil Field Operations	7,800,000	156,000,000 total gallons (over the project lifespan) obtained from produced water from adjacent oil field operations.

West Kern Water District	325,780	6,515,600 total gallons (over the project lifespan) obtained from West Kern Water District.
Total	8,125,780	162,515,600 total gallons (over the project lifespan).

Prior to application of produced water from oil field operations on the project site, all necessary permits and approvals will be obtained from the California Regional Water Quality Control Board, Central Valley Region. The water obtained from the West Kern Water District, will be in accordance with a will serve letter, from a nearby water supply line, and will be conveyed to the project site in a water truck. Estimated water demand at maximum production for dust control is 30,000 gallons per day.

(Reference SMARA 2772(C)(11))

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18. If the nature of the deposit and the mining method used will permit, describe and show the steps or phases of the mining operation that allow concurrent reclamation, and include a proposed time schedule for such concurrent activities.

The mine operator wants to have the flexibility to move between mine areas and, therefore, does not want to be constrained by a phased operation. The mine areas are identified as three distinct areas because of the natural terrain and are for reference purposes only. As proposed, no more than twenty (20) acres are planned to be disturbed at any given time. Revegetation will coincide with the wet season in order to establish coverage. Maximum operational slopes will be 2:1 (horizontal:vertical). Maximum final reclaimed mining area slopes will be 3:1 (horizontal:vertical); maximum final reclaimed cut and fill slopes for access road improvements will be 2:1 (horizontal:vertical).

As proposed, the project proponent shall adhere to the following measures, as project design features, to comply with the assumptions made for emissions calculations per the Air Quality Impact Assessment (WZI, Inc., June 2015, updated June 2019); these assumptions are listed on Page 54 of the Air Quality Impact Assessment, and state in part:

9. Maximum exposed land is 20 acres at any given time (SMARA)
    a. Disturbed land not being mined daily (15 acres) will be covered in dust palliative to prevent wind erosion during periods of inactivity
    b. Disturbed land being mined daily (5 acres) will be watered 3x/day

Any product stockpiles made within the Mining Areas will be a maximum of 20 feet in height, and will have a maximum slope of 2:1 (horizontal:vertical). Any product stockpiles (for any product which may be processed through the blending and screening site) are shown on Figure 7, within the 2.42 acre blending and screening site disturbance area; any such stockpiles within this area will have a maximum height of 10 feet and a maximum slope of 2:1 (horizontal:vertical). Upon final reclamation of the project site, no stockpiles will remain.

(Reference 2772(C)(6) and 3503(a)(1))

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19. Attach a map of the mined lands showing the following information:

    a. Boundaries and topographic details of the site.

b. Location of all streams, roads, railroads, water wells, structures, dwellings, and utility facilities within 500 feet of the site.
c. Location of all currently proposed access roads to be constructed in conducting the surface mining operation.
d. Location of areas (to be) mined, and of waste dumps and tailings ponds.
e. By use of symbol or map overlay, depiction of separate mining phases, if applicable.
f. The source of map base, orientation (North arrow), and scale (e.g., 1" = 500', etc.) of the map.

See Figure 3

(Reference 2772(C)(5))

RECLAMATION PLAN:

20. Indicate on an overlay of map of Item 19, or by symbol on map, those areas to be covered by reclamation plan.

Acreage 93.67 acres

Acreage: 88 acres proposed mine area disturbance (60 acres in Mining Area 1, 19 acres in Mining Area 2, 9 acres in Mining Area 3)
1.4 acres existing road access disturbance
1.85 acres proposed access road disturbance
2.42 acres blending and screening site disturbance
93.67 total acres of disturbance

The 1.4 acres of existing road access disturbance will not be reclaimed, as these roads will be needed in conjunction with grazing operations after the site has been deemed fully reclaimed. As such, the reclamation plan will encompass 92.27 acres (93.67 total acres of disturbance minus 1.4 acres of existing road access disturbance). See Figure 3 for area to be reclaimed.

(Reference SMARA 2772(C)(5))

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21. Describe the ultimate physical condition of the site and specify proposed use(s), or potential use(s), of the mined lands as reclaimed.

The reclaimed site will be revegetated with an approved seed mix. The project site will be reclaimed to its current use as grazing land.

The 1.4 acres of existing road access disturbance will not be reclaimed, as these roads will be needed in conjunction with the grazing operations after the site has been deemed fully reclaimed. As such, the reclamation plan will encompass 92.27 acres (93.67 total acres of disturbance minus 1.4 acres of existing road access disturbance). See Figure 3 for area to be reclaimed.

(Reference SMARA 2772(C)(7)

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22. Provide evidence that all owners of a possessory interest in the land have been notified of the proposed use(s) or potential use(s) identified in Item 21. (Attach copy of notarized statement of acknowledgment, etc.)

See Statement of Responsibility sheet attached to this application.

(Reference SMARA 2772(C)(7))

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23. Describe how implementation of the reclamation plan will affect future mining in the area.

Implementation of the reclamation plan will not affect the potential for future mining in the area.

(Reference SMARA 2772(C)(9))

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24. Describe how the proposed reclamation plan will affect public health and safety, giving consideration to the degree and type of present and probable future exposure of the public to the site.

The reclamation plan is designed to protect public health and safety.
The project site will be reclaimed to its current use as grazing land.

The project site is fenced with barbed wire to exclude the public from entering, and a locked gate will prevent unauthorized entry. The property will remain fenced with barbed wire to exclude the public from entering and locked following completion of the project.

(Reference SMARA 3502(b)(2)

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25. Describe how the project will adhere to the specified requirements for protection of wildlife habitat.

A copy of the reclamation plan will be circulated to entities including the California Department of Fish and Wildlife, and the US. Fish and Wildlife Service for review and comment. Any necessary permits and approvals will be obtained from the two aforementioned agencies and incorporated into the approved reclamation plan by reference. The Kern County Planning and Natural Resources Department, as the Lead Agency, will recommend the Kern County Planning Commission include Mitigation Measures as necessary to protect wildlife habitat.

See San Joaquin Kit Fox Survey (Padre Associates, Inc., June 2015), Biological Resources Report (Padre Associates, Inc., December 2014, updated June 2019), Botanical Survey (Padre Associates, Inc., April 2015, revised May 2019), and Supplemental Update of Biological Resources (Padre Associates, Inc., May 2018, updated June 2019) for further discussion.

(Reference SMARA 3703 and 3503(c))

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26. Describe the reclamation procedures used to ensure adherence with the specified requirements for backfilling, regrading, slope stability, and recontouring. Indicate on map (Items 19 - 20) or on diagrams as necessary. Discussion should explain why final cut slopes proposed have a minimum slope stability factor of safety which is suitable for the proposed end use and conform with surrounding topography and/or approved end use. Additionally, a sufficient number of cross-sections, no larger than 11 inches by

17 inches, which demonstrate existing and proposed final slopes should be incorporated into the plan. **NOTE:** If any final reclaimed fill slopes exceed 2:1 (horizontal to vertical), submit specific geologic and engineering analysis which demonstrates the proposed slope has a minimum slope stability factor of safety that is suitable for the proposed end use and when the proposed final slope can be successfully revegetated.

Maximum proposed slopes are as follows:

- Maximum operational slopes for the mining areas, and the blending and screening site, would be 2:1 (horizontal:vertical).
- Maximum final reclaimed slopes for the mining areas, and the blending and screening site, would be 3:1 (horizontal:vertical).
- Maximum operational cut and fill slopes for the proposed access road would be 1:1.75 (horizontal:vertical).
- Maximum final reclaimed cut and fill slopes for proposed access road would be 1:1.75 (horizontal:vertical).

Please see Figures 3 and 4. The 92.27 acres encompassed by the reclamation plan will be revegetated and monitored for performance success.

(Reference SMARA 3704 and 3502(b)(3))

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27. If revegetation is proposed, describe what procedures will be employed to ensure adherence with the specified requirements. Indicate on map (Items 19 - 20) or on diagrams as necessary. If revegetation is not applicable, indicate why not. At a minimum, the plan should include or elaborate on the following:

    a. A baseline study documenting the vegetative density, cover, and species richness of the site.

    According to the Botanical Survey prepared by Padre & Associates (April 2015, revised May 2019), sixty-two (62) plant species were identified on the project site during the survey period. The plant species present represent a mixture of native and non-native plant species typically found in similar habitats in western Kern County and surrounding areas. None of the plant species are designated as having special-status.

    b. Test plots to be employed/monitoring.

    In accordance with SMARA, a test plot will be employed (adjacent to the screening plant location) to confirm the adequacy of the reclamation plan. The test plot results will be used to make adjustments to the plan to ensure successful revegetation. The test plot will be grown, consisting of the proposed seed mixture and will confirm the anticipated success of the reclamation plan, or help recognize where adjustments are necessary in order to assure success in meeting the approved baseline coverage, reclamation plan, and financial assurance commitment. A test plot (40 feet by 40 feet) will be established after 20 acres of mine area is disturbed.

    c. Need for decompaction.

    The 92.27 acres encompassing the reclamation plan will be decompacted as necessary by ripping to a depth of between 6 and 18 inches, each rip spaced no more than 18 inches apart, followed by the site being disked and left in a rough condition prior to seeding. Less than six (6) inches of topsoil (growth media) will be applied to disturbed areas for revegetation.

    d. Need for soil analysis.

A soil analysis is required by the State Mining and Geology Board Reclamation Regulations Article 9, Reclamation Standards for Revegetation if the soil has been chemically altered or if the growth media consists of other than native topsoil. Soils to be revegetated will not come in contact with any mining related chemicals or other materials. Consequently, no chemical alteration will take place and no soil analysis should be necessary. Should it be determined that reclamation efforts are not progressing as expected, soil amendments may be applied as recommended by the certified biologist and/or botanist.

e. Proposed revegetation mix.

The plant community of the site is currently dominated by non-native grassland with some native species. A seed mix with more native plant species was recommended by the California Department of Conservation/Office of Mine Reclamation (currently Division of Mine Reclamation) in its January 3, 2013 letter. The Kern County Planning and Natural Resources Department notes that the aforementioned letter was submitted when a Negative Declaration was proposed to be prepared for purposes of the California Environmental Quality Act (CEQA) (although it was subsequently determined an Environmental Impact Report shall be prepared); nonetheless, the aforementioned letter is attached to the Reclamation Plan. The following seed mix is proposed (see table below).

Proposed Seed Mix		
Common Name (Seeds)	**Species**	**Pounds Per Acre**
Blando brome	Bromus hordeaceus	12
Rose Clover	Trifolium hirtum	16
Big squirrel tail	Elymus multisetus	3
Nodding needle grass	Stipa cernua	3
Lupine	Lupinus microcarpus	2

Seeding Rate: 36 lbs per acre

f. When planting will be conducted.

Grasses and forbs will be planted and/or seeded between October and December to coincide with the onset of winter rains in the vicinity of the project site.

g. Need for irrigation.

Based on currently accepted practices regarding revegetation methods implemented in western Kern County, no supplemental irrigation or fertilizer will be applied to revegetated areas. Reclamation activities will be initiated during the normal rainy season. It is expected that the natural seasonal rain cycle should be sufficient to stimulate the growth process of the native species.

h. Protection measures to be employed.

The site is located in a remote area of western Kern County which is not subject to issues of surface trespass. In order to optimize the revegetation effort, vehicle traffic on revegetated areas of the property will be restricted and the site will be posted and monitored to prevent unwanted activities. Additional remedial measures will be implemented as necessary to achieve the performance standards. To protect the seed mix, it will be tacked into the growth media with a sheep's foot or other implement to help germination and prevent blowing/washing away.

i. Success of revegetation.*

The proposed end use is cattle grazing. The goal of revegetation is to establish a producing dry land range crop for cattle grazing as well as erosion control. Success criteria for revegetation is as follows:

Parameter	Success Criteria
Cover	67.5%
Species Richness	5 species per square meter

According to the University of California Cooperative Extension (i.e. email correspondence from Julie Finzel, Livestock and Natural Resources Advisor), the application rates for the recommended seed mix should be sufficient to provide 0.25 animal unit months(AUM)/acre, assuming normal rainfall and good grazing management; nonetheless, the success criteria as listed in the above table shall be achieved prior to allowing disturbed land to be deemed reclaimed. The proposed success criteria is based on email correspondence with Julie Finzel, which indicates that a cover range of 60%-75% with all 5 revegetation species present at varying percentages (species richness) is reasonable to expect with the proposed seed mix, assuming average annual rainfall. The email correspondence from Julie Finzel, as referenced above, is included in the Reclamation Plan.

(Reference SMARA 3705 and 3503(g))

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28. Describe the reclamation procedures used to ensure adherence with the specified requirements for drainage, diversion structures, waterways, and erosion control. Additionally, indicate on map (Items 19 - 20) or on diagrams as necessary the following:

    a. All existing, interim, and final drainage patterns.
    b. Location of any diversion structures. If not applicable, indicate why not.
    c. Erosion control facilities (i.e. sumps).

    Mining excavation will be slope "inward", retaining some storm water runoff as well as functioning as a sediment trap. A 3-foot berm, with a maximum 3:1 (horizontal:vertical) slope will be constructed around mine excavations to further contain storm water and sediment. The berm will function as a broad-crested weir: in the event of any overflow, storm water will be released in the form of low-velocity and minimally erosive sheet flow.

    As proposed, culverts will be constructed where drainage courses cross the proposed mine road. Culverts will be sized to convey the 50-year, 24-hour storm event. All drainage courses generally flow to the northeast away from SR 58. The natural drainage channel at all three culvert inlets (i.e. channel 1, channel 2, and channel 4, as described above in the response to Question 13), as proposed, will be armored with rock rip-rap, which will be sized adequately to avoid displacement under the indicated design storm. Rip-rap will also function as an energy dissipater to restore flow to its natural state and velocity. There will be no change to drainage boundaries.

    Hydrology and drainage calculations have been prepared to determine the storm water and erosive potential for various events, to include 2-year, 10-year, 50-year, and 100-year, 24 hour storms. The 50-year 24 hour storms will be the basis for design of drainage improvements, BMP's, and erosion control measures. See the Hydrology Study for Johe Ranch Mine, County of Kern, California, prepared by LAV/Pinnacle Engineering, dated July 29, 2015, Revised April 24, 2019.

    In accordance with the Reclamation plan, disturbed areas will be re-seeded with an approved seed mix.

(Reference SMARA 3706, 3710, 3502(b)(6), 3503(a)(3),(b)(1),(d) and (e), 2772(c)(8)(b))

29. Describe the reclamation procedures used to ensure adherence with the specified requirements for prime agricultural land reclamation. If not applicable, please explain why.

N/A: The property is classified as Grazing Land on the Kern County Important Farmland 2018 Map prepared by the California Department of Conservation Farmland Mapping and Monitoring Program. Although APN 156-070-01 & 156-070-10 are currently under Williamson Act contract, none of the subject property is classified as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. The property owner is not proposing to cancel the Williamson Act contract; consequently, reclamation will return the land to its current use as grazing.

(Reference SMARA 3707)

30. Describe the reclamation procedures used to ensure adherence with the specified requirements for other agricultural land reclamation. If not applicable, please explain why.

The site is currently used as grazing land and will be returned to that use, in accordance with the approved reclamation plan.

(Reference SMARA 3708)

31. Describe the reclamation procedures used to ensure adherence with the specified requirements for building, structure, and equipment removal. Additionally, indicate on the map (Items 19 - 20) or on diagrams as necessary the following:

a. Where all equipment, supplies, and other materials will be stored.

A portable screening plant (which will be brought on-site for special projects and operated at the blending and screening site, as shown on Figure 3), radial stacker, portable truck scale, grader, tire truck, water truck and two front-end loaders will be stored onsite (as indicated in the response to Question 16b above); all other equipment will be stored off-site.

b. Identify which buildings, structures, and equipment will be: (1) dismantled and removed off site; and/or (2) remain on site as consistent with the approved end use.

No permanent equipment or supplies will be stored on site. No buildings or structures will be required for this mining operation. The portable truck scale fits into the back of a pickup truck and will be removed as necessary, and upon completion of surface mining operations. No buildings or structures are proposed in conjunction with the proposed project. As proposed, after completion of the project, all equipment will be removed from the site.

(Reference SMARA 3709 and 3502(b)(5))

32. Describe soil conditions. Elaborate on the reclamation procedures used to ensure adherence with the specified requirements for topsoil salvage, maintenance, and distribution.

The soils types of the proposed project are covered by the USDA, Soil Survey of Kern County, California, Northwestern Part, September 1988. The site is almost entirely comprised of Mendi-

Hillbrick-Kilmer association, 9 to 30 percent slopes, and Reward shaly loam, 30 to 50 percent slopes. A very small area of the southeast corner contains Aramburu very shaly clay loam, 15 to 30 percent slopes, and Pottinger very shaly clay loam, 2 to 9 percent slopes.

Prior to mining activities, up to six inches of growth media (which may also be referred to as topsoil) will be removed and stockpiled onsite. To allow flexibility in operations, the operator will have the option of stockpiling topsoil in the Topsoil Stockpiles area, as shown in Figure 7, stockpiling topsoil in the mining areas, or immediately using topsoil for reclamation of previously mined areas on the site. Topsoil stockpiles will be up to 20 feet tall and will have a maximum slope of 2:1 (horizontal:vertical). Topsoil stockpiles within the 2.42-acre blending and screening site will be a maximum of 10 feet tall, and will have a maximum slope of 2:1 (horizontal:vertical). Topsoil shall not be stripped more than one year ahead of mining operations. Topsoil stockpiles will be planted with a vegetative cover or will be protected by other equally effective measures to prevent water and wind erosion and to discourage weeds. All topsoil piles will be placed separately from mining production stockpiles. During reclamation, topsoil contained in stockpiles will be distributed to disturbed areas as necessary; less than six (6) inches of topsoil will be returned to all disturbed areas.

(Reference SMARA 3711, 3707(b) and 3503(f) and (a)(2))

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33. Describe how contaminants will be controlled and mine waste will be disposed of (i.e., refuse, fuel storage, tailings, etc.), especially with regard to surface runoff and groundwater. Indicate on map (Items 19 - 20) or on diagrams as necessary.

Noting that this is not a large scale operation, and no structures are proposed, all domestic refuse that is brought on site, will be removed from site the same day.

The only known potential contaminants are those associated with the operation of equipment on the mine site. Equipment fueling and maintenance will be conducted on an as-needed basis by service vehicles that will not remain on site. Bulk diesel (approximately 100 gallons) will be off-loaded by means of a pump and hose between the truck and the mining equipment. Please see the Fuel & Oil Spill Contingency Plan (WZI, Inc., December 2018).

No wastewater or process water will be generated as a result of the mining operation. Earth berms will surround mine excavations, as described in the response to Question 28 above. Mine excavations are proposed to drain internally, sloping "inward", such that any silts or eroded materials are captured, and prevented from entering the storm water stream and leaving the site. In the event of an overflow, storm water would leave excavated areas in the form of weir flow, trapping and retaining sediments or other potential pollutants.

There are no hazardous wastes or toxic contaminants that will be generated or introduced in the mining process and no run-off water will be collected, altered or contaminated at the site.

Sewage requirements will be met by use of portable toilet(s) which will be serviced by a contractor.

There is no waste that will be generated during the mining process. See the Soil Sample Report (WZI, Inc., December 12, 2018) which contains information documenting composition of multiple soil samples.

Stockpiles will be placed in a manner that will keep them separated from storm water runoff.

(Reference SMARA 3712 and 2772(c)(8)(a))

34. Describe the reclamation procedures used to ensure adherence with the specified requirements for closure of surface openings. If not applicable, please explain why.

There will be no open ditches or surface openings.

(Reference SMARA 3713)

35. Financial Assurances

Upon approval of the surface mining permit and reclamation plan and prior to commencement of surface mining operations, financial assurance(s) ensuring that reclamation is performed in accordance with the surface mining operation's approved reclamation plan must be submitted to and approved by Kern County. Financial assurances may take the form of surety bonds, irrevocable letters of credit, trust funds, or other forms of financial assurances specified by the State Mining and Geology Board and Kern County.

Financial assurance instruments shall be made payable to "Kern County or the Department of Conservation." The financial assurance may also be made payable to additional public agencies, including federal agencies responsible for enforcing reclamation requirements over the mining operation. Financial assurances, along with a copy of the itemized reclamation cost estimate ***(based on the approved reclamation plan)***, must be submitted to Kern County for review and approval prior to commencement of mining operations. The amount of financial assurances required of a surface mining operation for any one year shall be adjusted annually to account for new lands disturbed by surface mining operations, inflation, and reclamation of lands accomplished in accordance with the approved reclamation plan.

The permit application shall include a detailed, itemized estimate of reclamation costs. ***The assumption when preparing the estimate is that the mine operator is incapable of performing the work or has abandoned the surface mining operation, thereby resulting in the County or State hiring an independent contractor to perform the reclamation work.*** At a minimum, the detailed itemized estimate of all associated reclamation costs shall include, but is not limited to:

a. Costs of backfilling, regrading, slope stabilization, and recontouring.
b. Costs of revegetation and wildlife habitat replacement, including any monitoring.
c. Costs of final engineering design.
d. Costs of labor, including supervision.
e. Costs of mobilization.
f. Costs of equipment.
g. Costs of removal of buildings, structures, and equipment.
h. Costs associated with reduction of specific hazards, such as: heap leaching facilities, chemical processing ponds, soil decontamination, in-water slopes, highwalls, landslides, subsidence, or other mass ground failure.
i. Costs of drainage and erosion control measures.
j. Costs of soil tests.
k. Costs of haul road ripping and reseeding.
l. Costs of fencing.
m. Costs of liability insurance.
n. Costs of long-term stabilization, control, containment of waste solids and liquids.

Financial Assurance Cost Estimates and Financial Assurance Instruments will be submitted for review and approval as required.

(Reference SMARA 2773.1)

FOR OFFICE USE ONLY

Date Accepted: 2-9-17 Received By: Randall Cates **FEES** $14,210.00

Case # CUP 17 Map # 117 S.D. # 4 Case $ 14,210.00
Floodplain N/A Zoning Ord. Sec. 19.12.030.G Env'l EIR
G.P/S.P 8.3, 8.3/2.4, 8.4, 8.4/2.2, 8.4/2.4 x Consistent ___ Not Consistent Other_____

Element or Name Kern County General Plan

Reviewed By: Randall Cates Other _____

Total $14,210.00 ($8,666.00 for receipt #157681, $5,544.00 for receipt #185500)

NOTES:_____

Receipt # 157681 & 185500

Attachments

STATEMENT OF RESPONSIBILITY

In consideration of approval by the Kern County Planning Commission of this application for a Surface Mining Permit and Reclamation Plan, the undersigned, jointly and severally, hereby covenants with Kern County as follows:

(1) That all of the provisions of said permit and/or plan and any and all conditions appended thereto shall be faithfully performed and completed by the undersigned within the time therein provided, or within any additional time as may be allowed pursuant to the Ordinance Code of Kern County (Chapter 19.100).

(2) That the obligations of the undersigned to perform and complete the provisions of said permit and/or plan, including any and all conditions appended thereto, shall be subject to the provisions of said Ordinance Code which are incorporated herein by reference.

(3) That the place of performance by the undersigned of the covenants herein shall be the County of Kern, State of California.

(4) That any notice required to be given, or otherwise given to the undersigned may be by personal service or by ordinary United States mail, postage prepaid, and addressed to the agent, or any of the agents, named in paragraph 7 of the application filed by the undersigned.

Dated this 16 day of May, 2016.

Diatom LLC By Wanda Cooper
(Signature - to be signed in presence of Notary Public)

WANDA Cooper
(Printed Name)

(Reference SMARA 2772.C.10)

For Office Use Only

(To be completed by Staff after approval of project)

CUP No. 17, Map No. 117

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Kern)

On May 16, 2016 (Date) before me, Koni Zamarripa Santos Notary, (Here Insert Name and Title of the Officer)

personally appeared Wanda Cooper (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Koni Zamarripa Santos
Signature of Notary Public

KONI ZAMARRIPA-SANTOS
Commission # 2057113
Notary Public - California
Kern County
My Comm. Expires Feb 7, 2018

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

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☐ Other: _____	☐ Other: _____
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SURFACE MINING AND RECLAMATION ACT OF 1975
ARTICLE 1. GENERAL PROVISIONS. SECTION 2710 et seq.
ARTICLE 2. DEFINITIONS. SECTION 2725 et seq.
ARTICLE 3. DISTRICT COMMITTEES. SECTION 2740 - 2741.
ARTICLE 4. STATE POLICY FOR THE RECLAMATION OF MINED LANDS. SECTION 2755 et seq.
ARTICLE 5. RECLAMATION PLANS AND THE CONDUCT OF SURFACE MINING OPERATIONS. SECTION 2770 et seq., as amended
CCR TITLE 14 (REGISTER 85, NO. 18-5-4-85)
CHAPTER 8. MINING AND GEOLOGY
SUBCHAPTER 1. STATE MINING AND GEOLOGY BOARD
ARTICLE 1. SURFACE MINING AND RECLAMATION PRACTICE. SECTION 3500 et seq.
ARTICLE 9. RECLAMATION STANDARDS. SECTION 3700 et seq.

Mining Operation and Closure

YES	NO	?	N/A		
x				SMARA 2770.5	100-year flood, CalTrans contact.
x				SMARA 2772 (c) (1)	Name and address of operator/agent.
x				SMARA 2772 (c) (2)	Quantity & type of minerals to mined.
x				SMARA 2772 (c) (3)	Initiation and termination date.
x				SMARA 2772 (c) (4)	Maximum anticipated depth of mining.
x				SMARA 2772 (c) (5)	Description, including map with boundaries, topographic details, geology, streams, roads, utilities.
x				SMARA 2772 (c) (6)	Mining plan and time schedule for reclamation (concurrent or phased reclamation).
x				SMARA 2772 (c) (9)	Impact of reclamation on future mining.
x				SMARA 2772 (c)(10)	Applicant statement accepting responsibility for reclamation per the reclamation plan.
x				SMARA 2773.1	Performance (financial) assurances.
x				CCR 3502 (b) (2)	Public health and safety (exposure).
			x	CCR 3713 (b)	All portals, shafts, tunnels, or openings, gated or protected from public entry, but preserve access for wildlife.
			x	CCR 3502 (b) (5)	Disposition of old equipment.
x				CCR 3709 (a)	Equipment stored in designated area and waste disposed of according to ordinance.

YES	NO	?	N/A		
x				CCR 3709 (b)	Structures and equipment dismantled and removed.
x				CCR 3713 (a)	Drill holes, water wells, monitoring wells abandoned in accordance with laws.
				End Land Use	
x				SMARA 2772 (c) (7)	Proposed subsequent use.
x				CCR 3704 (e)	Final landforms conform with surrounding topography or end use.
			x	CCR 3707 (a)	Return prime ag to prime ag, unless exempted.
x				CCR 3707 (c)	Productivity rates equal pre-project or similar site for two consecutive years. Rates set forth in plan.
			x	CCR 3708	Other ag capable of sustaining crops of area.
x				SMARA 2772 (c) (8)	Description of reclamation measures adequate for proposed end use.
x				CCR 3706 (a)	Mining and reclamation to protect downstream beneficial uses.
				Geotechnical Requirements	
x				CCR 3502 (b) (3)	Slopes: critical gradient, consider physical properties and landscaping.
x				CCR 3704 (f)	Cut slopes have minimum factor of safety for end use and conform with surrounding topography.
x				CCR 3502 (b) (4)	Fill materials in conformance with current engineering technology.
			x	CCR 3704 (a)	For urban use, fill compacted in accordance with UBC or local grading ordinance.
			x	CCR 3704 (b)	For resource conservation, compact to standard for that end use.
x				CCR 3704 (d)	Final reclamation fill slopes not exceed 2:1, except when engineering and revegetation analysis allow.
x				CCR 3704 (e)	Final landforms of fills conform with surrounding topography or end use.

Hydrology and Water Quality

YES	NO	?	N/A		
x				CCR 3710 (a)	Surface and groundwater protected in accordance with Porter-Cologne and Clean Water Acts (RWQCB/SWRCB).
x				CCR 3706 (a)	Mining and reclamation to protect downstream beneficial uses.
x				CCR 3706 (b)	Water quality, recharge, and groundwater storage shall not be diminished, except as allowed by plan.
x				CCR 3503 (b) (2)	Prevent siltation of groundwater recharge areas.
			x	SMARA 2773 (a)	Water quality monitoring plan specific to property.
x				CCR 3713 (a)	Drill holes, water wells, monitoring wells abandoned in accordance with laws.
x				CCR 3503 (e)	Erosion and drainage (grading to drain to natural courses or interior basins).
x				SMARA 2772(c)(8)(b)	Rehabilitation of streambanks/beds to minimize erosion.
x				CCR 3502 (b) (6)	Temporary stream and water diversions shown.
x				CCR 3503 (a) (3)	Erosion control facilities (dikes, ditches, etc.) as necessary.
x				CCR 3706 (c)	Erosion and sedimentation controlled during all phases as per RWQCB/SWRCB.
			x	CCR 3503 (b) (1)	Settling ponds (sedimentation and water quality).
x				CCR 3706 (d)	Surface runoff and drainage controlled and methods designed for not less than 20 year/1 hour intensity storm event.
x				CCR 3706 (e)	Altered drainages shall not cause increased erosion or sedimentation.
			x	SMARA 2773 (a)	Sediment and erosion control monitoring plan specific to property.
			x	CCR 3503 (d)	Disposal of mine waste and overburden (stable--no natural drainage restrictions without suitable provisions for diversion).
x				SMARA 2772(c)(8)(a)	Description of contaminant control and mine waste disposal.
x				CCR 3503 (a) (2)	Overburden stockpiles managed to minimize water and wind erosion.

YES	NO	?	N/A		
__	__	__	x	CCR 3704 (g)	Piles or dumps not placed in wetlands without mitigation.
__	__	__	x	CCR 3711 (e)	Topsoil redistributed in stable site and consistent thickness.
__	__	__	x	CCR 3712	Waste and tailings, and waste disposal governed by SWRCB (Article 7, Chapter 15, Title 23, CCR).
x	__	__	__	CCR 3710 (b)	In-stream in accordance with DFG 1600, EPA 404, and Sec. 10 Rivers and Harbors.
__	__	__	x	CCR 3710 (c)	In-stream channel elevations and bank erosion evaluated annually using extraction quantities, cross-sections, aerial photos.
__	__	__	x	CCR 3706 (f)	Stream diversions constructed in accordance with DFG 1603, EPA 404, Sec. 10 Rivers and Harbors.
__	__	__	x	CCR 3706 (g)	All temporary diversions eventually removed.

Environmental Setting and Protection of Fish and Wildlife Habitat

x	__	__	__	CCR 3502 (b) (1)	Environmental setting and impact of reclamation on surrounding land uses. (Identify sensitive species, wildlife habitat, sensitive natural communities, e.g., wetlands, riparian zones, etc.)
x	__	__	__	CCR 3705 (a)	Vegetative cover, suitable to end use, self-sustaining. Baseline studies documenting cover, density and species richness.
x	__	__	__	CCR 3503 (c)	Protection of fish and wildlife habitat (all reasonable measures).
x	__	__	__	CCR 3703 (a)	Sensitive species conserved or mitigated.
x	__	__	__	CCR 3703 (b)	Wildlife habitat at least as good as pre-project, if approved end use is habitat.
__	__	__	x	CCR 3703 (c)	Wetlands avoided or mitigated at 1:1 minimum.
__	__	__	x	CCR 3704 (g)	Piles or dumps not placed in wetlands without mitigation.
__	__	__	x	CCR 3706 (a)	Mining and reclamation to protect downstream beneficial uses.
__	__	__	x	CCR 3706 (f)	Stream diversions constructed in accordance with DFG 1603, EPA 404, Sec. 10 Rivers and Harbors.
__	__	__	x	CCR 3706 (g)	All temporary diversions eventually removed. (Restore wildlife habitat).

YES	NO	?	N/A		
x				CCR 3710 (a)	Surface and groundwater protected.
			x	CCR 3710 (b)	In-stream in accordance with DFG 1600, EPA 404, and Sec. 10 Rivers and Harbors.
			x	CCR 3710 (c)	In-stream channel elevations and bank erosion evaluated annually using extraction quantities, cross-sections, aerial photos.
			x	CCR 3710 (d)	In-stream not cause fish impacts according to DFG 1600.
			x	CCR 3713 (b)	All portals, shafts, tunnels, or openings, gated or protected from public entry, but preserve access for wildlife.

Resoiling and Revegetation

			x	CCR 3503 (f)	Resoiling (fine material on top plus mulches).
			x	CCR 3704 (c)	Mine waste stockpiled to facilitate phased reclamation and separate from growth media.
			x	CCR 3711 (a)	All salvageable topsoil removed. Topsoil and vegetation removal not process mining by more than one year.
			x	CCR 3711 (b)	Topsoil resources mapped prior to stripping, location of stockpiles on map. Topsoil and growth media in separate stockpiles.
x				CCR 3711 (c)	Soil salvage and phases set forth in plan, minimize disturbance, designed to achieve revegetation success.
			x	CCR 3707 (b)	Segregate and replace topsoil by horizon.
			x	CCR 3711 (d)	Topsoiling phased ASAP. Stockpiles not be disturbed until needed. Stockpiles clearly identified and planted with vegetation or otherwise protected.
			x	CCR 3711 (e)	Topsoil redistributed in stable site and consistent thickness. Harbors.
x				CCR 3705 (d)	Roads stripped of roadbase materials, resoiled and revegetated, unless exempted.
			x	CCR 3705 (e)	Soil altered or other than native topsoil, required soil analysis. Amend if necessary.
			x	CCR 3707 (d)	Fertilizers and amendments not contaminate water.

YES	NO	?	N/A		
x				CCR 3503 (g)	Revegation and plant survival (use available research).
x				CCR 3503 (a) (1)	Removal of vegetation and overburden preceding mining kept to a minimum.
x				SMARA 2773 (a)	Revegetation plan specific to property. Monitoring plan.
x				CCR 3705 (a)	Vegetative cover, suitable to end use, self-sustaining. Baseline studies documenting cover, density and species richness.
x				CCR 3705 (b)	Test plots if success has not been proven previously.
x				CCR 3705 (c)	Decompaction of site.
x				CCR 3705 (d)	Roads stripped of roadbase materials, resoiled and revegetated, unless exempted.
x				CCR 3705 (f)	Temporary access not bladed. Barriers installed.
x				CCR 3705 (g)	Use native plant species, unless exotic species meet end use.
x				CCR 3705 (h)	Plant during correct season.
x				CCR 3705 (i)	Erosion control and irrigation, when necessary.
			x	CCR 3705 (j)	If irrigated, demonstrate self-sustaining without for two-year minimum.
			x	CCR 3705 (k)	Weeds managed.
x				CCR 3705 (l)	Plant protection measures, fencing, caging.
x				CCR 3705 (m)	Success quantified by cover, density and species-richness. Standards proposed in plan. Sample method set forth in plan and sample size provide 80 percent confidence level, as minimum.

Administrative Requirements

x				SMARA 2774 (b)	Annual inspection.
x				SMARA 2776	All mining operations since 1/1/76 included in reclamation plan.
x				SMARA 2777	Amended reclamation plans required prior to substantial deviations to approved plans.
			x	PRC 21151.7	EIR required for cyanide heap leaching.

NOTES:

California Department of Conservation/ Office of Mine Reclamation

January 3, 2013 letter

DEPARTMENT OF CONSERVATION

Managing California's Working Lands

OFFICE OF MINE RECLAMATION

801 K STREET • MS 09-06 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 323-9198 • FAX 916 / 445-6066 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

January 3, 2013

VIA EMAIL: catesr@co.kern.ca.us
ORIGINAL SENT BY MAIL

Mr. Randall Cates
Planner 2
Planning and Community Development Department
2700 M Street, Suite 100
Bakersfield, CA 93301-2323

JOHE RANCH QUARRY RECLAMATION PLAN

Dear Mr. Cates:

The Department of Conservation's Office of Mine Reclamation (OMR) has reviewed the reclamation plan for Johe Ranch Quarry dated November 15, 2012. The operator, G.F. Industries, is proposing to mine diatomaceous earth at 400,000 tons annually for a total of 8,000,000 tons over a period of twenty years. The project will occur on approximately 94 acres of a 331-acre site. OMR staff conducted a site visit on November 29, 2012 to evaluate site conditions and discuss reclamation issues.

The Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code section 2710 et seq.) and the State Mining and Geology Board Regulations (California Code of Regulations (CCR) Title 14, Division 2, Chapter 8, Subchapter 1) require that specific items be addressed or included in reclamation plans. The following comments prepared by Molly Ferrell, Restoration Ecologist, and Joshua Goodwin, Geologist, are offered to assist in your review of this project. We recommend that the reclamation plan be supplemented to fully address these items.

Mining Operation and Closure

(Refer to SMARA sections 2770, 2772, 2773, CCR sections 3502, 3709, 3713)

1. SMARA section 2772(c)(5) states that the reclamation plan shall include a map with boundaries and topographic details of the site. SMARA section 2773(a) requires the establishment of site-specific criteria for evaluating compliance with the approved

reclamation plan with regards to topography and sediment and erosion control. The proposed mine plan shown on Figure 6, *Johe Ranch Mine, Mining and Reclamation Plan*, presents the current and proposed topography at a 25-foot contour interval (CI). The level of detail necessary to provide adequate information for annual compliance monitoring cannot be shown on a map with a 25-foot CI. The reclamation plan should be supplemented with a more detailed final contour map to provide the County with sufficient topographic compliance criteria, which is necessary for an effective annual inspection of the mine and for an accurate calculation of financial assurances. OMR, recommends using a CI of 10 feet or less to ensure adequate detail is provided for the County's annual inspections of the mine.

2. SMARA section 2772(c)(6) requires that the reclamation plan include a time schedule that provides for initiation of reclamation at the earliest possible time on each portion of the mined land that will not be subject to further disturbance. The plan as submitted provides for reclamation to begin only after mining at three separate locations has been completed. Item 18, page 7 states "The proposed plan is to mine out Mining Area 3 and Mining Area 2, and then retreat to Mining Area 1. However, should the need arise, the mine operator requires the flexibility to move between mine areas and, therefore, does not want to be constrained by a phased operation." OMR recommends that the plan be revised to provide for concurrent or phased reclamation.

3. CCR section 3502(b)(2) requires that the reclamation plan address public health and safety measures in consideration of the degree and type of present and probable future exposure of the public to the site. The degree of slope angle in Item 24 on page 9 of the reclamation plan does not adequately address exposure of the public to the site. As the site is close to the State Route 58 (SR 58), measures such as signage, fencing or locked gates should be added to this section of the reclamation plan.

Geotechnical Requirements

(Refer to CCR sections 3502, 3704)

4. CCR section 3704(f) states that cut slopes, including final high walls and quarry faces, shall have a minimum factor of safety that is suitable for the proposed end use and conform with the surrounding topography. Several items in the reclamation plan state that the mining plan calls for a final slope of 2H:1V (horizontal:vertical) and if it is determined that flatter slopes are required for grazing animals, the gradient will be adjusted accordingly. Based on review of the "New Contour" lines on Figure 6, Mining Areas 1 and 2 both will have areas with slopes that are approximately 1H:1V. The reclamation needs to be revised to correct this inconsistency. OMR recommends having the proposed final contour lines redrawn on Figure 6 to show all slopes at 2H:1V, as stated in the reclamation plan.

Hydrology and Water Quality

(Refer to SMARA sections 2772, 2773, CCR sections 3502, 3503, 3706, 3710, 3712)

5. CCR sections 3706 and 3710 require that surface and groundwater be protected in accordance with the Porter-Cologne and Clean Water Acts as implemented by the Regional Water Quality Control Board and the State Water Resources Control Board. Regulations approved by the State Water Resources Control Board require that a mine site which discharges storm waters that may have contacted any overburden, raw material,

intermediate products, by-products, or waste products on the mine site obtain a general industrial activities storm water permit and submit a Storm Water Pollution Prevention Plan (SWPPP). We recommend that the applicant consult with the Regional Water Quality Control Board to determine if these requirements are applicable to this operation. If the permit and the SWPPP are obtained, the required information, monitoring requirements and water quality standards can be used to satisfy the erosion control requirements of SMARA if they are incorporated into the reclamation plan. If no permit and SWPPP are obtained, the reclamation plan should be supplemented with a site-specific erosion and sediment control plan.

6. CCR section 3706(d) requires the use of silt fences, sediment ponds, or other erosion control measures to ensure that surrounding lands are protected from erosion, gullying and sedimentation. CCR section 3706(e) states that where natural drainages are covered or restricted or otherwise impacted by surface mining activities, mitigation alternatives shall be included in the reclamation plan to assure that runoff will not cause increased erosion or sedimentation.

   Item 13, page 4, of the reclamation plan states, "All drainage channels are shown in Figure 6 and will remain undisturbed by mining". Based on a review of Figure 6 and observations made during OMR's site visit, this statement is incorrect as the large drainage northeast of "Mining Area Three" does not have the symbol for "Existing/Final Drainage" drawn in it. This drainage is also the location that is planned for a turnaround for the 30-foot wide access road, which impacts the other drainages on the site.

   Item 28, page 13, states, "Existing drainage flows will not be impacted by surface mining operations or reclamation procedures. There are no diversion structures or erosion control features on site, and none are proposed." As stated in the previous paragraph, all of the drainages onsite will be traversed by the access road. Additionally, the proposed "New Contour" lines in all three mining areas create new drainages that will be susceptible to headward cutting erosion that could adversely impact SR 58 if erosion control methods are not utilized at the site.

   The reclamation plan must be supplemented to include a drainage analysis and sediment and erosion control plan that is prepared by a qualified professional. Erosion control methods must be designed to handle runoff from not less than a 20-year/1-hour intensity storm event.

7. SMARA section 2772(C)(8)(A) calls for a description of how contaminants will be controlled and mining waste will be disposed. The Project Description prepared by the County states, "The project proponent estimates that there will be no mineral waste generated." OMR staff observed overburden in several of the drainages on site that was approximately 6 to 8 feet thick. The geologic description provided in Item 12 of the reclamation plan discusses soil profiles found in the area that are up to 6 feet thick. Figure 6 shows 9 circular topsoil stockpiles that have a 50-foot diameter and are no more than 12 feet in height, per Item 32, page 14 of the reclamation plan. These 9 stockpiles of topsoil would amount to approximately 2,600 cubic yards of material. If 6 inches of topsoil were removed over the 88 acres planned for extraction, there would be approximately 70,000 cubic yards of topsoil. The reclamation plan describes 2 to 6 feet of clay and sandy loam material in the

mining area, most of which is overburden. Therefore, the proposed mine will likely have a significant amount of waste material that will have to be disposed of, as well as a need for much larger topsoil stockpiles than planned. OMR recommends that the reclamation plan be revised to include phased reclamation in order to accommodate the large volume of waste material and topsoil.

The reclamation plan needs to discuss the manner in which mine waste will be disposed of at the site and ensure that it will not come into contact with stormwater runoff. If the operator continues to assert that there will be no mine waste generated during the mining activities, then their assumptions must be backed up with site-specific geologic data that provides a defensible rationale as to the actual amount of expected mine waste at the site.

Resoiling and Revegetation

(Refer to SMARA section 2773, CCR sections 3503, 3704, 3705, 3707, 3711)

8. CCR section 3711(a) requires that topsoil and vegetation removal shall not precede surface mining activities by more than one year, unless a longer time period is approved by the lead agency. OMR recommends adding a sentence to the reclamation plan to this effect.

9. CCR section 3711(d) requires topsoil stockpiles to be clearly identified and protected from wind and water erosion. The measure under Item 32 page 14 stating that stockpiles will be 'wetted such that a surface crust develops' is not adequate. OMR recommends that the reclamation plan be amended to include a provision such as: "topsoil and suitable growth media stockpiles shall be planted with a vegetative cover or shall be protected by other equally effective measures to prevent water and wind erosion and to discourage weeds".

10. CCR section 3704(c) requires that piles of mining waste shall be stockpiled in such a manner as to facilitate phased reclamation and that they be segregated from topsoil and topsoil substitutes or growth media salvaged for use in reclamation. The reclamation plan should include a discussion of how waste material will be stockpiled separately from topsoil and provide a footprint of waste piles on a map.

11. CCR section 3705(g) requires that the revegetation efforts use native plant species, when appropriate. The biotic survey (P. 14) states that 73% of the plant species identified were native species. OMR recommends that some local, native seed be added to the revegetation mix to supplement the range/forage quality. The Zorro fescue (*Vulpia myuros*) is a California state-listed noxious weed and should not be included in the reclamation plan seed mix.

12. During OMR's site visit, big squirreltail grass (*Elymus multisetus)*, a California native, was observed as the dominant native at the site. OMR recommends adding *E. multisetus* and some other native species on the biological plant survey list such as *Poa secunda*, *Lupinus microcarpus* and *Stipa* (formerly *Nassella*) *cernua*. Seeds should be listed as pure live seed (PLS) per pound in the reclamation plan. OMR's experience is that pounds of seed per acre could be reduced to save the operator cost. OMR recommends consulting with the local Natural Resource Conservation Service for seed source and optimal amounts of pure live seed per acre. The following seed mix should be added to the reclamation plan:

Common name	Species
Blando brome	*Bromus hordeaceus*
Rose clover	*Trifolium hirtum*
Big squirreltail	*Elymus multisetus*
Nodding needle grass	*Stipa cernua*
Lupine	*Lupinus microcarpus*

Administrative Requirements

(Refer to SMARA sections 2772, 2773, 2774, 2776, 2777, Public Resources Code section 21151.7)

SMARA section 2774 addresses the requirements with respect to lead agency approvals of reclamation plans, plan amendments, and financial assurances. Once OMR has provided comments, a proposed response to the comments must be submitted to the Department at least 30 days prior to lead agency approval. The proposed response must describe whether you propose to adopt the comments. If you do not propose to adopt the comments, the reason(s) for not doing so must be specified in detail. At least 30 days prior notice must be provided to the Department of the time, place, and date of the hearing at which the reclamation plan is scheduled to be approved. If no hearing is required, then at least 30 days notice must be given to the Department prior to its approval. Finally, within 30 days following approval of the reclamation plan, a final response to these comments must be sent to the Department. Please ensure that your agency allows adequate time in the approval process to meet these SMARA requirements.

If you have any questions on these comments or require any assistance with other mine reclamation issues, please contact me at (916) 445-6175.

Sincerely,

Beth Hendrickson, Manager
Reclamation Unit

Julie Finzel
(University of California Cooperative Extension, Livestock and Natural Resources Advisor)
Correspondence

Randall Cates

From: Allen Waggoner <awaggoner@wziinc.com>
Sent: Monday, January 8, 2018 9:44 AM
To: Randall Cates
Subject: FW: AUM calculations

Hi Randall,

Here is the email from Julie. For the percent cover, Julie indicated 60-75% would be reasonable so we took the average at 67.5%. Please let me know if you need anything else.

Thanks,

Allen

Allen Waggoner PG, CEG, CHG
Senior Professional Geologist
WZI Inc.
1717 28th St.
Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
Cell: (661) 808-0095
E-mail: awaggoner@wziinc.com

From: Julie A Finzel [mailto:jafinzel@ucanr.edu]
Sent: Thursday, November 30, 2017 2:05 PM
To: Allen Waggoner
Subject: RE: AUM calculations

Hi Allen,

I did a cursory review of available resources. As such, I can provide input on your question below, however, I would like to point out that I have in no way considered all potential resources or references. It is very likely that I have missed something that could impact your client; I wouldn't refer to my opinion below as anything more than an informed guess.

First, considering percent cover. If average annual rainfall is assumed, a range of 60-75% cover is reasonable to expect given the species seeded. If rainfall this year is below average (a La Nina is predicted), percent plant cover may easily fall short of this mark.

Second, in regards to species richness, I think it's important to consider planting rates as well as the potential for species success. I reviewed the planting rates you provided me in September 2016, which were:

Blando Brome – 12 lbs/acre
Rose Clover – 16 lbs/acre
Big Squirrel Tail – 3 lbs/acre

Nodding Needle Grass – 3 lbs/acre
Lupine – 2 lbs/acre

A total of 36 lbs of seed was applied per acre according to these seeding rates. Species represented by percent are:
Blando Brome – 33%
Rose Clover – 50%
Big Squirrel Tail – 8.3%
Nodding Needle Grass – 8.3%
Lupine – 5.5%

Considering species representation as well as potential for success, I would expect to see more than 50% blando brome, with the potential for much higher rates depending on precipitation timing and amounts. Some rainfall patterns favor forbs, while other favor grasses. Given my research today I wouldn't expect to see big squirrel tail or nodding needle grass, each, make up more than 5% of species present. Lupine success could be as much as 10% in a good rainfall year. As with blando brome, rose clover will depend on rainfall timing and amounts. I have read trials from 30-50 years ago where clover was seeded and established fairly well initially, but after five years couldn't be found on site. Considering the other species present, clover will probably be about 30% of the species on the site.

I would like to reiterate that these numbers represent an informed guess and also that they are highly dependent on rainfall patterns this year. Actual species richness could be radically different from the numbers I have suggested above.

Respectfully,

Julie

Julie Finzel
Livestock and Natural Resources Advisor
UCCE – Kern, Tulare and Kings Counties
1031 S. Mount Vernon Ave.
Bakersfield, CA 93307
661-868-6219
jafinzel@ucanr.edu
http://cekern.ucanr.edu/Livestock/

From: Allen Waggoner [mailto:awaggoner@wziinc.com]
Sent: Thursday, November 30, 2017 11:23 AM
To: Julie A Finzel
Subject: FW: AUM calculations

Hi Julie,

Below is the email with the species of interest for reclamation and the application rate. Randall has asked that we include a cover percentage and species richness (species/square meter) number for the success criteria of the revegetation. The numbers he had proposed from a previously approved mine operation are 74.4% cover and species richness of 5, meaning all 5 reclamation species would be present.

Please let me know if these numbers would be sufficient for the success criteria or if some other numbers would be more appropriate.

Thanks so much for your help,

Allen

Allen Waggoner PG, CEG, CHG
Senior Professional Geologist
WZI Inc.
1717 28th St.
Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
Cell: (661) 808-0095
E-mail: awaggoner@wziinc.com

From: Julie A Finzel [mailto:jafinzel@ucanr.edu]
Sent: Thursday, September 15, 2016 2:13 PM
To: Allen Waggoner
Subject: RE: AUM calculations

Hi Allen,

I have included some USDA Plant webpage references that have recommended seeding rates by species. USDA NRCS is a really good resource for seeding projects. Also, the company that produces the seed will be the most familiar with seeding rates per acre based on the purity of the seed as well as germination rates under test conditions.

Let me know if you have any questions.

Julie

Blando Brome
http://plants.usda.gov/plantguide/pdf/pg_brhoh.pdf

Rose Clover
http://plants.usda.gov/plantguide/pdf/pg_trhi4.pdf
Based on the plant guide, the seeding rate of rose clover seems high. There's also the possibility that rose clover won't perform well in the planting area due to low rainfall

Big Squirreltail
http://plants.usda.gov/plantguide/pdf/pg_elel5.pdf

Nodding Needlegrass
http://plants.usda.gov/plantguide/pdf/pg_nace.pdf

In regards to the lupine, there are many species of lupine. I would need a scientific name before I can pull any more information on it. I do have an estimate for Arroyo Lupine (Lupinus succulentus) that says there are about 15,000 seeds/lb which equals about 0.3 seeds per square foot when one lb/acre is planted. At 2 lbs/acre, that equals about 0.6 seeds/square foot.

Based on the references I have provided above, my assessment is that the seeding rates should be sufficient to provide 0.25 AUM/acre, assuming normal rainfall and good grazing management.

Julie Finzel

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1031 S. Mount Vernon Ave.
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661-868-6219
jafinzel@ucanr.edu
http://cekern.ucanr.edu/Livestock/

From: Allen Waggoner [mailto:awaggoner@wziinc.com]
Sent: Wednesday, September 14, 2016 3:49 PM
To: Julie A Finzel
Subject: RE: AUM calculations

Hi Julie,

Attached is the quote from J&M Land Restoration and recommended application rate for the recommended seed mix from the Office of Mine Reclamation for revegetation at the proposed Johe Ranch diatomite mine project. Pursuant to Randall Cates request, we are trying to establish that the recommended mix and application rate will be adequate to restore the project area to grazing land which will support 0.25 AUM per acre.

Thanks for your help,

Allen

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Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
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E-mail: awaggoner@wziinc.com

From: Julie A Finzel [mailto:jafinzel@ucanr.edu]
Sent: Thursday, September 08, 2016 11:16 AM
To: Allen Waggoner
Subject: AUM calculations

Hi Allen,

It was nice speaking with you this morning. Below are my calculations for an AUM. In thinking about the paragraph you read me, my concern would be what type of monitoring was expected and what are the expected results. As I stated during our conversation, it is important for both parties to agree to a standard and how it will be measured so there's no confusion or misinterpretation later.

1,200 lb cow eats 3% of her body weight daily (1200 * 0.03) = 36 lbs of forage consumed daily
36 * 30 days = 1,080 lbs of forage consumed monthly.
I tend to round down to 1,000 to keep things simple.

So, if one AUM is 1,000 lbs of forage, 1000 * 0.25 = 250 lbs of forage.
Therefore, 0.25 AUM = 250 lbs of forage per acre minimum forage production

Please let me know if you have any questions.

Julie

Julie Finzel
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jafinzel@ucanr.edu
http://cekern.ucanr.edu/Livestock/

Randall Cates

From: Allen Waggoner <awaggoner@wziinc.com>
Sent: Friday, January 3, 2020 10:27 AM
To: Randall Cates
Subject: FW: Johe Ranch AUM estimate

CAUTION: This email originated from outside of the organization. Do not click links, open attachments, or provide information unless you recognize the sender and know the content is safe.

Randall,

Here is Julie's response to your request. She actually added a little more information.

Please let me know if you need anything else.

Allen

Allen Waggoner PG, CEG, CHG
Senior Professional Geologist
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1717 28th St.
Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
Cell: (661) 808-0095
E-mail: awaggoner@wziinc.com

From: Julie A Finzel <jafinzel@ucanr.edu>
Sent: Thursday, January 02, 2020 11:41 AM
To: Allen Waggoner <awaggoner@wziinc.com>
Subject: Johe Ranch AUM estimate

Hi Allen,

As a follow-up and clarification to my September 8, 2016 email regarding the Johe Ranch Mining Project:

0.25 AUM = 250 lbs of *available* forage per acre per year minimum forage production. Using the assumption that half of the forage produced is typically lost due to trampling, fecal contamination, or wildlife, a minimum of 500 lbs of forage per acre must be produced annually to support 0.25 AUM.

I went to google maps and studied the area carefully. I have a forage production plot northwest of the proposed mine location that I visit annually to measure forage production. I am familiar with the area and the species that grow there. In my opinion it is reasonable to expect the mine site to produce 500 lbs/acre or more post-successful reclamation treatments and seeding. Please see reference chart below for actual production data from the nearby plot since 2013.

Therefore, based on my informed guess, it may be assumed it would require 48 acres of reclaimed land to sustain one head of cattle on a year-round basis (12,000 pounds needed for each head of cattle per year divided by 250 pounds of available forage produced per acre per year). Further, with appropriate soil treatments and reclamation techniques I believe the seeding rate estimate provided by J & M land restoration from June 9, 2016 should be sufficient to provide this level of forage production.

Please let me know if you need anything further from me.

Best,

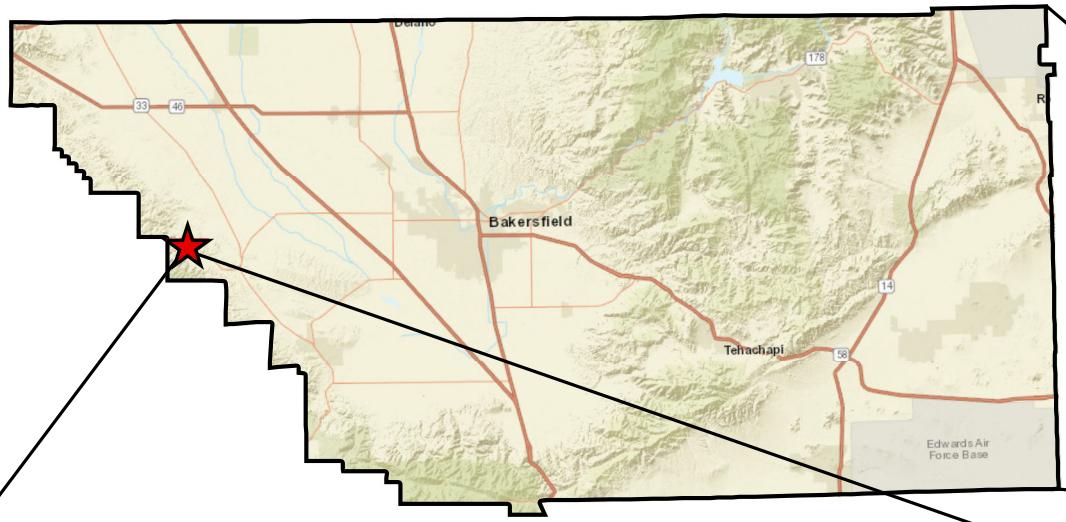
Julie

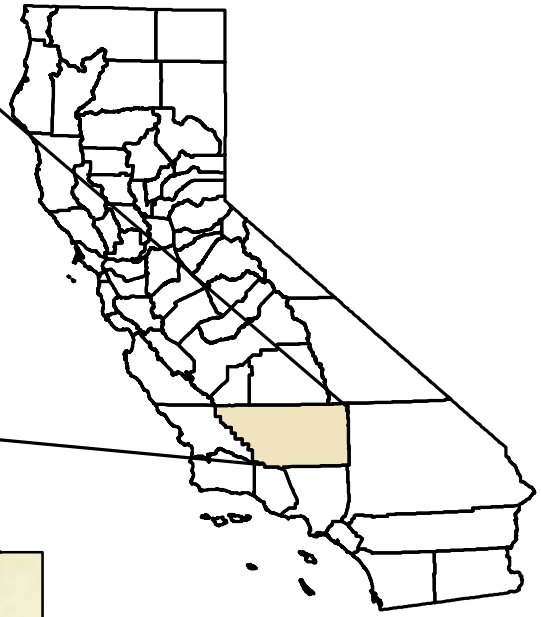
Year	Lbs/acre
2013	1038
2014	0
2015	2894
2016	4708
2017	1982
2018	1957
2019	3209.5

Julie Finzel
Livestock and Natural Resources Advisor
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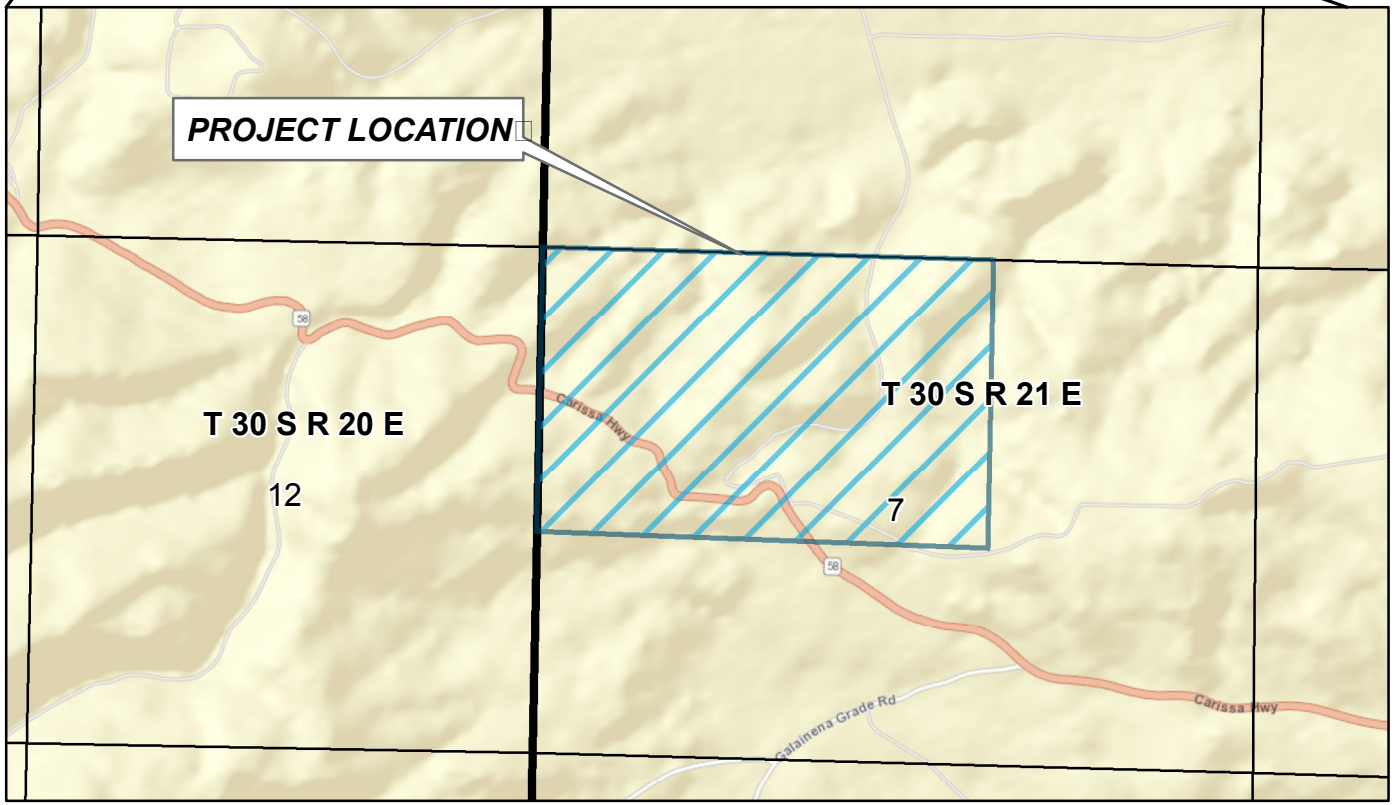
Reclamation Plan Figures
(Figures 1 through 8)

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KERN COUNTY, CALIFORNIA



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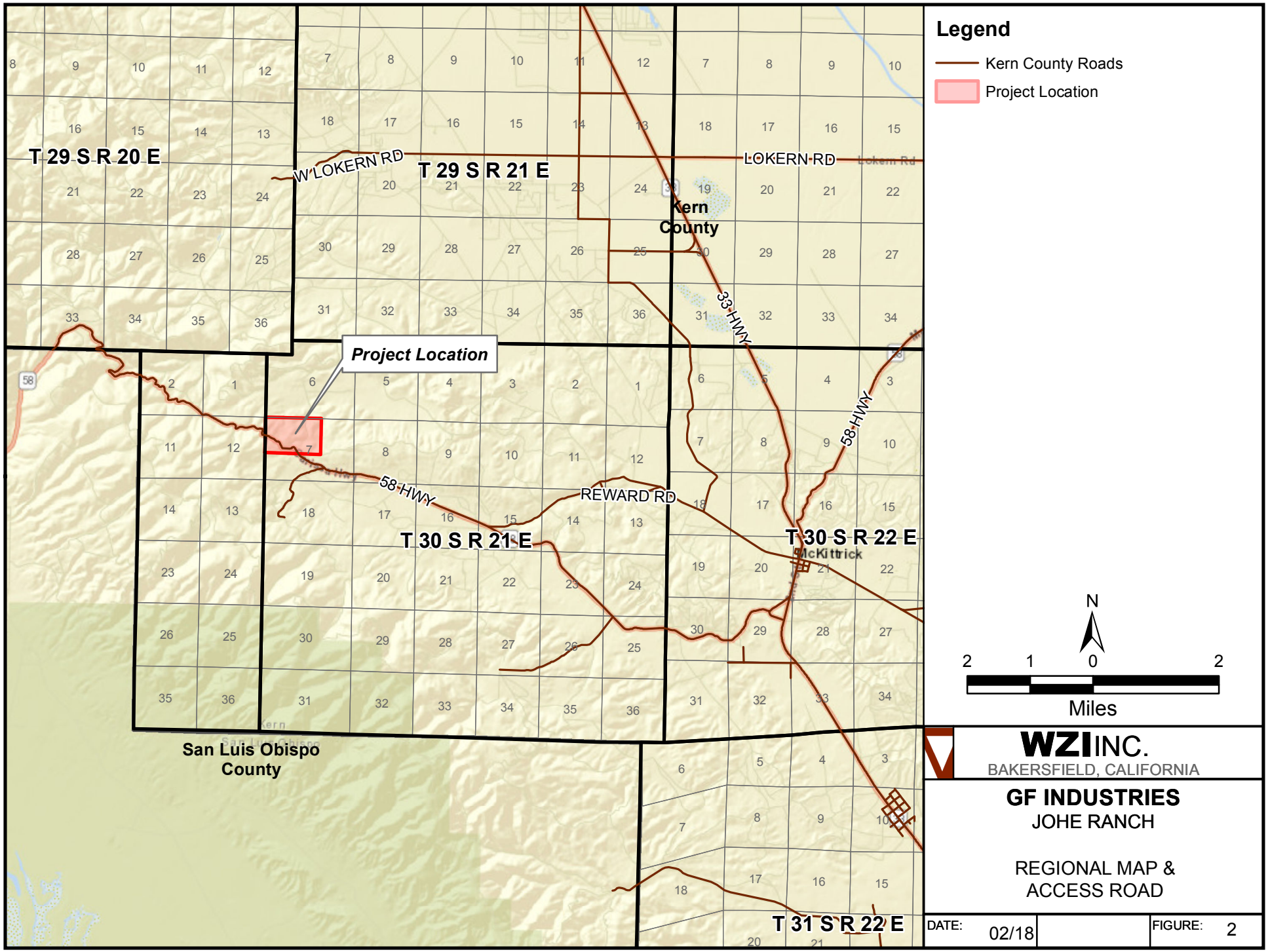
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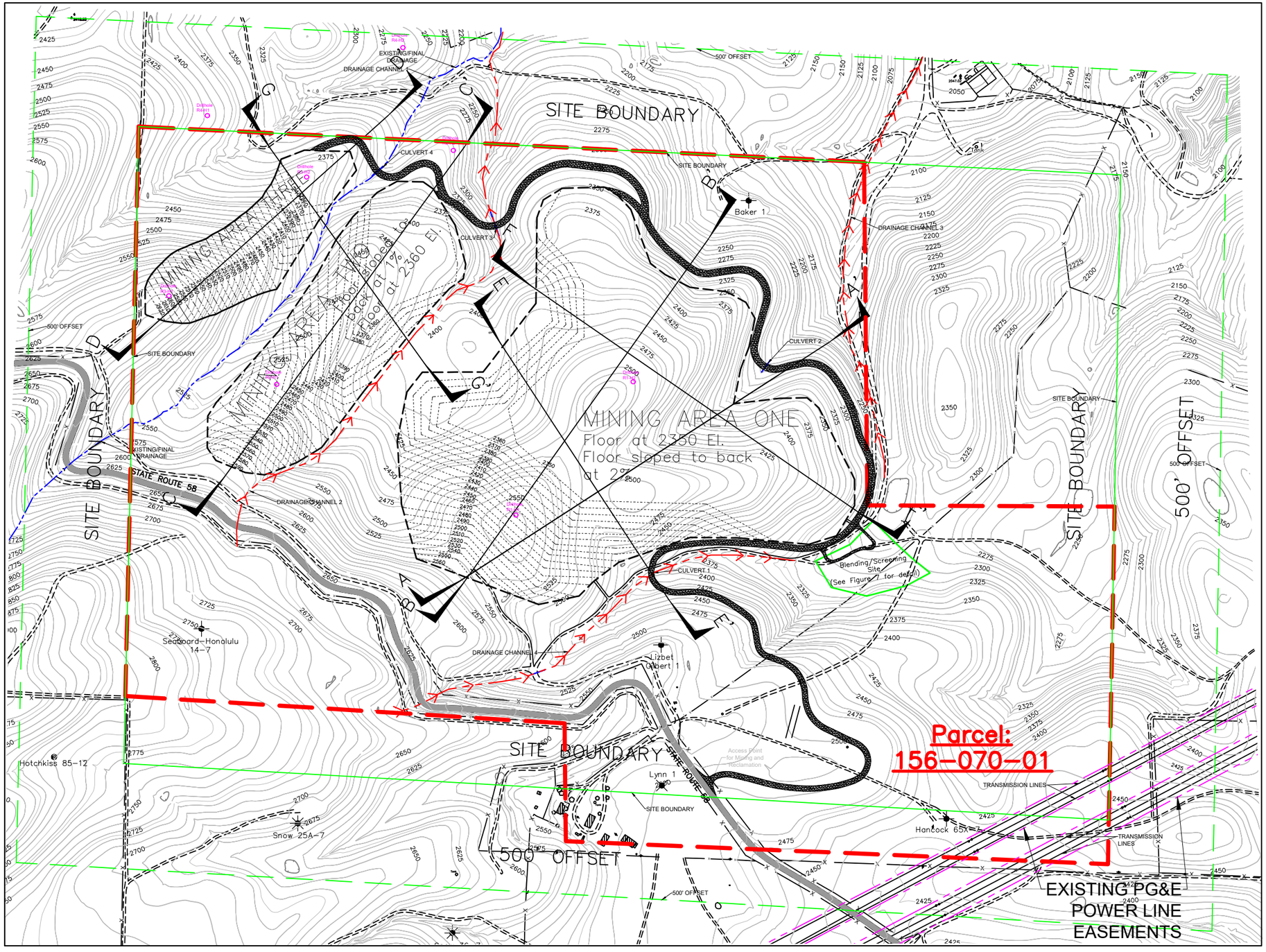
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GF INDUSTRIES
JOHE RANCH

LOCATION MAP

DATE:		FIGURE:
02/18		1


Legend
Kern County Roads
Project Location
T 29 S R 20 E
T 29 S R 21 E
W LOKERN RD
LOKERN RD
Kern County
33 HWY
58 HWY
Project Location
58 HWY
REWARD RD
T 30 S R 21 E
T 30 S R 22 E
McKittrick
San Luis Obispo County
T 31 S R 22 E
N
2 1 0 2
Miles
WZI INC.
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GF INDUSTRIES
JOHE RANCH
REGIONAL MAP &
ACCESS ROAD
DATE: 02/18
FIGURE: 2



500 250 0 500
FEET

N

LEGEND

- EXISTING GROUND CONTOUR
- PROPOSED CONTOUR
- EXISTING FENCE LINE
- 500' PROJECT BOUNDARY OFFSET
- MINING DISTURBANCE BOUNDARY
- PROJECT BOUNDARY
- EXISTING RANCH ROAD
- PROPOSED ACCESS ROAD
- INTERMITTENT DRAINAGE CHANNEL
- "BLUE-LINE" WATERCOURSE PER USGS MAP
- ACTIVE DRY GAS WELL
- ABANDONED GAS WELL
- DRILLHOLE
- ABANDONED WELL
- BOUNDARY OF APN 156-070-01

Title Report Items

2e – Pipeline right of way granted to Shell Oil Company in 1961. Right of way has since been abandoned. Recording No. 37984 per Book 3390, Page 863, O.R.

2f – Existing power line easement and right or way granted to PG&E 1969 & 1971:
Recording No. 48864 per Book 4301, Page 992, O.R.
Recording No. 13625 per Book 4563, Page 979, O.R.

2g – Existing power line easement and right of way granted to PG&E 1969 & 1970:
Recording Nos. 51318, 51319, & 51320 per Book 4305, Pages 483, 488, & 492, O.R.
Recording No. 40723 per Book 4415, Page 760, O.R.
Recording Nos. 41602 & 41603 per Book 4417, Pages 16 & 20, O.R.

2h – Covenants and restrictions imposed by a Land Conservation Contract (Williamson Act) dated 2/17/1976. Contract term was 10 years. Contract has expired. Recording No. 11902 per Book 4939, Page 1484, O.R.

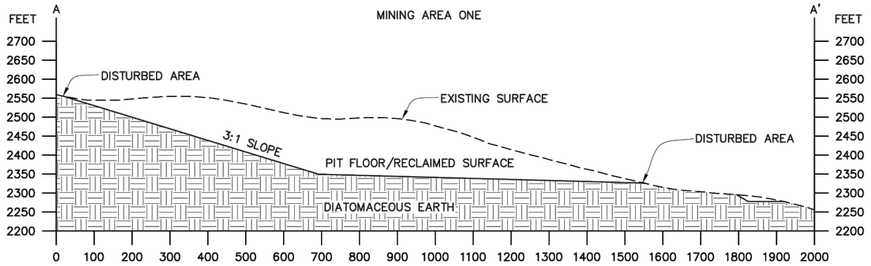
2i – Oil and gas lease from United States Dept. of the Interior BLM to Hunt Oil USA, Inc. 1993. Lease term was 10 years. Lease expired 2003. Recording No. 113429 per Book 6890, Page 156, O.R.

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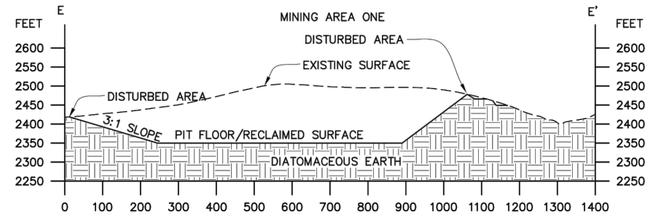
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SITE PLAN

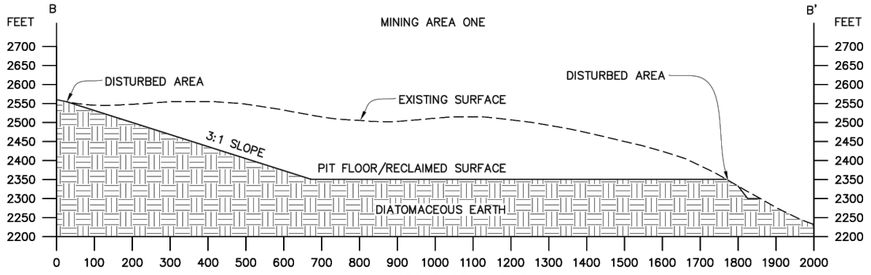
DATE:	JOB NO.:	FIGURE:
06/20		3



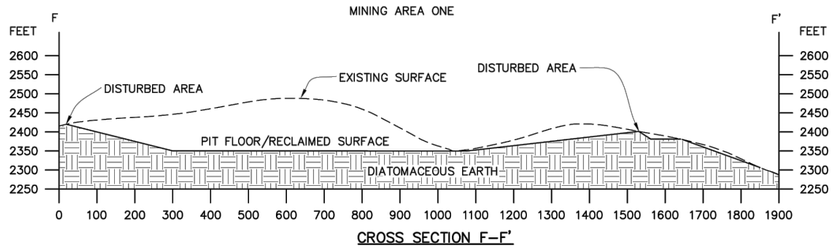
CROSS SECTION A–A'



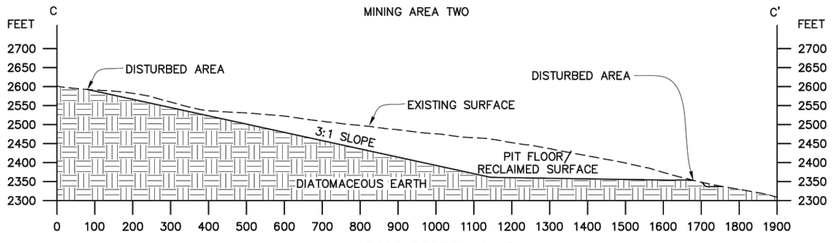
CROSS SECTION E–E'



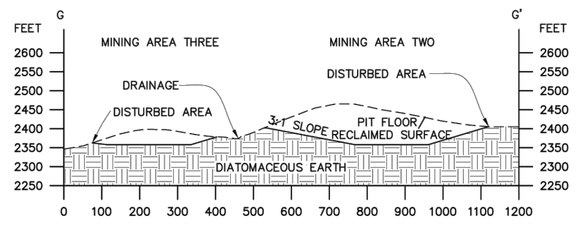
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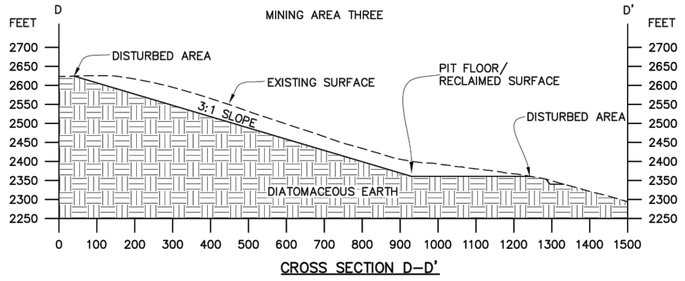
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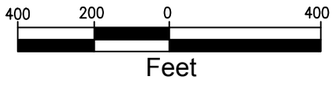
CROSS SECTION C–C'



CROSS SECTION G–G'



CROSS SECTION D–D'



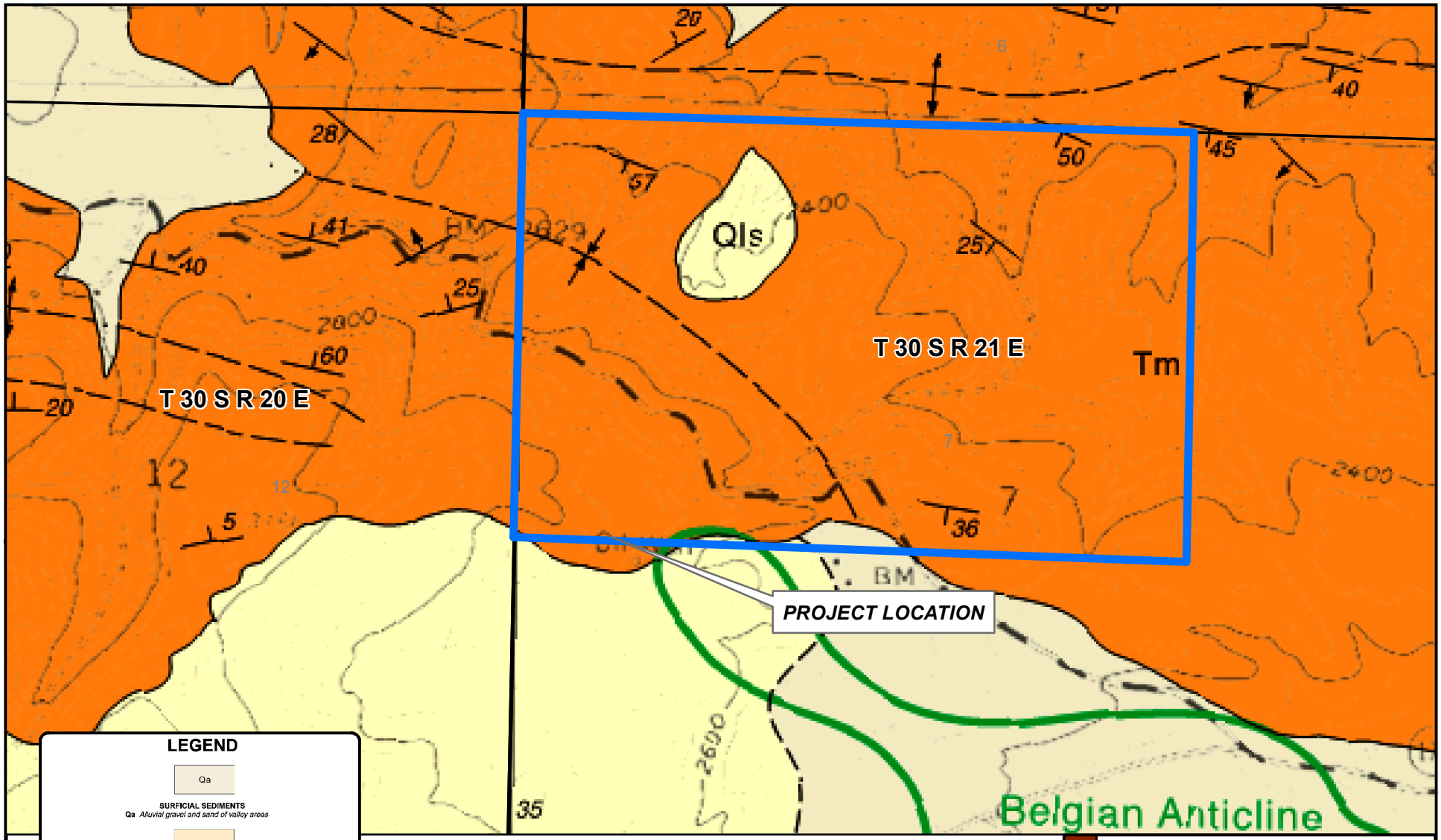
Cross Section Scale
1":400'

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CROSS SECTIONS

DATE:	JOB NO.:	FIGURE:
02/18		4



LEGEND

Qa

SURFICIAL SEDIMENTS
Qa *Alluvial gravel and sand of valley areas*

Qls

LANDSLIDE RUBBLE
Qls *Landslide of cream white* **Tm** *debris; merges into* **Qoa**

Qoa

OLDER DISSECTED SURFICIAL SEDIMENTS
Qoa *Dissected alluvial gravel of cream white* **Tm** *debris, merges into* **Qls**

Tm
Tmg

MONTEREY SHALE
Marine, biogenic, lithified; age Miocene
Tm *McLure Shale Member, siliceous shale, white weathering, thin bedded, platy, hard, commonly cherty, brittle, much fractured; Mohnian Stage, upper Miocene*
Tmg *Gould Shale Member, siliceous shale, semi-siliceous shale and clay shale, contains thin yellow dolomite beds, Luisian and Relizian stages, middle Miocene*

REF: Dibblee, T.W., 2005, Geologic map of the McKitterick Summitt Quadrangle, San Luis Obispo and kern County, Ca., Dibblee Geology Center Map #DF-101, Santa Barbara Museum of Natural History

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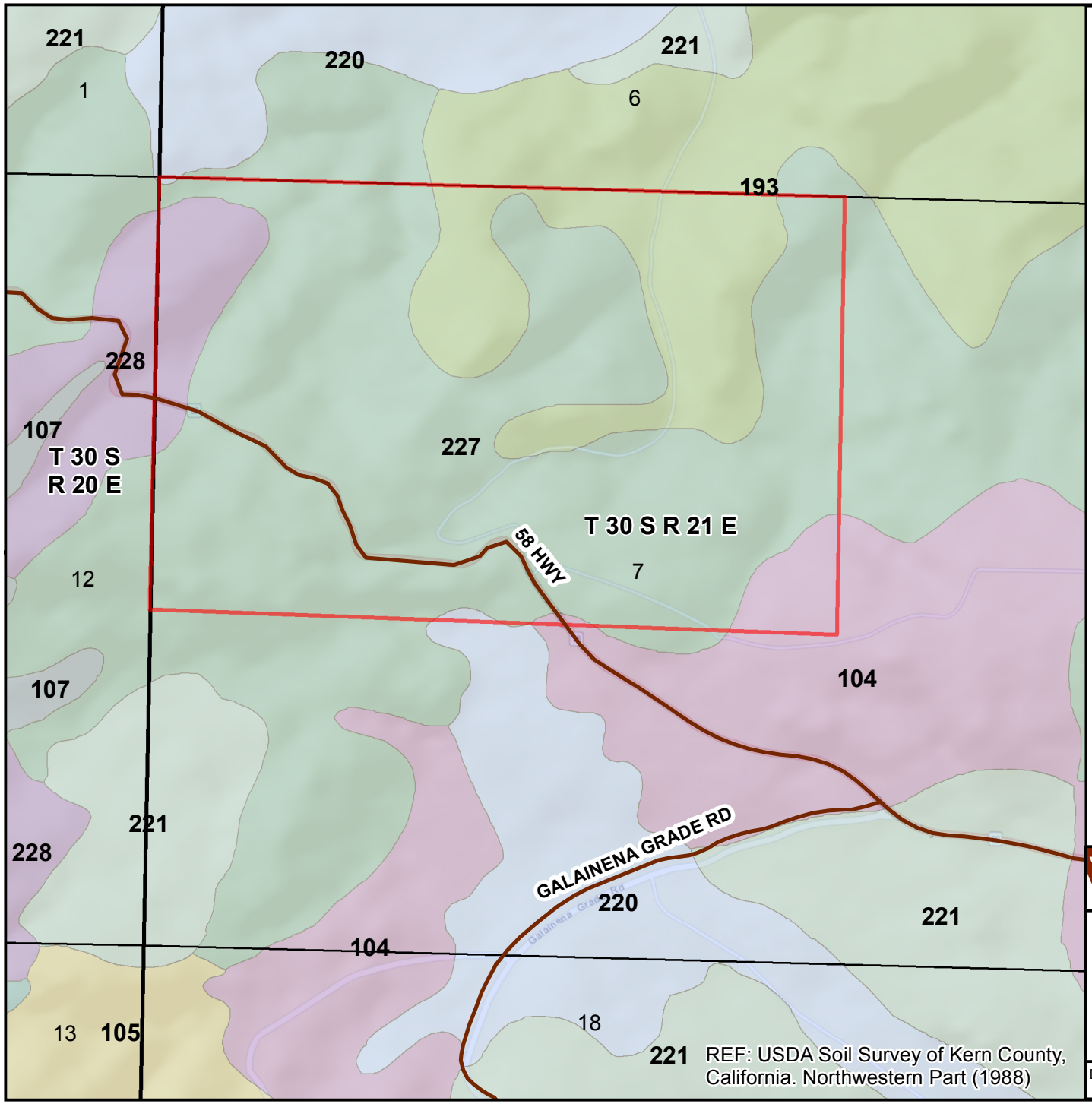
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SURFACE GEOLOGY MAP

DATE: 02/18

FIGURE: 5



Legend

Project Location

Soil Survey of Kern County

- 104 Aramburu very shaly clay loam, 15-30% slopes
- 105 Aramburu very shaly clay loam, 30-50% slopes
- 106 Aramburu very shaly clay loam, 50-75% slopes
- 107 Aramburu-Temblor complex, 30-50% slopes
- 177 Kimberlina gravelly sandy loam, 2-5% slopes
- 193 Mendi-Hillbrick-Kilmer association, 9-30% slopes
- 220 Pottinger very shaly clay loam 2-9% slopes
- 221 Pottinger very shaly clay loam, 9-15% slopes
- 227 Reward shaly loam, 15-30% slopes
- 228 Reward shaly loam, 30-50% slopes

N

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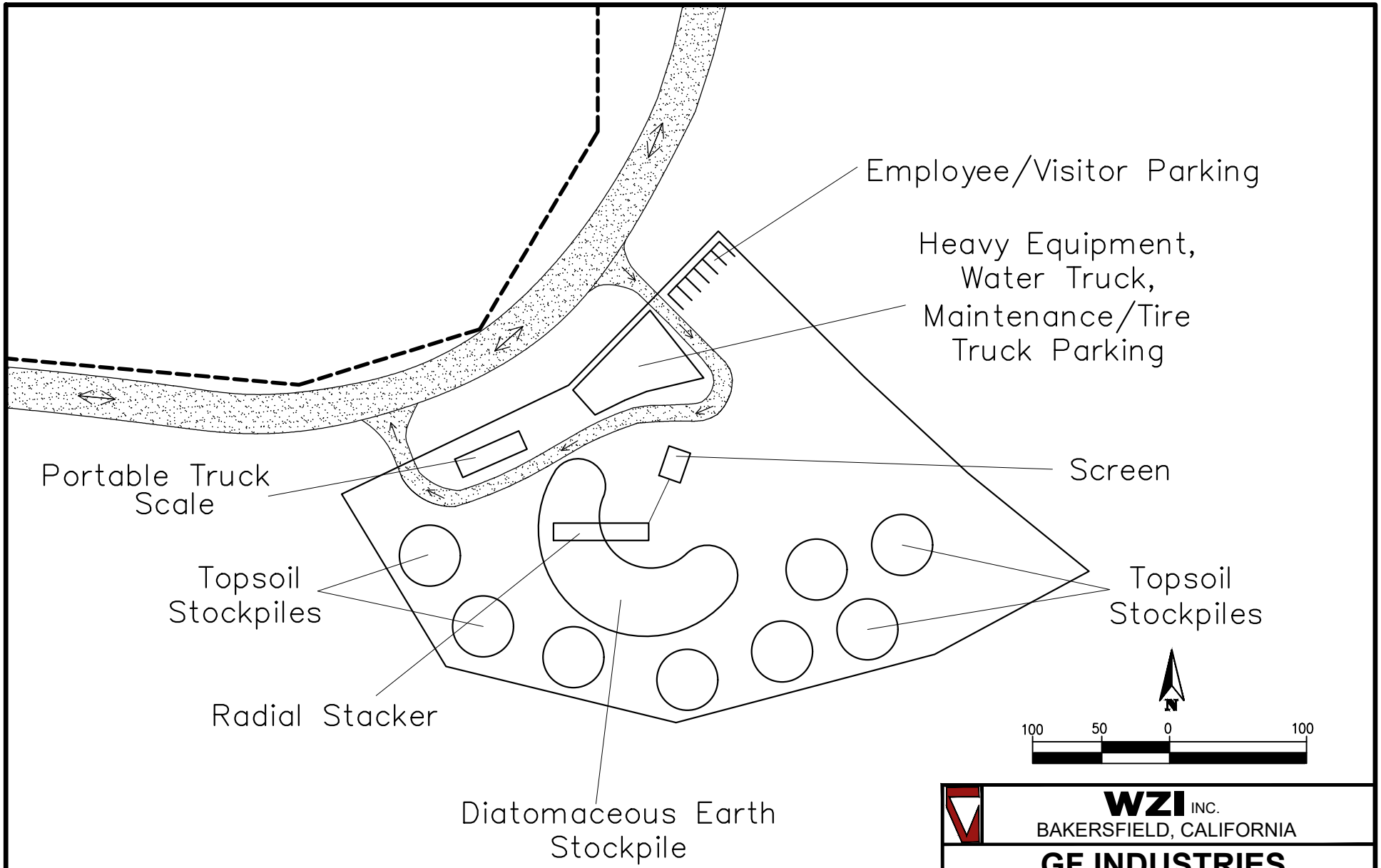
REF: USDA Soil Survey of Kern County, California. Northwestern Part (1988)

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SOIL SURVEY MAP

DATE:		FIGURE:
02/18		6

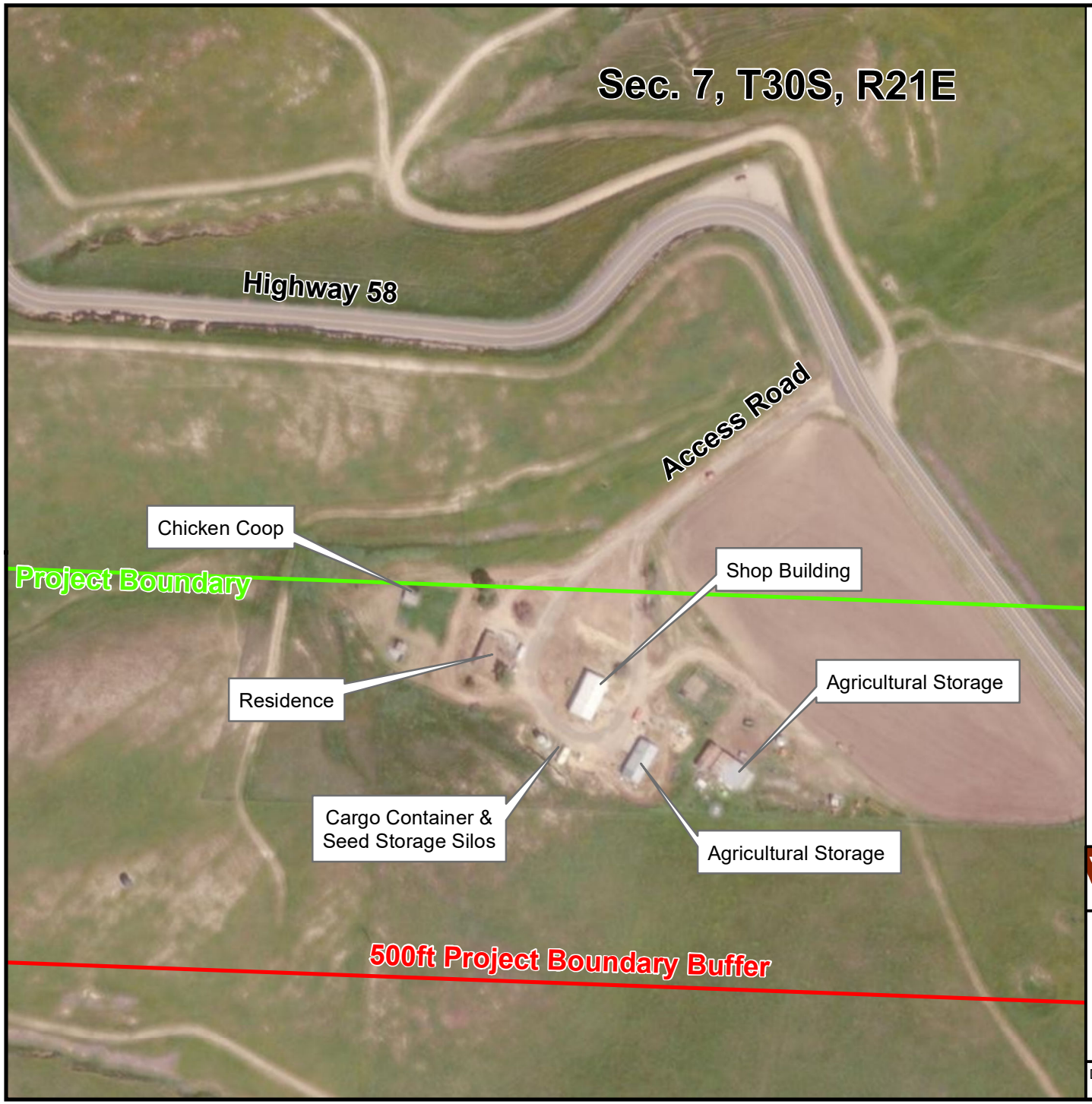


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BLENDING/SCREENING PLANT DETAIL

DATE:	JOB NO.:	FIGURE:
06/20		7



Legend

- Project Site Boundary
- 500ft Project Boundary Buffer

N
W E
S

0 100 200 400

Feet

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JOHE RANCH

Structures within 500' of the Project Site Boundary

DATE:	07/20		FIGURE:	8

Appendix C

Air Quality Impact Assessment

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Appendix C.1

Air Quality Impact Assessment

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Air Quality Impact Assessment
GF Industries
Johe Ranch Mine, McKittrick CA
Kern County, California

June 2015
UPDATED June 2019

Submitted to:
GF Industries
14211 Gannet St.
La Mirada, CA 90638

Prepared by:
WZI Inc.
1717 28th Street
Bakersfield, California 93301

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1 EXECUTIVE SUMMARY

1.1 PURPOSE

WZI Inc. (WZI) was asked on behalf of the GF Industries (Johe's Ranch Mine) to prepare an air quality impact assessment for the project required by Kern County Planning and Community Development Department in support of the Conditional Use Permit (CUP) application. This assessment examines the potential impact on air quality resulting from the project located west of the city limits of McKittrick in Kern County, California. This document was prepared in accordance with the San Joaquin Valley Air Pollution Control District's *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI)*, March 19, 2015 Revision* and Kern County Planning Department's *Guidelines for Preparing an Air Quality Assessment for use in Preparing Environmental Impact Reports*.

The project is located just north of Hwy 58, eight and one half miles west of the unincorporated (census-designated place) town of McKittrick, in Kern County, California. Specifically the site is the west half of the northwest quarter of Section 7, Township 30 South, Range 21 East MDBM, (**Exhibit 1.1-1 '**Project Location Map'). The current land use designation is 8.3/2.4 (Extensive Agriculture Steep Slope) and the zoning is A (Exclusive Agriculture). Current land use and zoning of the project site are shown on **Exhibit 1.1-2** "Land Use Map" and **Exhibit 1.1-3** "Zoning Map." The project is in compliance with Kern County's general plan and zoning code.

The proposed Johe's Ranch Mine is being planned to coincide with the completion of another mine with the same operations. The mine currently in operations by GF Industries is herein referred to as 'East Pit.' The East Pit Mine will be completing operations at the same time Johe's Ranch Mine is planned to begin operating. Therefore, an analysis will be done to calculate the net emissions increase for an expected increase in production output from the Johe's Ranch Mine when compared to East Pit's current operation.

This study is based on the following development scenario:

TABLE 1.1-1
Development Scenario

Land Use/ Zoning	Number of Units	Proposed Development
8.3/2.4	93.67 acres	Mining Operations

WZI is a professional consulting firm with experience in regulatory compliance, environmental engineering and geology. The members of WZI are State of California Registered Environmental Assessors, Registered Engineers and Geologists. WZI expresses no opinion as to disciplines, subjects and practices outside those specifically enumerated below. Further, WZI expresses no opinion herein as to any matters of California or federal law. This Air Quality Impact Assessment is based on the foregoing and subject to limitations, qualifications, exceptions and assumptions set forth herein.

1.2 RESULTS AND CONCLUSIONS

The project is located in the southern portion of the San Joaquin Valley Air Basin (SJVAB), near the unincorporated town (census-designated place) of McKittrick within Kern County. SJVAB has an extensive set of laws, rules, and regulations, governing air pollution of all types, mobile and stationary. During the last twenty years, the air quality has shown a steady trend of improvement as indicated by monitoring conducted by the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the California Air Resources Board (CARB). The assessment identified air impacts related to the project's construction phase, operation phase and its cumulative contribution which are discussed below:

1.3 CONSTRUCTION AND OPERATIONS PHASE

The construction of the project is expected to begin in 2015 and end in 2035 (20 years) for a single Phase. These years are used because the construction and operational emissions will be higher in 2015 and 2035 versus 2020 and 2040. Better construction equipment and mobile emission standards are required in later years, which lower the emissions significantly. Using the 2015 and 2035 years shows very conservative emission numbers. The single phase consists of grading in increments and transporting diatomaceous earth via truck to various clients within Kern County over a 20 year span. A portion of each year will require emissions from both construction and operational phases. The Construction related emissions include the equipment use onsite for grading and setup as the mine changes with the constant removal of ore. Grading during construction does not refer to the removal of the diatomaceous earth. The emissions from the mine pit are calculated in the operational emissions only. These numbers are attributed to the off-road diesel exhaust and fugitive dust emissions created from the mine equipment as a result of movement within the mine. The total and annual unmitigated and mitigated emissions during construction are shown on **Table 1.3-1.**

TABLE 1.3-1
Total Annual Construction Related Emissions (2016)

Project	ROG (tons/yr)	NO_X (tons/yr)	CO (tons/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	SO_X (tons/yr)
Total Annual Construction Emissions						
Unmitigated	0.16	1.82	0.86	9.07	1.37	0.0019
Mitigated	0.16	1.82	0.86	3.22	0.54	0.0019
SJVAPCD Level of Significance	10	10	**100**[1]	15	15*	27[2]
Kern County Level of Significance[3]	**10**	**10**	**100**	**15**	**15***	**27**

***USEPA specified interim use of PM_{10} threshold for $PM_{2.5}$

[1] San Joaquin Valley is in attainment for CO and SO_X therefore no specific level emissions from a project are considered significant.

[2] Ibid

[3] Kern County Planning Department, Guidelines for Preparing An Air Quality Assessment For Use In Environmental Reports, Attachment A, December 01, 2006

The operation is anticipated to begin in October, 2020. The table below shows the project operation emissions at full operations for the year 2015.

TABLE 1.3-2
Total Annual Project Operational Emissions (2016)

Project	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	PM_{10} (tons/year)	$PM_{2.5}$ (tons/year)	SO_X (tons/year)
Mobile Mine Equipment Emissions						
Unmitigated	0.16	1.82	0.86	0.07	0.06	0.0019
Mitigated	0.16	1.82	0.86	0.07	0.06	0.0019
Mine Source Emissions						
Unmitigated	0	0	0	9.03	1.39	0
Mitigated	0	0	0	3.18	0.48	0
Screening Unit Emissions						
Unmitigated	1.36E-03	2.62E-02	4.64E-03	6.58	0.99	6.90E-03
Mitigated	1.36E-03	2.62E-02	4.64E-03	0.20	3.43E-02	6.90E-03
Mobile On-Road Emissions						
Unmitigated	0.162	1.306	2.699	0.489	0.145	0.008
Mitigated	0.162	1.306	2.699	0.489	0.145	0.008
Total Source Emissions						
Unmitigated Total	0.319	3.157	3.564	16.16	2.59	0.017
Mitigated Total	0.319	3.157	3.564	3.94	0.715	0.017
SJVAPCD Level of Significance	10	10	**100**[4]	15	15*	27[5]
Kern County Level of Significance[6]	**10**	**10**	**100**[7]	**15**	**15***	**27**[8]

***USEPA specified interim use of PM_{10} threshold for $PM_{2.5}$

The project's mine source emissions are from mining operations including: off-road vehicle travel (fugitive dust), ore handling, stockpile erosion, screening operations, and disturbed ground of the mine. The mine source emissions were manually calculated using the appropriate sections of the AP-42. The mobile mine equipment emissions include the diesel exhaust for travel within the mine. The project's mobile on-road source emissions include emissions from employee trips and haul-

[4] San Joaquin Valley is in attainment for CO and SO_X therefore no specific level emissions from a project are considered significant.
[5] Ibid
[6] Kern County Planning Department, Guidelines for Preparing An Air Quality Assessment For Use In Environmental Reports, Attachment A, December 01, 2006
[7] GAMAQI (March 19, 2015).
[8] Ibid

truck trips. Detailed calculations of mine source and mobile source emissions are included in **Appendix I** "Project Emissions Calculation". The project's operational emissions will not exceed the District's and Kern County's NOx threshold. Haul trucks have been transporting product from East Pit Mine for the last fifteen years and are, therefore, part of the existing baseline emissions. There will be fifteen additional haul trucks each day for an increase in production once Johe's Ranch Mine is operational. The project will involve removal of diatomaceous earth for purposes of diatomite mining from Johe's Ranch Mine with use of heavy-duty trucks to provide hauling of ore to clients in Kern County.

1.4 CUMULATIVE IMPACTS

There are no other projects within six miles of the proposed Johe's Ranch Mine; therefore, no cumulative impact analysis is necessary.

1.4.1 REGIONAL ANALYSIS

An analysis was made of the existing and proposed projects within a one-mile and a six mile radius. Because there are no projects within a one-mile radius or in the six-mile radius, no cumulative impact analysis was conducted.

1.4.2 PROJECTIONS ANALYSIS

The Air Quality Attainment Plans[9] recognized growth of the population and economy within the SJVAB. The plans predicted the workforce in Kern County to increase along with a 2.2 percent population increase annually from 2002 to 2030 (i.e., 62% total increase uncompounded for 28 years). This project, when considered with all projects in the areas of the San Joaquin Valley Air Basin, is considered *less than significant*.

Based on the analysis presented in this study, the impacts of the project are summarized as follows:

1.5 PROJECT IMPACTS (CONSTRUCTION AND OPERATIONAL)

Impacts Found to be Significant and Unavoidable:

- No Criteria Pollutant air impacts are considered significant and unavoidable after mitigation.

Impacts Found to be *Less than Significant*:

- Criteria Pollutant air impacts from NOx and PM-10 are considered less than significant
- The project specific visibility impacts based on the San Joaquin Valley Air Pollution Control District's Guide for Assessing and Mitigating Air Quality Impact ("GAMAQI"), Criteria

[9] 2007 PM $_{10}$ Attainment Plan, 2004 Extreme Ozone Attainment Demonstration Plan and the 2007 Ozone Attainment Plan, San Joaquin Valley Air Pollution Control District

Pollutant Modeling and SJVAPCD Operational Thresholds are considered to be less than significant.

- The project specific health risks impacts based on modeling and the SJVAPCD standards are considered to be less than significant.
- The project specific odor impacts during the operational phase are considered to be less than significant.
- The project specific impacts from greenhouse gases are considered to be less than significant.
- The project specific impact of Valley Fever based on the location of the project is considered less than significant.

2 INTRODUCTION

The project is located eight and one half miles west of the unincorporated town of McKittrick on the North side of Highway 58, in Kern County, California. It is more specifically identified as approximately 331 acres of land located in the west half of the northwest quarter of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian, in Kern County, California (See **Exhibit 1.1-1**"Project Location Map"). The current land use designation is 8.3/2.4 (Extensive Agriculture Steep Slope) and the zoning is A (Exclusive Agriculture). The proposed project is in compliance with the County's general plan and zoning code.

Johe's Ranch is located in an unincorporated area of Kern County eight and a half miles west of the town of McKittrick. The property is rich in diatomaceous earth, which GF Industries intends to extract and supply to clients. The land is vacant and undeveloped in a rural area. No demolition is required.

It is proposed to begin the mining project around October 2015. The expected production life of the project is 20 years. Expected production is 6.6 million tons of product over the life of the mine with a per year production of 330,000 tons. The project will begin once all necessary equipment is transported to Johe's Ranch from the project currently in operation designated as 'East Pit'. The East Pit is located four miles east of Johe's Ranch and has been in operation by GF Industries (GFI), also mining diatomaceous earth. East Pit is expected to be exhausted of product later this year. All equipment in operation at East Pit will be used at Johe's Ranch. The equipment currently in operation include: two rubber tired loaders, one tire truck, and one water truck. In addition, GF Industries intends to add a screener at Johe's Ranch for any processing that may be necessary according to client requirements. The same number of workers employed at East Pit will be operating at Johe's Ranch. There are three employees onsite for typical operations.

The project site has a total of 313 acres with a maximum disturbance area of 93.67 acres. The mining areas make up 88 acres of land and are divided into three separate areas due to the topography. The area sizes are 58 acres, 17 acres, and 13 acres for mine areas one, two and three respectively. While the plan is to move from mine area three and progress eastward to mine area one, GFI needs to be able to mine at any portion of the mine areas based on the soil chemistry and the type of product needed. GFI will be required to work with a maximum of 20 acres of exposed land at any one time, which will limit land exposure for purposes of dust control. Of the 20 acres of exposed land, five acres will be the limit of daily disturbance. The dust palliative for prevention of wind erosion will be applied to the remaining 15 acres of exposed land. This method will be practiced throughout the life of the mine.

Transporting product from the mine will be achieved with the use of a haul truck fleet. The haul trucks are only used for on-road transport with the exception of loading product. Within the mine boundary, haul trucks will only travel on pre-designated roads that are covered in oil sand for durable dust suppression. The travel is limited on the project site from the road to the stockpiles for loading and back to the road for transport. Each haul truck has a 25.5 ton capacity and there will be an average of 50 trucks/day in order to achieve the 330,000 tons of product annually. The site speed limit will be 15 mph or less for all vehicles.

GFI expects to haul diatomaceous earth from the Johe's Ranch to three different clients. The same clients will be receiving product from Johe's Ranch as were receiving from East Pit. Each client is a set distance from the jobsite. Based on the percentage of haul trucks delivering to each of the clients and the measured distance to each, an average distance per haul truck was determined (93 miles/truck/trip). The difference between the average distance from Johe's Ranch and East Pit is four miles.

The permitted screening unit is planned for producing a specific quality of ore to the client when it is required. The screening unit is conservatively estimated to be used for one hour each day for a maximum of 90 days each year.

Facilities on the jobsite are minimal. No electricity use is necessary because operations occur during daylight hours and no office will be present. All refuse brought onto the site is removed each day, and there will be no chemicals stored onsite. A portable toilet will be provided for employees.

3 ENVIRONMENTAL SETTING

3.1 CLIMATE

The San Joaquin Valley lies in the central region of the State of California; it is bounded to the east by the Sierra Nevada Mountain Range, bounded to the west by the Coastal Mountain Range and to the south by the Tehachapi Mountains. The proposed project site is located in the southern portion of the valley.

The climate of the southern San Joaquin Valley is classified as a Dry–Summer Subtropical type, and is characterized by hot summers, mild winters, and small amounts of precipitation. The major climatic controls in the SJVAB are the surrounding mountains and the Pacific High pressure system over the ocean. The Great Basin High pressure system to the east also affects the valley, primarily during winter months. These influences result in distinct seasonal weather characteristics.

The Pacific High is a semi–permanent, subtropical, high-pressure system located off the Pacific Coast. The Pacific High tends to migrate seasonally. During the summer, it moves northward and dominates the regional climate. This high produces persistent temperature inversions and a predominantly northwest airflow. Clear skies, high temperature, low humidity, and relatively good air circulation characterize this season. The Pacific High blocks migrating extra-tropical storms, therefore very little precipitation occurs in the summer months. Occasionally, tropical air moves into the area and thunderstorms may occur over the adjacent mountains.

As the Pacific High shifts southward during the fall, its dominance is diminished in the San Joaquin Valley. During this transition period, the storm belt and zone of strong westerly winds also shifts southward, into California. Three weather regimes generally prevail during winter: (1) storm periods which are usually characterized by cloudiness, precipitation, and shifting, gusty winds; (2) clear weather associated with either a buildup of pressure through the interior of California following these storms or the influence of a well–developed Great Basin High pressure system; and

(3) persistent fog or stratus clouds and temperature inversions associated with a weak influence of the Great Basin High trapping a layer of cool, moist air in the San Joaquin Valley. Thus sky, temperature, and humidity conditions are much more variable during winter. Air movement is also variable, with stagnant conditions occurring more frequently than during summer.

The nearby Temblor Range to the west and its foothills modify the local climate of the project area. Radiative cooling at night, especially during clear conditions, results in a distinct down slope drainage flow. Thus, the mountains provide a distinct diurnal wind pattern of generally northerly winds during the day and a westerly drainage flow at night.

The western side of the San Joaquin Valley experiences fewer days of fog and less dense fog than does the eastern side at comparable elevations. Thunderstorms tend to be less frequent, probably averaging less than one per year.

Diurnal wind regimes markedly affect the horizontal transport of air in the project area. During the summer, northeast winds dominate the daytime regime. These winds, generated by the Pacific High offshore, are enhanced by the San Joaquin Valley orientation and by the thermal low that develops in the central valley during this season. In response to this thermal low, air moves inland through passes in the coastal ranges, principally the Carquinez Strait near San Francisco, and flows to the south in the San Joaquin Valley as an up–valley northwesterly wind. This general northwest flow in the San Joaquin Valley is expressed locally as a more northeasterly wind under the influence of local terrain on the west–side of the valley.

Dominant nighttime wind directions during summer are markedly different from those of the daytime. Winds with a northerly component have a low frequency of occurrence at night. The high frequency of west to southwest winds at night is due primarily to down slope drainage flow.

During the winter months, northerly to northeasterly winds remain dominant in the daytime. However, winds are more variable than during summer, due in part to: (1) the southward migration of the Pacific High and resultant storm passages; (2) the absence of a strong thermal trough; and (3) the varied influence of the Great Basin High. As in summer, winds during winter nights are predominantly from the west to southwest and are associated with drainage flow. Wind speeds are generally higher in summer than in winter in the project area. Calm conditions occur most often in winter but are relatively infrequent during either season.

The mountains to the east, south and west essentially block the region from transport of very cold air from the mid–continent in winter, and the relatively cool, marine air from the Pacific Ocean during summer. Transport of marine air through the Carquinez Strait during summer has a moderating effect on northern portions of the San Joaquin Valley, but this effect is not great in the southern portion of the valley. In this area, temperature regimes are influenced primarily by topography, the higher elevations generally experiencing cooler temperatures.

3.2 DESCRIPTION OF POLLUTANTS

The following is a general description of the sources, and the physical and health effects for air pollutants expected from this project.[10]

Ozone [11]

[10] Note: Vinyl chloride is not emitted by the proposed development.
[11] US EPA, "Air Quality Criteria for Ozone and Related Photochemical Oxidants", Vol. III EPA/600/P-05/004cF.

Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. Here, ground level or "bad" ozone is an air pollutant that damages human health, vegetation, and many common materials. It is a key ingredient of urban smog. The troposphere extends to a level about 10 miles up, where it meets the second layer, the stratosphere. The stratospheric or "good" ozone layer extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B).

“Bad” ozone is what is known as a photochemical pollutant. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight.

Ozone is a regional air pollutant. It is generated over a large area and is transported and spread by wind. Ozone, the primary constituent of smog, is the most complex, difficult to control, and pervasive of the criteria pollutants. Unlike other pollutants, ozone is not emitted directly into the air by specific sources. Ozone is created by sunlight acting on other air pollutants (called precursors), specifically oxides of nitrogen (NO_X) and reactive organic gases (ROGs). Sources of precursor gases to the photochemical reaction that form ozone number in the thousands. Common sources include consumer products, gasoline vapors, chemical solvents, and combustion products of various fuels. Originating from gas stations, large industrial facilities, and small businesses such as bakeries and dry cleaners, the ozone-forming chemical reactions often take place in another location, catalyzed by sunlight and heat. The second highest levels in California were recorded in the San Joaquin Valley Air Basin. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins. Approximately 50 million people lived in counties with air quality levels above U. S. EPA’s health-based national air quality standard in 1994. The highest levels of ozone were recorded in Los Angeles. High levels also persist in other heavily populated areas including the Texas Gulf Coast and much of the Northeast.[12]

While the ozone in the upper atmosphere absorbs harmful ultraviolet light, ground-level ozone causes damage to the tissues of plants, animals, and humans, as well as to a wide variety of inanimate materials such as plastics, metals, fabrics, rubber, and paints. Societal costs from ozone damage include increased medical costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

Health Effects

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground level ozone can adversely affect the human respiratory system. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops and some man-made materials, such as rubber, paint, and plastics. High levels of ozone may negatively impact immune systems making people more susceptible to respiratory illnesses including bronchitis and pneumonia. Ozone also accelerates aging and exacerbates pre-existing asthma and bronchitis and in cases of high concentrations can lead to the development of asthma in active children. Active people, both children and adults, appear to be more at risk from ozone exposure than those with a low level of activity. Additionally, the elderly and those with respiratory disease are also considered sensitive populations for ozone.

People who work or play outdoors are at a greater risk for harmful health effects from ozone. Children and adolescents are also at greater risk, as they are more likely than adults to spend time engaged in vigorous activities. Research indicates that children under 12 years of age spend nearly

[12] http://www.arb.ca.gov/homepage.htm.

twice as much time outdoors daily than adults. Teenagers spend at least twice as much time as adults in active sports and outdoor activities. Also, children inhale more air per pound of body weight than adults, and they breathe more rapidly than adults. Children are less likely than adults to notice their own symptoms and avoid harmful exposures.

Ozone is a powerful oxidant – it can be compared to household bleach, which can kill living cells (such as germs or human skin cells) upon contact. Ozone can damage the respiratory tract, causing inflammation and irritation, and it can induce symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthma symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. Exposure to levels of ozone above the current ambient air quality standard leads to lung inflammation and lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Recent evidence has, for the first time, linked the onset of asthma to exposure to elevated ozone levels in exercising children (McConnell, R., et al 2002). Elevated ozone concentrations also reduce crop and timber yields, damage native plants, and damage materials such as rubber, paints, fabric, and plastics (California Air Resources Board and American Lung Association of California, 2004).

Reactive Organic Gases and Volatile Organic Compounds[13,14]

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including Volatile Organic Compounds (VOCs) and Reactive Organic Gases (ROGs). ROGs include all hydrocarbons except those exempted by the California Air Resources Board (CARB). Therefore, ROGs are a set of organic gases based on state rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by federal law. The list of compounds exempt from the definition of VOC is included by the SJVAPCD and is presented in SJVAPCD Rule 1020. ROGs are therefore a set of organic gases based on federal rules and regulations. Both VOCs and ROGs are emitted from incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions, and paint. Both VOC and ROG terminology will be used in this analysis.

Health Effects

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons are considered Toxic Air Contaminants, or air toxics. There are no health standards for ROG separately. In addition, some compounds that make up ROG are also toxic. An example is benzene, which is a carcinogen. Toxic Air Contaminants will be discussed in detail later within this document.

Carbon Monoxide [15]

Carbon monoxide (CO) is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless, poisonous gas that is highly reactive. CO is a byproduct of motor vehicle exhaust, which contributes more than

[13] "Air Quality Criteria for Ozone and Related Photochemical Oxidants", Vol. III EPA/600/P-05/004cF, US EPA February 2006

[14] CARB "Definitions of VOC and ROG", Revised November 2004

[15] Air Quality Criteria for Carbon Monoxide, EPA/600/P-99/001F,US EPA June 2000

two-thirds of all CO emissions nationwide. In cities, automobile exhaust can cause as much as 95% of all CO emissions. These emissions can result in high concentrations of CO, particularly in local areas with heavy traffic congestion. Other sources of CO emissions include industrial processes and fuel combustion in sources such as boilers and incinerators. Despite an overall downward trend in concentrations and emissions of CO, some metropolitan areas still experience high levels of CO.

Health Effects

CO enters the bloodstream and binds more readily to hemoglobin than oxygen, reducing the oxygen-carrying capacity of blood, thus reducing oxygen delivery to organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease. Healthy individuals are also affected, but only at higher levels of exposure. Carbon monoxide binds strongly to hemoglobin, the oxygen-carrying protein in blood, and thus reduces the blood's capacity for carrying oxygen to the heart, brain, and other parts of the body. At high concentrations, CO can cause heart difficulties in people with chronic diseases, and can impair mental abilities. Exposure to elevated CO levels is associated with visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, difficulty performing complex tasks, and death.

The adverse health effects associated with exposure to ambient and indoor concentrations of CO are related to concentration of carboxyhemoglobin (COHb) in the blood. Health effects observed may include early onset of cardiovascular disease, behavioral impairment; decreased exercise performance of young healthy men, reduced birth weight, Sudden Infant Death Syndrome (SIDS), and increased daily mortality rate (Fierro, M.D., et al, 2001). Most of the studies evaluating adverse health effects of CO on the central nervous system examine high-level poisoning; such poisoning results in symptoms ranging from common flu and cold symptoms (shortness of breath on mild exertion, mild headaches, and nausea) to unconsciousness and death. Hexter and Goldsmith report an association between daily death rate and exposure to ambient CO in Los Angeles County. They postulate a concentration of 20.2 ppm (the highest daily concentration recorded during a 4 year period) contributed 11 out of 159 deaths (Hexter, A. and J.R. Goldsmith, 1971). Additional studies conducted in Los Angeles and Sao Paulo also suggest a relationship between daily death rates and CO concentrations (Kinney, P. and Ozkaynak, 1991; Saldivia, P.H., et al, 1995).

Nitrogen Oxides[16]

Nitrogen oxides (NO_X) are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone, and react in the atmosphere to form acid rain. NO_X is emitted from the use of solvents and combustion processes in which fuel is burned at high temperatures, principally from motor vehicle exhaust and stationary sources, such as electric utilities and industrial boilers. A brownish gas, nitrogen dioxide is a strong oxidizing agent that reacts in the air to form corrosive nitric acid, as well as toxic organic nitrates, a particulate.

Health Effects

NO_X is an ozone precursor that combines with ROG to form ozone. See the ozone section above for a discussion of the health effects of ozone.

Direct inhalation of NO_X can also cause a wide range of health effects. NO_X can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. Short-term exposures (e.g., less than 3 hours) to low levels of NO_2 may lead to changes in airway responsiveness and lung function in individuals with preexisting respiratory illnesses. These exposures may also increase respiratory illnesses in children. Long-term exposures to NO_2 may lead to increased susceptibility to respiratory infection and may cause irreversible alterations in lung structure. Other health effects associated with NO_X are an increase in the incidence of chronic

[16] US EPA, "Air Quality Criteria for Ozone and Related Photochemical Oxidants", Vol. III EPA/600/P-05/004cF.

bronchitis and lung irritation. Chronic exposure to nitrogen dioxide (NO_2) may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction. NO_X can cause fading of textile dyes and additives, deterioration of cotton and nylon, and corrosion of metals due to production of particulate nitrates. Airborne NO_X can also impair visibility. NO_X is a major component of acid deposition in California. NO_X may affect both terrestrial and aquatic ecosystems. NO_X in the air is a potentially significant contributor to a number of environmental effects such as acid rain and eutrophication in coastal waters. Eutrophication occurs when a body of water suffers an increase in nutrients that reduce the amount of oxygen in the water, producing an environment that is destructive to fish and other animal life.

Nitrogen dioxide is toxic to various animals as well as to humans. Its toxicity relates to its ability to combine with water to form nitric acid in the eye, lung, mucus membranes and skin. Studies of the health impacts of NO_2 include experimental studies on animals, controlled laboratory studies on humans, and observational studies.

In animals, long-term exposure to NO_X increases susceptibility to respiratory infections lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and potentially, lung damage.

Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

NO_X contributes to a wide range of environmental effects directly and when combined with other precursors in acid rain and ozone. Increased nitrogen inputs to terrestrial and wetland systems can lead to changes in plant species composition and diversity. Similarly, direct nitrogen inputs to aquatic ecosystems such as those found in estuarine and coastal waters can lead to eutrophication (a condition that promotes excessive algae growth, which can lead to a severe depletion of dissolved oxygen and increased levels of toxins harmful to aquatic life). Nitrogen, alone or in acid rain, also can acidify soils and surface waters. Acidification of soils causes the loss of essential plant nutrients and increased levels of soluble aluminum that are toxic to plants. Acidification of surface waters creates conditions of low pH and levels of aluminum that are toxic to fish and other aquatic organisms. NO_X also contributes to visibility impairment. (U.S. EPA, 2005).

Particulate Matter[17,18,19]

Particulate matter pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset, or portion of PM_{10}.

In the Western United States, there are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor

[17] Review of the National Air Quality Standards for Particulate Matter: Assessment of Scientific and Technical Information, EPA-450/5-82-001, US EPA January 1982

[18] PM_{10} Attainment Demonstration Plan, San Joaquin Valley Air Pollution Control District, 2003.

[19] Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, Cal EPA ARB May 2003.

vehicles, power plants, industrial processing, wood burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, and agriculture, and fugitive windblown dust. Because particles originate from a variety of sources, their chemical and physical compositions vary widely.

The sources of $PM_{2.5}$ include fuel combustion from automobiles, power plants, wood burning, industrial processes, and diesel powered vehicles such as buses and trucks. These fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds (all of which are also products of fuel combustion) are transformed in the air by chemical reactions. Fine particles are of concern because they are risk to both human health and the environment.

Health Effects

PM_{10} and $PM_{2.5}$ particles are small enough – about $1/7^{th}$ the thickness of a human hair – to be inhaled into, and lodge in, the deepest parts of the lung, evading the respiratory system's natural defenses. Health problems begin as the body reacts to these foreign particles. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non health-related effects include reduced visibility and soiling of buildings. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. PM_{10} and $PM_{2.5}$ can aggravate respiratory disease, and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of PM_{10}. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link PM_{10} exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic PM_{10} can also damage manmade materials and is a major cause of reduced visibility in many parts of the U.S.

Children are more susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems are still developing. The average adult breathes 13,000 liters of air per day and children breathe up to 50 percent more air per pound of body weight than adults. The breathing of fine particles by children is believed to cause both acute and chronic respiratory problems such as asthma. Forty percent of all asthma cases are children who make up only 25 percent of the population.

Premature deaths linked to particulate matter are now at levels comparable to deaths from traffic accidents and second-hand smoke. One of the most dangerous pollutants, fine particulate matter (e.g., from diesel exhaust and fireplace soot) not only bypasses the body's defense mechanisms and becomes embedded in the deepest recesses of the lung, but also can disrupt cellular processes. Population based studies in hundreds of cities in the U.S. and around the world have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks. Long-term studies of children's health conducted in California have demonstrated that particulate pollution may significantly reduce lung function growth in children (California Air Resources Board, 2002).

Attaining the California PM standards would annually prevent about 6,500 premature deaths, or 3% of all deaths. These premature deaths shorten lives by an average of 14 years. This is roughly equivalent to the same number of deaths (4,200-7,400) linked to second hand smoke in the year 2000. In comparison, motor vehicle crashes cause 3,200 deaths and homicides were responsible for 2,000 deaths. Attaining the California PM and ozone standards would annually prevent 4,000 hospital admissions for respiratory disease, 3,000 hospital admissions for cardiovascular disease,

and 2,000 asthma-related emergency room visits. Exposure to diesel PM causes about 250 excess cancer cases per year in California. (California Air Resources Board, 2002).

A recent study provides evidence that exposure to particulate air pollution is associated with lung cancer. This study found that residents who live in an area that is severely impacted by particulate air pollution are at risk of lung cancer at a rate comparable to non-smokers exposed to second-hand smoke. This study also found an approximately 16 percent excess risk of dying from lung cancer due to fine particulate air pollution (Pope, C.A., III, et al, 2002).

Another study shows that individuals with existing cardiac disease can be in a potentially life-threatening situation when exposed to high levels of ultrafine air pollution. Fine particles can penetrate the lungs and may cause the heart to beat irregularly or can cause inflammation, which could lead to a heart attack (Peters, A., et al, 2001).

Currently, 61% of California's population live in areas that exceed the federal $PM_{2.5}$ air standard, while 89% live in areas that exceed California's $PM_{2.5}$ air standard (California Air Resources Board, 2004).

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. Historically, in the late 1970's in the SJVAB portion of Kern County, SO_2 was a pollutant of concern but with the successful application of regulations, the levels have been reduced significantly. In fact, the latest data from the CARB demonstrates that the highest 1-hour concentration for SO_2 was 0.011 ppm. With the CAAQS being 0.25 ppm, SO_2 concentrations in the SJVAB are only about 4 percent of the standard.

High concentrations of SO_2 can result in temporary breathing impairment for asthmatic children and adults who are active outdoors. Short-term exposures of asthmatic individuals to elevated SO_2 levels during moderate activity may result in breathing difficulties that can be accompanied by symptoms such as wheezing, chest tightness, or shortness of breath. Other effects that have been associated with longer-term exposures to high concentrations of SO_2, in conjunction with high levels of PM, include aggravation of existing cardiovascular disease, respiratory illness, and alterations in the lungs' defenses. SO_2 also is a major precursor to $PM_{2.5}$, which is a significant health concern, and a main contributor to poor visibility. See also the discussion of health effects of particulate matter.

Sulfur dioxide not only has a bad odor, it can irritate the respiratory system. Exposure to high concentrations for short periods of time can constrict the bronchi and increase mucous flow, making breathing difficult. Sulfur dioxide can also:

- Immediately irritate the lung and throat at concentrations greater than 6 parts per million (ppm) in many people.
- Impair the respiratory system's defenses against foreign particles and bacteria, when exposed to concentrations less than 6 ppm for longer time periods.
- Enhance the harmful effects of ozone. Combinations of the two gases at concentrations occasionally found in the ambient air appear to increase airway resistance to breathing.
- Sulfur dioxide tends to have more toxic effects when acidic pollutants, liquid or solid aerosols, and particulates are also present. In the 1950s and 1960s, thousands of excess deaths occurred in areas where SO2 concentrations exceeded 1 ppm for a few days and other pollutants were also high. Effects are more pronounced among mouth breathers, e.g., people who are exercising or who have head colds. These effects include:
- Health problems, such as episodes of bronchitis requiring hospitalization associated with lower-level acid concentrations.

- Self-reported respiratory conditions, such as chronic cough and difficult breathing, associated with acid aerosol concentrations. Asthmatic individuals are especially susceptible to these effects. The elderly and those with chronic respiratory conditions may also be affected at lower concentrations than the general population.
- Increased respiratory tract infections, associated with longer term, lower-level exposures to SO_2 and acid aerosols.
- Subjective symptoms, such as headaches and nausea, in the absence of pathological abnormalities, due to long-term exposure.
- Sulfur dioxide easily injures many plant species and varieties, both native and cultivated. Some of the most sensitive plants include various commercially valuable pines, legumes, red and black oaks, white ash, alfalfa and blackberry. The effects include:
- Visible injury to the most sensitive plants at exposures as low as 0.12 ppm for 8 hours.
- Visible injury to many other plant types of intermediate sensitivity at exposures of 0.30 ppm for 8 hours.
- Positive benefits from low levels, in a very few species growing on sulfur deficient soils.
- Increases in sulfur dioxide concentrations accelerate the corrosion of metals, probably through the formation of acids. SO_2 is a major precursor to acidic deposition. Sulfur oxides may also damage stone and masonry, paint, various fibers, paper, leather, and electrical components.
- Increased SO_2 also contributes to impaired visibility. Particulate sulfate, much of which is derived from sulfur dioxide emissions, is a major component of the complex total suspended particulate mixture.

Sulfates. Sulfates are particulate products of combustion of sulfur-containing fossil fuels. When SO or SO_2 are exposed to oxygen it precipitates out into sulfates (SO_3 or SO_4). Data collected in Kern County identify levels of sulfates that are significantly less than the applicable health standards.

Sulfates (SO_4^{2-}) are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and / or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property (California Air Resources Board, 2005.

Lead.[20] Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. Lead was used until recently to increase the octane rating in auto fuel. Since gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels and the use of leaded fuel has been

[20] The project does not emit lead; therefore it will not be discussed further in this report.

mostly phased out, the ambient concentrations of lead have dropped dramatically. Kern County no longer monitors lead in the ambient air of the SJVAB.

Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ. Recent studies also show that lead may be a factor in high blood pressure and subsequent heart disease. Lead can also be deposited on the leaves of plants, presenting a hazard to grazing animals and humans through ingestion (U.S. EPA 2005a).

Hydrogen Sulfide.[21] Hydrogen sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations.

Exposure to low concentrations of hydrogen sulfide may cause irritation to the eyes, nose, or throat. It may also cause difficulty in breathing for some asthmatics. Exposure to higher concentrations (above 100 parts per million [ppm]), can cause olfactory fatigue, respiratory paralysis, and death. Brief exposures to high concentrations of hydrogen sulfide (greater than 500 ppm) can cause a loss of consciousness. In most cases, the person appears to regain consciousness without any other effects. However, in many individuals, there may be permanent or long-term effects such as headaches, poor attention span, poor memory, and poor motor function. No health effects have been found in humans exposed to typical environmental concentrations of hydrogen sulfide (0.00011-0.00033 ppm). Deaths due to breathing in large amounts of hydrogen sulfide have been reported in a variety of different work settings, including sewers, animal processing plants, waste dumps, sludge plants, oil and gas well drilling sites, and tanks and cesspools

Visibility Reducing Particles. This standard is a measure of visibility. The CARB does not yet have a measuring method with enough accuracy or precision to designate areas in the State attainment or non-attainment. The entire State is labeled unclassified.

Vinyl Chloride.[22] Vinyl chloride monomer is a sweet smelling, colorless gas at ambient temperature. Landfills, publicly owned treatment works and PVC production are the major identified sources of vinyl chloride emissions in California. Polyvinyl chloride (PVC) can be fabricated into several products such as PVC pipes, pipefittings, and plastics. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers. There are currently no adopted ambient air standards for vinyl chloride.

Short-term exposure to vinyl chloride has been linked with the following acute health effects (Agency for Toxic Substances and Disease Registry, 1997; Agency for Toxic Substances and Disease Registry, 1990; U.S. Department of Health and Human Services, 1993):

Acute exposure of humans to high levels of vinyl chloride via inhalation in humans has resulted in effects on the central nervous system, such as dizziness, drowsiness, headaches, and giddiness.

Vinyl chloride is reported to be slightly irritating to the eyes and respiratory tract in humans. Acute exposure to extremely high levels of vinyl chloride has caused loss of consciousness, lung and kidney irritation, and inhibition of blood clotting in humans and cardiac arrhythmias in animals.

[21] The project does not emit hydrogen sulfide; therefore it will not be discussed further in this report.
[22] The project does not emit vinyl chloride; therefore it will not be discussed further in this report.

Tests involving acute exposure of mice have shown vinyl chloride to have high acute toxicity from inhalation exposure.

Long-term exposure to vinyl chloride concentrations has been linked with the following chronic health effects (Agency for Toxic Substances and Disease Registry, 1997; U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database), 1993; U.S. Department of Health and Human Services, 1993; U.S. Environmental Protection Agency, 1997):

- Liver damage may result in humans from chronic exposure to vinyl chloride, through both inhalation and oral exposure.
- A small percentage of individuals occupationally exposed to high levels of vinyl chloride in air have developed a set of symptoms termed "vinyl chloride disease," which is characterized by Raynaud's phenomenon (fingers blanch and numbness and discomfort are experienced upon exposure to the cold), changes in the bones at the end of the fingers, joint and muscle pain, and scleroderma-like skin changes (thickening of the skin, decreased elasticity, and slight edema).
- Central nervous system effects (including dizziness, drowsiness, fatigue, headache, visual and/or hearing disturbances, memory loss, and sleep disturbances) as well as peripheral nervous system symptoms (peripheral neuropathy, tingling, numbness, weakness, and pain in fingers) have also been reported in workers exposed to vinyl chloride.

Several reproductive/developmental health effects from vinyl chloride exposure have been identified (Agency for Toxic Substances and Disease Registry (ATSDR), 1990; U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database, 1993). They include:

- Several case reports suggest that male sexual performance may be affected by vinyl chloride. However, these studies are limited by lack of quantitative exposure information and possible co-occurring exposure to other chemicals.
- Several epidemiological studies have reported an association between vinyl chloride exposure in pregnant women and an increased incidence of birth defects, while other studies have not reported similar findings.
- Epidemiological studies have suggested an association between men occupationally exposed to vinyl chloride and miscarriages in their wives' pregnancies although other studies have not supported these findings.
- Long term exposure to vinyl chloride has also been identified as a cancer risk (Agency for Toxic Substances and Disease Registry (ATSDR), 1990; U.S. Department of Health and Human Services, Registry of Toxic Effects of Chemical Substances (RTECS, online database). 1993[1]; U.S. Department of Health and Human Services, Hazardous Substances Data Bank (HSDB, online database). 1993; U.S. Environmental Protection Agency 1997).
- Inhaled vinyl chloride has been shown to increase the risk of a rare form of liver cancer (angiosarcoma of the liver) in humans.
- Animal studies have shown that vinyl chloride, via inhalation, increases the incidence of angiosarcoma of the liver and cancer of the liver.

Toxic Air Contaminants. Hazardous air pollutants is a term used by the federal Clean Air Act that includes a variety of pollutants generated or emitted by industrial production activities. Called Toxic Air Contaminants (TAC) under the California Clean Act, ten have been identified through ambient air quality data as being the most substantial health risk in California. A description of these pollutants, their sources and health effects are contained in “ARB Almanac, Chapter 5: Toxic Air

Contaminant Emissions, Air Quality and Health Risk". Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to brain and nervous system and respiratory disorders. The California Air Resources Board provides emission inventories for only the larger Air Basins.

The San Joaquin Valley Air Basin shows the following tons per year (tpy) emissions for the year 2006 for the ten TACs: acetaldehyde (1,761 tpy), benzene (1,789 tpy), 1 ,3-butadiene (503 tpy), carbon tetrachloride (0 tpy), chromium (hexavalent), (0.22 tpy), para-dichlorobenzene (147 tpy), formaldehyde (4,396 tpy), methylene chloride (429), perchloroethylene (588 tpy), and diesel particulate matter (7,695 tpy). Based on 2006 data, approximately 87 % of acetaldehyde emissions are from mobile sources, with area sources such as residential wood combustion accounting for approximately 10% of total emissions. The primary sources of benzene in the San Joaquin Valley Air Basin include mobile sources (71%) and stationary sources (28%). Approximately 72% of Hexavalent chromium emissions are from mobile sources. Approximately 54 % of 1.3 –butadiene emissions are from mobile sources. Emissions of carbon tetrachloride are zero. Most of the emissions of para- dichlorobenzene are from consumer products such as non-aerosol insect repellents and solid/gel air fresheners. Approximately 78 % of formaldehyde emissions in the San Joaquin Valley Air Basin are from mobile sources, while 84% of Methylene chloride emissions are from paint removers/strippers, automotive brake cleaners, and other consumer products. Perchloroethylene is produced primarily from stationary sources such as dry cleaning plants and manufacturing of aircraft parts and fabricated metal parts. Approximately 94% of the diesel PM emissions are from mobile sources.

TACs do not have ambient air quality standards. Since no safe levels of TACs can be determined, there are no air quality standards for TACs. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxic "Hot Spots" Information and Assessment Act apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the Act must prepare and submit toxic emission inventory plans and reports, and periodically update those reports. From current 2006 CARB emissions inventory for the San Joaquin Valley Air Basin there are 3,534 facilities that have been deemed to pose significant health risk under the ACT, as part of the permitting process these facilities subsequently reduced those risks to a level no longer considered significant under the standards of the "Hot Spots" program. This is not considered significant under the standards of the "Hot Spots" program.

Health Effects of TACs
Health Risks - Acetaldehyde

Acetaldehyde is both directly emitted into the atmosphere and formed in the atmosphere from photochemical oxidation. Sources include combustion processes such as exhaust from mobile sources and fuel combustion from stationary internal combustion engines, boilers, and process heaters.

Acetaldehyde is classified as a federal hazardous air pollutant and as a California TAC. Acetaldehyde is a carcinogen that also causes chronic non-cancer toxicity in the respiratory system. Symptoms of chronic intoxication of acetaldehyde in humans resemble those of alcoholism.

The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythemia, coughing, pulmonary edema, and necrosis may also occur. Acute inhalation of acetaldehyde resulted in a depressed respiratory rate and elevated blood pressure in experimental animals. Tests involving acute exposure of rats, rabbits, and hamsters have demonstrated acetaldehyde to have low acute toxicity from inhalation and moderate acute toxicity from oral or dermal exposure (U.S. EPA, 2005).

Health Risks - Benzene

Approximately 84 percent of the benzene emitted in California comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. Currently, the benzene content of gasoline is less than one percent.

Benzene is highly carcinogenic and occurs throughout California. Benzene also has non-cancer health effects. Brief inhalation exposure to high concentrations can cause central nervous system depression. Acute effects include central nervous system symptoms of nausea, tremors, drowsiness, dizziness, headache, intoxication, and unconsciousness (California Environmental Protection Agency and Air Resources Board, 2005).

Neurological symptoms of inhalation exposure to benzene include drowsiness, dizziness, headaches, and unconsciousness in humans. Ingestion of large amounts of benzene may result in vomiting, dizziness, and convulsions in humans. Exposure to liquid and vapor may irritate the skin, eyes, and upper respiratory tract in humans. Redness and blisters may result from dermal exposure to benzene.

Chronic inhalation of certain levels of benzene causes disorders in the blood in humans. Benzene specifically affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Increased incidence of leukemia (cancer of the tissues that form white blood cells) has been observed in humans occupationally exposed to benzene (U.S. EPA, 2005b).

Health Risks - 1, 3 –Butadiene

The majority of 1, 3-butadiene emissions come from incomplete combustion of gasoline and diesel fuels. Mobile sources account for 83 percent of total statewide emissions. Area wide sources such as agricultural waste burning and open burning contribute approximately 13 percent of statewide emissions.

1 ,3-Butadiene has been identified as a carcinogen in California. Butadiene vapors cause neurological effects at very high levels such as blurred vision, fatigue, headache, and vertigo. Dermal exposure of humans to 1,3-butadiene causes a sensation of cold, followed by a burning sensation, which may lead to frostbite (California Environmental Protection Agency Air Resources Air Resources Board, 2005).

One epidemiological study reported that chronic (long-term) exposure to 1,3-butadiene via inhalation resulted in an increase in cardiovascular diseases, such as rheumatic and arteriosclerotic heart diseases, while other human studies have reported effects on the blood. A large epidemiological study of synthetic rubber industry workers demonstrated a consistent association between 1 ,3-butadiene exposure and occurrence of leukemia. Several epidemiological studies of workers in styrene-butadiene rubber factories have shown an increased incidence of respiratory, bladder, stomach, and lymphato-hematopoietic cancers. However, these studies are not sufficient to determine a causal association between 1,3-butadiene exposure and cancer due to possible exposure to other chemicals and other confounding factors (U.S. EPA, 2005c).

Health Risks - Carbon Tetrachloride

The primary sources of carbon tetrachloride in California include chemical and allied product manufacturers and petroleum refineries.

In California, carbon tetrachloride has been identified as a carcinogen. Carbon tetrachloride is also a central nervous system depressant and mild eye and respiratory tract irritant (California Environmental Protection Agency Air Resources Board, 2005). EPA has classified carbon tetrachloride as a Group B2, probable human carcinogen (U.S. EPA, 2005d).

Acute inhalation and oral exposures to high levels of carbon tetrachloride have been observed primarily to damage the liver (swollen, tender liver, changes in enzyme levels, and jaundice) and kidneys (nephritis, nephrosis, protein urea) of humans. Depression of the central nervous system has also been reported. Symptoms of acute exposure in humans include headache, weakness, lethargy, nausea, and vomiting. Delayed pulmonary edema (fluid in lungs) has been observed in humans exposed to high levels of carbon tetrachloride by inhalation and ingestion, but this is believed to be due to injury to the kidney rather than direct action of carbon tetrachloride on the lung. Chronic inhalation or oral exposure to carbon tetrachloride produces liver and kidney damage in humans and animals (U.S. EPA, 2005d).

Health Risks - Chromium, Hexavalent

Chromium plating and other metal finishing processes are the primary sources of hexavalent chromium emissions in California. In California, hexavalent chromium has been identified as a carcinogen. There is epidemiological evidence that exposure to inhaled hexavalent chromium may result in lung cancer. The principal acute effects are renal toxicity, gastrointestinal hemorrhage, and intravascular hemolysis (California Environmental Protection Agency Air Resources Air Resources Board).

The respiratory tract is the major target organ for chromium (VI) following inhalation exposure in humans. Other effects noted from acute inhalation exposure to very high concentrations of chromium (VI) include gastrointestinal and neurological effects, while dermal exposure causes skin burns in humans. Chronic inhalation exposure to chromium (VI) in humans results in effects on the respiratory tract, with perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, asthma, and nasal itching and soreness reported. Chronic human exposure to high levels of chromium (VI) by inhalation or oral exposure may produce effects on the liver, kidney, gastrointestinal and immune systems, and possibly the blood (U.S. EPA 2005e).

Health Risks - Para-Dichlorobenzene

The primary sources of para-dichlorobenzene include consumer products such as non-aerosol insect repellents and solid/gel air fresheners. These sources contribute 99% of statewide para-dichlorobenzene emissions.

In California, para-dichlorobenzene has been identified as a carcinogen. Acute exposure to 1,4-dichlorobenzene via inhalation in humans results in irritation to the eyes, skin, and throat. In addition, long-term inhalation exposure may affect the liver, skin, and central nervous system in humans (e.g., cerebellar ataxia, dysarthria, weakness in limbs, and hyporeflexia) (California Environmental Protection Agency Air Resources Air Resources Board, 2005; U.S. EPA, 2005f).

Health Risks - Formaldehyde

Formaldehyde is both directly emitted into the atmosphere and formed in the atmosphere as a result of photochemical oxidation. Formaldehyde is a product of incomplete combustion. One of the primary sources of formaldehyde is vehicular exhaust. Formaldehyde is also used in resins, can be found in many consumer products as an antimicrobial agent, and is used in fumigants and soil disinfectants.

The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans has been associated with respiratory symptoms and eye, nose, and throat irritation. Animal studies have reported effects on the nasal respiratory epithelium and lesions in the respiratory system from chronic inhalation exposure to formaldehyde. Occupational studies have noted statistically significant associations between exposure to formaldehyde and increased incidence of lung and nasopharyngeal cancer. This

evidence is considered to be "limited," rather than "sufficient," due to possible exposure to other agents that may have contributed to the excess cancers. EPA considers formaldehyde to be a probable human carcinogen (cancer-causing agent) and has ranked it in EPA's Group B 1. In California, formaldehyde has been identified as a carcinogen (California Environmental Protection Agency Air Resources Air Resources Board, 2005; U.S. EPA, 2005g).

Health Risks - Methylene Chloride

Methylene chloride is used as a solvent, a blowing and cleaning agent in the manufacture of polyurethane foam and plastic manufacture, and as a solvent in paint stripping operations. Paint removers account for the largest use of methylene chloride in California.

Case studies of methylene chloride poisoning during paint stripping operations have demonstrated that inhalation exposure to extremely high levels can be fatal to humans. Acute inhalation exposure to high levels of methylene chloride in humans has resulted in effects on the central nervous system (CNS) including decreased visual, auditory, and psychomotor functions, but these effects are reversible once exposure ceases. Methylene chloride also irritates the nose and throat at high concentrations. The major effects from chronic inhalation exposure to methylene chloride in humans are effects on the central nervous system, such as headaches, dizziness, nausea, and memory loss. In addition, chronic exposure can lead to bone marrow, hepatic, and renal toxicity. EPA considers methylene chloride to be a probable human carcinogen and has ranked it in EPA's Group B2. California considers methylene chloride to be carcinogenic (U.S. EPA, 2005h).

Health Risks - Perchloroethylene

Perchloroethylene is used as a solvent, primarily in dry cleaning operations. Perchloroethylene is also used in degreasing operations, paints and coatings, adhesives, aerosols, specialty chemical production, printing inks, silicones, rug shampoos, and laboratory solvents.

In California, perchloroethylene has been identified as a carcinogen. Perchloroethylene vapors are irritating to the eyes and respiratory tract. Following chronic exposure, workers have shown signs of liver toxicity, as well as kidney dysfunction, and neurological disorders (California Environmental Protection Agency Air Resources Board, 2005).

Health Risks - Diesel Particulate Matter

Diesel particulate matter is emitted from both mobile and stationary sources. In California, on-road diesel fueled engines contribute approximately 24 percent of the statewide total, with an additional 71 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources contribute about 5 percent of total diesel particulate matter.

Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde and nickel) have the potential to contribute to mutations in cells that can lead to cancer. Long-term exposure to diesel exhaust particles poses the highest cancer risk of any toxic air contaminant evaluated by the California Office of Environmental Health Hazard Assessment (OEHHA). ARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles.

In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Using information from OEHHA's assessment, ARB estimates that diesel-particle levels measured in California's air in 2000 could cause 540 "excess" cancers (beyond what would occur if there were no diesel particles in the air) in a population of 1 million people over a 70-year lifetime. Other

researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated cancer risks from diesel exhaust that are similar to those developed by OEHHA and ARB.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, lightheadedness and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution (see also health effects discussion in **Section 3**). Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks and premature deaths among those suffering from respiratory problems. Because children's lungs and respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children. In California, diesel exhaust particles have been identified as a carcinogen (California Office of Environmental Health Hazard Assessment and the American Lung Association. 2005; California Environmental Protection Agency Air Resources Board, 2005).

4 REGULATORY SETTING

Regulatory oversight for air quality in the San Joaquin Valley Air Basin rests at the regional level with the San Joaquin Valley Air Pollution Control District (SJVAPCD), the California Air Resources Board (CARB) at the state level, and the U.S. Environmental Protection Agency (U.S. EPA) Region IX office at the federal level.

4.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The Clean Air Act (CAA) and in particular the 1990 amendments to the Federal Clean Air Act (CAA) provides the principal framework for national, state and local efforts to protect air quality. Under the Clean Air Act, the Office of Air Quality Planning & Standards (OAQPS) is responsible for setting and enforcing these standards, also known as national ambient air quality standards (NAAQS), for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring that these air quality standards are met, or attained (in cooperation with state, Tribal and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories and other sources.

OAQPS is responsible for setting the National Ambient Air Quality Standards (NAAQS), which control pollutants harmful to people and the environment. There are two types of standards, primary and secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. The six criteria pollutants addressed in the NAAQS are Carbon Monoxide, Nitrogen Dioxide, Lead, Ozone (smog), Particulate Matter and Sulfur Dioxide. If the levels of these pollutants are higher than what is considered acceptable by EPA, then the area in which the level is too high is called a nonattainment area. OAQPS monitors very closely many areas for criteria pollutants and attainment.

These standards promulgated by the CAA identify levels of air quality for “criteria” pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, over a given averaging period with an adequate margin of safety, to protect the public health and welfare.

Averaging periods vary by pollutant and range from 1-hour standards to annual standards. Units of measure for the standards are in parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu g/m^3$). The criteria pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2 is a form of NO_X), sulfur oxides (SO_2 is a form of SO_X), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively) and lead. The U.S. EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters (outer continental shelf), and those that are under the exclusive authority of the federal government, such as aircraft, locomotives, and interstate trucking.

Based on monitoring data recorded throughout the country, the U.S. EPA identifies air sheds that are achieving the NAAQS and designates them as being in attainment. Other regions may also be designated as non-attainment or unclassified based on available data and because they have levels above the NAAQS or have not been classified and are treated as attainment. Areas designated non-attainment are further defined by classifications ranging from sub marginal to extreme. The year in which the attainment is reached determines the non-attainment classification, i.e., serious, severe, and extreme. Each specific classification has defined time periods for reaching attainment and various sanctions for failure to make progress. The SJVAB is designated non-attainment for the ozone 8-hour standard, and is designated as a serious non-attainment area for $PM_{2.5}$.[23] In September 2008, SJVAPCD was determined to be in attainment for PM_{10}.

Through various programs, OAQPS monitors for criteria pollutants. One program is the Ambient Air Monitoring Program. Through this program, air quality samples are collected to judge attainment of ambient air quality standards, to prevent or alleviate air pollution emergencies, to observe pollution trends throughout regions and to evaluate the effects of urban, land-use and transportation planning relating to air pollution. There are other important types of pollution monitoring programs; two of which are Enhanced Ozone Monitoring and Air Pollution Monitoring.

The Enhanced Ozone Monitoring Program goes one step further. The chief objective of the enhanced ozone monitoring program is to provide an air quality database that will assist air pollution control agencies in evaluating, tracking the progress of, and, if necessary, refining control strategies for attaining the ozone NAAQS. EPA has required more extensive monitoring of ozone and its precursors in areas with persistently high ozone levels (mostly large metropolitan areas).

In order to work towards attainment, OAQPS requires that each state containing nonattainment areas to develop a written plan for cleaning the air in those areas. The plans developed are called State Implementation Plans (SIPS). Through these plans, the states outline efforts that they will make to try to correct the levels of air pollution and bring their areas back into attainment.

4.2 CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board (CARB), a department of the California Environmental Protection Agency, oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the Federal CAA requirements, and regulating emissions from motor vehicles sold in California and emissions from various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The amendments to the CCAA establish ambient air quality standards for the state, California Ambient Air Quality Standards, (CAAQS), and a legal mandate to achieve these standards by the earliest practicable date. These standards apply to the same criteria pollutants as the Federal CAA,

[23] San Joaquin Valley Air Pollution Control District, 2006 PM_{10} Plan – San Joaquin Valley Plan to Attain Federal Standards for Particulate Matter 10 Microns and Smaller. 2006.

and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride. They are also more stringent than the federal standards and, in the case of PM_{10}, far more stringent.

The San Joaquin Valley Air Basin is designated as non-attainment area according to the state standards for Ozone, and $PM_{2.5}$. Concentrations of all other pollutants meet state standards.

CARB is also responsible for regulations pertaining to Toxic Air Contaminants (TACs)[24]. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. The Act, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release into the air basin. The goal of the Act is to collect emission data, identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce the potential health risk to below a level of significance. Owners of facilities found to pose significant risks by an air district must prepare and implement risk reduction audit plans within 6 months of the determination. Each air pollution control district ranks the data for purposes of risk assessment into high, intermediate, and low priority categories. When considering the ranking, the potency, toxicity, quantity, volume of hazardous materials released from the facility, and the proximity of the facility to receptors, are given consideration by an air district.

CARB is also responsible for regulation of Global Climate Change emissions. This will be discussed in Section 8**,** "Global Climate Change**"** of this report.

4.3 SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD)

Air districts have the primary responsibility of air pollution control from all sources of emissions including emissions from motor vehicles. SJVAPCD has implemented the Indirect Source Rule (ISR) 9510 which allows the district to assess fees based on mobile source emissions related to new development projects and to utilize a portion of the collected fees on air emission reduction projects. Air districts adopt and enforce rules and regulations to achieve state and federal ambient air quality standards and enforce applicable state and federal law.

State law recognized that air pollution does not respect political boundaries and therefore required CARB to divide the state into separate air basins that each have similar geographical and meteorological conditions [California Health and Safety Code Section 39606 (a)]. Originally, air pollution was regulated separately by county Air Pollution Control Districts (APCDs). Although this is still the practice in most counties in California, many county agencies began to realize that air quality problems are best managed on a regional basis and began to combine their regulatory agencies into regional agencies. This was the case for the San Joaquin Valley Air Basin, where until 1991 each county operated a local APCD, at that time the San Joaquin Valley Unified Air Pollution Control District (currently named San Joaquin Valley Air Pollution Control District) was formed. The SJVAPCD boundaries and monitoring station locations are shown on **Figure 4.3-1** "SJVAPCD Monitoring Station Locations".

SJVAPCD Environmental Review Guidelines state that CEQA applies to projects that have the potential for causing a significant effect on the environment.[25]

The San Joaquin Valley Air Pollution Control District Rules and Regulations contain several rules which may apply to the proposed project.

[24] http://www.arb.ca.gov/homepage.htm
[25] San Joaquin Valley Air Pollution Control District, Environmental Review Guidelines, 2000.

Regulation II (Permits) - Regulation II (Rules 2010-2550) is a series of rules covering permitting requirements within the air basin. SJVAPCD regulations require any person constructing, altering, replacing or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate. Most new stationary sources, if they emit over 2 pounds of pollutants per day, will be subject to Best Available Control Technology in accordance with the SJVAPCD's New Source Review Rule and to the New Source Review Rule.[26]

Regulation VIII (Fugitive PM_{10} Prohibitions)- Regulation VIII (Rules 8011-8081) is a series of rules designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, etc. If a construction project is 10.0 or more acres in area or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days, a Dust Control Plan must be submitted as specified in Section 6.3.1 of Rule 8021. Construction activities shall not commence until the SJVAPCD has approved the Dust Control Plan. The project could also be subject to provisions within Rule 8021 (Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities), Rule 8031 (Bulk Materials), Rule 8041 (Carryout and Track Out), Rule 8051 (Open Areas), Rule 8061 (Paved and Unpaved Roads), and Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas). Rule 8061 places thresholds and requirements on limiting Visible Dust Emissions (VDE) from unpaved road segments. Rule 8071 also contains thresholds and requirements.

Rule 3135 (Dust Control Plan Fee) requires the applicant to submit a fee in addition to a Dust Control Plan. The purpose of this fee is to recover the SJVAPCD's cost for reviewing these plans and conducting compliance inspections.

Rule 4002 (National Emission Standards for Hazardous Air Pollutants) In the event that any portion of an existing building will be renovated, partially demolished or removed, the project will be subject to SJVAPCD Rule 4002. Prior to any demolition activity, an asbestos survey of existing structures on the project site may be required to identify the presence of any asbestos containing building material (ACBM). Any identified ACBM having the potential for disturbance must be removed by a certified asbestos contractor in accordance with CAL-OSHA requirements.

Rule 4102 (Nuisance) applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and be subject to SJVAPCD enforcement action.

Rule 9510 (Indirect Source Review) This rule requires the applicants of certain development projects to submit an application to the SJVAPCD when applying for the development's last discretionary approval. Projects subject to the rule are required to quantify indirect emissions (mobile source emissions), area source emissions and construction exhaust emissions and to mitigate a portion of these emissions. The ISR rule became effective March 1, 2006. Rule 9510 was adopted to reduce the impacts of growth in emissions from all new development in the San Joaquin Valley. The emission reductions expected from the rule allow the SJVAPCD to achieve attainment of the federal air quality standards for ozone by 2023[27].

[26] SJVAPCD Rules and Regulations, October, 2010.
[27] San Joaquin Valley Air Pollution Control District Ozone Attainment Plan, 2007

In the context of toxic air contaminants, to meet the requirements of federal and State law, the SJVAPCD has created an Integrated Air Toxic Program. This program serves as a tool for implementation of the requirements outlined in Title III of the 1990 Federal Clean Air Act Amendments. The goals of SJVAPCD risk management efforts are to: 1) minimize increases in toxic emissions associated with new and modified sources of air pollution; and 2) ensure that new and modified sources of air pollution do not pose unacceptable health risks at nearby residences and businesses. In order to achieve these goals, the SJVAPCD reviews the risk associated with each permitting action where there is an increase in emissions of Toxic Air Contaminants. SJVAPCD staff, as part of the engineering evaluation for these projects, performs this risk management review. The risk management review is performed concurrently with other project review functions necessary to process permit applications with the SJVAPCD. Under the SJVAPCD's risk management policy, Best Available Control Technology must be applied to all units that, based on their potential emissions may pose greater than *de minimus* risks. Facilities that pose health risks above SJVAPCD action levels are required to submit plans to reduce their risk. Action levels for risk were established in the SJVAPCD's Board-Approved Risk Reduction policy. The action level for cancer risk is 10 cases per million exposed persons, based on the maximum exposure beyond facility boundaries at a residence or business. The action level for non-cancer risk is a hazard index of 1.0 at any point beyond the facility boundary where a person could reasonable experience exposure to such risk.

The SJVAPCD has an extensive stationary source permitting program[28] that includes New Source Review Rules, which are in the approved State Implementation Plan. These rules require offsets of emissions of ozone and particulates precursors at a ratio of greater than one to one, when ten tons and fifteen tons are exceeded. The rules also require that each new stationary source, which exceeds two pounds per day of pollutants, shall install Best Available Control Technology.

4.4 KERN COUNTY

The Kern County General Plan Conservation Land Use, Open Space and Conservation Element contains goals, policies, objectives, and implementation measures that comprehensively address general conditions and site specific circumstances that may affect air quality.[29] The policies are listed as follows:

Policy 18 The air quality implications of new discretionary land use proposals shall be considered in approvals of major developments.

Policy 20 The County shall include fugitive dust measures as a requirement for discretionary projects and as required by the adopted rules and regulations of the San Joaquin Valley Air Pollution Control District.

Policy 21 The County shall support air districts' efforts to reduce PM_{10} and $PM_{2.5}$ emissions.

Policy 22 Kern County shall continue to work with the San Joaquin Valley Air Pollution Control District toward air quality attainment with federal, State and local standards.

[28] SJVAPCD Rules and Regulations, October, 2010.
[29] Kern County General Plan, 2007, Chapter 1- Land Use, Open Space and Conservation Element

Policy 23 The County shall continue to implement the local government control measures in coordination with the Kern Council of Governments and the San Joaquin Valley Air Pollution Control District.

Policy 24 Kern County shall consult with transit providers to determine project effects and ensure that impacts are mitigated.

Implementation Measures

F. All discretionary permits shall be referred to appropriate air district for review and comment.

G. Discretionary development projects involving the use of tractor-trailer rigs shall incorporate diesel exhaust reduction strategies including, but not limited to:

a. Minimizing idling time.

b. Electrical overnight plug-ins.

H. Discretionary projects may use one or more of the following to reduce air quality effects:

a. Pave dirt roads within the development

b. Pave outside storage areas.

c. Provide additional low Volatile Organic Compounds (VOC) producing trees on landscape plans.

d. Use of alternative fuel fleet vehicles or hybrid vehicles.

e. Use of emission control devices on diesel equipment.

g. Provide bicycle lockers and shower facilities on site.

h. Increasing the amount of landscaping beyond what is required in the Zoning Ordinance (Chapter 19.86).

i. The use and development of park and ride facilities in outlaying areas.

j. Other strategies that may be recommended by the local Air Pollution Control Districts.

I. Work with transit providers to develop long-range transit strategies based on future and anticipated land use plans.

J. The County shall include PM_{10} control measures as conditions of approval for subdivision maps, site plans and grading permits.

In addition to Policies and Goals established by Kern County, a list of the evaluation of environmental impacts is performed on a project level to establish the potential impact of an individual project.

Kern County adopted "Thresholds of Environmental Significance" for projects that produce emissions that exceed specific thresholds. Kern County defines these thresholds for purposes of determining cumulative effects as the baseline for "considerable". Projects located in the San Joaquin Valley Air Pollution Control District will be subject to the following significance thresholds:

Kern County Thresholds of Environmental Significance

ROG (tons per year)	NO_X (tons per year)	PM_{10} (tons per year)
10	10	15
Stationary Sources:		
Severe Attainment		25
(2004 Environmental Protection Agency designation)		
Extreme Nonattainment:		10

4.5 NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Ambient air quality standards are regulatory levels of ambient pollutant concentrations which, when exceeded, may adversely impact the health and welfare of the public. National Ambient Air Quality Standards (NAAQS) were established as a result of the provisions of the Federal Clean Air Act (CAA) of 1970. The national standards are divided into primary standards, designed to protect public health, and secondary standards intended to protect the public from any known or anticipated adverse effects of a pollutant. The national standards may be equaled continuously and exceeded once per year. National standards have been established for ozone, nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns, particulate matter less than 2.5 microns, sulfur dioxide, and lead.

California Ambient Air Quality Standards (CAAQS) were established in 1969 as a result of the Mulford-Carrell Act. In addition to the national standards, California also established standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. California standards for ozone, nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns in aerodynamic diameter, and sulfur dioxide are not to be exceeded. The pollutants and their corresponding national and state ambient air quality standards, for 2015 (time of submittal), are shown in **Table 4.5-1**.

TABLE 4.5-1
Ambient Air Quality Standards[30]

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration[3]	Method[4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	—	—	35 µg/m3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 pg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		53 ppb (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[9]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 pg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[9]	—	
Lead[10,11]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m3 (for certain areas)[11]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[12]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

California Air Resources Board (6/4/13)

[30] California Air Resources Board, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf, 6/4/13

Footnotes to Table 4.5-1

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/m^3 as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 30 years.
9. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 100 ppb and 100 ppb are identical to 0.100 ppm.
10. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
11. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
12. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 j.tg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
13. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

The Federal Clean Air Act Amendments made in 1977 require each state to identify geographic areas in compliance with the national standards as well as those areas that are not in compliance. These designations are known as the "attainment" status designations. Areas not in compliance with the national standards are termed "nonattainment" and are subject to New Source Review (NSR) regulations. Areas meeting the national standards are referred to as "attainment" and are subject to Prevention of Significant Deterioration (PSD) and NSR regulations. Areas with insufficient data to make a determination are "unclassified" but are treated as "attainment" areas until proven otherwise. The designation of an area is made on a pollutant-specific basis. Therefore, it is possible to be located in an area designated nonattainment for one pollutant, but attainment or unclassified for other pollutants.

The California Air Resources Board (CARB) coordinates and oversees state air quality management districts and air pollution control districts. CARB has retained authority over mobile sources but has delegated much of the control of stationary sources to local agencies. They, much like the federal program, designate areas as "attainment", "non-attainment", or "unclassified" based on ambient air data that has been collected in the applicable area. **Table 4.5-2** is a listing of the State and Federal attainment status for the Kern County portion of the San Joaquin Valley Air Basin.

TABLE 4.5-2
Kern County –SJVAPCD Portion Attainment Status

Pollutant	Designation/Classification	
	Federal Standards[a]	State Standards[b]
Ozone – 1 hour	No Federal Standard[f]	Nonattainment/Severe
Ozone – 8 hour	Nonattainment/ Extreme[e]	Nonattainment
PM_{10}	Attainment[c]	Nonattainment
$PM_{2.5}$	Nonattainment[d]	Nonattainment
Carbon Monoxide	Attainment /Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment/Unclassified	Attainment
Sulfur Dioxide	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

[a] See 40 CFR Part 81
[b] See CCR Title 17 Sections 60200-60210
[c] On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.
[d] The Valley is designated nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009).
[e] Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).
[f] Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.

The urbanized areas of Fresno, Bakersfield, Stockton, and Modesto are designated as attainment and all of the non-urbanized areas of the San Joaquin Valley Basin are designated as unclassified for the federal CO standards.

In July 1997, the U.S. EPA announced new health-based standards for ozone and $PM_{2.5}$. $PM_{2.5}$ is a subset of PM_{10} and a microscopic form of particle pollution primarily composed of diesel soot and other combustion by-products. Previously, the NAAQS for particulate matter applied to the highest 24-hour or annual averages measured within a monitoring planning area. Monitoring networks were often designed to measure the highest values, even though these networks did not necessarily represent the overall exposure of populations to excessive particulate concentrations. Some data from these networks were disregarded by epidemiologists as being unrelated to health indicators such as hospital admissions and death. The new forms for these standards are intended to provide more robust measures for the particulate matter indicator. While PM_{10} network design and siting criteria are unchanged, new $PM_{2.5}$ monitoring networks to determine compliance or non-compliance are intended to best represent the exposure of populations that might be affected by elevated $PM_{2.5}$ concentrations.

$PM_{2.5}$ measurements from central California indicate that the annual 15 mg/m^3 standard is exceeded in several populated areas, specifically in the central and southern San Joaquin Valley (where the Proposed Project is located). These high annual averages are dominated by elevated concentrations in the cities and in non-urban locations during winter and fall. $PM_{2.5}$ constitutes approximately 80% of PM_{10} during winter and approximately 50% of PM_{10} during the rest of the year. Other $PM_{2.5}$ exceedances have occurred as isolated events at one or two locations when a nearby activity contributed a large bolus of fugitive dust, or when wind typically dominated by the coarse particle fraction. Windblown dust excursions have been most often found in the southern San Joaquin Valley and in the high desert, especially in the vicinity of Owens Lake.

Designation Classifications

National Designation Categories

Non-Attainment Area: Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Unclassified/Attainment Area: Any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant or meets the national primary or secondary ambient air quality standard for the pollutant.

Ozone Classifications:

Marginal Primary standard, attainment date of 3 years after enactment

Moderate Primary standard, attainment date 6 years after enactment

Serious Primary standard, attainment date 9 years after enactment

Severe 15 Primary standard, attainment date 15 years after enactment

Severe 17 Primary standard, attainment date 17 years after enactment

Extreme Primary standard attainment date 20 years after enactment

Incomplete (or No) Data: An area designated as an ozone non-attainment area as of the date of enactment of the Clean Air Act Amendments of 1990 and did not have sufficient data to determine if it is meeting or is not meeting the ozone standard.

Carbon Monoxide Classifications:

Serious: A design value of 16.5 ppm and above and a primary standard attainment date of December 21, 2000.

Moderate: A design value of 9.1 up to 16.4 ppm and a primary standard attainment date of December 31, 1995.

Not Classified: An area designated as a carbon monoxide non-attainment area as of the date of enactment of the Clean Air Act Amendments of 1990 and did not have sufficient data to determine if it is meeting or is not meeting the carbon monoxide standard.

State Designation Classifications:

Unclassified: A pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or non-attainment.

Attainment: A pollutant is designated attainment if the State standard for that pollutant was not violated at any site in the area during a three-year period.

Non-attainment: A pollutant is designated non-attainment if there was at least one violation of a State standard for that pollutant in the area.

Non-attainment/Transitional: A subcategory of the non-attainment designation. An area is designated non-attainment/transitional to signify that the area is close to attaining the standard for that pollutant.

As part of the 1990 Federal CAA Amendments, 189 substances commonly used in many businesses, including manufacturing and industrial processes, were identified as Toxic Air Contaminants (TACs). The amendments required the U.S. EPA to establish a 10-year schedule for developing new regulations for controlling these pollutants using maximum achievable control technology (MACT). Under Title III to the 1990 Federal Clean Air Act Amendments, the U.S. EPA was also required to develop regulations to address urban area risk, residual risk, and accidental releases of Toxic Air Contaminants.

Pursuant to the CAA, states may develop a State Implementation Plan (SIP) to explain how they will achieve the CAA standards within the state. If the SIP is deemed acceptable, the U.S. EPA will delegate responsibility for implementation pursuant to the SIP. California has an approved SIP. These implementation plans are updated and revised periodically based on changes in conditions, and revision in standards.

4.6 EXISTING AIR QUALITY IN THE SAN JOAQUIN VALLEY BASIN[31]

The San Joaquin Valley Air Basin (SJVAB) consists of eight counties: Fresno, Kern (western and central), Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare, which are shown on **Exhibit 4.3-1** "Monitoring Station Locations". Cumulatively, these counties make up about 16% of California's geographic area, making the SJVAB the second largest air quality basin delineated by the California Air Resources Board. The SJVAB consists of a continuous intermountain valley approximately 250 miles long and averaging 80 miles wide. The geography of mountainous areas to the east, west and south, in combination with long summers and relatively short winters, contributes to local climate episodes that prevent dispersion of pollutants. Although marine air generally flows into the SJVAB from the San Joaquin River Delta, the region's topographic features restrict air movement through and out of the valley. Additionally the surrounding mountainous areas are generally higher in elevation than the summer inversion layers. As a result, the SJVAB is highly susceptible to pollutant accumulation over time.

[31] California Air Resources Board, http://www.arb.ca.gov/adam/welcome.html.

Monitoring Stations

The SJVAB has 36 monitoring stations to measure air quality, 22 operated by the SJVAPCD, 2 by the National Park Service, one by the Tachi Yokut Tribe, one by the Chukchansi Indians, eight by the California Air Resources Board and two jointly by the SJVAPCD and CARB. **Exhibit 4.3-1** shows the location of these monitoring stations. By using the data collected at these stations the attainment status and the progress towards attainment is measured.

4.6.1 REGIONAL AMBIENT AIR QUALITY[32]

Ozone

Exhibit 4.6-1, "San Joaquin Valley Air Basin Ozone Air Quality Trends", shows the long-term trends in the SJVAB for the number of days over the federal 1-hour ozone standard. As can be seen, the number of days over the standard has decreased basin wide from a peak of 80 in the late 1970's to 0 days in 2013. Short-term trends show a moderate decrease in the number of days over the standard basin-wide from below 10 days in 2004 to 0 days in 2013. The federal 8 hour standard has been steadily decreasing days above standard as well but is still over the threshold for 89 days during 2013.

Particulate

The air quality data shows an overall improvement in PM_{10}. The peak 24-hour PM_{10} exceedance was 439 micrograms per cubic meter in 1990 and only 150 micrograms per cubic meter in 2003. As of October 2006, the San Joaquin Valley had attained the federal PM_{10} standard and had received approval as an attainment basin for this pollutant.[33] The number of days of exceedance has decreased over the same time period from 59 in 1990 to 0 in 2009-2011.

All Other Pollutants

The remaining federal criteria pollutants (NO_X, SO_X, CO) that are measured by the monitoring stations have been shown to be in attainment.

Toxic Air Contaminants

Toxics have been monitored at four sites in the SJVAB as shown on **Exhibit 4.3-1**. **Table 4.6-1** below shows the data that has been collected from these monitoring stations. The toxic air contaminants are: acetaldehyde; benzene; 1, 3-butadiene; carbon tetrachloride; chromium (hexavalent); para-dichlorobenzene; formaldehyde, methylene chloride; perchlorethylene; and diesel particulate matter (diesel PM). These are the TACs that are considered to pose the greatest health risk in SJVAB. **Table 4.6-1** on the following page demonstrates that in general since 1992 the volume of toxics in the SJVAB and the health risk posed by these toxics has decreased.

[32] "Extreme Ozone Attainment Demonstration Plan-San Joaquin Valley Air Basin Plan Demonstrating Attainment of Federal 1-hour Ozone Standard," San Joaquin Valley Air Pollution Control District (October 8, 2004).

[33] On Oct. 17, 2006, U.S. EPA finalized approval of PM_{10} Attainment for SJVAB, the appeal period will end in May 2008.

TABLE 4.6-1[34]
San Joaquin Valley Air Basin Annual Average Toxic Air Contaminant Concentration and Health Risk

TAC*	Conc./Risk	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Acetaldehyde	Annual Avg	1.38	1.73	1.29	0.54	1.28	1.19	1.30	1.56	1.09	1.15	1.24	1.34	1.14	1.42	1.33	1.15
	Health Risk	7	8	6	3	6	6	6	8	5	6	6	7	6	7	6	6
Benzene	Annual Avg	1.36	1.32	1.33	1.16	0.73	0.71	0.76	0.69	0.63	0.54	0.55	0.46	0.37	0.37	0.36	.318
	Health Risk	126	122	123	107	68	66	71	64	58	50	51	43	34	35	34	29
1,3-Butadiene	Annual Avg	0.24	0.34	0.32	0.26	0.22	0.20	0.23	0.18	0.16	0.15	0.15	0.10	0.08	0.08	0.07	0.065
	Health Risk	89	127	121	99	83	73	88	67	59	56	55	36	30	31	26	24
Carbon Tetrachloride	Annual Avg		0.11		0.10	0.08		0.11		0.10	0.09	0.09	0.10				
	Health Risk		29		26	20		30		25	23	24	26				
Chromium (Hexavalent)	Annual Avg	0.23	0.21	0.19	0.28	0.13	0.11	0.10	0.10	0.12		0.09	0.08	0.08	0.07	0.05	0.083
	Health Risk	34	31	29	42	20	16	15	15	18		13	12	13	11	8	12
Para-Dichlorobenzene	Annual Avg	0.11	0.13	0.11	0.11	0.10	0.13			0.11	0.13	0.15	0.15	0.15	0.15	0.15	
	Health Risk	7	9	7	8	7	9			7	9	10	10	10	10	10	
Formaldehyde	Annual Avg	1.46	1.67	1.80	2.10	2.96	2.77	2.86	3.44	2.61	3.08	3.13	3.02	2.27	2.52	2.78	2.51
	Health Risk	11	12	13	15	22	20	21	25	19	23	23	22	17	19	20	18
Methylene Chloride	Annual Avg	0.55	0.76	0.59	0.61	0.54	0.53	0.52	0.50	0.53	0.27	0.16	0.14	0.11	0.12	0.11	0.1
	Health Risk	2	3	2	2	2	2	2	2	2	<1	<1	<1	<1	<1	<1	<1
Perchloroethylene	Annual Avg	0.10	0.47	0.07	0.07	0.07	0.06	0.04		0.08	0.05	0.04	0.03	0.03	0.03	0.03	0.026
	Health Risk	4	19	3	3	3	2	2		3	2	2	1	1	1	1	1
Diesel Particulate Matter**	Annual Avg				(1.7)					(1.3)							
	Health Risk				(510)					(390)							
Average Basin Risk***	w/o Diesel PM	280	360	304	305	231	194	235	181	196	170	184	157	111	114	105	90
	w/ Diesel PM				(815)					(586)							

*Concentrations for Chromium (Hexavalent) are expressed as µg/m3 and concentrations for Diesel PM are expressed as µg/m3. Concentrations for all other TACs are expressed as parts per billion.
**Diesel PM estimates are based on receptor modeling techniques, and the estimates are available only for selected years. Currently, the estimates are being reviewed.
***Health Risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentration. It reflects only those compounds listed in this table and only those with data for that year. There may be other significant compounds for which we do not monitor or have health risk information. Additional information about interpreting the toxic air contaminant air quality trends can be found in Chapter 1, ARB Almanac: *Interpreting the Emission and Air Quality Statistics*

[34]"Toxic Air Contaminant Emissions, Air Quality, and Health Risk," ARB Almanac, Ch. 5, California Air Resources Board (2009)

4.6.2 EXISTING LOCAL AIR QUALITY [35]

Criteria Pollutants

The California Air Resources Board (CARB) operated several meteorological and air quality monitoring stations in the Bakersfield area. **Tables 4.6-2** through **4.6-10** present the most recent summaries of the monitored air quality for ozone (O_3), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 microns in aerodynamic diameter, carbon monoxide (CO), nitrogen dioxide (NO_X), sulfur dioxide (SO_2) and lead (Pb). No data is available for Hydrogen Sulfide or Vinyl Chloride in Kern County. **Exhibit 4.3-1,** "Monitoring Station Locations" shows the locations of the various monitoring stations in the area surrounding the SJVAB.

The plots of the various pollutants versus time (1979 to 2013) are included on **Exhibits 4.6-2** "Monitoring Station Data – Ozone 1 Hour Concentration" through **4.6-8** "Monitoring Station Data – SO_X Maximum 24 Hour Concentration." The trend for each pollutant is analyzed utilizing a least squares fit technique. Based on these plots it is clearly demonstrated that the air quality in the area surrounding the proposed project sites has improved during the time period for which data has been collected. The Federal Clean Air Act also requires that emission inventories be compiled and reported through a Conformity Analysis with the State Implementation Plan.

For the purposes of background data and air quality assessment, this analysis will rely on data collected in the past years for the CARB monitoring stations that are closest in proximity to the proposed facility.

TABLE 4.6-2
Background Ambient Air Quality Data for 1-Hour Ozone

CARB Air Monitoring Station	Number of Days* Exceeding 1-Hour NAAQS			Number of Days Exceeding 1-Hour CAAQS (0.09 ppm)			Maximum 1-Hour Concentration (ppm)		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Bakersfield – California Ave.	0	0	0	5	9	3	0.107	0.102	0.107
Bakersfield –Municipal Airport	-	-	-	-	33	6	-	0.120	0.109
Maricopa- Stanislaus Street	-	-	-	10	1	0	0.114	0.097	0.089

*NAAQS 1-Hour standard has been rescinded and replaced with an 8-Hour standard which is more restrictive.

TABLE 4.6-3
Background Ambient Air Quality Data for 8-Hour Ozone

CARB Air Monitoring Station	Number of Days Exceeding 8-Hour NAAQS (0.075 ppm)			Number of Days Exceeding 8-Hour CAAQS (0.070 ppm)			Maximum 8-Hour Concentration (ppm)		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Bakersfield – California Ave.	25	56	22	51	83	47	0.094	0.095	0.098
Bakersfield –Municipal Airport	-	61	23	-	75	56	-	0.107	0.102
Maricopa- Stanislaus Street	49	46	10	81	63	23	0.105	0.093	0.083

[35] California Air Resources Board, https://www.arb.gov/adam/

TABLE 4.6-4
Background Ambient Air Quality Data for PM_{10} - National

CARB Air Monitoring Station	Annual Average (µg/m³)			Days Exceeding NAAQS (>150 µg/m³)			Maximum National 24-Hour Concentration NAAQS (150 µg/m³)		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Bakersfield – California Ave.	32.3	36.6	40.4	0	0	0	86	97.4	99.6
Oildale – Manor Street	35.0	39.7	40.4	0	0	0	88.6	100.2	91.1

TABLE 4.6-5
Background Ambient Air Quality Data for PM_{10} - State

CARB Air Monitoring Station	Annual Average (µg/m³)			Days Exceeding CAAQS (>50 µg/m³)			Maximum California 24-Hour Concentration CAAQS (50 µg/m³)		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Bakersfield – California Ave.	32.6	44.2	41.4	47.1	116.4	89.4	238.0	154.0	125.8
Oildale – Manor Street	34.8	40.2	40.5	65.9	98.4	75.2	89.4	105.5	94.7

- = No reported data

TABLE 4.6-6
Background Ambient Air Quality Data for $PM_{2.5}$- National

CARB Air Monitoring Station	Annual Average(ppm)			Days Exceeding NAAQS (>35 µg/m³)			Maximum 24-Hour Concentration NAAQS (35 µg/m³)		
	2012	2013	2014	2012	2013	2014	2012	2013	2014
Bakersfield – Planz Road	14.7	22.8	21.6	21.8	49.4	-	52.5	167.3	91.0
Bakersfield – California Ave.	13.0	20.0	18.6	24.4	50.4	39.3	86.5	111.7	101.9

TABLE 4.6-7
Background Ambient Air Quality Data for CO

CARB Air Monitoring Station	Days Exceeding NAAQS (>9.0 ppm)			Days Exceeding CAAQS (>9.0 ppm)			Maximum 8-Hour Concentration NAAQS (9.0 ppm) CAAQS (9.0 ppm)		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
Bakersfield – Golden St. Hwy.	0	0	-	0	0	-	1.51	1.34	-

TABLE 4.6-8
Background Ambient Air Quality Data for NO_X

CARB Air Monitoring Station	Annual Average (0.03 ppm)			Days Exceeding CAAQS (0.18 ppm)			Maximum 1-Hour Concentration CAAQS (0.18 ppm)		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Bakersfield – California Ave.	0.014	0.015	0.015	0	0	0	0.079	0.064	0.064
Bakersfield – Golden St. Hwy.	0.019	-	-	0	-	-	0.033	-	-
Shafter- Walker St.	0.012	0.013	0.013	0	0	0	.074	.054	.052

- = No reported data

TABLE 4.6-9
Background Ambient Air Quality Data for SO_X

CARB Air Monitoring Station	Days Exceeding CAAQS 24-hour Standard (>0.04 ppm)			Annual Average NAAQS (0.030 ppm)			Maximum 24-Hour Concentration NAAQS (0.14 ppm) CAAQS (0.04 ppm)		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Bakersfield – California Ave.	-	-	-	-	-	-	-	-	-

- = no reported data

TABLE 4.6-10
Background Ambient Air Quality Data for Lead

CARB Air Monitoring Station	Days Exceeding CAAQS 30-Day Standard (>1.5 µg/m^3)			Calendar Quarter NAAQS (1.5 µg/m^3)			Maximum 30-Day Concentration NAAQS (1.5 µg/m^3) CAAQS (1.5 µg/m^3)		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Bakersfield – California Ave.	-	-	-	-	-	-	-	-	-

- = no reported data

Existing Conditions at Project Site

The project site is located in unincorporated Kern County near the Town of McKittrick outside the City of Bakersfield. No onsite data exists for criteria pollutants or toxics. However, using the highest background concentration from the surrounding monitors over the past years will conservatively represent the background concentrations at the site.

In the tables above the most complete data for each respective criteria pollutant was obtained using the California Air Resources Board Air Quality Data Statistics. The closest Air Monitoring Stations to Johe's Ranch Mine are located 40 miles away in Bakersfield, CA. Due to the rural location of the mine these concentrations are in excess of what will be experienced on the jobsite. Mitigation measures, described in section eight of this report, have been planned in order to minimize particulate emissions.

Sensitive Receptors

The SJVAPCD identifies a sensitive receptor as a location where human populations, especially children, senior citizens, and sick persons, are present, and where there is a reasonable expectation of continuous human exposure to pollutants, according to the averaging period for ambient air quality standards, such as 24-hour, 8-hour or 1-hour. Examples of sensitive receptors include residences, hospitals, and schools.[36] Industrial and commercial uses are not considered sensitive receptors.

For this analysis, all land uses other than commercial, agricultural and industrial are considered sensitive receptors.

[36] SJVAPCD Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI), March 19, 2015 Revision

Criteria Pollutants

As stated above, Kern County has adopted the following significance thresholds[37] concerning air quality for projects located within the San Joaquin Valley portion of Kern County. The thresholds for project emissions are as follows:

- 10 tons per year for ROG,
- 10 tons per year for NO_X,
- 15 tons per year for PM_{10}, and
- 25 tons per year for stationary sources (non-pollutant specific).

The above standards are utilized in air quality analysis along with state and federal guidelines for assessing air quality impacts. Kern County adopted thresholds are defined for purposes of determining cumulative effects as the baseline for "considerable." Anything above 10 in one million is considered significant, but still accepted by the SJVAPCD up to 20 in a million as stated in SJVAPCD APR 1906 "Framing for Performing Heath Risk Assessment".

Additionally, in order to be consistent with federal guidance documents,[38] actions that violate federal standards[39] for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors while outdoors and secondary standards designed to safeguard human welfare) are considered significant impacts. Additionally, actions that violate state standards developed by the California Air Resources Board (CARB) or criteria developed by the SJVAPCD including thresholds for criteria pollutants are considered significant impacts.[40]

Visibility[41]

The California State Ambient Air Quality Standard for Visibility Reducing Particles (VRP) represents a policy judgment that a certain minimum degree of visibility is conducive to public welfare, regardless of location. This policy is manifested as a State wide minimum dry air particle extinction limit of 0.23/km (230 Mm^{-1}) averaged from 9 AM to 5 PM (PST) when Relative Humidity (RH) is less than 70 percent. This is roughly equivalent to V_r= 10 miles. The standard is 0.07/km (70Mm^{-1}) for the Lake Tahoe Air Basin (roughly equivalent to V_r = 30 miles). Equivalent PM_{10} concentrations when this standard is just met range from about 50µg/m^3 for a fine particle dominated urban setting (e.g., Sacramento in the winter) to 90 or more µg/m^3 for a mixture of coarse and fine particles (e.g., Central Valley summer). The Lake Tahoe VRP limit equates to PM_{10} concentrations ranging from about 16 to 25 µg/m^3 over a similar range of aerosol characteristics.

[37] "California Environmental Quality Act (CEQA) Draft Implementation Document," Kern County Planning Department (June 2004).
[38] Guidance for Preparing an Air Quality Assessment for Use in Environmental Impact Report
[39] Federal Clean Air Act, as amended (42 U.S.C. 7401 et seq.)., Title I – Air Pollution Control and Prevention.
[40] California Health and Safety Code, Division 26, Air Resources §39000 et seq.
[41] Cal EPA Air Resources Board and Office of Environmental Health Hazard Assessment, Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates; May 2003.

Health Risk-Based Thresholds[42,43]

The California Office of Environmental Health Hazard Assessment (OEHHA) is responsible for setting health risk thresholds for air toxics. These thresholds include Reference Exposure Levels (RELs) for non-carcinogenic toxins that pose potential acute and/or chronic health risks and Unit Risk Factors (URFs) for carcinogens. The RELs and URFs represent exposure levels that OEHHA deems not likely to cause adverse effects in a human population, including sensitive receptors. These thresholds are based on the most recent scientific data and are designed to protect the most sensitive individuals in the population by inclusion of margins of safety. The thresholds approved by the SJVAPCD are a potential to increase cancer risk for the person with maximum exposure potential by 10 in one million or a non-cancer Hazard Index greater than 1 for both acute and chronic exposure.

There are no thresholds of significance for Valley Fever that has been adopted by the state. However, the likelihood of its occurrence can be determined based on the proposed project location.

Odor-based Thresholds[44]

Projects that would potentially generate objectionable odorous emissions proposed to locate near existing sensitive receptors or other land uses where people may congregate could constitute a significant air quality impact to existing uses. Also, residential or other sensitive receptor projects built for the intent of attracting people locating near existing odor sources could also cause a significant air quality impact for the proposed uses. The SJVAPCD suggests a threshold based on the distance of the odor source from the project and complaint records for a facility or similar facility. If there is one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period[45], the odor impact is considered significant.

The air contaminants which may be emitted at the proposed project have no known odors associated with operations.

Construction Specific Thresholds[46]

The SJVAPCD approach to analyses of construction impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emission concentrations for modeling of direct impacts. PM_{10} emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction. The SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Chapter 9 of the GAMAQI (as

[42] See GAMAQI and OEHHA, Air Toxics "Hot Spots" Program.
[43] Cal EPA Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual, and Part II: Technical Support Document for Describing Available Cancer Potency Factors.
[44] GAMAQI.
[45] Ibid
[46] GAMAQI March 19, 2015, pg. 119; http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf

appropriate, depending on the size and location of the project site) would constitute sufficient mitigation to reduce PM_{10} impacts to a level considered less-than-significant.[47] Additionally, SJVAPCD has adopted Rule 9510, the Indirect Source Review Rule, which is designed to reduce the construction PM_{10} by 50% and the construction NO_X by 33.3%.

All practicable mitigation measures will be implemented during the construction phase of the project. While implementation of these mitigation measures would bring the project's construction emissions to a level that is below significance according to the SJVAPCD, the emissions from construction will still be quantified. The project specific construction emissions were quantified, modeled, and compared along with the operational emissions against the NAAQS and CAAQS and the health thresholds in order to determine local impact significance.

General Thresholds[48]

According to the Kern County Planning Department, a project could have a potentially significant air quality impact on the environment if it would:

- Conflict with or obstruct implementation of air quality plans;
- Violate ambient air quality standards or contribute to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under Federal or State standards;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors.

Cumulative Thresholds[49]

The cumulative thresholds are the same as the project level thresholds in accordance with the Kern County Guidance for Air Quality Assessments for Environmental Impact Reports.

Global Climate Change Thresholds[50]

As directed by SB97, the Natural Resources Agency adopted Amendments to the CEQA Guidelines for greenhouse gas emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approves the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

[47] Ibid.
[48] CEQA Guidelines.
[49] CEQA Guidelines, CCR Title 14 Div. 6 Chapter 3 Part. 9 §15130.
[50] See Section 9.7 for detailed information regarding Global Climate Change Thresholds of Significance

According to the CEQA guideline amendments, the following factors, among others, should be considered when assessing the significance impacts from greenhouse gas emissions on the environment:

1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
2) Whether the project emissions exceeds a threshold of significance that the lead agency determines applies to the project; and
3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, and EIR must be prepared for the project.

6 PROJECT IMPACTS

The Project Specific Impact Analyses are broken into three sub elements:

- Criteria Pollutant and Visibility Impacts
- Public Health/Hazards Impacts
- Project Specific Construction and Operational Impacts

6.1 MODELS USED IN ANALYSIS[51]

Table 6.1-1 shows which models are used in the General Operational Thresholds, the pollutants to which they apply and the standards to which the model results will be compared for significance determination. These models, current models during time of submission, were selected in conformance with U. S. EPA and SJVAPCD guidelines.[52,53] The same thresholds are utilized for construction and operational emissions or combinations thereof.

[51] U.S. EPA, Guideline on Air Quality Models (revised), EPA-450/2-78-027R.
[52] Ibid
[53] GAMAQI and District recommendations at http://www.valleyair.org/.

TABLE 6.1-1
Standards Utilized for General Thresholds of Significance

Thresholds of Significance	Pollutant(s)	Standard	Modeling Technique
Conflict with or obstruct implementation of applicable air quality plan	PM_{10}, $PM_{2.5}$	U.S. EPA's Prevention of Significance Deterioration Significant Impact Levels (PSD SIL's) for onsite sources, GAMAQI for indirect sources	AERMIC Model (AERMOD), CalEEmod 2013.2.2
	NO_X		
	SO_X		
	CO	NAAQS, CAAQS	
	Ozone and ROG	New Source Review Rule of SJVAPCD for onsite, GAMAQI for indirect sources	CalEEmod 2013.2.2 EMFAC2007
	Visibility	Air Quality Related Values (AQRV's)	U.S.EPA VISCREEN
Violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation	PM_{10}, $PM_{2.5}$	PSD SIL's NAAQS, CAAQS for onsite, GAMAQI for indirect sources	AERMIC Model (AERMOD), CalEEmod 2013.2.2 EMFAC2007
	NO_X		
	SO_X		
	CO		
	Ozone and ROG	New Source Review Rule of SJVAPCD for onsite, GAMAQI for indirect sources	CalEEmod 2013.2.2
	Visibility	AQRV's	U.S.EPA VISCREEN
Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)	PM_{10}, $PM_{2.5}$	PSD SIL's NAAQS, CAAQS for onsite, GAMAQI for indirect sources	AERMIC Model (AERMOD), CalEEmod 2013.2.2
	NO_X		
	SO_X		
	CO		
	Ozone and ROG	New Source Review Rule of SJVAPCD for onsite, GAMAQI for indirect sources	CalEEmod 2013.2.2
	Visibility	AQRV's	U.S.EPA VISCREEN
Expose sensitive receptors to substantial pollutant concentrations	PM_{10}, $PM_{2.5}$	PSD SIL's NAAQS, CAAQS for onsite, GAMAQI for indirect sources	U.S. EPA's CalEEmod 2013.2.2
	NO_X		
	SO_X		
	CO		
	Ozone	New Source Review Rule of SJVAPCD for onsite, GAMAQI for indirect sources	CalEEmod 2013.2.2
	Air Toxics	10×10^{-6} excess cancer risk 1.0 non cancer health risk	HARP
	Visibility	AQRV's	U.S.EPA VISCREEN
Create objectionable odors affecting a substantial number of people	SO_X, H_2S	PSD SIL's, NAAQS, CAAQS, odor thresholds, GAMAQI (odor complaints)	AERMIC Model (AERMOD)

Table 6.1-2 indicates the various models used in the impact analysis and their respective units of measure.

TABLE 6.1-2
Models used in Impact Analysis

Model	Project Specific	Public Health /Hazards	Cumulative	Area of model impact
AERMIC Model (AERMOD)	($\mu g/m^3$) Criteria Pollutants	see HARP	($\mu g/m^3$) Criteria Pollutants	Six mile radius model limitation, Impacts are assessed at maximum point of impact
VISCREEN	Index of Perceptibility			Any Class I within 100 km
HARP		Cancer risk/million, Hazards Index		Maximum point of impact is assumed to be the location of Sensitive Receptor
CalEEmod 2013.2.2 Construction	tons/year		tons/year	Onsite Construction
CalEEmod 2013.2.2 Operational	tons/year		tons/year	Utilized Air shed for identified projects
Kern COG Conformity Analysis	Households/period Employment/period		Households/period Employment/period	Regional/Basin Wide for all projects in SIP

The following models and guidelines are used as tools to create the analytical basis for the impact analysis. Each model is used specifically to analyze either: 1) project specific impacts, 2) modeled cumulative impacts, or 3) regional impacts. Pursuant to the methodologies prescribed by the SJVAPCD's GAMAQI, the analysis within this section primarily models and analyzes ROG, NO_X, CO, PM_{10}, $PM_{2.5}$, SO_X and visibility.[54] Some results are reported in concentration by species; some provide data in mass per unit time; some provide probability of occurrences per million persons and some provide data in the number of households or employment over specified periods of time. Some of the more important tools are discussed below.

[54] Per the March 2015 GAMAQI Technical Guidance Document the SJVAPCD no longer monitors lead in the ambient air of the SJVAB since the use of leaded fuel has been mostly phased out. H_2S is associated with geothermal activity, oil and gas production, refining, sewage treatment plants and confined animal feeding operations. The ARB does not have a measuring method to accurately designate areas in the state, attainment or non-attainment. Sulfate data collected in the SJVAB demonstrates levels of sulfates significantly less than the health standards.

AERMOD[55]

AMS/EPA Regulatory Model Improvement Committee, AERMIC Model (AERMOD) atmospheric dispersion model is used for modeling the potential impacts of area sources in simple (i.e., flat) and complex (i.e., hilly) terrain. This program uses Gaussian dispersion to determine concentration of pollutants from sources. It is an accepted mathematical estimate of pollutant levels based on distance from a point source and physical conditions of equipment, site and weather conditions. The model is limited to approximately a 50 kilometer radius; however this analysis reports the impacts at their maximum location. The units of output are micrograms per cubic meter. This model is used for both project specific long term and short term impacts and cumulative impacts.

VISCREEN[56]

The U.S. EPA model VISCREEN is used to estimate impacts to visibility at the Class I area nearest to a subject project. This model estimates the visibility of plumes which may be created from the proposed project or the ability for a plume to obscure the view.

VISCREEN uses two scattering angles to calculate potential plume visual impacts for cases where the plume is likely to be the brightest (i.e. 10 degree azimuth for the forward scatter case) and the darkest (i.e. 140 degree for the backward scatter case). The forward scatter case produces a very bright plume when the sun is placed directly in front of the observer, while the backward scatter case produces a dark plume when the sun is directly behind the observer. For viewing backgrounds, the terrain is assumed to be black and located as close to the observer and the plume as possible. This assumption yields the darkest possible background against which plumes are the most likely to be visible. However, actual viewing backgrounds would be much lighter and located much further from the observer. This model is used for project specific impacts.

HARP[57]

The Hotspots Analysis and Reporting Program (HARP) is a tool that assists with the programmatic requirements of the Air Toxics "Hot Spots" Program. HARP is a computer software package that combines the tools of emission inventory database, facility prioritization calculation, air dispersion modeling, and risk assessment analysis. All of these tools are tied to a single database allowing information to be shared and utilized.

HARP can be used by air pollution control and air quality management districts, facility operators, and other parties to manage and evaluate emissions inventory data and the potential health impacts associated these emissions.

CalEEmod and GAMAQI [58]

- The Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) considers construction emissions and operational emissions as separate:

[55] User's Guide for the AMS/EPA Regulatory Model – AERMOD, EPA-454/B-03-001, including Addendum dated 2004.
[56] US EPA, Workbook for Plume Visual Impact Screening and Analysis, EPA-450/4-88-015.
[57] HARP was developed in cooperation with the California Air Resources Board, California Office of Environmental Health Hazard Assessment, and Dillingham Software Engineering, Inc.
[58] SJVAPCD Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI), March 19, 2015 Revision

- Construction emissions are considered short-term impacts and are temporary in nature. CalEEMod estimates construction related emission as if all construction were ongoing at the same time with all paving and architectural coatings applied in the last year. This analysis utilized the emission factors from EMFAC2007 for the construction analysis.
- CalEEMod operational emissions are comprised of two separate sources, area sources, those emissions from space heating, landscape maintenance… and mobile sources, vehicles which travel all over the city and county. These emissions are calculated for the build out period and take into account future fleet mixes and emission controls. These are depicted as long-term impacts.

CalEEMod provides a simple platform to calculate both construction emissions and operational emissions from a land use project. It calculates both the daily max and annual average for criteria pollutants as well as total or annual greenhouse gas (GHG) emissions which can be used in support of analyses in CEQA documents such as Environmental Impact Reports (EIRs) and Negative Declarations. In addition, default values for water and energy use are quantified which may be useful for other sections in an EIR or represent opportunities to incorporate the rigorous site-specific information from the other EIR sections.

Where site specific or project specific data was available, CalEEMod default factors were modified to fit with the information. Where little or no information was available for a project, default values were selected. For the cumulative analysis, modeled air emissions that occur in the San Joaquin Valley Air Basin were utilized.

Kern COG Conformity Model using Traffic Analysis Zone (TAZ)[59,60]

The Traffic Analysis Zone (TAZ) analysis is a U.S. EPA approved model used to show conformance with the State Implementation Plan (SIP). It is used throughout the San Joaquin Valley Air Basin to show conformance with the SIP, including the mandated 5% reduction in emissions to bring the State into attainment with the National Ambient Air Quality Standards (NAAQS), i.e., conformity analysis. This model, which incorporates growth and development plans as well as traffic study data, is broken down into zones based on traffic patterns. Each zone is combined through the model to create larger regional zones, which in turn are added together to create even larger regional zones ultimately creating a model for the entire air shed. This model has to show that there will be further progress towards attainment in accordance with the State Implementation Plan. The units in the TAZ analysis are in households and employment in specified year time intervals. This model is used for cumulative impact analysis for the air basin.

Project Specific Criteria Pollutants and Visibility Impacts

The proposed project will have several sources of emissions and impacts. The impacts from each phase are discussed in detail below.

6.2 PROJECT SPECIFIC CRITERIA POLLUTANTS

[59] Kern Council of Governments, 2007 Regional Housing Needs Assessment, Sept 2007.
[60] KCOG, 2015 Conformity Analysis for the 2015 Federal Transportation Improvement Program and the Regional Transportation Plan Amendment 2014, June 2014.

6.2.1 CONSTRUCTION EMISSIONS

Construction activity impacts from the project will primarily result in fugitive particulate matter emissions. Grading, excavation, filling, and other construction activities result in increased dust emissions. Regulation VIII of the San Joaquin Valley Air Pollution Control District specifies control measures for specified outdoor sources of fugitive particulate matter emissions. Rule 8011 contains administrative requirements, Rule 8021 applies to construction activities, and Rule 8071 applies to vehicle and equipment parking, fueling, and service areas. The San Joaquin Valley Air Pollution Control District does not require a permit for these activities, but does impose measures to control fugitive dust, such as the application of water or a chemical dust suppressant.

SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), does not necessarily require a quantification of construction emissions for all projects. Quantification is generally only required at the request of the lead agency. In general, the SJVAPCD assumes that implementation of these measures will bring the construction impacts to a level considered *less than significant*. For this project, the construction emissions were quantified in order to demonstrate that the impacts from the project would be below the applicable thresholds.

Construction will also result in exhaust emissions from diesel-powered heavy equipment. Exhaust emissions from construction include emissions produced onsite as the equipment is used and emissions from trucks transporting excavated materials from the site, and topsoil grading. Examples of these emissions include CO, ROG, NO_X, $PM_{10\ and}$ PM $_{2.5}$.

Exhaust emission factors for typical diesel-powered heavy equipment are based on U.S. EPA AP-42 emissions factors. Actual exhaust emissions will vary substantially from day to day. Numerous variables factored into estimating total construction emissions include: level of activity, length of construction period, number of pieces and types of equipment in use, site characteristics, weather conditions, number of construction personnel, and amount of materials to be transported onsite or offsite. Additional exhaust emissions would be associated with the transport of workers and materials. The specific mix of construction equipment is known.

Using the emissions rates from CalEEmod 2013.2.2 and the planned construction fleet, the construction emissions for this project were quantified. These were the current models during time of submission. Some emissions where calculated in a spreadsheet due to limitations of 2013 CalEEMod. Initial operational year is calculated and shown in Appendix I. The table below shows annual construction emissions which are estimated to be the same for each year of operation.

TABLE 6.2-1
Construction Related Emissions

Project	ROG (tons/yr)	NO_X (tons/yr)	CO (tons/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	SO_X (tons/yr)
Annual Construction Emissions						
Unmitigated	0.16	1.82	0.86	9.07	1.37	0.0019
Mitigated	0.16	1.82	0.86	3.22	0.54	0.0019

SJVAPCD Level of Significance[61]	10	10	100	15	15*	27
Kern County Level of Significance[62]	**10**	**10**	**N/A[63]**	**15**	**15***	**N/A[64]**

The Kern County area and the San Joaquin Valley are designated non-attainment for $PM_{2.5}$ particulates for both state and federal standards and non-attainment for PM_{10} particulates for state standards. Fugitive particulate emissions will occur during construction and operations. Control measures are required and enforced by the San Joaquin Valley Air Pollution Control District under Regulation VIII. As stated in GAMAQI, the SJVAPCD guidance document, implementation of these control measures will result in short-term emissions that are considered *less than significant*. The following three rules related to fugitive dust control apply to this project:

- Rule 8011 Fugitive dust administrative requirements for control of fine particulate matter.
- Rule 8021 Fugitive dust requirements for control of fine particulate matter from construction, demolition, excavation, extraction, and earthmoving activities.
- Rule 8071 Fugitive dust requirements for control of fine particulate matter from vehicle and/or equipment parking, shipping, receiving, transfer, fueling and service areas one acre or larger.

In addition, the project should include the following as requirements of the local municipal code:

- Water sprays or chemical suppressants must be used in all unpaved areas to control fugitive emissions.

Compliance with Regulation VIII of the San Joaquin Valley Air Pollution Control District and the County codes would reduce net particulate emission impacts to levels that are considered *less than significant*. Section eight of this report details all mitigation measures planned for the project.

6.2.2 LONG-TERM EMISSIONS

Long-term emissions are caused by mobile sources (vehicle emissions), stationary source (products screen), and other area sources (material handling) emissions. The major long-term impacts to air quality would be emissions caused by haul trucks traveling to and from the mine.

Operational Emissions Quantification

[61] GAMAQI, March 19, 2015 Revision

[62] Kern County Planning Department, Guidelines for Preparing An Air Quality Assessment For Use In Environmental Reports, Attachment A, December 01, 2006

[63] Kern County is in attainment for CO and SO_X therefore no specific level emissions from a project are considered significant.

[64] Ibid

The proposed project operational emissions would be generated by area sources and mobile sources as a result of normal day-to-day activities on the project site after occupation. Mobile emissions would be generated by haul trucks removing ore from the mine for transport to cement plants and the employee motor vehicles (three workers) traveling to and from the project site.[65]

Area Source Emissions

The area source emissions have been quantified utilizing the applicable sections of AP-42. Area source emissions include road dust from equipment travel on site, disturbed land wind erosion from the open pit mine, handling of ore, stockpile wind erosion, and from the screening plant. Detailed calculations and AP-42 reference sections can be viewed in **Appendix-I**.

Assumptions made for emissions calculations include:

1. Project site totals 313 acres
    a. Total disturbance will be 93.67 acres (for life of mine)
    b. Mine 1, 2, and 3 sized at 58, 17, and 13 acres respectively
    c. Access roads and screening area make up remaining 5.67 acres
2. Each haul truck has 25.5 tons of hauling capacity
3. Each haul truck travels an average of 93 miles/trip according to client locations
4. There will be an average of 50 trucks/day hauling ore from Johe's Ranch Mine
5. Onsite Equipment includes:
    a. Two rubber tired loaders, 415-hp and 285-hp respectively
    b. Tire Truck
    c. Water Truck
    d. Stationary screening unit
        i. Stationary Screening unit will have dust collector and covered conveyors
6. Production at East Pit averaged 227,500 tons/year diatomaceous earth
    a. 35 haul trucks daily
7. Production at Johe's Ranch is expected to be 330,000 tons/year diatomaceous earth
    a. 50 haul trucks daily
8. Operating 5 days/week (261 days/yr)
9. Maximum exposed land is 20 acres at any given time (SMARA)
    a. Disturbed land not being mined daily (15 acres) will be covered in dust palliative to prevent wind erosion during periods of inactivity
    b. Disturbed land being mined daily (5 acres) will be watered 3x/day
10. Watering access roads and disturbed mine pit area 3x/day
11. Oil sand palliative utilized for access roads onsite utilized by haul trucks
    a. Trucks will only travel on the designated roads for access to stockpiles
12. Maximum project site speed limit is 15 mph
13. No waste will be produced as a result of this project
14. Employee facility will be accomplished with portable toilet
15. No electricity use is necessary

[65] South Coast Air Quality Management District, Software User's Guide; CalEEMod For Windows Version 2013.2.2, Emission Estimation for Land Use Development Projects, July 2013.

TABLE 6.2-2
Project Mining Source Emissions at Build-out (2035)

Emissions Source	ROG (tons/yr)	NO_X (tons/yr)	CO (tons/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	SO_X (tons/yr)
Mine						
Unmitigated Emissions, 2035	0	0	0	18.03	2.70	0
Mitigated Emissions, 2035	0	0	0	6.33	0.95	0
Screening Unit						
Unmitigated Emissions, 2035	1.36E-03	2.62E-02	4.64E-03	6.58	0.99	6.90E-03
Mitigated Emissions, 2035	1.36E-03	2.62E-02	4.64E-03	0.20	0.03	6.90E-03

Mobile Source Emissions

Kern County is a non-attainment area for federal air quality standards for ozone and $PM_{2.5}$. Nitrogen oxides and reactive organic gases are regulated as ozone precursors. A precursor is defined by the SJVAPCD as "a directly emitted air contaminant that, when released into the atmosphere forms or causes to be formed or contributes to the formation of a secondary air contaminant for which an ambient air quality standard has been adopted…"

The SJVAPCD regulates air quality in the San Joaquin Valley Air Basin portion of Kern County. The predicted emissions associated with vehicular traffic (mobile sources) are not subject to the SJVAPCD permit requirements. However, the SJVAPCD is responsible for overseeing efforts to improve air quality within the San Joaquin Valley. The SJVAPCD has prepared an Air Quality Attainment Plan to bring the San Joaquin Valley into compliance with the California Ambient Air Quality Standard for ozone. The SJVAPCD reviews land use changes to evaluate the potential impact on air quality. Kern County and the SJVAPCD have established a significance level for ROG and NO_X of 10 tons per year each and 15 tons per year for PM_{10}.[66] US EPA has recommended the use of the PM_{10} standards as the interim standard for $PM_{2.5}$.

Vehicle emissions have been estimated for the year 2035; the projected completion date. Project-related mobile source emissions for ROG, NO_X, CO, PM_{10}, $PM_{2.5}$, and SO_X attributable to this project are summarized on **Table 6.2-3**; total project emissions on **Table 6.2-4.**

TABLE 6.2-3
Project Mobile Source Emissions at Build-out (2035)

Emissions Source	ROG (tons/yr)	NO_X (tons/yr)	CO (tons/yr)	PM_{10} (tons/yr)	$PM_{2.5}$ (tons/yr)	SO_X (tons/yr)
On-Road						
Unmitigated Emissions, 2035	0.086	0.458	1.28	0.477	0.137	0.008

[66] SJVAPCD, Guide for Assessing and Mitigating Air Quality Impacts, revised March 19, 2015.

Mitigated Emissions, 2035	0.086	0.458	1.28	0.477	0.137	0.008
Mine Equipment Off Road						
Unmitigated Emissions, 2035	0.1508	0.33	0.8495	3.96E-03	0.0118	3.9E-03
Mitigated Emissions, 2035	0.1508	0.33	0.8495	3.96E-03	0.0118	3.9E-03

The project related maximum emissions are shown in **Table 6.2-4.**

TABLE 6.2-4
Total Project Operational Emissions (2035)

Project	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	PM_{10} (tons/year)	$PM_{2.5}$ (tons/year)	SO_X (tons/year)
Mobile Mine Equipment Emissions						
Unmitigated	0.012	0.1508	0.33	0.8495	3.96E-03	0.0118
Mitigated	0.012	0.1508	0.33	0.8495	3.96E-03	0.0118
Mine Source Emissions						
Unmitigated	0	0	0	18.03	2.70	0
Mitigated	0	0	0	6.33	0.95	0
Screening Unit Emissions						
Unmitigated	1.36E-03	2.62E-02	4.64E-03	6.58	0.99	6.90E-03
Mitigated	1.36E-03	2.62E-02	4.64E-03	0.20	3.03E-02	6.90E-03
Mobile On-Road Emissions						
Unmitigated	0.086	0.458	1.267	0.477	0.137	0.008
Mitigated	0.086	0.458	1.267	0.477	0.137	0.008
Total Operational Emissions						
Unmitigated Total	0.24	0.81	2.13	25.10	3.84	0.0188
Mitigated Total	0.24	0.81	2.13	7.02	1.13	0.0188
SJVAPCD Level of Significance	10	10	100[67]	15	15*	27[68]

[67] San Joaquin Valley is in attainment for CO and SO_X therefore no specific level emissions from a project are considered significant. The only significance level is the Prevention of Significance Determination (PSD) limit which is discussed in the criteria pollutant modeling section later.

[68] Ibid

Kern County Level of Significance[69]	**10**	**10**	**100**[70]	**15**	**15***	**27**[71]

*USEPA specified interim use of PM_{10} threshold for $PM_{2.5}$

The project's operational emissions include emissions from employee trips, truck trips and on-site material movement. The project serves Johe's Ranch by hauling mined diatomite ore to clients within Kern County. These trucks have been providing this service the East Pit already and are part of the baseline emissions. Additional truck trips are proposed as part of Johe's Ranch due to increasing production and increased mileage of 4 miles. The project's operational emissions at build-out do not exceed the District's and Kern County's NOx thresholds or PM10 thresholds.

The production of diatomite at East Pit is the only operation that currently exists within six miles of Johe's Ranch Mine site. The East Pit will shut down operations when Johe's Ranch is set to begin. Therefore, there will be a net change in emissions modeled using CalEEmod for the first full year of operations in 2016 which can be seen below:

TABLE 6.2-5
Total Net Project Emissions (2016)

Project	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	PM_{10} (tons/year)	$PM_{2.5}$ (tons/year)	SO_X (tons/year)
Total Source Emissions (mitigated)						
Johe's Ranch Mine	0.47	4.98	4.42	7.16	1.25	0.019
East Pit	0.42	4.53	3.50	6.99	1.20	0.016
Net Emissions	.05	0.45	0.92	0.17	0.05	0.0028
SJVAPCD Level of Significance	10	10	N/A[72]	15	15*	N/A[73]
Kern County Level of Significance[74]	**10**	**10**	**N/A**[75]	**15**	**15***	**N/A**[76]

*USEPA specified interim use of PM_{10} threshold for $PM_{2.5}$

The project net air quality impacts are considered to be *less than significant*.

Health Risk Analysis of the Project on Existing Sensitive Receptors

[69] Kern County Planning Department, Guidelines for Preparing An Air Quality Assessment For Use In Environmental Reports, Attachment A, December 01, 2006
[70] GAMAQI March 19, 2015
[71] Ibid
[72] San Joaquin Valley is in attainment for CO and SO_X therefore no specific level emissions from a project are considered significant. The only significance level is the Prevention of Significance Determination (PSD) limit which is discussed in the criteria pollutant modeling section later.
[73] Ibid
[74] Kern County Planning Department, Guidelines for Preparing An Air Quality Assessment For Use In Environmental Reports, Attachment A, December 01, 2006
[75] Kern County is in attainment for CO and SO_X therefore no specific level emissions from a project are considered significant. .
[76] Ibid

The SJVAPCD identifies a sensitive receptor as a location where human populations, especially children, senior citizens, and sick persons, are present, and where there is a reasonable expectation of continuous human exposure to pollutants, according to the averaging period for ambient air quality standards, such as 24-hour, 8-hour or 1-hour. Examples of sensitive receptors include residences, hospitals, and schools.[77] Industrial and commercial uses are not considered sensitive receptors.

Potential Effect on Sensitive Receptors

The air quality impact of this project is not likely to affect sensitive receptors. Sensitive receptors are areas where young children, chronically ill individuals, or other individuals more sensitive than the general population are located. Examples of sensitive receptors are schools, day care centers, and hospitals. The screening unit will be considered the only stationary source of emissions.

Air Modeling Scenarios

Because of the variance of the soil diatomite composition, multiple scenarios were developed. The proximity of the exposed areas within the mine to the project boundary necessitated multiple air models to adequately predict dispersion of emissions. The following three scenarios are modeled to be the most realistic possibilities. Preliminary plans on the order of mining operations involve beginning in mine area #3 and progressing East to mine area #2 and finally mine area #1. However, GF Industries wants more flexibility in order to provide for the needs of the cement plants being supplied with the product. The following tables indicate Criteria pollutant impacts for each of the three scenarios modeled:

TABLE 6.2-6
Project Criteria Pollutant[78]Impact Model Results (Scenario 1)

Pollutant	Averaging period	Project Impact ($\mu g/m^3$)	PSD SIL ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
NO_X [79]	1 – hour	130.58	-	188.68	339
	Annual	3.84	1	100	57
SO_X	1-hour	0.27	--	195.0	655
	3-hour	0.11	25	1,300	--
	24-hour	0.02	5	365	105
	Annual	0.01	1	80	--
CO	1-hour	64.38	2,000	40,000	23,000
	8-hour	18.90	500	10,000	10,000
PM_{10}	24-hour	23.35	5	150	50
	Annual	4.11	1	--	20

[77] GAMAQI, March 19, 2015 Revision

[78] No hydrogen sulfide, or vinyl chloride are expected to be emitted from the proposed facility and therefore were not modeled or listed in this table.

[79] Tier 1 approach was used to model 1-hr NOx to address the new federal 1 hr NOx standard established by EPA. The modeled 1 hr NOx value was combined with the background value for the nearest monitoring station (Visalia N-Church St).

TABLE 6.2-6
Project Criteria Pollutant[78]Impact Model Results (Scenario 1)

Pollutant	Averaging period	Project Impact ($\mu g/m^3$)	PSD SIL ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
$PM_{2.5}$	24-hour	4.02	5	35	--
	Annual	0.46	1	12	12

Source: Appendix VII, AERMOD Criteria Pollutant Impacts

Table 6.2-6 shows the results of the first mining scenario modeled with Aermod. The maximum ground exposure at any given time is 20 acres or less. Therefore a model was created depicting a section of this maximum area within the boundaries of Mine #1. The remainder of the model is identical for each remaining scenario because the access roads and stockpile areas remain. The emission sources, in addition to the exposed 20 acres, include unpaved roads, diatomite storage piles, topsoil storage piles, a screening unit, on-site mining equipment, and haul trucks on-site travel. See **Appendix IV** for graphical depiction of this air model.

TABLE 6.2-7
Project Criteria Pollutant Impact Model Results (Scenario 2)

Pollutant	Averaging period	Project Impact ($\mu g/m^3$)	PSD SIL ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
NO_X [80]	1 – hour	122.47	-	188.68	339
	Annual	3.84	1	100	57
SO_X	1-hour	0.277	--	195.0	655
	3-hour	0.0818	25	1,300	--
	24-hour	0.0218	5	365	105
	Annual	0.0040	1	80	--
CO	1-hour	56.71	2,000	40,000	23,000
	8-hour	19.74	500	10,000	10,000
PM_{10}	24-hour	31.90	5	150	50
	Annual	5.07	1	--	20
$PM_{2.5}$	24-hour	5.09	5	35	--
	Annual	0.81	1	12	12

Source: Appendix VII, AERMOD Criteria Pollutant Impacts

To have a more accurate representation of the proposed mining operation, the second scenario was built to evaluate the results of mining partially in Mine #2 and in Mine #1 at the same time. Keeping

[80] Tier 1 approach was used to model 1-hr NOx to address the new federal 1 hr NOx standard established by EPA. The modeled 1 hr NOx value was combined with the background value for the nearest monitoring station (Visalia N-Church St).

with the maximum 20 acres of exposed ground, the area was split between the two mines at ten acres a piece. The reason for this air model was to accurately estimate the dispersion attributed to operating in a different location which would result in different dispersion based on the proximity of the area to the project boundaries. GF Industries plans on operating with flexibility that would allow mining in any portion of the three mine boundaries at their discretion. See **Appendix V** for graphical depiction of this air model.

TABLE 6.2-8
Project Criteria Pollutant Impact Model Results (Scenario 3)

Pollutant	Averaging period	Project Impact ($\mu g/m^3$)	PSD SIL ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)
NO_X [81]	1 – hour	123.06	-	188.68	339
	Annual	3.262	1	100	57
SO_X	1-hour	0.223	--	195.0	655
	3-hour	0.0921	25	1,300	--
	24-hour	0.0192	5	365	105
	Annual	0.0036	1	80	--
CO	1-hour	58.63	2,000	40,000	23,000
	8-hour	17.93	500	10,000	10,000
PM_{10}	24-hour	37.76	5	150	50
	Annual	5.82	1	--	20
$PM_{2.5}$	24-hour	5.844	5	35	--
	Annual	0.916	1	12	12

Source: Appendix VII, AERMOD Criteria Pollutant Impacts

Finally, the third scenario depicts the possibility of mining in both Mine #3 and Mine #2. This model was necessary due to the close proximity of Mine #3 to the upper Northwest boundary of the

[81] Tier 1 approach was used to model 1-hr NOx to address the new federal 1 hr NOx standard established by EPA. The modeled 1 hr NOx value was combined with the background value for the nearest monitoring station (Visalia N-Church St).

proposed project site. This was modeled so that the 20 acres were split between these two mines at 10 acres a piece. See **Appendix VI** for graphical depiction of this air model.

The criteria pollutant emission model results for each source are contained in **Appendix VII**. The maximum predicted impacts were compared to the applicable NAAQS, CAAQS and PSD SIL.

6.3 PROJECT SPECIFIC PUBLIC HEALTH/HAZARDS IMPACTS

Toxic Air Contaminants

The analysis is used to determine if the construction and operation of the commercial project would have a significant health risk on the nearby sensitive receptors. The toxic air containments speculated emissions for each source are located in **Appendix II** "AERMOD/HARP Health Risk Impacts."

Health Risk to the Project from Existing Industrial Activities

A report was requested from Kern County Planning and Community Development which disclosed no facilities within a six-mile radius. The nearest large active facility is located approximately 3.5 miles East of the project site; previously referred to as the East Pit which will cease operations upon startup of Johe's Ranch Mine. Therefore, there will not be simultaneous emissions between the proposed Johe's Ranch Mine and East Pit. There are no other projects located within the 6-mile radius during time of submission. "The nearest large active facility is located approximately 3.5 miles East of the project site; previously referred to as the East Pit which will cease operations upon startup of Johe's Ranch Mine." Project has no on-site residents or other sensitive receptors, so no health risk to the project was analyzed.

The cumulative priority score for Johe's Ranch Mine resulting from the estimated toxic emissions was less than 1.0 (**Appendix II** "AERMOD/HARP Health Risk Impacts"). Therefore, the SJVAPCD would not consider the toxic emissions to be significant.

Health Risk Analysis of Construction and Operation of the Project on Existing Sensitive Receptors

The SJVAPCD identifies a sensitive receptor as a location where human populations, especially children, senior citizens, and sick persons, are present, and where there is a reasonable expectation of continuous human exposure to pollutants, according to the averaging period for ambient air quality standards, such as 24-hour, 8-hour or 1-hour. Examples of sensitive receptors include residences, hospitals, and schools.[82] Industrial and commercial uses are not considered sensitive receptors. The current sensitive receptors are listed in **Table 6.3-1**.

TABLE 6.3-1
Existing Sensitive Receptors

Receptor Description	Distance from Project Boundary
Residence (1)	0 miles

[82] GAMAQI, March 19, 2015 Revision

TABLE 6.3-1
Existing Sensitive Receptors

Receptor Description	Distance from Project Boundary
Residence (2)	3 miles
Residence (3)	3.1 miles
Residence (4)	1 mile
Town of McKittrick	8 miles

The health risk assessment is based on operations and construction for a one year period since it reflects the total build out of the project. In order to take the health effects of diesel particulate emissions into account, the emissions from the equipment were obtained using CalEEmod and included in the health risk assessment model. The emission rate for diesel particulate matter from the construction equipment was also obtained from CalEEmod.[83] Operations and construction for a one year period, 2016, reflects conservative emissions. 2016 is used because operations and construction occur concurrently. The analysis is conducted for the "buildout" year of 2016 with full 70 year exposure. The analysis uses the higher mobile source numbers of 2016 (worker Trips) in construction which uses the 2016 Emfac numbers.

There will be one stationary source that will operate part-time on the job site. The following is a source used for the operational phase of the project: Screening unit operating an average of one hour each work day.

Exposure Assessment[84]

The purpose of the exposure assessment is to estimate the extent of public exposure to each substance for which cancer risk will be quantified or non-cancer effects evaluated. This involves emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimating short-term and long-term exposure levels.

Emissions Quantification

For this risk assessment, air toxics emissions from the project were quantified based on the design specifications described above, and analytical sample analyses. Emission estimates were based on hourly and annual emission calculations.

Peak hourly emissions are in units of grams per second (g/s).

Annual emissions (g/s) = (Peak Hourly - g/s) x Operating Schedule (hr/day) x days per year (day/yr) / (8,760 hr/yr)

[83] EMFAC7G User's Guide.

[84] U.S. EPA, User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, EPA-454/B-95-003a and EPA-454/B-95003b, including Addendum dated 2002.

This results in an annualized emission rate of the pollutant expressed on a short-term basis.

Modeling of Environmental Transport

The HARP model was utilized for the air toxics exposure assessment. Emission sources and model control parameters were identical to those utilized for the criteria pollutant impact analysis described above.

Identification of Exposure Routes

The exposure analysis included the four pathways recommended by the OEHHA (i.e., inhalation, dermal exposure, soil ingestion, and mother's milk).

Identification of Exposed Populations

For this assessment, a computer-generated Cartesian grid of model receptors was constructed. The receptor grid does not represent actual persons, but rather, was utilized to construct impact isopleths and determine the locality of the maximum predicted impacts. From these isopleths, potential impacts to neighboring receptors were obtained.

Estimated Short- and Long-Term Exposure Levels

The HARP model was used to estimate the acute non-carcinogenic health risk impacts of the project construction and operation. HARP is a multi-source, multi-pollutant, multi-pathway risk assessment model.

Risk Characterization

Risk characterization is the process of evaluating the risks due to facility emissions. As explained above, the HARP model calculates the estimated cancer and non-cancer health risk based on the predicted short-term and long-term exposure levels for each air toxic at each model receptor. This section presents the total predicted individual cancer risk for residential and working populations, presents the total population excess cancer burden, and evaluates the predicted non-cancer health hazards from the proposed project construction and operational phases.

CARB generally considers a potential cancer risk of ten in a million (i.e., 10×10^{-6}) as significant. For acute or chronic non-cancer health impacts, the AB2588 significance threshold is 1.0. For this health risk assessment, the AB2588 significance thresholds were used:

Excess Cancer Risk:	10.0×10^{-6}
Non-Cancer Health Hazard Indices:	1.0

Operational Phase Direct Toxic Impacts

Cancer Impacts

The total individual excess cancer risk is defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular facility continuously, 24 hours a day, 261 days a year, for a 20 year life of mining operations. This risk is defined as an excess risk because it is above and beyond the background cancer risk to the population.

TABLE 6.3-2
Individual Excess Cancer Risk - Maximum Impacts

Receptor Description (Point of Maximum Impact)	#	UTM Easting (meters)	UTM Northing (meters)	Cancer Risk (Respiratory)
	1	248003	3913869	2.86E-06

Since the modeled risk is lower than the 10E-06 threshold, it is considered *less than significant*. The model results are contained in **Appendix II**, "AERMOD/HARP Health Risk Impacts."

The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2,** "Description of Pollutants."

Chronic Non-Cancer Health Impacts

Scientists at OEHHA have established No Adverse Effect Level (NAEL) concentrations for non-carcinogenic chemicals. In determining these thresholds, OEHHA has assumed continuous exposure, 24 hours a day, 261 days a year, with a 20-year exposure. According to OEHHA, exposure to non-carcinogens at or below the chronic NAEL will not result in adverse chronic non-cancer health effects to the public.

TABLE 6.3-3
Chronic Non-Cancer Maximum Impacts

Receptor Description (Point of Maximum Impact)	#	UTM Easting (meters)	UTM Northing (meters)	Hazard Index (Respiratory)
	1	248003	3913869	8.0E-02

Since the modeled risk is lower than 1, it is considered *less than significant*. The model results are contained in **Appendix II**.

The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2**.

Acute Non-Cancer Health Impacts

Scientists at OEHHA believe that one-hour average exposures at or below the acute NAEL will not result in acute adverse health effects to the public. OEHHA only considers the inhalation exposure pathway for acute health effects.

TABLE 6.3-4
Acute Non-Cancer Maximum Impacts

Receptor Description (Point of Maximum Impact)	#	UTM Easting (meters)	UTM Northing (meters)	Hazard Index (Respiratory)
	1	249278	3913794	1.15E-01

Since the modeled risk is lower than 1, it is considered *less than significant*. The model results are contained in **Appendix II**.

The health risk associated with these criteria pollutant impacts are discussed in **Section 3.2**.

Uncertainty in Impact Assessment[85]

Predictions of future health risks include substantial uncertainties. There are model and data uncertainties with respect to the assumed emissions, dispersion modeling and toxicological factors, and uncertainties with respect to the characteristics of the potentially exposed population. For example, possible exposure scenarios can be based on the assumption that a person resides in the same location for the average period in U.S. residency (approximately 9 years), or for the 90th percentile of residency (approximately 30 years), or for an entire lifetime (approximately 70 years). Further, that exposure may be assumed at the highest modeled concentration, or some average, or a modestly high concentration representative of the exposed population.

Because risk assessments are often performed to limit impacts to public health, the assumptions used in assessments are typically conservative in nature. The risk assessment methodology described above followed the CAPCOA and OEHHA guidelines, which are specified by regulators with a conservative bias. The following discussion provides qualitative assessments of the uncertainty associated with four major areas of the health risk assessment.

Air Dispersion Modeling

In general, U.S.EPA-approved dispersion models such as AERMOD tend to over-predict concentrations rather than under-predict. For example, the model algorithms assume chemical emissions are not transformed in the atmosphere into other chemical compounds. For certain pollutants, conversion may occur quickly enough to reduce concentrations from the conservative model predictions.

Exposure Assessment

The most important uncertainties related to exposure include the definitions of exposed populations and their exposure characteristics. The choice of a "residential" maximally exposed individual is very conservative in the sense that no real person is likely to spend 24 hours a day, 365 days a year over a 70-year period at exactly the point of highest toxicity-weighted annual average air concentration. The greatest true exposure is likely to be at least 10 times lower than that calculated for the maximum exposed individual (MEI).

Toxicity Assessment

The use of toxicity data in risk estimation is also uncertain. Estimates of toxicity for this risk assessment were obtained from the *Air Toxics Hot Spots Program Risk Assessment Guidelines* (OEHHA, 2003), which is among the most conservative compilations of toxicity information. Toxicity estimates are derived either from observations in humans or from projections derived from experiments with laboratory animals. Human data are obviously more relevant for health risk assessments, but are often uncertain because of: 1) difficulty of estimating exposures associated with the health effect of interest; 2) insufficient study populations; 3) relatively high occupational exposures (the source of human data) that are extrapolated and applied to low environmental exposures; or 4) variations in the susceptibility of different populations when compared to the population as a whole. Cancer risk coefficients from human data are typically considered

[85] OEHHA, Air Toxics "Hot Spots" Program.

proportional to pollutant concentration at any level of exposure (i.e., a linear, no-threshold model), which is conservative at low environmental doses. For non-cancer effects, the lowest exposure known to cause effects in humans is usually divided by uncertainty or safety factors to account for variations in receptor susceptibility and other factors. When toxicity estimates are derived from animal data, they usually involve extra safety factors to account for the possibility of greater sensitivity in humans, and the less-than-human-lifetime observations in animals.

6.4 VISIBILITY IMPACTS

An analysis was conducted of the potential project-related impacts to visibility, including Class I areas[86] located within 100 kilometers of the project site (**Exhibit 6.4-1**, "Site Location 100 km Radius"). One military site located within approximately 100 kilometers of the project site was also analyzed to determine potential Project-related impacts to visibility. The following section describes the analysis methodology and results.

Models and Modeling Techniques

The U.S.EPA model VISCREEN was used with default screening values to estimate impacts to visibility at the Class I area nearest to the project site. There are two Class I areas located within an approximate 100-kilometers boundary that are administrated by National Park Service (NPS): Dome Land Wilderness Area and San Rafael Wilderness Area. Edwards Air Force Base is also located in that range. Although the military site is not considered a Class I area, visibility impacts were still considered.

Historically, a representative of NPS, as well as meteorologists at the military site, were contacted for guidance regarding the Air Quality Related Values (AQRVs) of the Class I areas. Additionally, two guidance documents, *Guidelines for Evaluating Pollution Impacts on Class I Wilderness Areas in California*[87], and *Assessment of Air Quality and Air Pollutant Impacts in Class I National Parks of California*[88], were used in this analysis.

TABLE 6.4-1
Class I Areas in the Vicinity of the Project

	PSD Class	Administering Agency
National Parks/Monuments		
Dome Land Wilderness	I	NPS
San Rafael Wilderness	I	NPS

[86] Lands designated as ***Class I Areas*** under the Clean Air Act Amendments of 1977 are afforded the highest level of protection from air pollutants in the nation. These lands consist of national wildernesses (Forest Service), parks (National Park Service) and wildlife refuges (U.S. Fish & Wildlife Service) in existence at the time the amendment was passed (http://www.fs.fed.us/outernet/r6/aq/natarm/c1info.htm).

[87] USDA Forest Service, Guidelines for Evaluating Pollution Impacts on Class I Wilderness Areas in California.

[88] National Park Service, Assessment of Air Quality and Air Pollutant Impacts in Class I National Parks of California.

VISCREEN uses two scattering angles to calculate potential plume visual impacts for cases where the plume is likely to be the brightest (i.e. 10 degree azimuth for the forward scatter case) and the darkest (i.e. 140 degree for the backward scatter case). The forward scatter case produces a very bright plume when the sun is placed directly in front of the observer, while the backward scatter case produces a dark plume when the sun is directly behind the observer. For viewing backgrounds, the terrain is assumed to be black and located as close to the observer and the plume as possible. This assumption yields the darkest possible background against which plumes are the most likely to be visible. However, actual viewing backgrounds would be much lighter and located much further away from the observer.

Distances from each site to the closest and most distant borders, as well as the standard visual range of each Class I area evaluated are presented in **Table 6.4-2** below.

TABLE 6.4-2

Distances and Visual Ranges for Nearby Class I Areas

	Distance to Closest Boundary (km)	Distance to Farthest Boundary (km)	Standard Visual Range (km)
National Parks/Monuments			
Dome Land Wilderness	143	172	243
San Rafael Wilderness	45	66	243

Level 1 Screening Analysis Results

A Level 1 screening analysis of the visibility impacts was conducted using the default settings; weatherunderground.com, Twisselman Weather Station, McKittrick, CA) as indicated in **Table 6.4-3**.

TABLE 6.4-3
Level 1 VISCREEN Settings

Transport Scenario Specifications		
Plume–Source–Observer Angle	11.25	degrees
Stability Class	6	
Wind Speed	1.0	m/s
Ambient Pollutant Concentrations		

Ozone	0.04	ppm

Particle Characteristics

Particle Type	Mass Flow (lb/hr)
Primary (NO_2)	0.0
Soot	0.0
Sulfate	0.0

The Level 1 analysis was conducted using pollutant emissions presented in **Table 6.4-4**. In accordance with U.S.EPA VISCREEN guidance, primary NO_2 was assumed to be zero, while PM_{10} emissions from diesel combustion and fugitive dust from onsite material movement and unpaved road vehicle travel sources were assumed to be particulate. The VISCREEN results are presented in **Appendix VIII**, "Project Specific U.S.EPA VISCREEN Model Results".

The emission rates used in the VISCREEN model are based on the area source emissions. The indirect source operational emissions will not occur onsite and therefore cannot contribute to a visible plume originating from the site. Since the sources onsite will be spread out and will not contribute to a single plume, like the one being considered in the model, the analysis is conservative.

TABLE 6.4-4
Level 1 Visibility Screening Analysis
Worst–Case Facility Emissions Inputs

Pollutant	Emissions (tons/yr)
Particulate	7.16
NO_X (as NO_2)	4.98
Primary NO_2	0
Soot	0
Primary SO_4	0

TABLE 6.4-5
Level 1 Results for the Project at Dome Land Wilderness
Screening Criteria INSIDE Class I Area ARE NOT Exceeded

Back ground	Theta	Azimuth	Distance	Alpha	Delta E Criteria	Delta E Plume	Contrast Criteria	Contrast Plume
Sky	10	127	172	41	2	0.030	0.05	0.001
Sky	140	127	172	41	2	0.005	0.05	0
Terrain	10	84	143	84	2	0.034	0.05	0
Terrain	140	84	143	84	2	0.003	0.05	0

TABLE 6.4-6
Level 1 Results for the Project at San Rafael Wilderness
Screening Criteria INSIDE Class I Area ARE NOT Exceeded

Background	Theta	Azimuth	Distance	Alpha	Delta E Criteria	Delta E Plume	Contrast Criteria	Contrast Plume
Sky	10	147	66	22	2	0.194	0.05	0.004
Sky	140	147	66	22	2	0.033	0.05	-0.001
Terrain	10	84	45	84	2	0.444	0.05	0.003
Terrain	140	84	45	84	2	0.018	0.05	0.000

It can be seen from the results that the proposed project will not exceed the standards for visibility at sensitive receptors within 100 km.

Visibility was evaluated in proximity to the project in accordance with the California visibility standard.[89] The California Ambient Air Quality Standard for Visibility Reducing Particles policy is a statewide minimum dry air particle extinction limit of 0.23/km averaged from 9 a.m. to 5 p.m. (PSI) when relative humidity is less than 70 percent. Equivalent PM_{10} concentrations when this standard is just met range from about 50µg/m^3 for a fine particle dominated setting (e.g. Sacramento in winter) to 90 or more µg/m^3 for a mixture of coarse and fine particles (e.g. Central Valley summer). The ambient air quality modeling was not required to be performed because of very low onsite emission. The maximum modeled PM_{10} impact would have been less than the 90 µg/m^3 limit otherwise, therefore the impact is considered *less than signi*ficant.

6.5 ODORS

Odor is strongest at its source and dissipates with increasing distance. The offensiveness and degree of odor is ultimately dependent on the sensitivity of the receptors exposed to the odor. According to the SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI), facilities located one mile or less from a sensitive receptor may create a significant odor impact to the sensitive receptor that may possibly be significant, and require a detailed analysis to assess impact significance. The detailed analysis includes evaluation of local meteorological conditions at the project site. The SJVAPCD's guidance indicates that a detailed analysis would include evaluating whether complaints have been filed with the SJVAPCD for similar existing operations. The

[89] Cal EPA, Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates, 2003 .

following analysis of potential odor impacts was conducted in accordance with the SJVAPCD's GAMAQI.

Temperature, wind, dust conditions, topography, and the presence of physical obstructions affect the degree of odor impacts on nearby sensitive receptors. The maximum summer temperature in the southern San Joaquin Valley is above 90ºF. Odor compounds travel further in warm climates than in relatively cooler climates. During windy conditions, odor compounds are diluted with fresh air and, consequently, disperse more quickly and are less noticeable at a distance. However, wind direction also defines the direction of travel for odors. Physical obstructions, such as windbreaks, cause more rapid dilution of odorous compounds and also capture odor-containing fugitive dust.

Historical wind data from the nearby Fellows, CA Mesoscale Model (MM5) –was examined to determine wind patterns in the project area. A wind rose diagram is included as **Exhibit 6.5-1** "Wind Rose Diagram." In the project area, winds generally blow from the Northeast or west-southwest, depending on the time of day and season.

There are no known odorous compounds associated with this project. The odor impacts are therefore considered *less than significant*.

7 CUMULATIVE IMPACTS

The Cumulative Impact Analyses are broken into five sub elements:

- Cumulative Criteria Pollutant and Visibility Impacts
- Cumulative Public Health /Hazards Impacts
- Cumulative Locally/Regionally Related Projects
- Basin-wide Cumulative Conformity Analysis
- Cumulative Greenhouse gases (See **Section 9**)

This Air Quality Impact Assessment considered the affects of the project with the cumulative impacts of growth in the area. The *Guide for Assessing and Mitigating Air Quality Impacts*[90] under CEQA defines cumulative impacts as two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The document also states "any proposed project that would individually have a significant air quality impact… would also be considered to have a significant cumulative air quality impact. Impacts of local pollutants (CO, TACs) are cumulatively significant when modeling shows that the combined emissions from the project and other existing and planned projects will exceed air quality standards."[91] If a project related air quality impact is individually less than significant, the impacts of reasonably anticipated future activities, probable future projects and past projects are included based on similar air quality impacts, transport considerations and geographic location.

[90] GAMAQI, March 19, 2015 Revision
[91] Ibid.

Cumulative impacts of the Project when considered together with past, existing and reasonably foreseeable future projects are not cumulatively considerable and are less than significant. This analysis considered the following cumulative impacts:

Cumulative Ozone Impacts - Ozone impacts are the result of the cumulative emissions from numerous sources in the region and transport from outside the region. Ozone is produced in chemical reactions involving ROG, NO_X, and sunlight.

Cumulative PM_{10} and $PM_{2.5}$ Impacts - PM_{10} and $PM_{2.5}$ has the potential to cause significant local problems during periods of dry conditions accompanied by high winds, and during periods of heavy earth disturbing activities. PM_{10} and $PM_{2.5}$ may have cumulative local impacts.

Cumulative CO Impacts – Cumulative carbon monoxide impacts are accounted for in the CO "Hot Spot" screening analysis described earlier in this document.

Cumulative Hazardous Air Pollutant (TAC) Impacts – Cumulative analysis for TACs focused on local impacts on sensitive receptors. The SJVAPCD recommends screening a radius of 1 mile for TAC cumulative impacts.

The Lead Agency has expressed that a quantitative cumulative analysis needs to be prepared when the proposed project will be individually significant or when a zone change or general plan amendment is required.

The cumulative analysis looks to several levels of impact, Regional Analysis, List of Projects/Cumulative Operational, Kern COG Conformity Analysis, Department of Finance Triennial Plan Projections Analysis, and the CARB Projection Analysis. Each level of cumulative analysis serves as an element of the whole cumulative analysis and is not to be considered separately.

The cumulative analysis is based, in part, on a quantitative analysis of projects in the vicinity of the proposed project, and is supplemented with the State of California Department of Finance population projections, and an analysis of data utilized by the Kern Council of Governments' (Kern COG) adopted regional growth forecast used for the regional air quality conformity analysis required by the 1990 Federal Clean Air Act Amendments (CAAA).[92] The nearby project analysis (traffic affected analysis) quantifies operational project impacts along with all identified projects in the vicinity of the proposed site for comparison with San Joaquin Valley Air Basin and the basin's Kern County portion totals for NO_X and ROG. The Kern COG analysis confirms whether the proposed project, when added to existing and proposed development and compared with local and regional growth forecasts,[93] are in line with those forecasts, and therefore, in conformance with SIP emission budgets or baseline emissions for NO_X, ROG, CO and PM_{10}. Along with CO "Hot Spot" analysis and TACs, the combined analyses provide a detailed description of the project's overall cumulative impact on air quality.

7.1 CUMULATIVE CRITERIA POLLUTANTS

[92] Kern Council of Governments, Conformity Analysis for the 2015 Federal Transportation Improvement Program and the 2014 Regional Transportation Plan, June 2014.

[93] This regional approach includes all aspects of growth within the San Joaquin Valley Air Basin including distribution centers, industrial uses, housing, and infrastructure development.

Regional Analysis

An analysis was made of the existing and proposed projects within a one-mile and six-mile radius. No development projects have been identified within a one-mile radius. No development projects have been identified within a six-mile radius; therefore, there are no cumulative impacts associated with this project and a cumulative impact was not conducted.

7.2 CUMULATIVE PUBLIC HEALTH/HAZARDS

There are five sensitive receptors in proximity to this project. Each receptor represents a residential household plus one more receptor placed in the middle of the Town of McKittrick. However, the proposed Johe's Ranch Mine is the only project within a 6-mile radius. Therefore, the cumulative commercial projects would not pose any public health hazards to the proposed project.

7.3 CUMULATIVE VISIBILITY

As discussed in the thresholds section of this study the threshold for the California visibility is correlated to the standard Extinction Coefficient of 0.23 per kilometer. This equates to 90 $\mu g/m^3$ of PM_{10}. There is no modeled PM_{10} impact above the PSD SIL for the project, therefore the project is considered *less than significant.*

7.4 DEPARTMENT OF FINANCE PROJECTIONS AND KERN COG CONFORMITY ANALYSIS[94]

7.4.1 KERN COG CONFORMITY ANALYSIS

Utilization of Kern COG data provides a framework for assistance in determining the cumulative significance of a project. Through the demonstration that a project's emissions are less than or consistent with projected growth in a particular local area, linked to a regional air basin projection, which ties to federal requirements, then that project could be said to be *in conformance* cumulatively as it is in line with regional, state and federal emissions budgets and air quality improvement goals.

The 2011 Conformity Analysis for the 2011 Federal Transportation Improvement Program Amendment #10 and the Regional Transportation Plan Amendment #2 complies fully with the July 1, 2004, EPA final rule that amended the transportation conformity rule to include criteria and procedures for the new 8-hour ozone and fine particulate matter ($PM_{2.5}$) national ambient air quality standards.

CEQA guidelines 15064(h)(3) states, "A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific

[94] Kern Council of Governments, Conformity Analysis for the 2015 Federal Transportation Improvement Program and the 2014 Regional Transportation Plan, June 2014.

requirements that will avoid or substantially lessen the cumulative problem (e.g. water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency."

It is important to note that the Kern COG conformity analysis highlights a project's conformance with existing local planning and does not serve as a determinant of a single project's impact.

7.4.2 CUMULATIVE CONFORMITY ANALYSIS

The proposed project is located in an unincorporated area of Kern County eight and one half miles west of McKittrick. There are four residences in this remote region separated by one mile or more. There will not be any projected job growth to the area as a result of this project. The impact of this project will net a maximum total increase of 15 haul trucks each day. These haul trucks are contracted with companies outside of the area. There will be the same number of employee trips frequenting the proposed Johe's Ranch Mine as were present in the East Pit; a total of three employees each day.

The land use, according to the Kern County General Plan, is designated as intensive agriculture consisting of steep sloped land. This mining operation will be carried over from a current operation (East Pit) which is four miles to the east of the proposed project site. The new operation will be manned by those already employed at East Pit. Therefore, employment will remain the same for the area but with a shift of four miles to the west along Highway 58.

Therefore there is no additional cumulative impact other than the net project emissions.

8 MITIGATION MEASURES/DESIGN FEATURES

The project impacts are *less than significant*. Mitigation is required for particulate emissions that have been factored into the estimated emissions from this report. Mitigation measures that will be implemented include the following:

- Stationary Screening Unit will have dust collectors and covered conveyors
- Main access roads will be covered with oil sand dust suppressant
- Exposed disturbed areas will be watered three times each day using a water truck
- Exposed open pit mine areas that are left undisturbed will be covered in a dust palliative to prevent wind erosion of fine particulates

The project will be in compliance with Kern County General Plan and SJVAPCD rules and regulations.

9 GLOBAL CLIMATE CHANGE

9.1 INTRODUCTION

Climate change is a shift in the "average weather" that a given region experiences. This is measured by changes in temperature, wind patterns, precipitation and storms. Global climate change means change in the climate of the earth as a whole. It can occur naturally as in the case of the ice ages. Climate naturally varies constantly, warming and cooling, at varying rates, magnitudes and time scales in response to solar variations, orbital variations, volcanic eruptions, and a variety of other natural forcing. According to CARB, the climate change that is occurring today differs from previous climate changes in both rate and magnitude,[95] although this is still being debated in the scientific community.

Gases that trap heat in the atmosphere are often called greenhouse gases. The Earth's surface temperature would be about 61 degrees Fahrenheit colder than it is now if it were not for the natural heat trapping effect of greenhouse gases.[96] The accumulation of these gases in the earth's atmosphere is considered the cause of the observed increase in the earth's temperature (global warming). The primary greenhouse gases are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride. These particular gases are important due to the residence time in the atmosphere from tens of years to more than 100 years. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and as well as human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities.

9.2 ENVIRONMENTAL SETTING

California is a substantial contributor of GHGs. According to the California Emission Inventory (CEI), in 2012, California produced 458.7 millon metric tons of carbon dioxide equivalent GHG emissions."[97] Climate studies indicate that California's "warming projections in mid-century range from about 1°C to 3°C (1.8°F to 5.4°F), rising by end-of-twenty-first century, from about 2°C to 5°C (3.6°F to 9°F)." [98]

GHGs are global in their effect, which is to increase the earth's ability to absorb heat in the atmosphere. Because the primary GHGs have a long lifetime in the atmosphere, they accumulate over time, and are generally well mixed; their impact on the atmosphere is mostly independent of the point of emission.[99]

9.3 REGULATORY SETTING

Federal Regulations

[95] California Environmental Protection Agency Air Resources Board, August 6, 2004, Technical Support document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles.
[96] Ibid
[97] California GHG Emission Inventory , 2014, California Greenhouse Gas Emissions for 2000 to 2012 –Trends of Emissions and Other indicators . http://www.arb.ca.gov/cc/inventory/data/data.htm (May 2014)
[98] California Energy Commission, July 2012, Climate change and Sea Level Rise Scenarios for California Vulnerability and Adaption Assessment. http://www.energy.ca.gov/2012publications/CEC-500-2012-008/CEC-500-2012-008.pdf
[99] U.S.EPA, 2003

Clean Air Act

In *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497, the U.S. Supreme Court held that the U.S. EPA has authority under the federal CAA to regulate CO_2 emissions if those emissions pose an endangerment to the public health or welfare.

In 2009, the U.S. EPA issued an "endangerment finding" under the federal CAA, concluding that GHGs threaten the public health and welfare of current and future generations and that motor vehicles contribute to GHG pollution. These findings provide the basis for adopting national regulations to mandate GHG emission reductions under the CAA.

To date, the U.S. EPA has exercised its authority to regulate mobile sources that reduce GHG emissions via the control of vehicle manufacturers, as discussed immediately below.

Federal Vehicle Standards

In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order 13432 in 2007 directing the U.S. EPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the U.S. EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the DOT, DOE, U.S. EPA and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the U.S. EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the U.S. EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the U.S. EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baselines.[100]

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

[100] The emission reductions attributable to the regulations for medium- and heavy-duty trucks were not included in the project's emissions inventory due to the difficulty in quantifying the reductions. Excluding these reductions results in a more conservative (i.e., higher) estimate of emissions for the project.

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and,
- While superseded by the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

California Regulations

Executive Order S-3-05

In 2005, former Governor Schwarzenegger signed Executive Order S-3-05, which established the following GHG emission reduction targets for California: (1) by 2010, reduce GHG emissions to 2000 levels; (2) by 2020, reduce GHG emissions to 1990 levels; and (3) by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32

Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020 (Health & Safety Code, §38550). In order to achieve this reduction mandate, AB 32 requires CARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

Of relevance to this analysis, in 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline. CARB's adoption of this limit is in accordance with Health & Safety Code section 38550.

Further, in 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (*Scoping Plan*) in accordance with Health & Safety Code section 38561. The *Scoping Plan* establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020.

In the *Scoping Plan*, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" [BAU] or "No Action Taken" [NAT]).[101] For example,

[101] CARB, Climate Change Scoping Plan: A Framework for Change, p. 12, December 2008.

in further explaining CARB's BAU methodology, CARB assumed that all new electricity generation would be supplied by natural gas plants, no further regulatory action would impact vehicle fuel efficiency, and building energy efficiency codes would be held at 2005 standards. The Scoping Plan identified a Cap-and-Trade program as one of the strategies California will employ to reduce GHG emissions. The Cap-and-Trade program is implemented by CARB and caps GHG emissions from the industrial, utility, and transporation fules sectors – which account for roughtly 85% of the state's GHG emissions.

In the 2011 Final Supplement to the *Scoping Plan's* Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7 percent (down from 28.5 percent) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12 percent to 20 percent), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16 percent (down from 28.5 percent) from the BAU conditions.

Most recently, in 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (First Update).[102] The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.

As part of the First Update, CARB recalculated the State's 1990 emissions level using more recent global warming potentials identified by the IPCC. Using the recalculated 1990 emissions level and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15 percent (instead of 28.5 percent or 16 percent) from the BAU conditions.

The First Update also includes a strong recommendation from CARB for setting a mid-term statewide GHG emissions reduction target. CARB specifically recommended that the mid-term target be consistent with: (i) the United States' pledge to reduce emissions 42 percent below 2005 levels (which translates to a 35 percent reduction from 1990 levels in California); and (ii) the long-term policy goal of reducing emissions to 80 percent below 1990 levels by 2050. However, to date, there is no legislative authorization for a post-2020 GHG reduction target.

Energy-Related Sources

California's Renewable Portfolio Standard requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020.[103] The 33 percent standard is consistent with the Renewable Portfolio Standard goal established in the *Scoping Plan*. As interim measures, this standard requires 20 percent of retail sales to be sourced from renewable energy by 2013, and 25 percent by 2016.

Mobile Sources

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[102] Health & Safety Code §38561(h) requires CARB to update the Scoping Plan every five years.

[103] Initially, the Renewable Portfolio Standard provisions applied only to investor-owned utilities, community choice aggregators, and electric service providers. SBX1-2 added, for the first time, publicly owned utilities to the entities subject to the standard.

AB 1493 (the Pavley Standard) required CARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016. CARB obtained a waiver from the USEPA that allows for implementation of these regulations notwithstanding possible federal preemption concerns.

CARB's regulations for passenger vehicles (cars and light trucks) combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. This new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California. These standards would apply to all passenger and light duty trucks used by customers, employees of and deliveries to the Project site.

Executive Order S-1-07 requires a ten percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020.[104] In 2009, CARB approved the Low Carbon Fuel Standard (LCFS) regulations, which became fully effective in April 2010. In 2013, an ethanol company obtained a court order compelling CARB to remedy substantive and procedural defects under CEQA of the LCFS adoption process.[105] However, the court allowed implementation of the LCFS to continue pending correction of the identified defects. Consequently, this analysis assumes that the LCFS will remain in effect during construction and operation of the Project.

In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for model years 2017–2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

For the area under TCAG's jurisdiction, including the Project Site, CARB adopted regional targets for reduction of mobile source-related GHG emissions by 5 percent for 2020 and by 10 percent for 2035.

Building Standards

Title 24 of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

The CEC has adopted the 2013 Building Energy Efficiency Standards (2013 Building Standards) contained in Title 24. The 2013 Building Standards (effective July 1, 2014) are 25 percent more efficient than previous standards for residential construction and 30 percent more efficient for nonresidential construction, and will require better windows, insulation, lighting, ventilation systems and other features that further reduce energy consumption in homes and businesses.[106]

The CEC also has adopted the 2012 Appliance Efficiency Regulations (2012 Appliance Standards), which are contained in Title 20 of the California Code of Regulations and include standards for both federally-regulated appliances and non-federally regulated appliances.

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of

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104 Carbon intensity is a measure of the GHG emissions associated with the various production, distribution and use steps in the "lifecycle" of a transportation fuel.

105 POET, LLC v. CARB (2013) 217 Cal.App.4th 1214.

106 The CEC recently opened the public process and rulemaking proceedings for adoption of the 2016 Building Energy Efficiency Standards, which the CEC anticipates will be proposed for adoption in 2015 and have an effective date of January 1, 2017.

Title 24) is commonly referred to as CALGreen, and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality.

Regional Regulations

SJVAPCD Guidance

On December 17, 2009, the SJVAPCD published its final staff report entitled, "*Addressing GHG Under the California Environmental Quality Act*" [107] (see **Appendix XV**) in which the district, among other things, provides guidance by which processes may be established for (i) assessing the significance of project-specific GHG impacts, (ii) identifying and quantifying GHG emission reduction measures for development projects and (iii) providing tools to streamline evaluation of project-specific GHG effects. The SJVAPCD suggests that projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program be determined to have a less than significant cumulative impact. Where projects are not exempt from CEQA and in the absence of an approved plan or mitigation program, projects complying with Best Performance Standards do not require specific quantification of GHG emissions. Projects not fitting any of the described standards, programs or exemptions require quantification of GHG emissions and demonstration that GHG emissions have been reduced or mitigated by 29% from the state's projected 2020 BAU emissions and the reduction of approximately 10% from 2002-2004 average emissions. In addition, where a lead agency has determined that an EIR is required, regardless of whether the project incorporates Best Performance Standards, quantification of GHG emissions is required.

In their document, the SJVAPCD proposes quantitative thresholds including mass of GHG emissions generated per unit of activity, GHG emissions per capita, and percent reduction compared to business as usual.

On June 25, 2014, the SJVAPCD published "CEQA determinations of Significance for Projects Subject to ARB's GHG Can-and Trade Regulation" (APR-2025). The SJVAPCD concluded that "though complicance with the Cap-and-Trade regulation, project-specific GHG emissions that are covered by the regulation will be fully mitigated. The District therefore concludes that GHG emissions increases subject to ARB's Cap-and-Trade regulation would have a less than significant individual and cumulative impact on global climate change.

9.3.1 GREENHOUSE GASES

[107] San Joaquin Valley Air Pollution Control District, Final Staff Report, Addressing Greenhouse Gas Emissions Impacts under the California Environmental Quality Act, December 17, 2009.

Naturally occurring GHGs include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. The principal GHGs[108] resulting from human activity that enter and accumulate in the atmosphere are:

- **Carbon Dioxide (CO_2)**: Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal etc.), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)**: Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide (N_2O)**: Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Fluorinated Gases:** Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as High Global Warming Potential[109] gases ("High GWP gases")

There are several gases that do not have a direct global warming effect but indirectly affect terrestrial and/or solar radiation absorption by influencing the formation or destruction of GHG, including tropospheric and stratospheric ozone.[110] These gases include carbon monoxide, oxides of nitrogen and non-methane volatile organic compounds. Aerosols, which are extremely small particles or liquid droplets, such as those produced by sulfur dioxide or elemental carbon emissions, can also affect the absorptive characteristics of the atmosphere.

9.3.2 HEALTH EFFECTS

An increase in the instability of the weather would give rise to more intense heat waves and extreme temperatures. A result of this would be an increase in the number of heat wave-related deaths. Also an increase in Earth's ambient temperature can increase the survival rate and disease transmission rate of infectious diseases.[111] Climate change may lead to changes in weather patterns that can influence the frequency of meteorological conditions conductive to the development of high pollutant concentrations such as the formation of ozone or secondary organic carbon particles.[112]

On December 7, 2009, the U.S. EPA finalized its finding under Clean Air Act section 202(a) that GHGs in the atmosphere endanger both the public health and the environment for current and future generations. The key effects that support the U.S. EPA's determination that current and future concentrations of GHGs endanger public health include:

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[108] http://www.epa.gov/climatechange/emissions/index.html

[109] High Global Warming Potential gases are non-CO_2 gases that cause the atmosphere to heat faster than CO_2.

[110] U.S. EPA, April 15, 2008, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006; EPA 430-R-08-005

[111] AB 1493 (Pavley) Briefing Package: Global Warming and Greenhouse Gas Emissions from Motor Vehicles, Cal EPA, Appendix IV

[112] Cal EPA Air Resources Board, DRAFT Staff Proposal Regarding the Maximum Feasible and Cost-Effective Reduction of Greenhouse Gas Emissions From Motor Vehicles; June 14, 2004

Temperature

There is evidence that the number of extremely hot days is already increasing. Severe heat waves are projected to intensify, which can increase heat-related mortality and sickness. Fewer deaths from exposure to extreme cold is a possible benefit of moderate temperature increases. Recent evidence suggests, however, that the net impact on mortality is more likely to be a danger because heat is already the leading cause of weather-related deaths in the United States.

Air Quality

Climate change is expected to worsen regional ground-level ozone pollution. Exposure to ground level ozone has been linked to respiratory health problems ranging from decreased lung function and aggravated asthma to increased emergency department visits, hospital admissions, and even premature death. The impact on particulate matter remains less certain.

Climate-Sensitive Diseases and Aeroallergens

Potential ranges of certain diseases affected by temperature and precipitation changes, including tick-borne diseases and food and water-borne pathogens, are expected to increase.

Climate change could impact the production, distribution, dispersion and allergenicity of aeroallergens and the growth and distribution of weeds, grasses, and trees that produce them. These changes in aeroallergens and subsequent human exposures could affect the prevalence and severity of allergy symptoms.

Vulnerable Populations and Environmental Justice

Certain parts of the population may be especially vulnerable to climate impacts, including the poor, the elderly, those already in poor health, the disabled, those living alone, and/or indigenous populations dependent on one or a few resources.

Environmental justice issues are clearly raised through examples such as warmer temperatures in urban areas having a more direct impact on those without air-conditioning.

Extreme Events

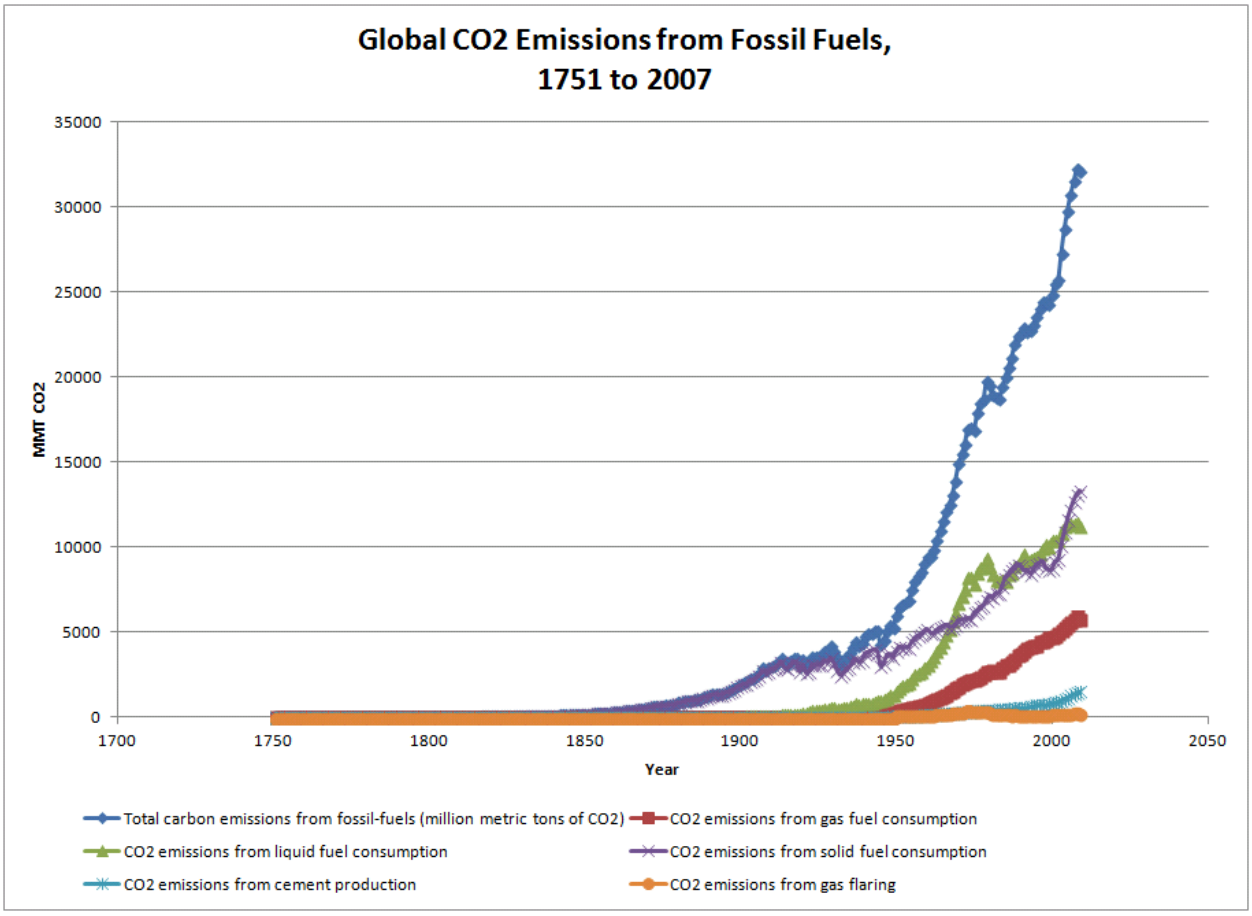
Storm impacts are likely to be more severe, especially along the Gulf and Atlantic coasts. Heavy rainfall events are expected to increase, increasing the risk of flooding, greater runoff and erosion, and thus the potential for adverse water quality effects. These projected trends can increase the number of people at risk from suffering disease and injury due to floods, storms, droughts and fires.

9.4 GHG INVENTORIES

Global

The figure[113] below presents the major sources of carbon dioxide emissions in the world. Carbon dioxide emissions from the United States represent approximately twenty percent of the global carbon dioxide emissions.

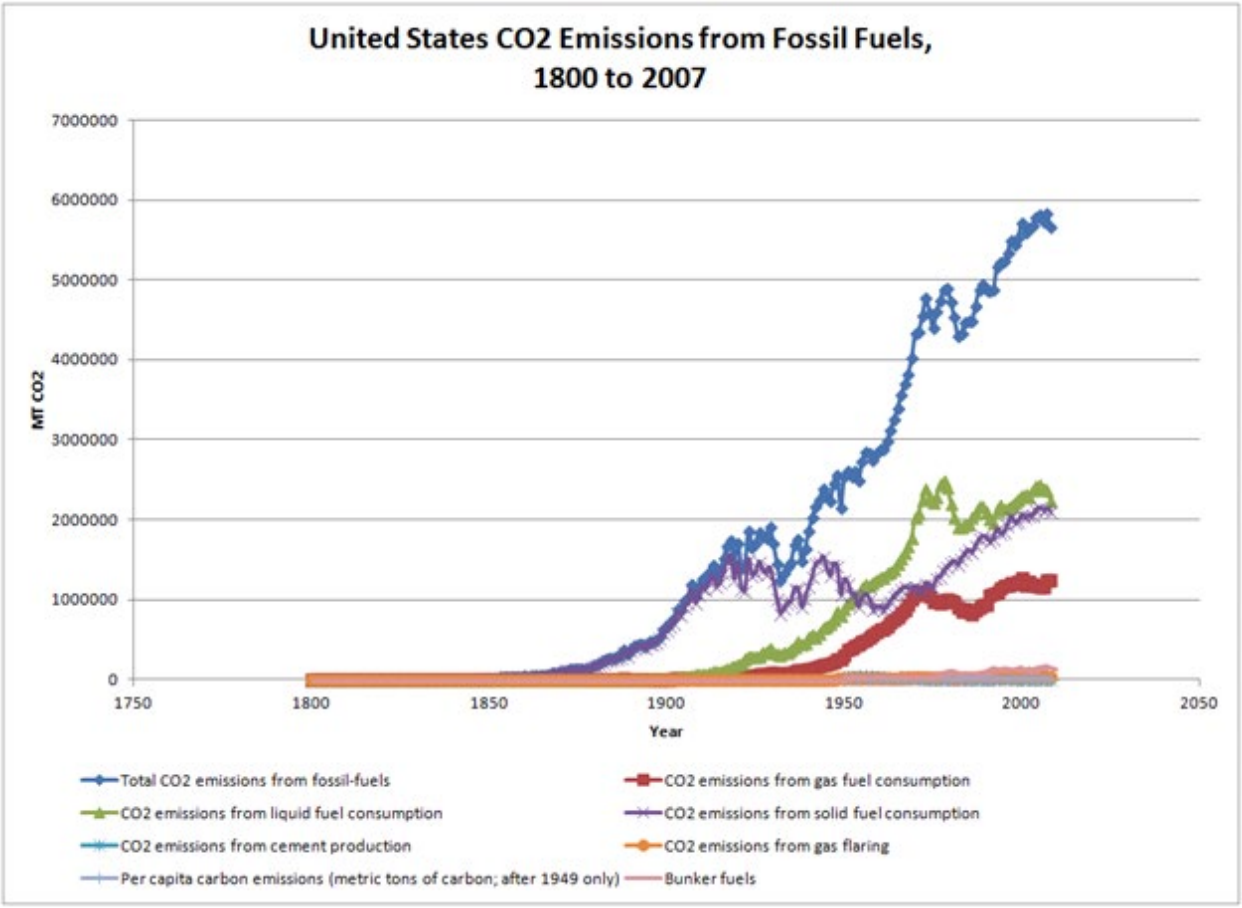
[113] Boden, T.A., G. Marland, and R.J. Andres. 2012. Global, Regional, and National Fossil-Fuel CO2 Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2012



United States

The U.S. EPA develops the national GHG inventory each year to track the national trend in emissions and removals since 1990. In 2011, total U.S. GHG emissions were 6,7023 $MMTCO_2$ e.[114] Relative to the U.S. gross domestic product, GHG emissions have actually deceased over the 1990 – 2011 period. Total U.S. emissions have increased by 8.4 percent from 1990 to 2011, and emissions decreased from 2010 to 2011 by 1.6 percent (108.0 MM CO2 Eq.). The decrease from 2010 to 2011 was due to a decrease in the carbon intensity of fuels consumed to generate electricity due to a decrease in coal consumption, with increased natural gas consumption and a significant increase in hydropower used. Additionally, relatively mild winter conditions, especially in the South Atlantic Region of the United States where electricity is an important heating fuel, resulted in an overall decrease in electricity demand in most sectors. The primary GHG emitted by human activities in the United States was carbon dioxide (CO_2), representing approximately 84 percent of total GHG emissions. The largest source of CO_2 is the combustion of fossil fuels. The figure below shows the historic carbon dioxide emissions from fossil fuel use in the United States.[115]

[114] U.S. EPA, April 15, 2008, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006; EPA 430-R-08-005
[115] Boden, T.A., G. Marland, and R.J. Andres. 2012.

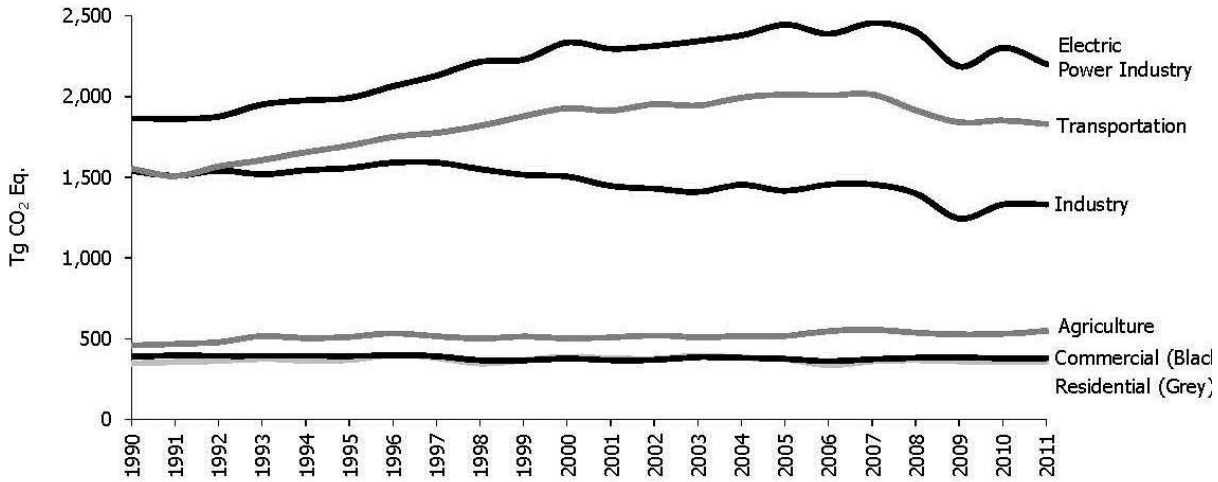


Methane emissions, which have steadily declined since 1990, result primarily from decomposition of wastes in landfills, natural gas systems and activities associated with domestic livestock. Agricultural soil management and mobile source fossil fuel combustion are the major sources of nitrous oxide emissions. The emissions of hydrofluorocarbons, which are substitutes for ozone depleting substances, are the primary component of fluorinated gas emissions.[116] Sinks for GHG include carbon sequestration in forests, trees in urban areas, agricultural soils, and land-filled yard trimmings and food scraps. These sinks, in aggregate, offset 13.5% of the total emissions in 2011.

To compare and combine emissions of different GHG into a national total, the U.S. EPA uses global warming potentials (GWPs). GWPs compare the radiative forcing or ability to trap heat of one metric ton of a GHG to a metric ton of CO_2. Emissions resulting from fossil fuel combustion from electricity generation accounted for the largest portion of U.S. GHG emissions in 2011. Transportation activities accounted for the second largest portion and emissions from industry comprised the third largest portion. The residential and commercial economic sectors, listed in descending order of their contribution, together account for the remaining U.S. CO_2 gas emissions generated by fossil fuel combustion.

[116] U.S. EPA, April 12, 2013, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2011; EPA 430-R-13-001

U. S. Emissions Allocated to Economic Sectors



REFERENCE: INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS:
1990-2011, USEPA #430-R-13-001

TABLE 9.4 -1
U. S. CO_2 Emissions ($MMTCO_2e$)[117] (includes electricity consumption)

	1990	2011
Residential	931.4	1,125.6
Commercial	757.0	960.5
Industrial	1,535.3	1,392.1

The residential, commercial and industrial sectors relied on electricity for meeting energy demands for lighting, heating, cooling, and operating appliances, which accounted for about 70% of the total CO_2 emissions. The remaining emissions were due to the consumption of natural gas and petroleum for heating and cooling. Emissions from transportation are evaluated separately.

California

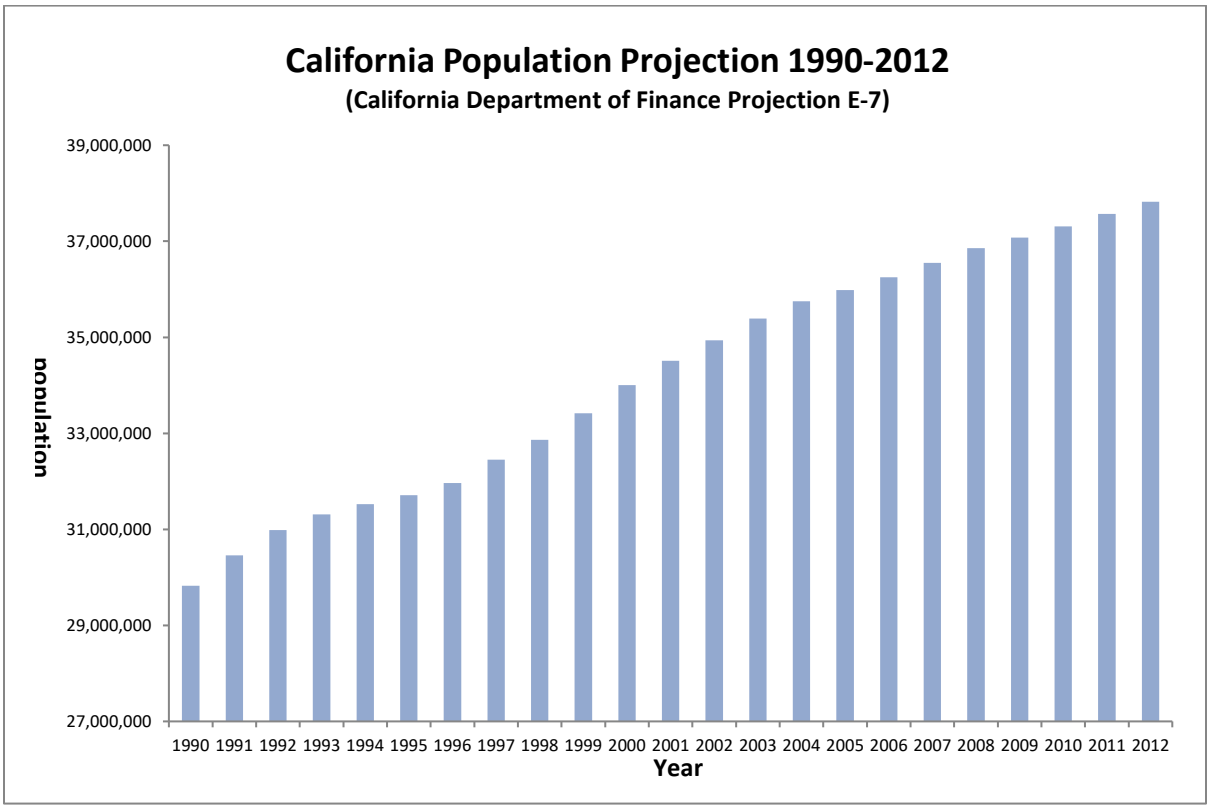
The CARB California GHG emission inventory has estimated the average gross emissions for 2012 to be 458.7$MMTCO_2e$.[118] The GHG inventory for 2012 in California has decreased by 1.6% since 2000.

[117] U.S. EPA, April 12, 2013, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2011; Table ES-3; EPA 430-R-13-001

[118] http://www.arb.ca.gov/cc/inventory/data/data.htm (May 2014)

The population in California increased 11 percent from 2000 to 2012, as shown on the graph below.[119] During this same period, California has significantly slowed the rate of growth (by more than half) of GHG emissions[120] due to a number of programs:

- Energy efficiency requirements
- Renewable energy programs
- Air pollution control programs



Source: California Department of Finance E-7, http://www.dof.ca.gov/research/demographic/reports/estimates/e-7/view.php

The California GHG inventory serves as the foundation for the State's greenhouse gas emission reduction program. It compiles statewide anthropogenic GHG emissions and sinks and classifies the emissions from different economic sectors, such as agriculture and forestry, commercial, in-state electricity generation, imported electricity, industrial, residential, and transportation (**Table 9.4-2**).

The relative contribution of each sector remained comparable over the time series. Transportation was the major emitter of GHGs in all years, producing 36% of California's GHG emission inventory in 2012. The electricity generation sector, which includes both in-state generation and imported electricity, was the next largest GHG contributor. Emitting approximately 104.9 MMTCO2e in 2000 and dropping to 95.1 MMTCO2e in 2012. The industrial sector, which declined, accounts for 29.9 MMTCO2e in 2012.

[119] California Department of Finance
[120] California Energy Commission, 2006, Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004

TABLE 9.4-2
California GHG Inventory by Economic Sectors (1990 to 2012)
(Million Metric Tons CO_2 Equivalent)

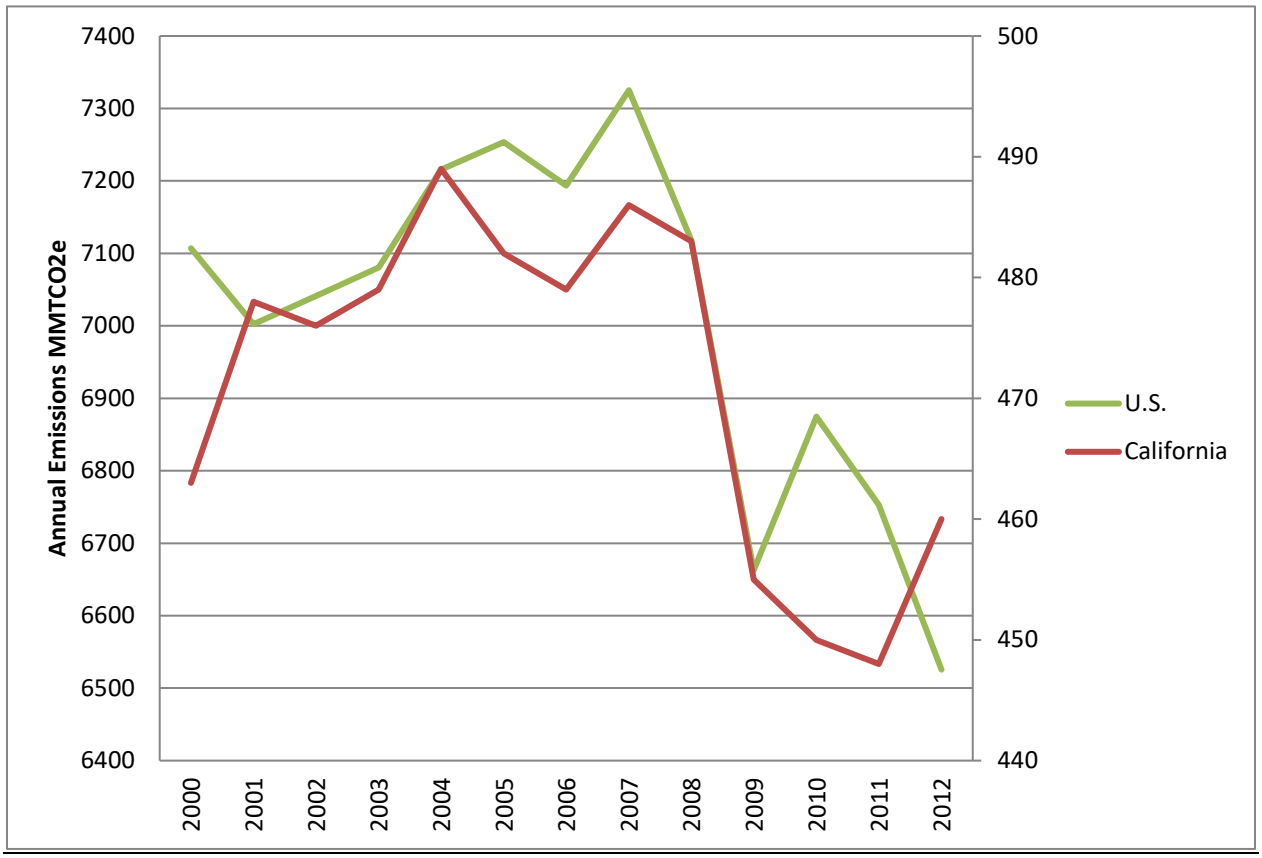
Categories included in the inventory	1990-2004 GHG Inventory by Economic Sectors (1st edition, Nov 2007) [121]										2000-2011 GHG Inventory by Sector & Activity (Aug 2013)[122]												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Electricity Generation (In State)	49	46	55	51	59	45	42	44	48	51	59	63	50	48	49	45	50	54	55	56	47	40	51.2
Electricity Generation (Imports)	62	57	50	56	56	54	50	56	58	56	46	59	59	65	66	63	55	60	66	48	44	47	44.1
Transportation	151	147	153	149	151	155	156	159	162	166	178	179	186	186	190	192	192	192	180	175	174	172	171
Industrial	103	100	97	95	94	96	98	104	105	102	103	101	101	101	103	102	100	97	98	93	100	103	101
Commercial	14	14	12	12	12	12	12	12	13	14	16	16	16	16	17	17	18	19	20	20	21	22	22
Residential	30	30	29	29	30	27	27	27	31	32	32	31	31	30	31	30	30	31	31	31	32	33	32
Agriculture & Forestry	24	22	23	23	23	24	23	24	24	25	29	29	32	33	33	33	34	33	34	32	32	32	38
Not Specified	1	1	1	2	3	5	6	7	8	10	0.4	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sinks from Forests and Rangelands	-7	-7	-6	-6	-6	-6	-5	-5	-5	-5	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	N/A	N/A	N/A
Net California Emissions Inventory (Scoping Plan)	**427**	**410**	**412**	**409**	**422**	**411**	**409**	**428**	**444**	**451**	**463**	**478**	**476**	**479**	**489**	**482**	**479**	**486**	**483**	**455**	**450**	**448**	**460**
Categories excluded from the inventory	87	79	73	71	78	79	79	70	68	72	55	49	53	47	51	54	56	59	55	55	55	50	N/A
Grand Total	**513**	**490**	**485**	**480**	**500**	**490**	**488**	**497**	**512**	**523**	**518**	**527**	**529**	**526**	**540**	**536**	**535**	**545**	**538**	**510**	**505**	**498**	**460**

Annual statewide emission inventories provide the basis for establishing historical emission trends. There are many factors affecting GHG emissions, including the state of the economy, changes in demography, improved efficiency, and changes in environmental conditions such as drought.[123]

From **Table 9.4-2** above, the total Net California Emissions in 2012 decreased by 0.7 percent from 2000 level.

[121] CARB Inventory Data Archive - 1990 to 2004 Inventory, http://www.arb.ca.gov/cc/inventory/archive/archive.htm,
[122] California Greenhouse Gas Emissions Inventory: 2000-2012, May 2014
http://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-12_report.pdf
[123] Greenhouse gas inventory data 2000-2009, http://www.arb.ca.gov/cc/inventory/data/data.htm

Recent Trends in Greenhouse Gas Emissions
(U.S. and California)



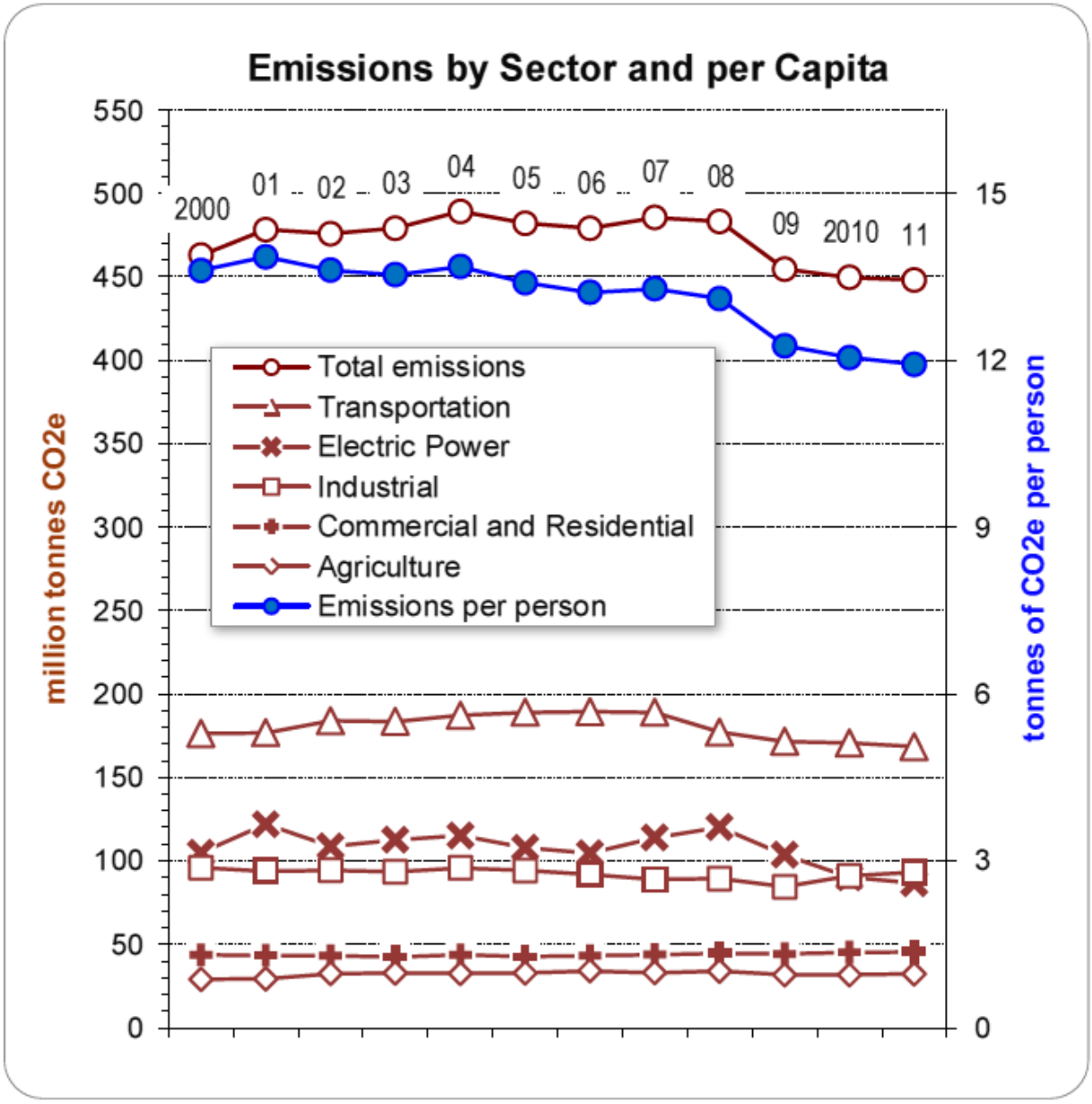
http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

Per Capita Emissions[124]

California's gross emissions of GHGs decreased by 6 percent from 478.4 million tonnes of CO2e in 2001 to 448.1 million in 2011, with a maximum of 489.2 million tonnes in 2004. During the same period, California's population grew by 9 percent from 34.5 to 37.6 million people. For the year 2011, California has a gross per capita emission of 11.9 MTCO2e/person. This compares favorably with a value of 14.5 MTCO2e/person in 1990 and 13.9 MTCO2e/person in 2000. In 2011, emissions continued to decrease for the transportation and electric power sectors. Emissions from all other sectors remained relatively flat or in-creased slightly from 2010.

The per capita comparison is a useful metric for emission evaluation because it shows that emissions have not grown consistently with population, indicating that energy conservation may have led to significant emission reductions.

[124] California Greenhouse Gas Emissions Inventory: 2000-2009, 2011, http://www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-09_report.pdf and http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_trends_00-11_2013-10-02.pdf

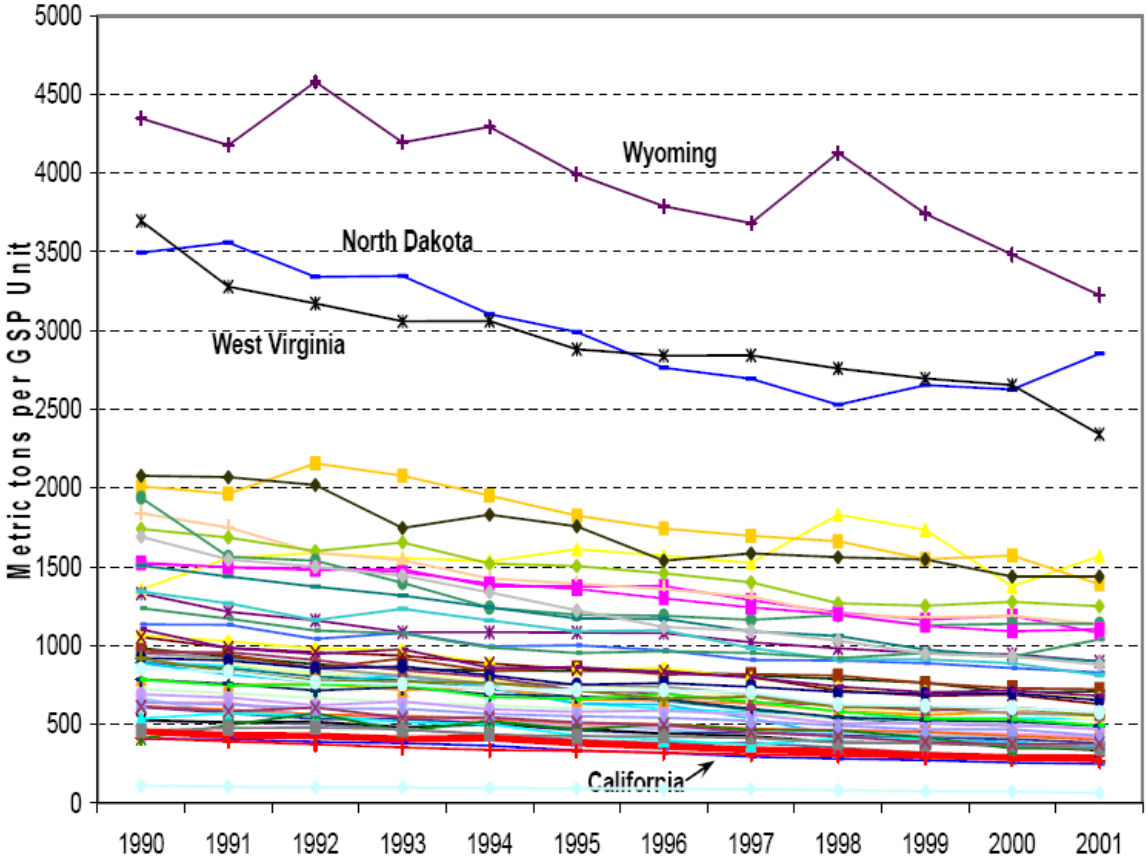


Source: CARB, 2013, California Greenhouse Gas Emissions for 2000 to 2011- Trends of Emissions and Other Indicators

California's Gross Domestic Product (GDP) increased from $1.47 trillion in 2001 to $1.69 trillion in 2011 (in 2005 dollars).[125] Reflecting the overall decrease in GHG emissions, the GHG intensity of California's economy, measured as GHG emissions per unit of economic output, decreased from 324.5 tonnes CO2e per million dollars in 2001 to 264.8 tonnes per million dollars in 2011 (CARB, 2013). And while California's economy and GDP continued to grow in 2011, the GHG intensity of California's economy continued to decrease. California has one of the lowest carbon dioxide emissions from fossil fuel combustion per GSP unit by State as shown in the following graph.

[125] California Department of Finance- California State Gross Domestic Product (GDP) 1963-2012

Carbon Dioxide Emissions from Fossil Fuel Combustion per Gross State Product[126]

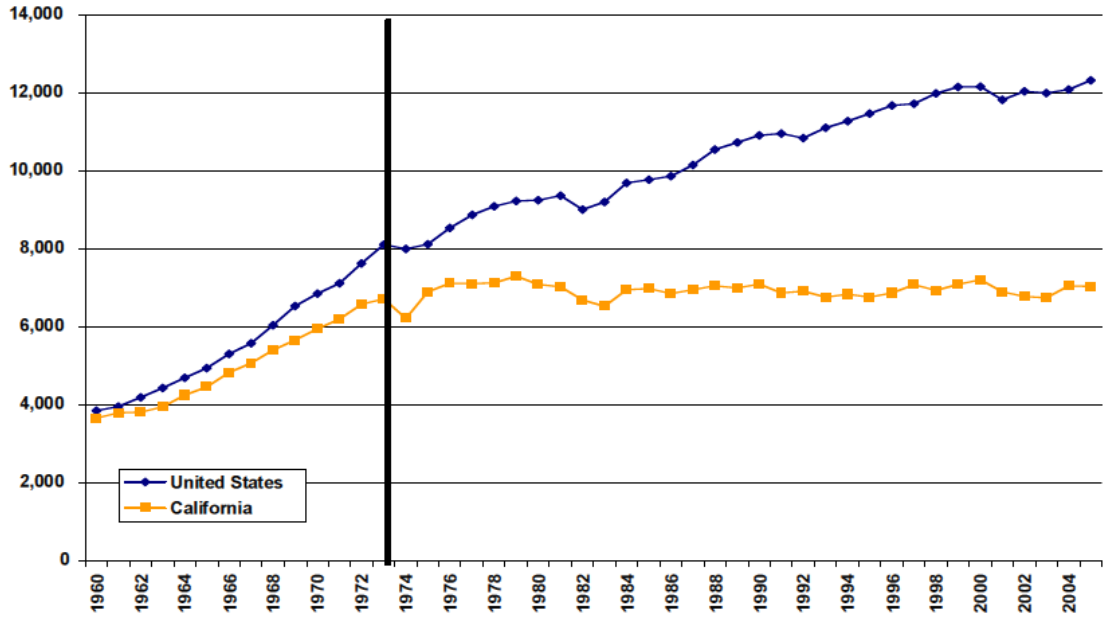


Electricity accounts for approximately 19 percent of the state's CO_2 emissions in 2011. California uses less electricity per person than any other state in the nation. While per capita electricity consumption in the United States increased by nearly 50 percent over the past 30 years, California's per capita electricity use decreased (as shown in the figure in the following page), due in large part to cost-effective building and appliance efficiency standards and other energy efficiency programs.[127]

[126] California Energy Commission, "Inventory Of California Greenhouse Gas Emissions And Sinks: 1990 To 2004", Final Staff Report, December 2006, Cec-600-2006-013-D

[127] California Energy Commission, 2007 Integrated Energy Policy Report, December 5, 2007.

Per Capita Electricity Sales in Kilowatt Hours per Person in California



Source: California Energy Commission

Reductions in energy consumption as a result of proposed changes to Title 24 will play a significant role in the realization of statewide GHG reduction targets. These percentage reductions include energy savings for heating, cooling, lighting and water heating only and do not include other appliances, outdoor lighting that is not attached to buildings, plug loads, or other energy uses.[128] With implementation of the 2013 Title 24 Energy standards, electricity usage will be reduced by an average of 27.2% for residential and non-residential uses compared to the 2008 standard.[129]

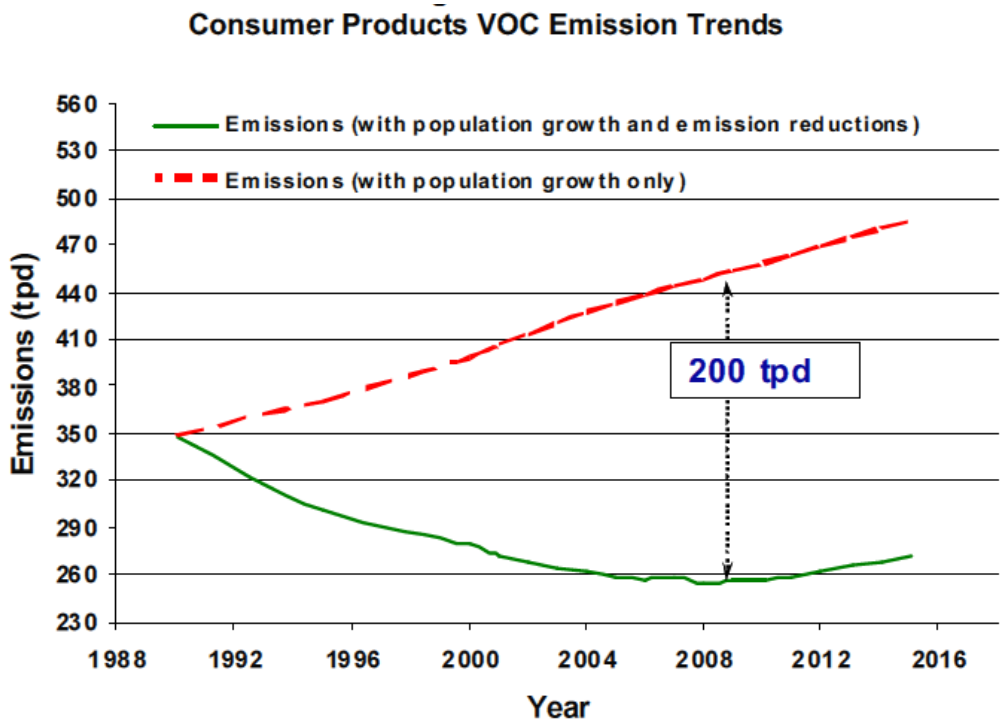
Consumer Products

Consumer products are a significant source of VOC emissions in California and contribute to the formation of both ground-level ozone and particulate matter pollution.

As evidence of the magnitude of consumer product VOC emissions, it is estimated that in 2010 consumer products emissions will be approximately 243 tons per day, or about 12 percent of the overall VOC inventory. In this same year, consumer product emissions will comprise about 18 and 7 percent of VOC emissions in the South Coast Air Quality Management District (SCAQMD) and SJVAPCD, respectively. Without further actions, consumer product emissions are expected to grow to approximately 270 tons per day in 2020, representing 14 percent of statewide VOC emissions.

[128] California Energy Commission, Impact Analysis, 2005 Update to the California Energy Efficiency Standards, June 20, 2003.

[129] California Energy Commission, Impact Analysis, 2013 California's 2013 Building Energy Efficiency Standards, July, 2013.



Source: California Air Resources Board, Initial Statement Of Reasons For Proposed Amendments to The California Consumer Products Regulation, May, 2008.

GHG emissions from consumer products are small relative to other sources, such as vehicle exhaust. However, the magnitude of the GHG problem justifies reductions from both large and small sources, wherever such measures are feasible and cost-effective.

Consumer products use various GHGs, mostly as propellants. To a much lesser degree, several solvents with fairly high GWPs are used. The propellants are typically low photochemically reactive compounds that are exempt VOCs. They have been used as a reformulation strategy to reduce VOC content. Compounds of interest include hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), hydrofluoroethers (HFEs), carbon dioxide (CO_2), and nitrous oxide (N_2O). However, the propellants HFC-134a and HFC-152a are the predominate GHGs used in consumer products today. Compressed CO_2 is also used as a propellant, but the GHG emissions are negligible compared to the emissions from HFCs.

9.5 GLOBAL CLIMATE CHANGE THRESHOLDS OF SIGNIFICANCE

Per Appendix G of the CEQA Guidelines, the thresholds of significance for GHGs are:

a) Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

These thresholds generally are consistent with CEQA Guidelines section 15064.4(b).

9.6 PROJECT GREENHOUSE GAS IMPACT ASSESSMENT

Global Climate Change-related impacts are generated by project-activities, both direct and indirect. Global Climate Change effects are felt globally. To properly assess a proposed project one must consider the project level cumulative emissions against the likelihood that the no build alternative results in a project being developed outside of California to meet the demand that created the proposed project need, or that the state goals will continue to reflect a weighted average emissions on a per capita or per Gross State Product (GSP) basis. The analysis looks to several levels of impact, project specific, statewide, federal and global. Each level serves as an element of the whole greenhouse gas analysis and is not to be considered separately. If any level exceeds the thresholds defined for this analysis then the greenhouse gas impact is considered significant and unavoidable.

The baseline for analysis varies by the particular regulatory framework and manner in which the emissions and impacts are determined.

In the instance of CEQA's analysis of Global Climate Change impacts, the Business-as-usual emissions estimates (and methodology for those estimates) as well as California's stated policy objectives (as established in responsible agency actions) define the point of relevance for impacts associated with a given discretionary act.

The stated policy objectives are driven by Executive Orders, AB 32 and other legislative acts. Some of the policy objectives are defined by: "Zero Net Energy", Low Carbon Fuel Standards, Pavley I & II light duty vehicle greenhouse gas standard, Renewable Portfolio Standard, and AB 32 objectives. 2030 GHG targets were adopted in "California's 2017 Climate Change Scoping Plan." This section was current during time of submission.[130]

9.6.1 PROJECT SPECIFIC ANALYSIS

The project is a diatomite mining operation in rural west Kern County. The project specific GHG emissions include emissions from area sources and mobile sources (off-road equipment, employee trips and haul trucks).

This analysis uses several baselines: Current "no project", a baseline directly based on the "Business-As-Usual" analysis, and 2008 CARB Scoping Plan (December 2008) Baseline.

The "no project" baseline would result in zero emissions, but would not address inevitable population growth projections. From a global context, population growth would occur elsewhere with less regulatory restriction.

9.6.1.1 BUSINESS-AS-USUAL[131]

Business-As-Usual (BAU) is a term used by California agencies to describe the rate of greenhouse gas emissions assuming no climate regulations. It is a projection into the future of the greenhouse gases which could be emitted by projects based on current technologies and existing regulations in the absence of other reductions. BAU includes forecasted demographic and economic growth, whereas the historic CEQA baseline non- greenhouse gas impact analysis does not include any

[130] https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

[131] The business as usual emissions for area sources (tied to year 2004 for projection, reflecting the 2001 Title 24 Standard) is calculated using CalEEmod; Additionally, WZI adds the transportation-related greenhouse gas emissions assuming the 2007 fleet mix.

growth factors. Understanding this difference, between historic CEQA analyses and the Greenhouse Gas element of CEQA is critical to a reasoned analysis of Global Climate Change impacts. The baseline for greenhouse gases is BAU.

The Business-As-Usual emissions for the project are estimated assuming the same methodology used by CARB to forecast the state-wide emissions. This projection assumes no change in vehicle fleet mix over time, no intervening climate change reductions measures, strategies or actions, and no VMT reduction from the central location of the jobsite. (See **Appendix IX**, "Greenhouse Gas Emission Calculations")

TABLE 9.6-1(a)
Project GHG Emissions East Pit Mine (Business-As-Usual)

Emission Source	Metric Tons/Year CO_2e	Ref.
Area-source emissions	405.31	[132]
Mobile-worker trips	3.295	[133]
Mobile-Haul Trucks	599.89	[134]
Total emissions	1008.5	

TABLE 9.6-1(b)
Project GHG Emissions Johe's Ranch (Business-As-Usual)

Emission Source	Metric Tons/Year CO_2e	Ref.
Area-source emissions	405.31	[147]
Mobile-worker trips	6.04	[148]
Mobile-Haul Trucks	908.87	[149]
Total emissions	1320.22	

TABLE 9.6-1(c)
Project GHG Emissions Johe's Ranch (Net)

Emission Source	Metric Tons/Year CO_2e	Ref.
Area-source emissions	0	[147]
Mobile-worker trips	2.74	[148]
Mobile-Haul Trucks	308.98	[149]
Total emissions	311.72	

9.6.1.2 PROJECT UNMITIGATED/ MITIGATED [135]

[132] CalEEmod project emissions. Appendix I Project Emissions Calculation
[133] Mobile source emissions also include the N_2O and CH_4 emissions from mobile sources and converted to CO_2e.
[134] CalEEmod project emissions. Appendix I Project Emissions Calculation
[135] This "unmitigated" value is calculated using the CalEEmod program in its currently adopted form with default settings with the exception that WZI conforms to the project specific trip lengths; electricity use and water supply-related emissions are zero; the project is remote and does not require electricity and water is pumped from an existing well to be used for dust control. Since the project does not have mitigation measures, the unmitigated and mitigated are the same.

The project does not have any project specific mitigation measures, therefore the project's unmitigated greenhouse gas emissions are the same as the mitigated emissions. (See **Appendix VIII**, "Greenhouse Gas Emission Calculations")

By year 2020, the enforcement of the California Light-Duty Vehicle Greenhouse Gas Standards, Low Carbon Fuel Standard will reduce the greenhouse gas emissions from mobile sources by approximately 20%.[136] The reduction has been applied to the calculation of project emissions from mobile sources.

TABLE 9.6-2(a)
Project GHG Emissions East Pit Mine (2020)

Emission Source	Metric Tons/Year CO_2e	Ref.
Area-source emissions	335.85	[137]
Mobile-worker trips	2.24	[138]
Mobile-Haul Trucks	471.89	[139]
Total emissions	809.98	

TABLE 9.6-2(b)
Project GHG Emissions Johe's Ranch (2020)

Emission Source	Metric Tons/Year CO_2e	Ref.
Area-source emissions	335.85	[155]
Mobile-worker trips	4.099	[156]
Mobile-Haul Trucks	715.05	[157]
Total emissions	1053.32	

TABLE 9.6-2(c)
Project GHG Emissions Net (2020)

Emission Source	Metric Tons/Year CO_2e	Ref.
Area-source emissions	0	[155]
Mobile-worker trips	1.86	[156]
Mobile-Haul Trucks	243.16	[157]
Total emissions	245.02	

The completion of the East Pit Mine, which is currently in operation four miles east of the proposed Johe's Ranch Mine site, will coincide with the startup of Johe's Ranch Mine. All project equipment currently operating at East Pit Mine will be transported to the Johe's Ranch Mine to resume the same operations. Because the East Pit Mine is part of the baseline emissions, a net change emissions analysis was completed.

[136] California Air Resources Board, Climate Change Scoping Plan, May 2014
[137] CalEEmod project emissions.
[138] Mobile source emissions also include the N_2O and CH_4 emissions from mobile sources and converted to CO_2e. See calculations in **Appendix VIII**
[139] CalEEmod project emissions

The percent reduction between the project's mitigated emission and Business-As-Usual emissions for the project should be equal to or greater than 16%[140] to conform with the goals of AB 32 as indicated in the Scoping Plan supplement; the percent reduction between the project's mitigated emission and 2008 Scoping Plan Baseline emissions should be equal to or greater than 15% to conform with the goals of AB32; thereby BAU and 2008 Scoping Plan Baseline are both treated as a greenhouse gas baseline for the project level analysis[141].

Table 9.6-3 below illustrate the project's greenhouse gas emissions compared to BAU and 2008 scoping plan baseline emissions. The percentage reductions exceed the required 16% from BAU.

TABLE 9.6-3
Comparison of Net BAU and Project Mitigated Emissions

Emission Source	Business-as-usual	Project Mitigated (2020)
Total Emissions	312	245
Percentage Reduction		21%

9.6.1.3 CONCLUSION REGARDING PROJECT SPECIFIC IMPACTS

The 29% GHG emission reduction compared to BAU has not been met (**Table 9.6-3**). Emission Reduction Credits (ERC's) will be purchased to offset this increase. Emissions for the year 2016 at Johe's Ranch Mine would be 1,005.13 $MTCO_2e$/yr and the East Pit Mine 2016 emissions would be 785.58 $MTCO_2e$/yr (Reference Appendix III CalEEmod results). This is a net increase of 221 $MTCO_2e$/yr, which will be fully offset by surrendering ERC's. Therefore, project GHG impact is less than significant

10 VALLEY FEVER EXPOSURE

Coccidioidomycosis, more commonly known as "Valley Fever," is an infection caused by inhalation of the spores of the Coccidioides immitis fungus, which grows in the soils of the southwestern United States. The fungus is very prevalent in the soils of California's San Joaquin Valley, particularly in Kern County. The ecologic factors that appear to be most conducive to survival and replication of the spores are high summer temperatures, mild winters, sparse rainfall, and alkaline, sandy soils.

Based on skin test surveys, the incidence of Valley Fever is between 25,000 and 100,000 new infections per year, with 70 deaths annually in the United States. It is difficult to determine the exact number of primary pulmonary and disseminated (cases in which the spores spread throughout the body) cases contracted annually, since diagnosis and reporting of cases is very incomplete. In Kern County, data from laboratory test reports indicate the occurrence of about 270 symptomatic infections per year, including 12 disseminated cases with an average of 5 deaths annually.

[140] California Air Resources Board, Aug, 2011, Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document. Supplement to the AB 32 Scoping Plan FED https://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf

[141] CARB, Climate Change Scoping Plan, Dec 2008, Pg 108

At least 60 percent of primary coccidioidomycosis is acquired symptomatically, with a positive result on a skin test being the only manifestation of infection. Forty percent of the infections become symptomatic with a disease spectrum ranging from mild influenza-like illness to a fulminating dissemination resulting in death. Primary coccidioidomycosis is limited to the initial lesions in the lungs where symptoms typically include fever, which may be 99 to 104 degrees Fahrenheit, chills, profuse sweating at night, and chest pain, which may worsen to include coughing, loss of appetite, headache, generalized muscle and joint aches, and slight swelling and redness of the joints. The prognosis of primary coccidioidomycosis is usually reliable and symptoms generally clear within two or three weeks. Patients whose symptoms persist after 6 to 8 weeks may be considered to have persistent pulmonary coccidioidomycosis.

Dissemination of coccidioidomycosis to sites in the body other than the lungs usually occurs within the first or second month and can cause a variety of symptoms. Dissemination may involve any organ of the body, except those in the gastrointestinal tract. The skin, bones, joints, meninges, and genitourinary system are most commonly involved. Involvement of a vital organ may result in death. Meningitis occurs in one-third to one-half of all patients with disseminated disease. Untreated coccidioidal meningitis is usually fatal within less than two years.

The five major factors that have an effect on the susceptibility to coccidioidal dissemination are race, sex, pregnancy, age and immunosuppression. In a retrospective study of the Kern County Health Department records, 64 deaths were recorded for the period 1901 to 1936, when the County had a population of 82,570. According to this data, Mexicans were 3.4 times more likely than whites to develop coccidioidal dissemination; blacks were 13.7 times more likely; and Filipinos were 175.5 times more likely. Death due to the disease was five times greater for Mexicans, 23.3 times greater for blacks, and 191.4 times greater for Filipinos than for white patients. Adult white females are ordinarily quite resistant to dissemination of the disease, but if they acquire the infection during the last half of pregnancy, there is a risk that it will spread beyond the lungs. Children under five and older individuals, perhaps those above fifty, also appear to be more likely to undergo dissemination of the infection.

The highest incidence rates within Kern County have occurred in the areas of Northeast Bakersfield, Lamont-Arvin, Taft, and Edwards Air Force Base. New residents to the San Joaquin Valley have usually never been exposed to "Valley Fever," and as a result are particularly susceptible to the infection. Many longtime residents of the area have at some time been exposed to the fungus, become infected, and have recovered, and are thus immune. However, occasionally, changes in the person's immune system brought about by other diseases or treatments which lower or suppress the immune system can allow a reactivation or reinfection.[142]

The soils in the areas of Arvin and Lamont are derived from decomposing Quaternary alluvial fan deposits. These, however, are sourced from Mesozoic Sierran granitic rocks having a different mineralogical and consequent chemical content than the soil in the area of the project. The soils in the area of Edwards Air Force Base are composed of decomposed, reworked non-marine alluvium, evaporite playa, sand, and terrace deposits. These have been derived from various Mesozoic granitic rocks. The increased aridity and prevalence of evaporites would alter the chemical composition, as compared to the soil in the area of the project, which forms in a wetter environment. The soils in the Taft area are mainly sourced from the nearby outcropping marine

[142] http://www.vfce.arizona.edu/FAQ.htm#howdoigetvelleyfever

Miocene Monterey Formation consisting mainly of sands, silts and diatomites. These again should form a somewhat dissimilar mineralogical and consequent chemical content than the soil in the area of the project. The soils in the area of Sharks Tooth Hill in Northeast Bakersfield which is endemic for San Joaquin Valley Fever, *Coccidioidomycosis,* is composed of the decomposed marine Round Mountain Silt Member of the Miocene Monterey Formation. The soil in the area of the project is derived from decomposing Quaternary fluvial deposits as sourced from the Sierra Nevada Mountains, composed of Cretaceous granites. This rock type would lead to similar soils based upon the similar mineralogical and consequent chemical content. [143, 144]

The subject project areas are not underlain by the type of sediments that are known to contain Valley Fever spores. Considering the SJVAPCD Regulation VIII dust control measures, the risk of contacting Valley Fever in connection with the cumulative impact of the subject projects is considered to be unlikely.

Taft is located in western Kern County to the south of the project site. The soils in the Taft area are mainly sourced from the nearby outcropping marine Miocene Monterey Formation consisting mainly of sands, silts and diatomites. The soils in the area of Sharks Tooth Hill in Northeast Bakersfield which is endemic for San Joaquin Valley Fever, *Coccidioidomycosis,* is composed of the decomposed marine Round Mountain Silt Member of the Miocene Monterey Formation. The soil in the area of the project is derived from decomposing Miocene deposits as sourced from the Temblor Range to the west, similar to the sediments in the Taft area. This rock type would lead to similar soils based upon the similar mineralogical and consequent chemical content. [145, 146]

The subject projects area are potentially underlain by the type of sediments that are known to contain Valley Fever spores.

The SJVAPCD Regulation VIII dust control measures will be implemented, thereby reducing the potential to come in contact with spores. Implementation of Mitigation Measure 1 described in Section 8, watering 3X/day, reduces the risk of exposure to Valley Fever during construction to *less than significant*.

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[143] United States Department of Agriculture, Soil Survey of Kern County California Southwestern Part, "Sheet NO. 7, Kern County, California" (Lamont Quadrangle). Issued 2009.

[144] State of California, Department of Conservation, Division of Mines and Geology, "Geologic Map of California," Bakersfield Sheet. 1964.

[145] United States Department of Agriculture, Soil Survey of Kern County California Southwestern Part, "Sheet NO. 7, Kern County, California" (Lamont Quadrangle). Issued 2009.

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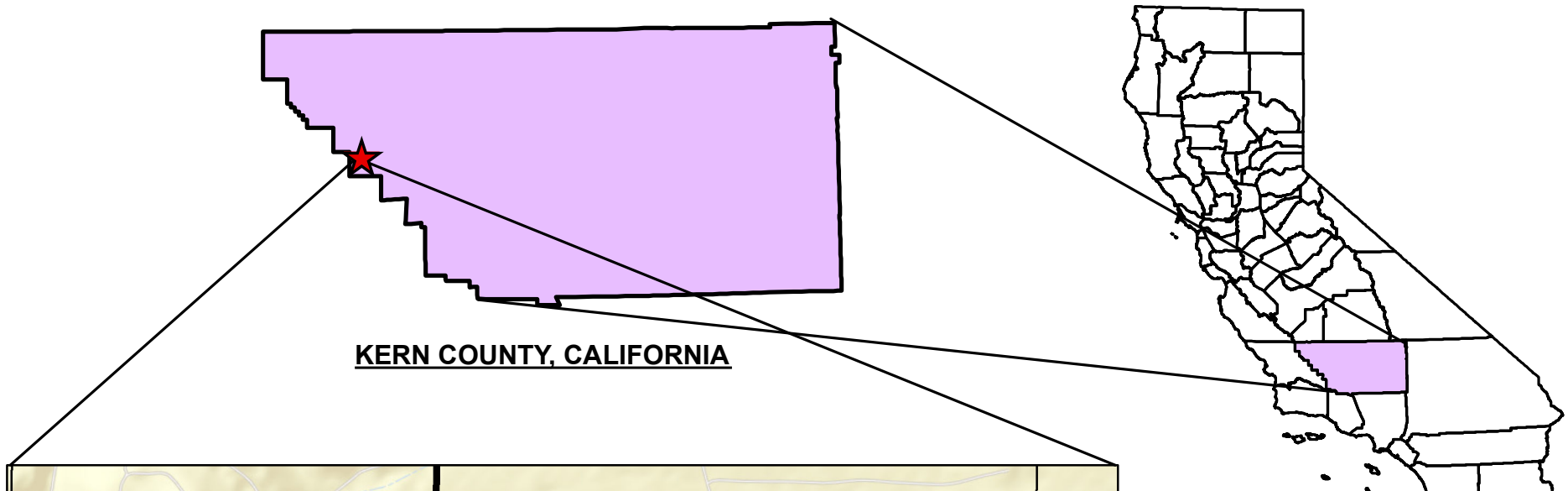
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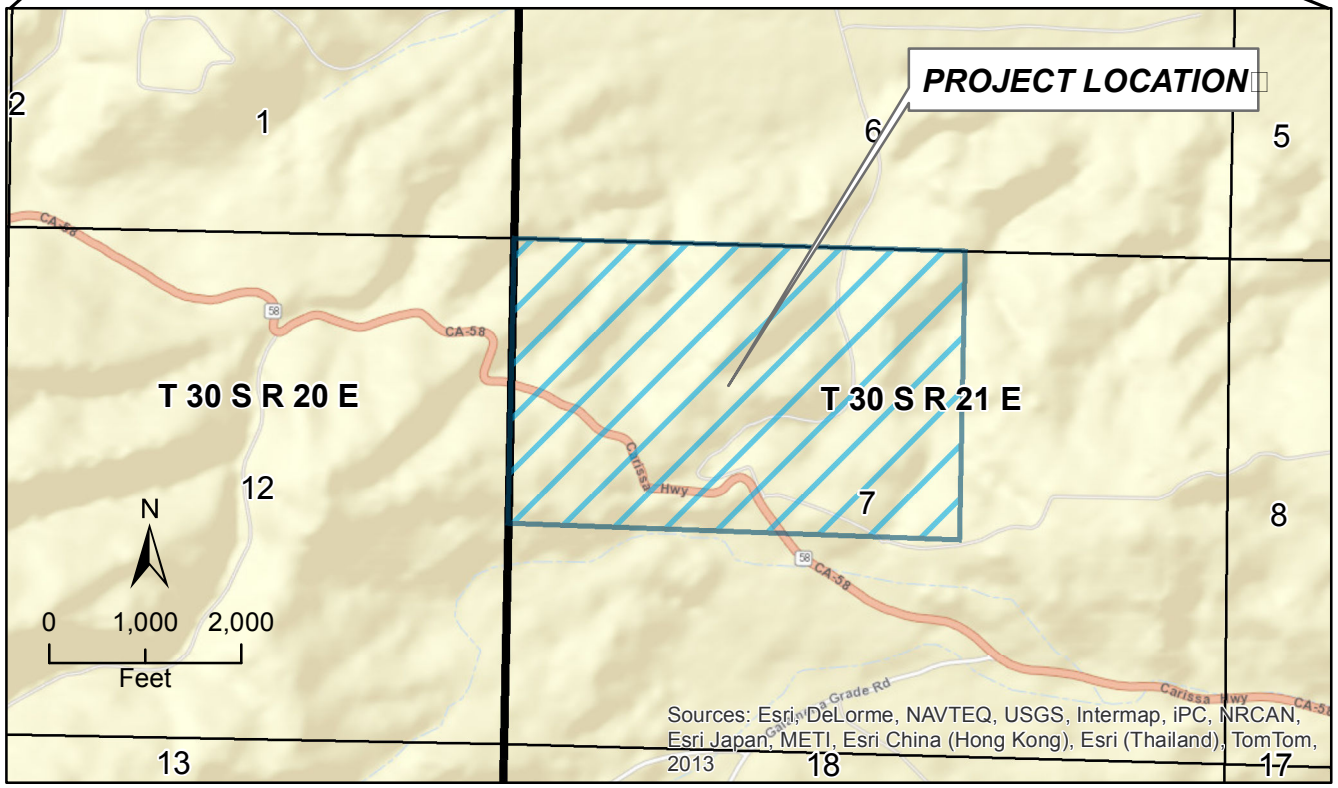
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EXHIBITS

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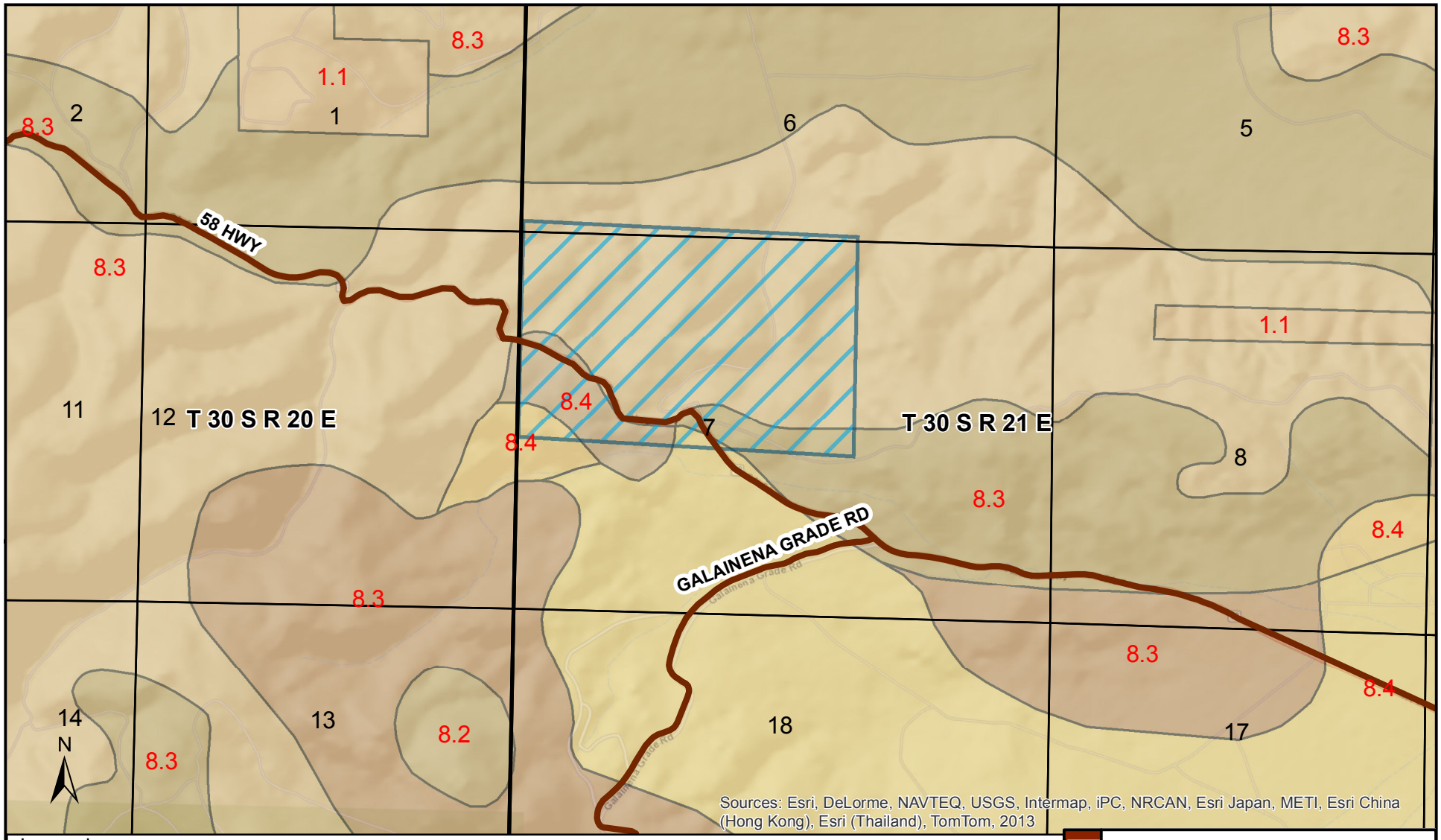


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

PROJECT LOCATION MAP

DATE:		EXHIBIT:
4/15		1.1- 1



Legend

- Project Location
- Roads

Kern County Land Use Descriptions

- 1.1, State or Federal Land
- 8.2/2.2, Resource Agriculture (Min. 20 Acre Parcel Size)
- 8.3, Extensive Agriculture (Min. 20 Acre Parcel Size)
- 8.3/2.2, Extensive Agriculture (Min. 20 Acre Parcel Size)
- 8.3/2.4, Extensive Agriculture (Min. 20 Acre Parcel Size)
- 8.4, Mineral and Petroleum (Min. 5 Acre Parcel Size)
- 8.4/2.2, Mineral and Petroleum (Min. 5 Acre Parcel Size)
- 8.4/2.4, Mineral and Petroleum (Min. 5 Acre Parcel Size)

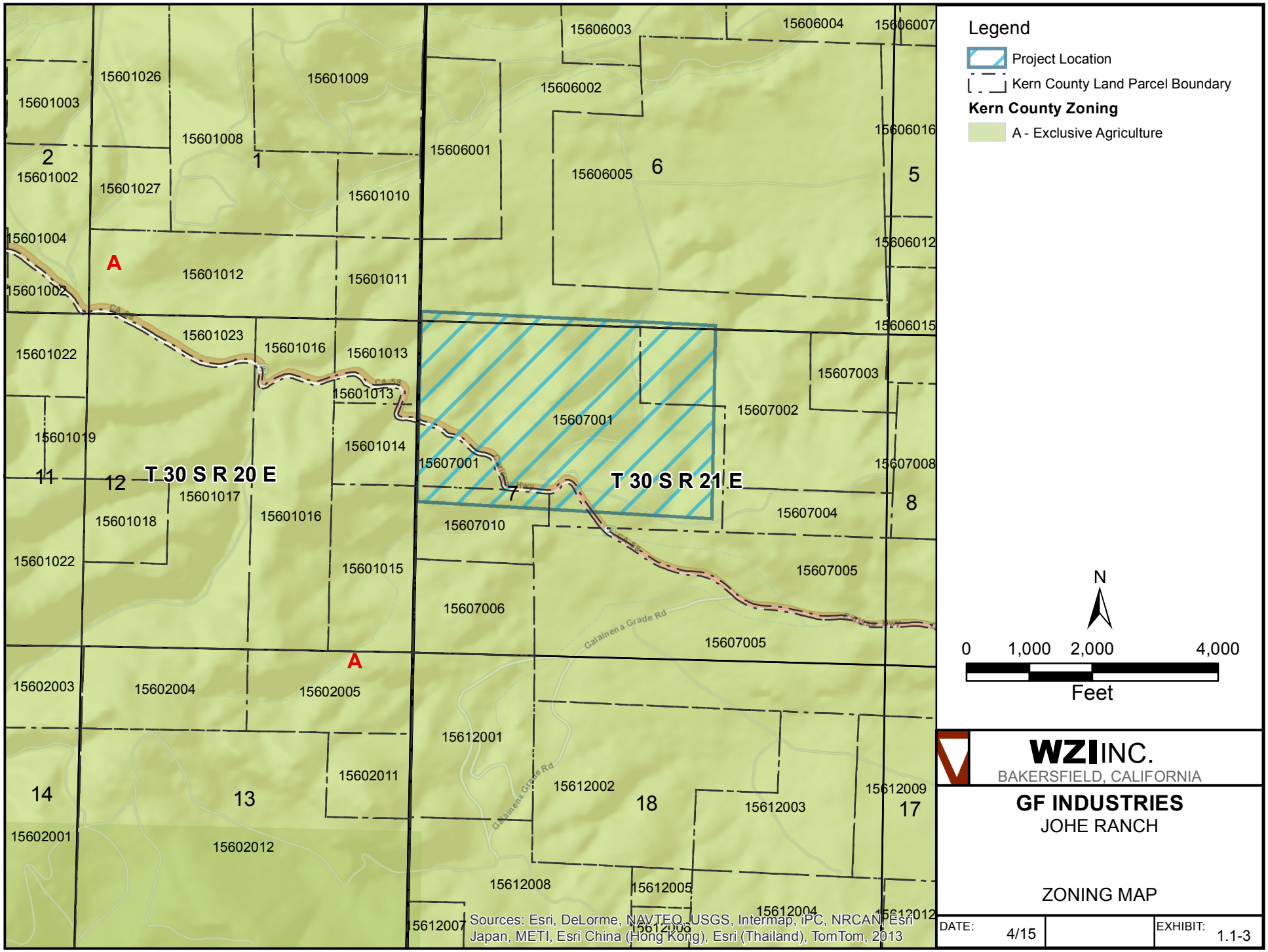
0 1,000 2,000 4,000
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

LAND USE MAP

DATE:		EXHIBIT:
4/15		1.1-2

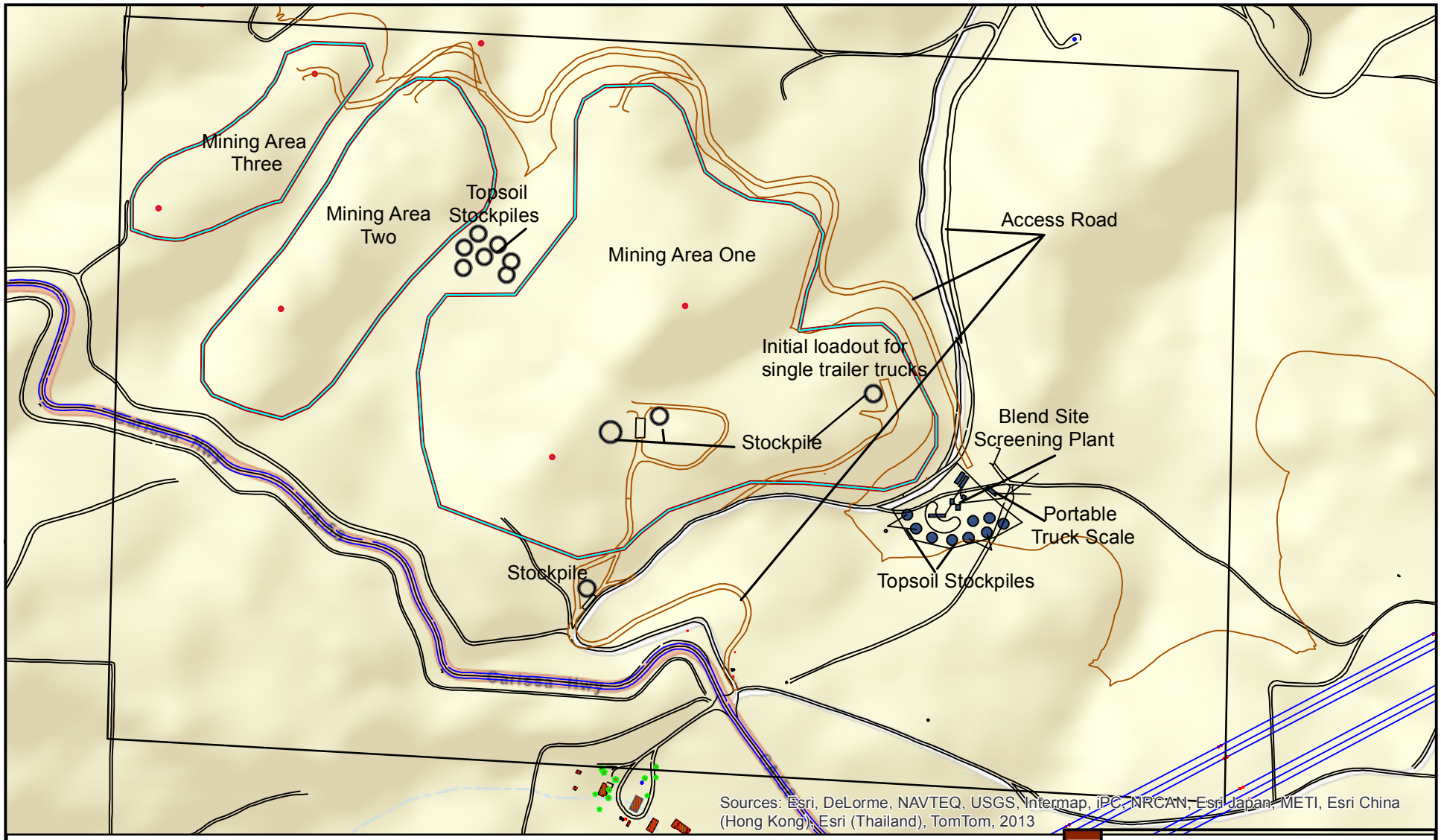


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

ZONING MAP

DATE:		EXHIBIT:
4/15		1.1-3



N

0 300 600 1,200

Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

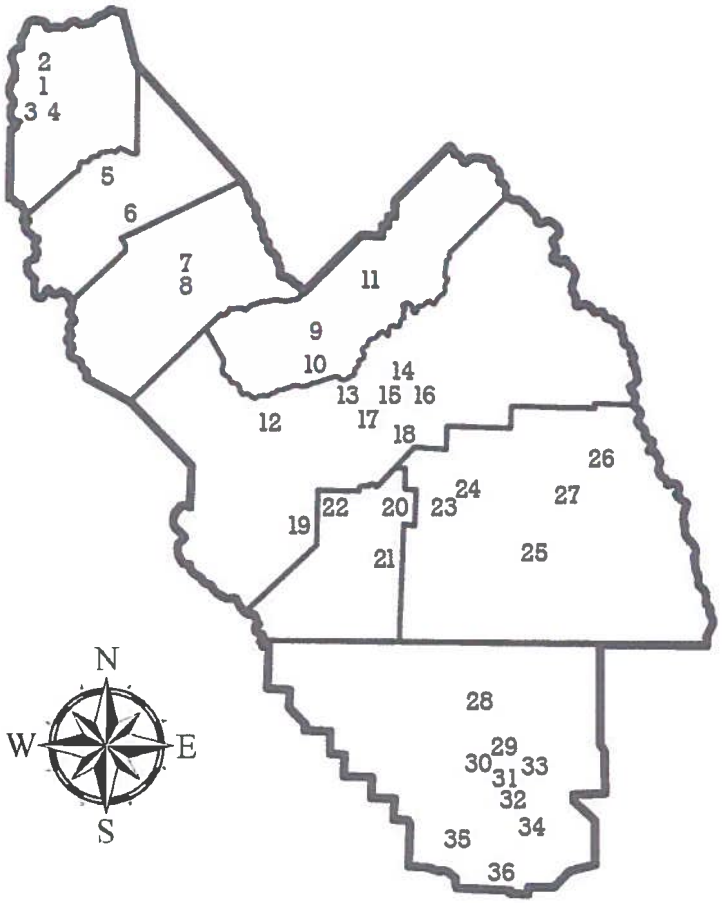
GF INDUSTRIES
JOHE RANCH

EXISTING SITE PLAN MAP

DATE:	4/15		EXHIBIT:	4

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

As of May 2014



SAN JOAQUIN COUNTY
- ■ 1 Stockton-Hazelton: G, M, P, F, T
- ★ 2 Stockton-Wagner/Holt: P
- ★ 3 Tracy-Airport: G, M, P, F
- ★ 4 Manteca: P, F, M

STANISLAUS COUNTY
- ■ 5 Modesto-14th St: G, M, P, F
- ★ 6 Turlock: G, M, P, F

MERCED COUNTY
- ★ 7 Merced-M St: P, F
- ★ 8 Merced-Coffee: G, F, M

MADERA COUNTY
- ★ 9 Madera City: G, P, F, M
- ★ 10 Madera-Pump Yard: G, M

Other[1]:

Chukchansi Indians
- ▲ 11 Picayune Rancheria: G, F, P, M

FRESNO COUNTY
- ★ 12 Tranquillity: G, F, M
- ★ 13 Sierra Sky Park: G, M
- ★ 14 Clovis: G, M, P, F
- ■ 15 Fresno-Garland: G, M, P, F, T, N, L
- ★ 16 Fresno-Pacific: F
- ★ 17 Drummond: G, P, M
- ★ 18 Parlier: G, M
- ★ 19 Huron: F, M

MONITORING DESIGNATIONS
- A Acid Deposition
- F Fine Particulate (PM2.5)
- G Gaseous
- M Meteorological
- P Particulate (PM10)
- N National Core
- T Toxins
- L Lead

KINGS COUNTY
- ★ 20 Hanford: G, F, M, P
- ★ 21 Corcoran: F, M, P

Other[1]:

Tachi Yokut Tribe
- ▲ 22 Santa Rosa Rancheria: G, M, P

TULARE COUNTY
- ★ 23 Visalia Airport: M
- ■ 24 Visalia-Church St: G, F, M, P
- ★ 25 Porterville: G, F, M

Other[2]:
- ▲ 26 Lower Kaweah: A, G, M
- ▲ 27 Ash Mountain: A, G, M, F

KERN COUNTY
- ● 28 Shafter: G, M
- ■ 29 Oildale: G, M, P
- ■ 30 California Avenue: A, G, M, P, F, T
- ★ 31 Bakersfield-Muni: G, M
- ■ 32 Bakersfield-Airport (Planz): F
- ■ 33 Edison: G, M
- ■ 34 Arvin-Di-Giorgio: G, M
- ★ 35 Maricopa: G, M
- ★ 36 Lebec: F, M

MONITORING OPERATION
- ★ Sites operated by the District
- ● Sites operated by the District & CARB
- ■ Sites operated by CARB
- ▲ Sites operated by other agencies

Other[1] Tribal

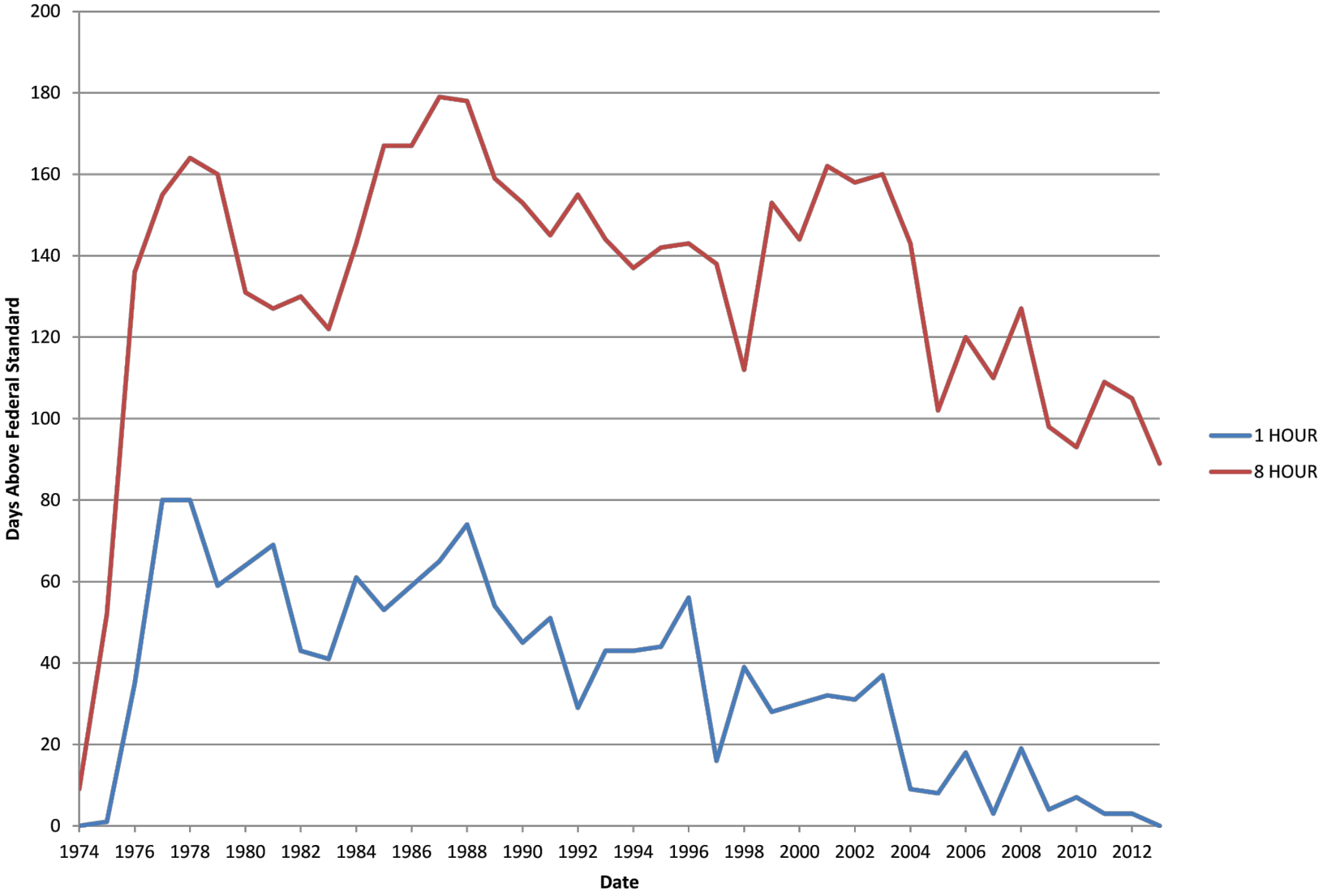
Other[2] National Park Service

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION LOCATION MAP

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.3–1

San Joaquin Valley Air Basin - Ozone Air Quality Trends

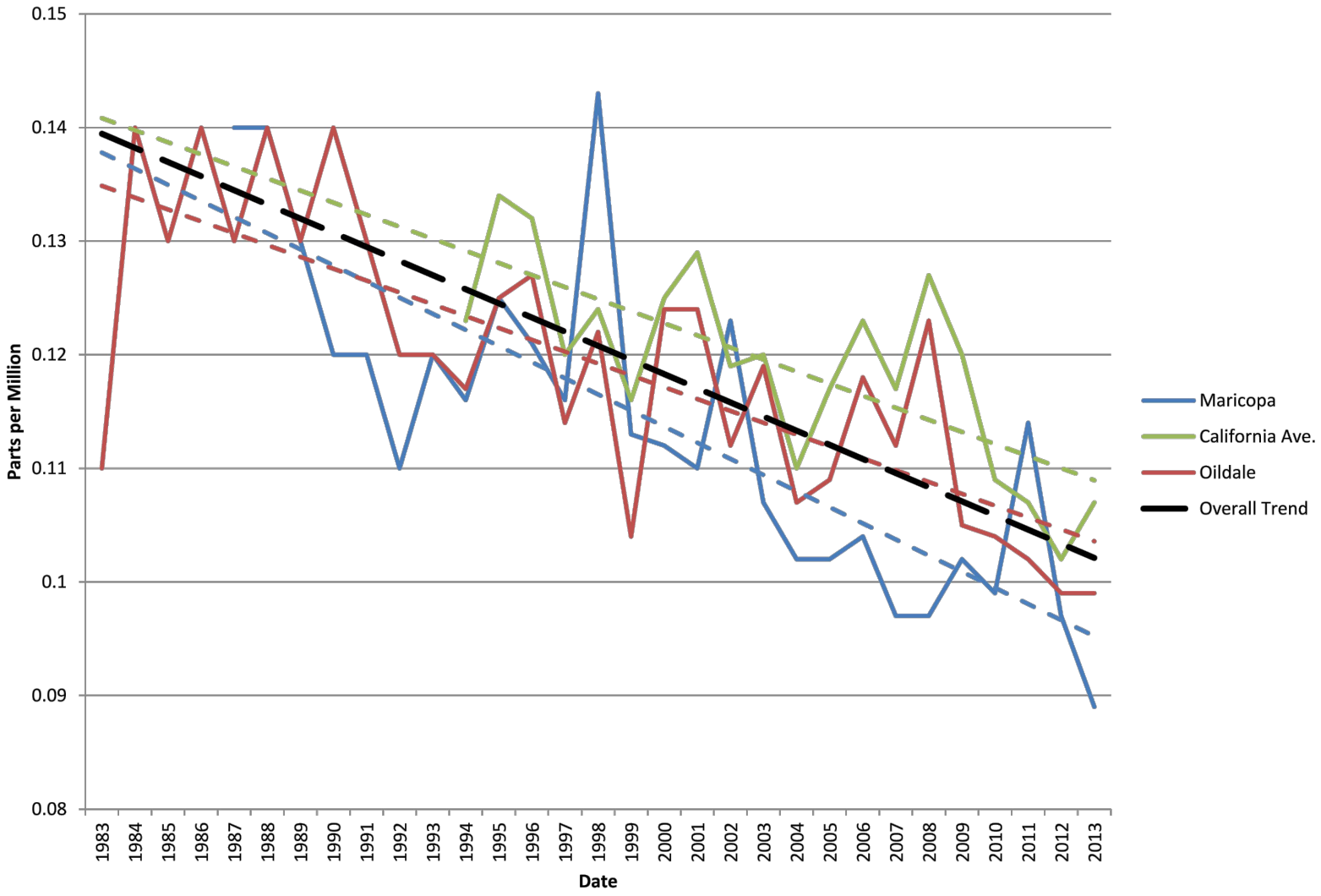


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
SAN JOAQUIN VALLEY AIR BASIN
OZONE AIR QUALITY TRENDS

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–1

Monitoring Station Data-Ozone Maximum 1-Hour Concentration

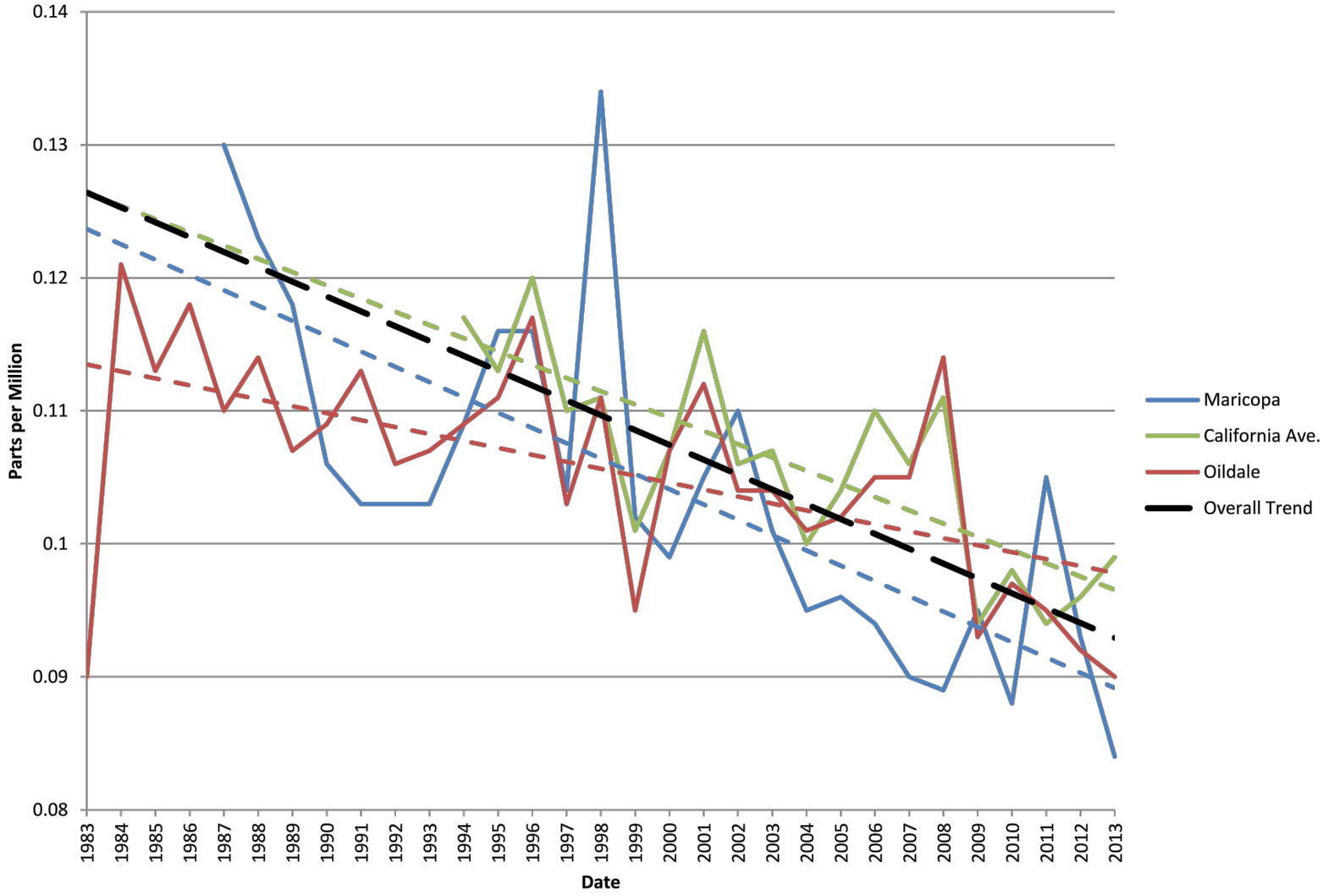


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
OZONE MAX 1-HR CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–2

Monitoring Station Data-Ozone Maximum 8-Hour Concentration

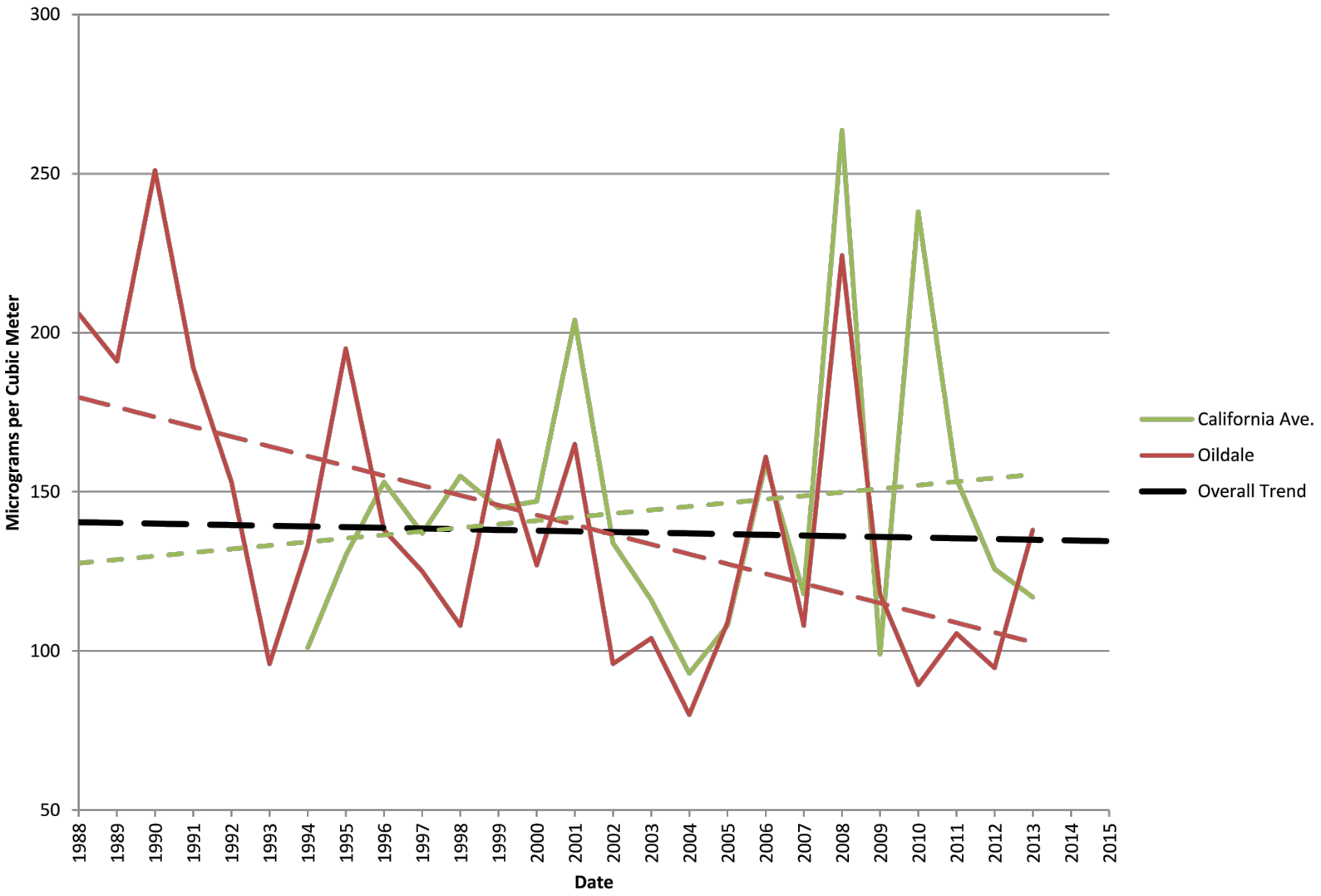


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
OZONE MAX 8-HR CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–3

Monitoring Station Data-PM10 Maximum 24-Hour Concentration



WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
PM10 MAX 24-HR CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–4

Monitoring Station Data-PM2.5 Maximum 24-Hour Concentration

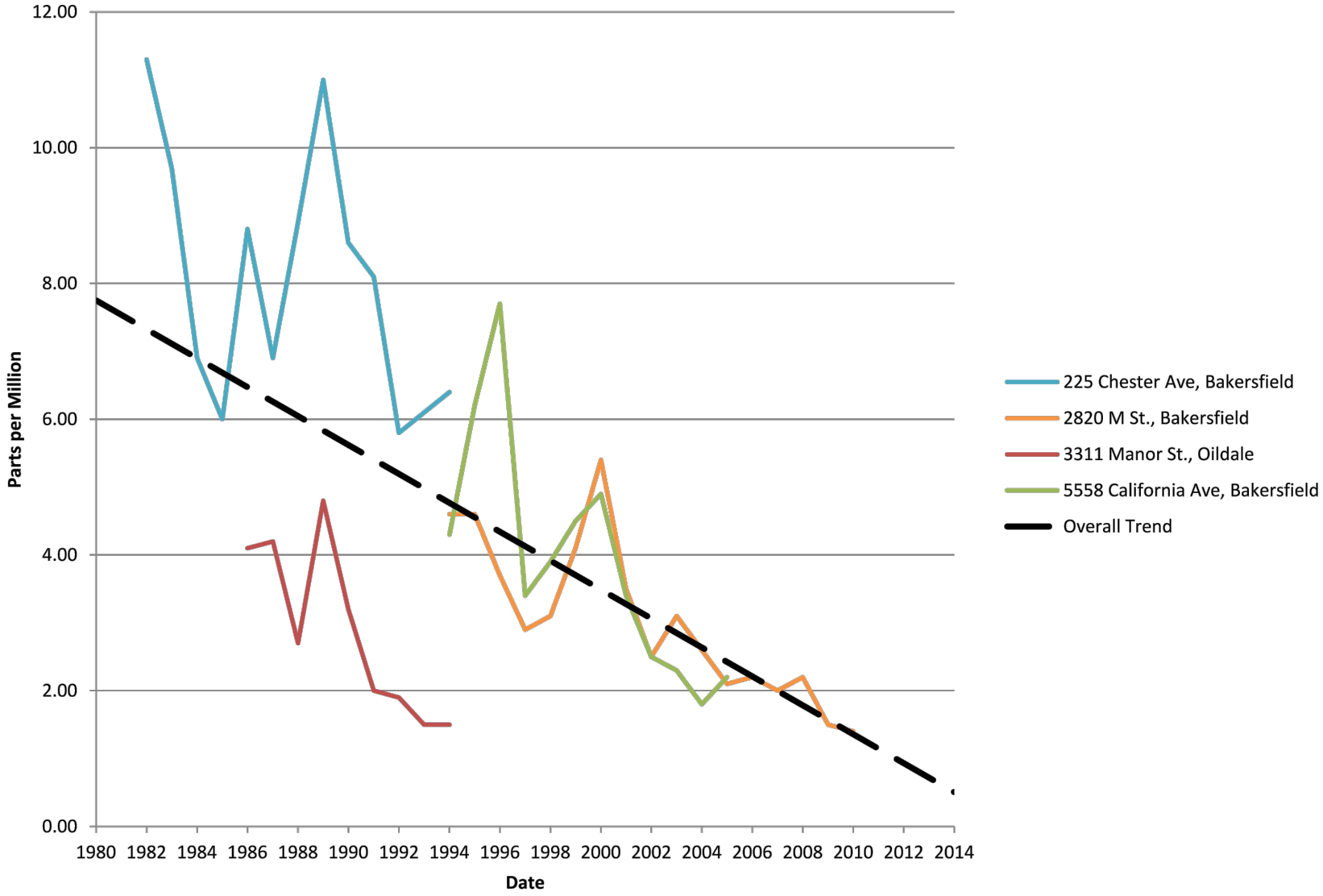


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
PM2.5 MAX 24-HR CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6-5

Monitoring Station Data CO Max 8-HR Concentration

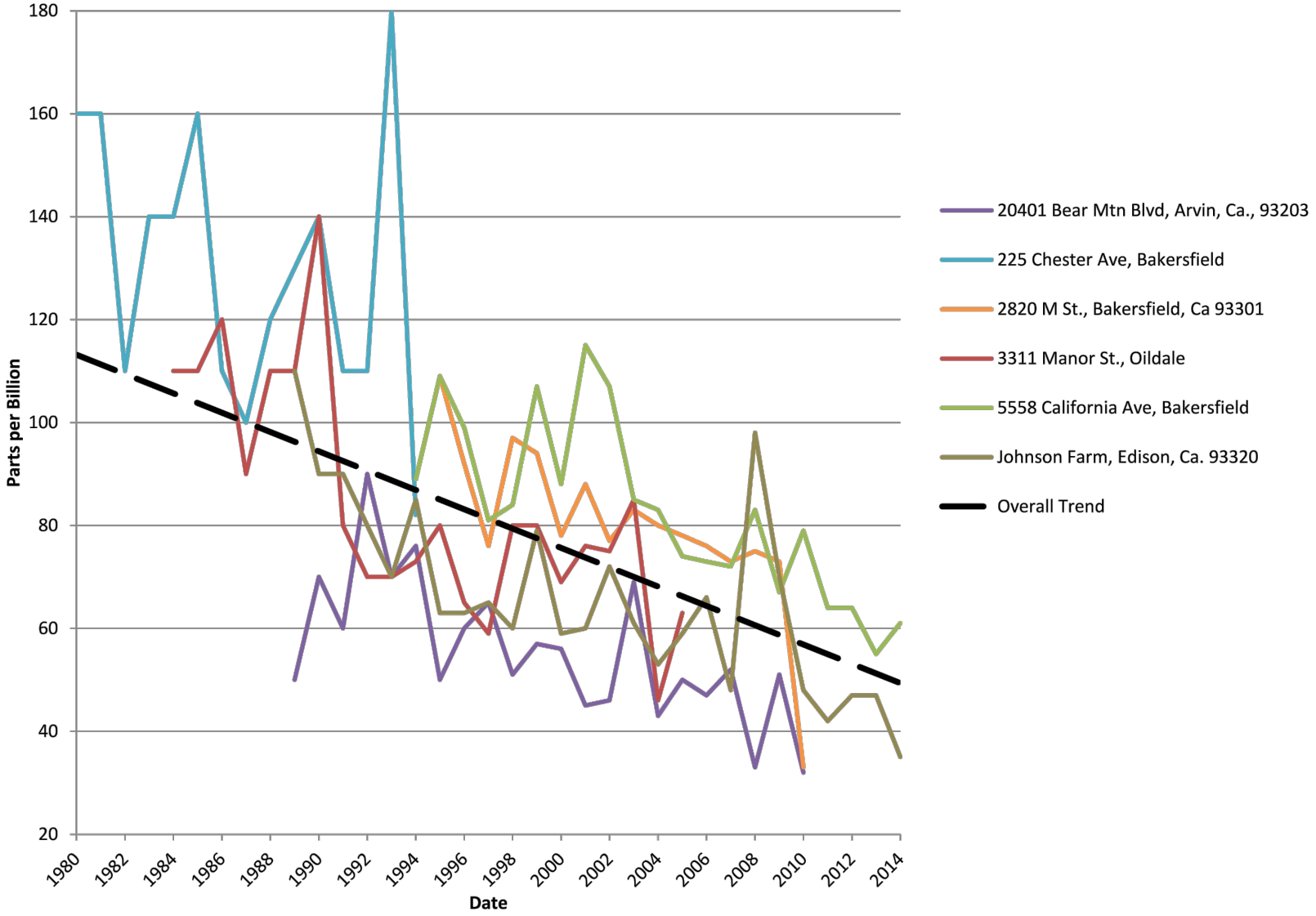


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
CO MAX 8-HR CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–6

Monitoring Station Data-NOx Maximum Hourly Concentration

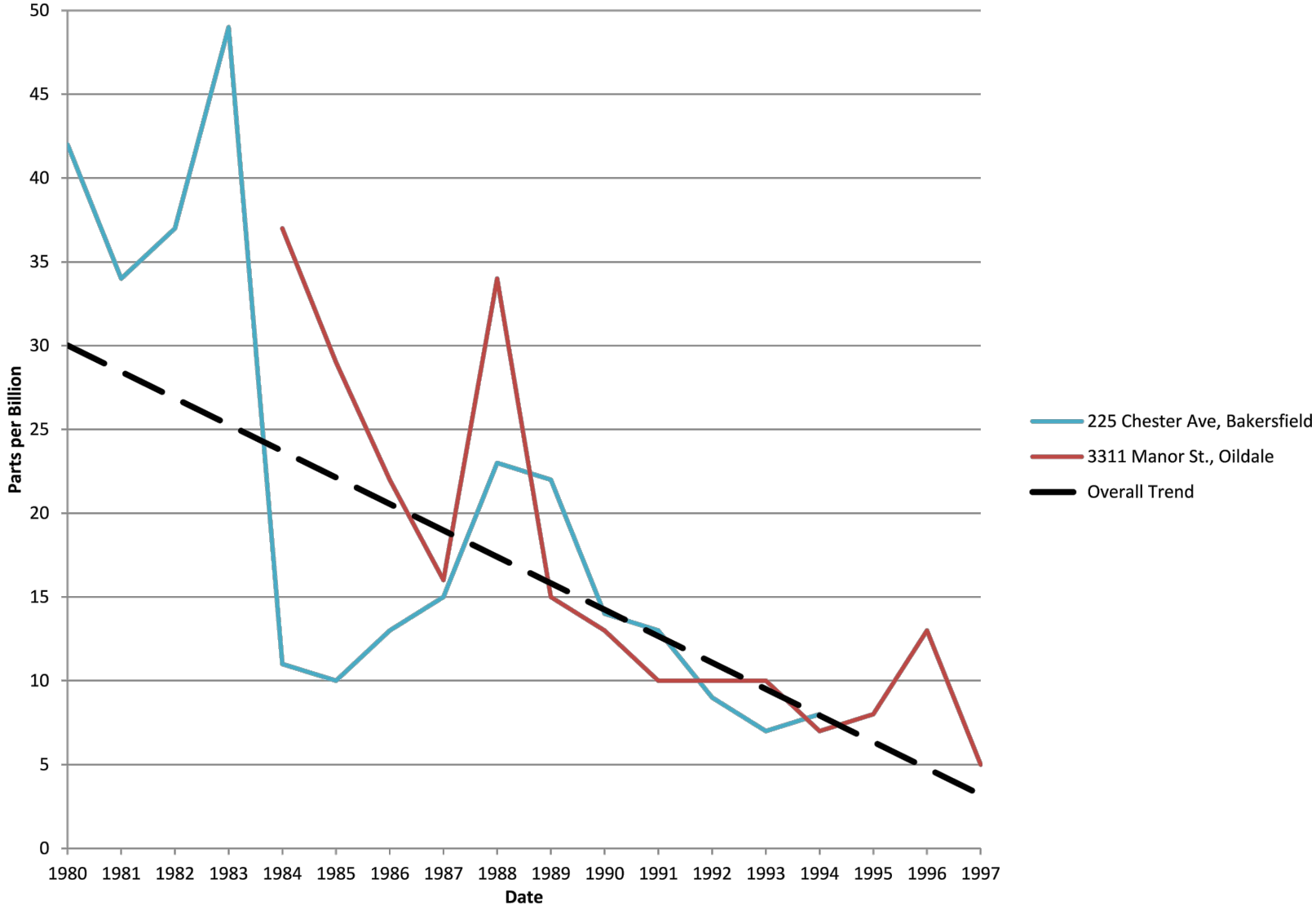


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
NOx MAX HOURLY CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–7

Monitoring Station Data-SOx Maximum 24-Hour Concentration



WZI INC.
BAKERSFIELD, CALIFORNIA

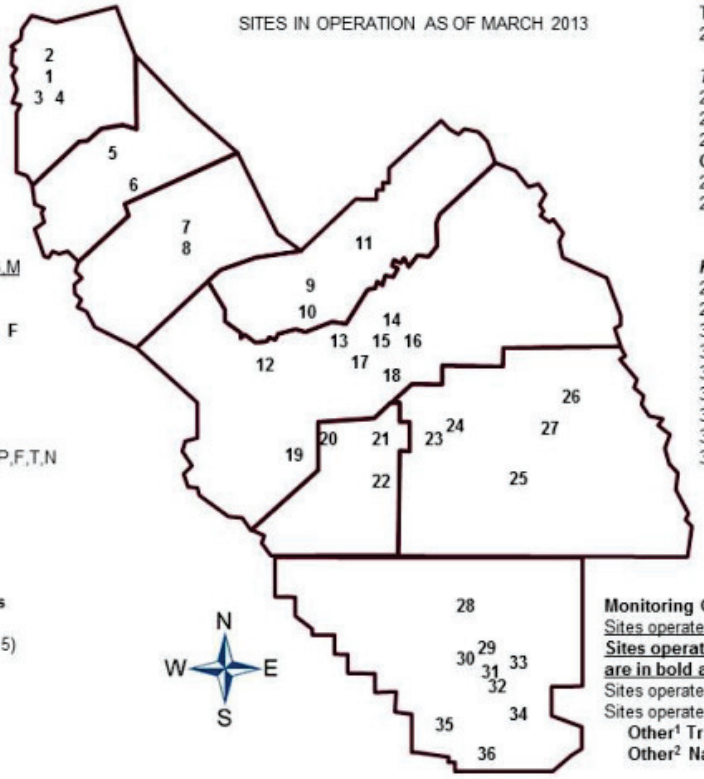
GF INDUSTRIES
MONITORING STATION DATA
SOx MAX 24-HR CONCENTRATION

DATE: 4/15	Johe's Ranch	EXHIBIT: 4.6–8

San Joaquin Valley Unified Air Pollution Control District **March 19, 2013**

San Joaquin Valley AIR POLLUTION CONTROL DISTRICT

SITES IN OPERATION AS OF MARCH 2013



San Joaquin Co:
1 Hazelton: G,M,P,F,T
2 Wagner/Holt: P
3 Tracy: G,M,P,F
4 Manteca: P,F,M

Stanislaus Co:
5 Modesto: G,M,P,F
6 Turlock: G,M,P,F

Merced Co:
7 M Street: P,F
8 Coffee St: F,G,M

Madera Co:
9 Madera City: G,P,F,M
10 Madera-Pump Yard: G,M
Other[1]:
Chukchansi Indians
11 Picayune Rancheria: F

Fresno Co:
12 Tranquillity: G,F,M
13 Sierra Sky Park: G,M
14 Clovis: G,M,P,F
15 Fresno-Garland: G,M,P,F,T,N
16 Fresno-Pacific: F
17 Drummond: G,P,M
18 Parlier: G,M
19 Huron: F,M

Monitoring Designations
A: Acid Deposition
F: Fine Particulate (PM2.5)
G: Gaseous
M: Meteorological
P: Particulate (PM10)
N: National Core
T: Toxics

Kings Co:
21 Hanford: F,G,P,M
22 Corcoran: G,M,P,F
Other[1]:
Tachi Yokut Tribe
20 Santa Rosa Rancheria: G,M,P

Tulare Co:
23 Visalia Airport: M
24 Church Street: G,M,P,F
25 Porterville: G,F,M
Other[2]:
26 Kaweah: A,G,M
27 Ash Mountain: A,G,M,F

Kern Co:
28 **Shafter:** G,M
29 Oildale: G,M,P
30 California Avenue: A,G,M,P,F,T
31 Bakersfield-Muni: G,M
32 Planz Road: F
33 Edison: G,M
34 Arvin-Di-Giorgio: G,M
35 Maricopa: G,M
36 Lebec: F,M

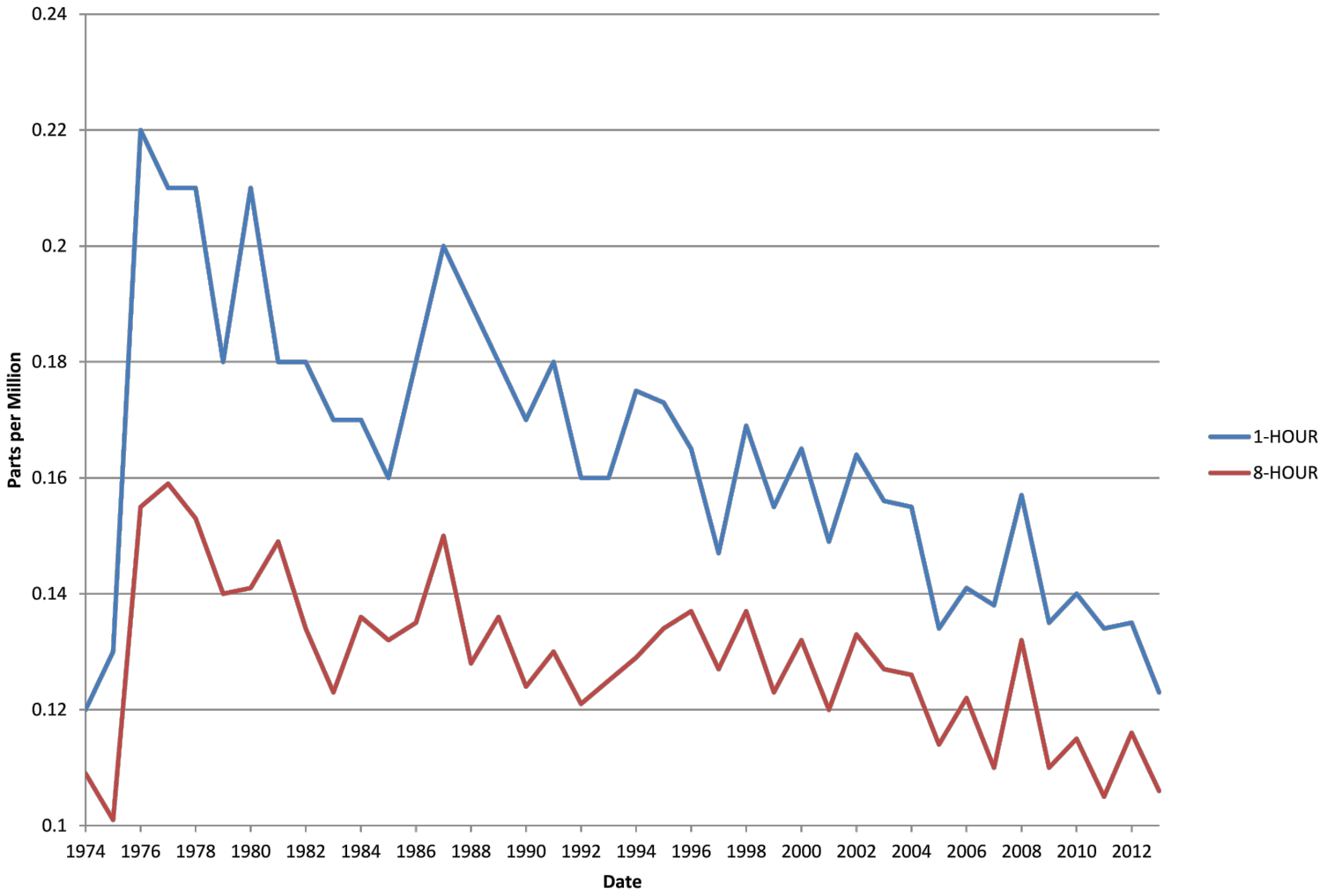
Monitoring Operation:
Sites operated by the District are underlined.
Sites operated jointly by the District and CARB are in bold and underlined.
Sites operated by CARB are in plain text.
Sites operated by other agencies are in bold text:
Other[1] Tribal
Other[2] National Park Service

WZI INC.
BAKERSFIELD, CALIFORNIA

Wible Ave, LLC
SAN JOAQUIN VALLEY AIR MONITORING STATION LOCATIONS

DATE: 5/14	Wible–102	EXHIBIT: 4.3–1

San Joaquin Valley Air Basin - Ozone Air Quality Trends

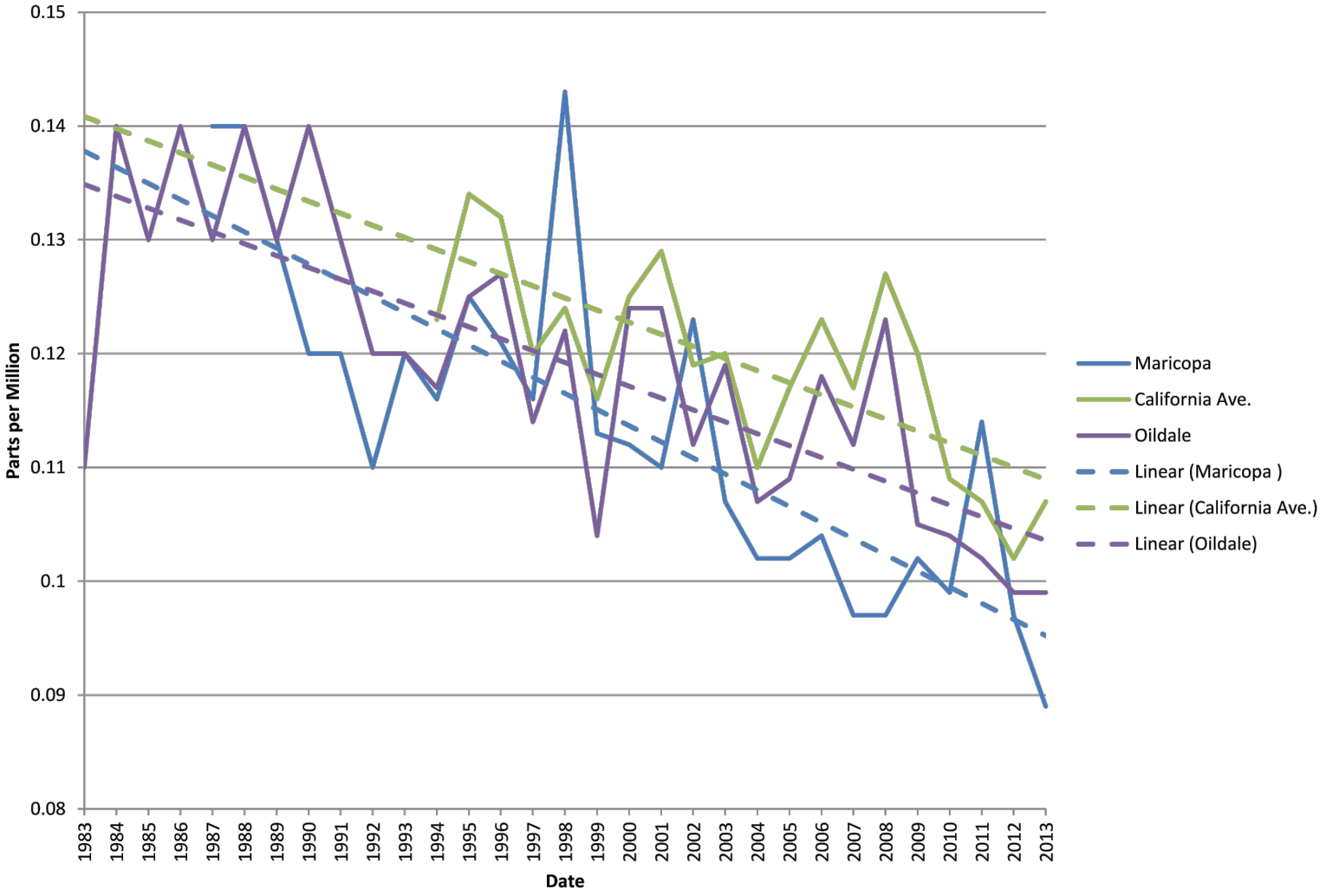


WZI INC.
BAKERSFIELD, CALIFORNIA

Wible Ave, LLC
SAN JOAQUIN VALLEY AIR BASIN
OZONE AIR QUALITY TRENDS

DATE: 5/14	Wible–102	EXHIBIT: 4.6–1

Monitoring Station Data-Ozone Maximum 1-Hour Concentration

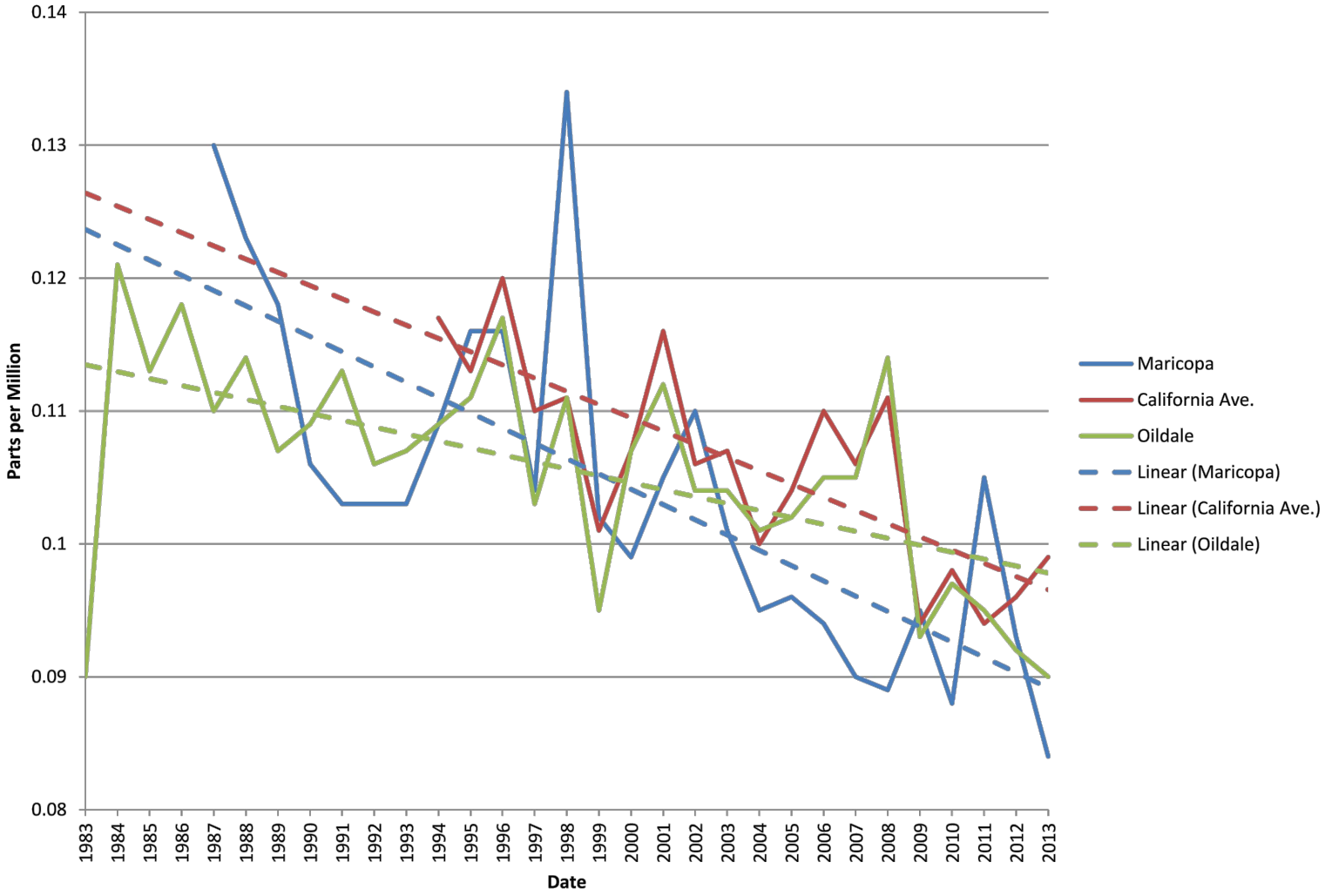


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
OZONE MAX 1-HR CONCENTRATION

DATE: 4/15		EXHIBIT: 7

Monitoring Station Data-Ozone Maximum 8-Hour Concentration

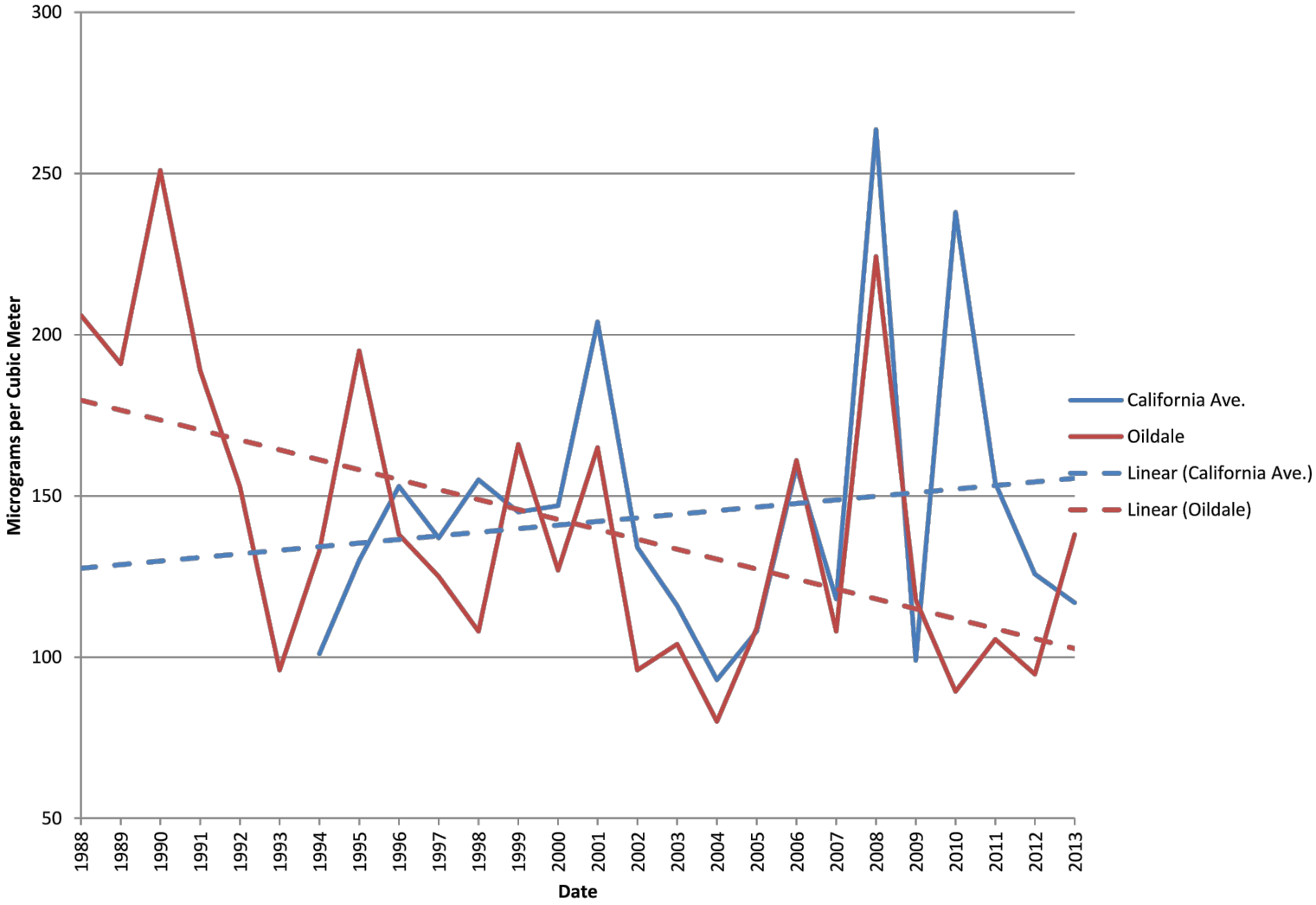


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
OZONE MAX 8-HR CONCENTRATION

DATE: 4/15		EXHIBIT: 8

Monitoring Station Data-PM10 Maximum 24-Hour Concentration

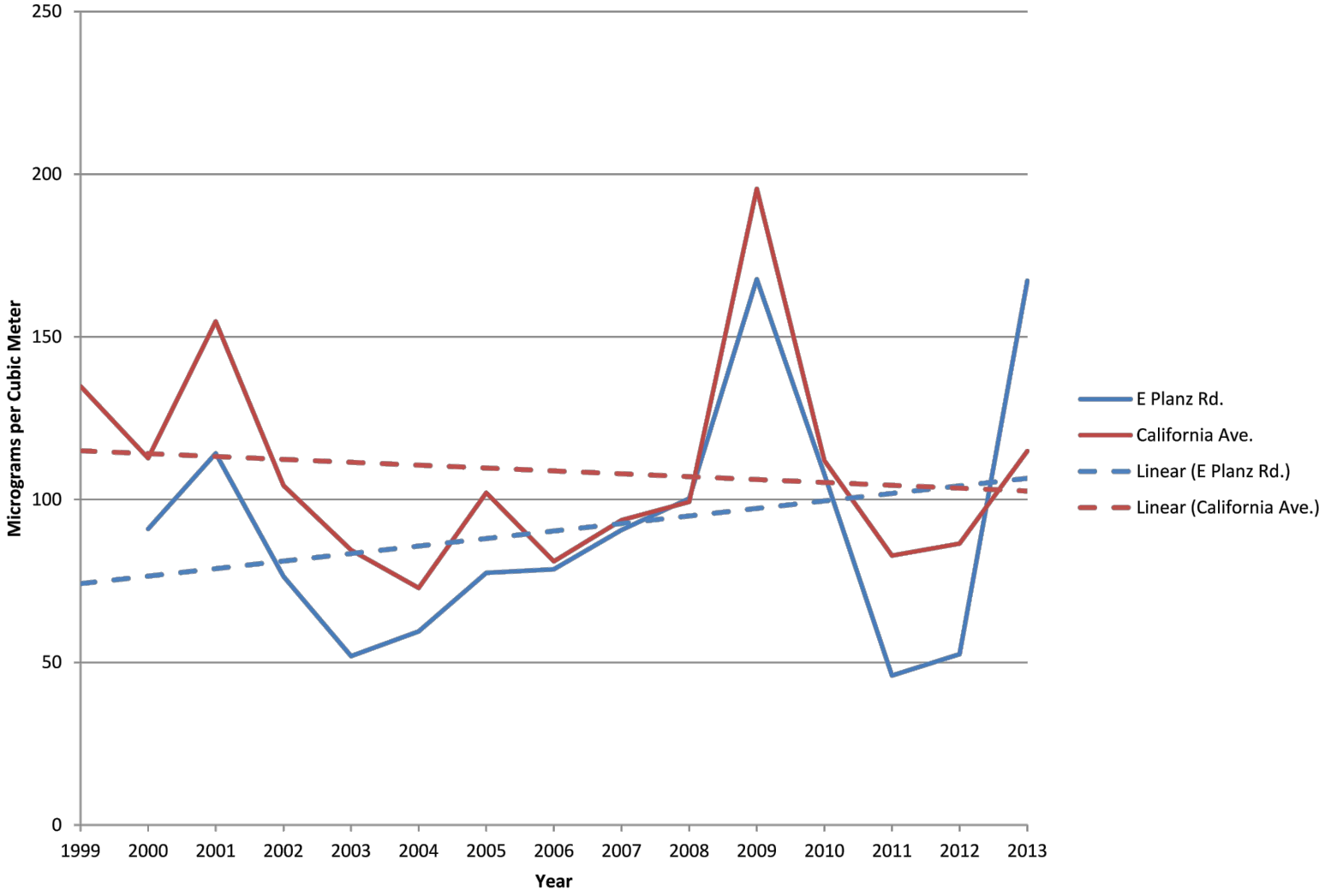


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
PM10 MAX 24-HR CONCENTRATION

DATE: 4/15		EXHIBIT: 9

Monitoring Station Data-PM2.5 Maximum 24-Hour Concentration

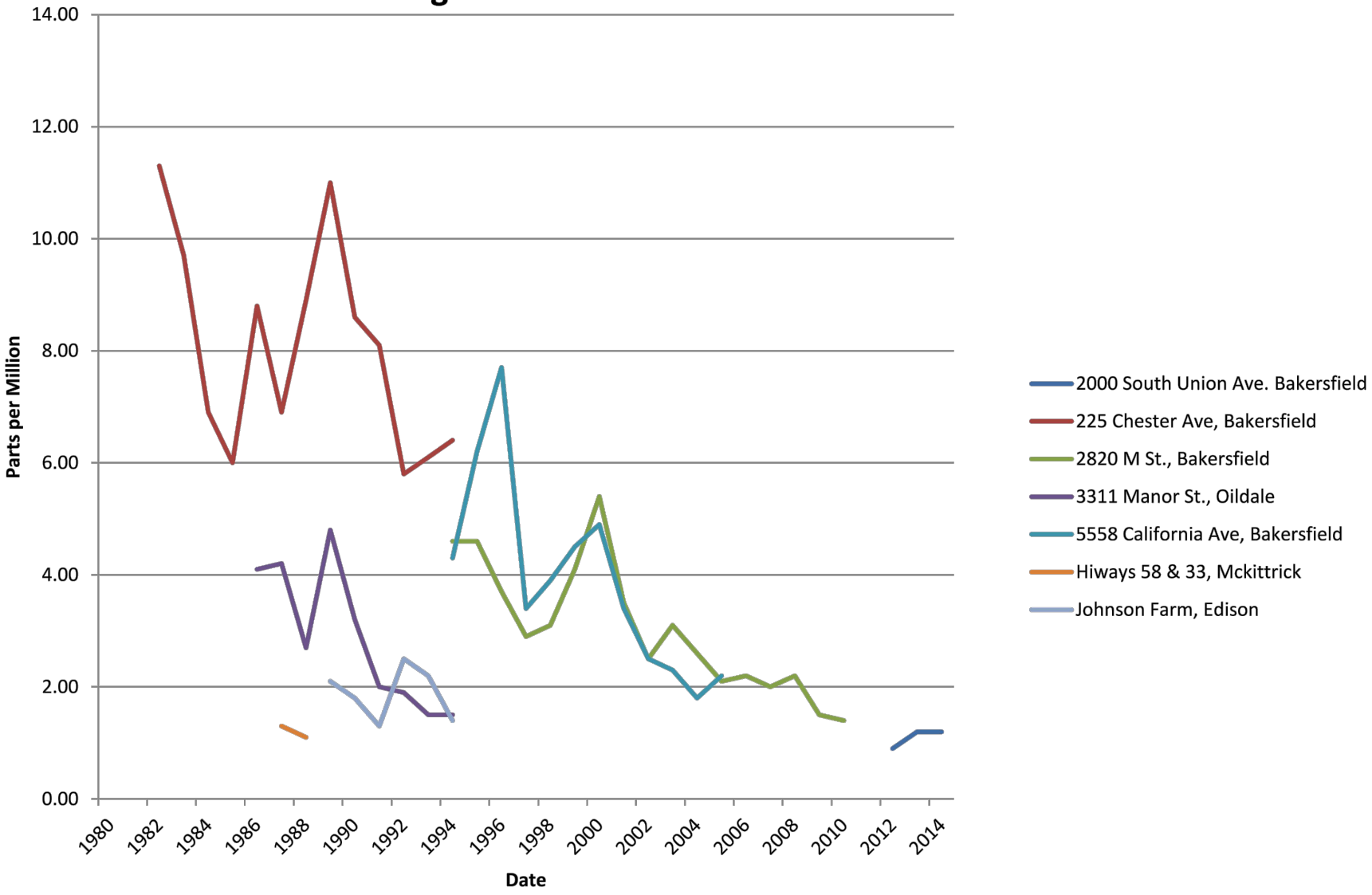


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
PM2.5 MAX 24-HR CONCENTRATION

DATE: 4/15 | EXHIBIT: 10

Monitoring Station Data CO Max 8-HR Concentration

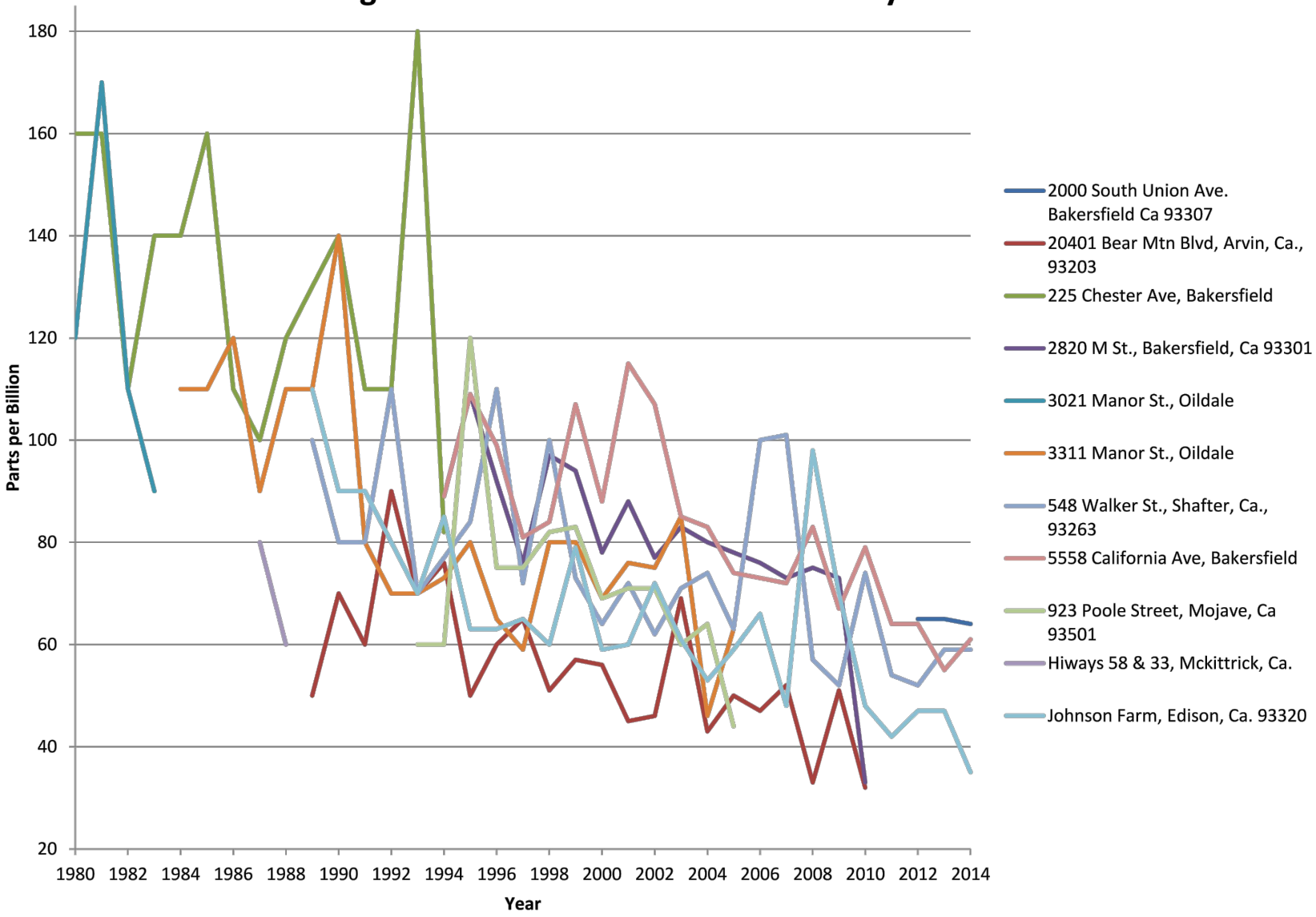


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
CO MAX 8-HR CONCENTRATION

DATE: 4/15		EXHIBIT: 11

Monitoring Station Data-NOx Maximum Hourly Concentration

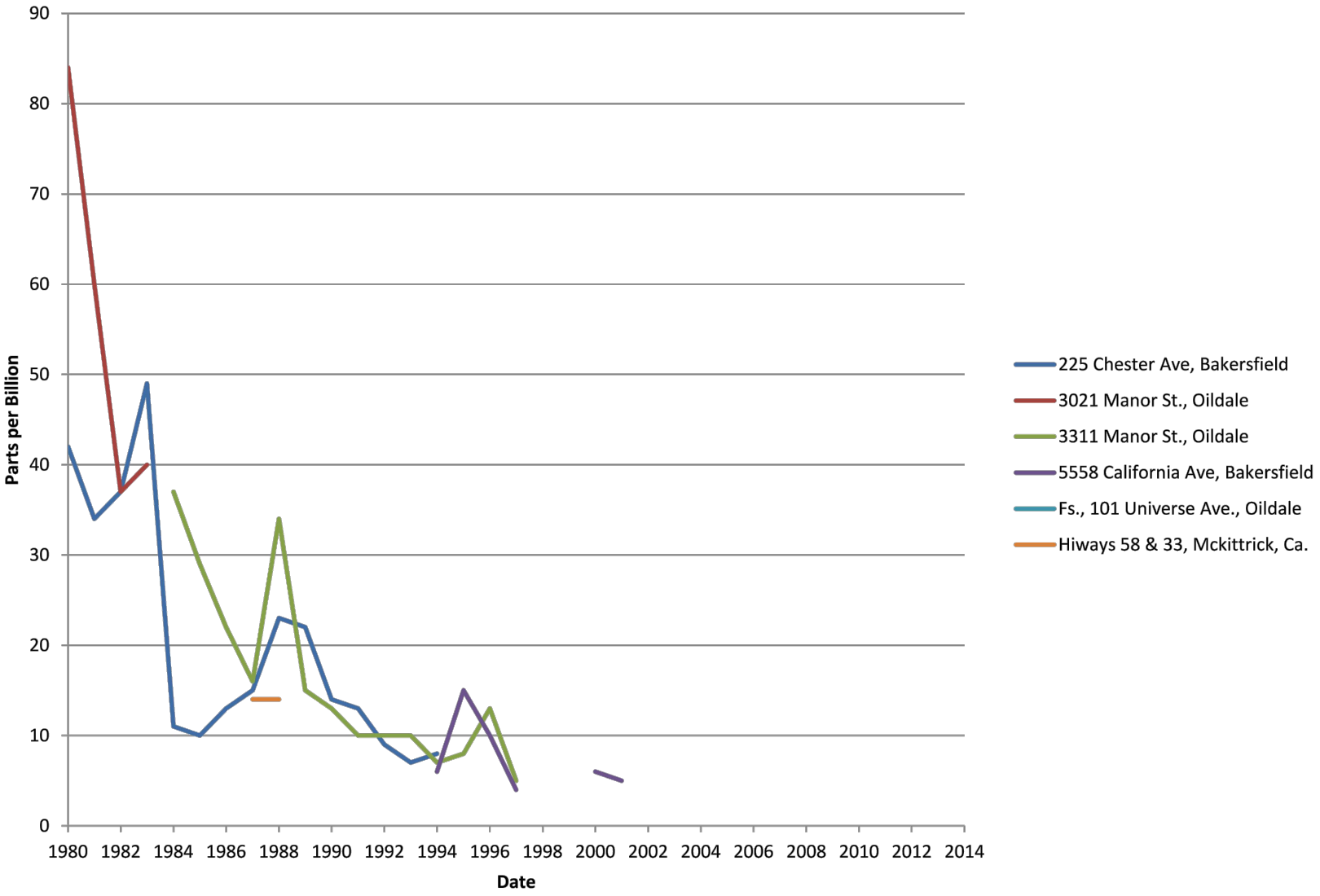


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
NOx MAX HOURLY CONCENTRATION

DATE: 4/15		EXHIBIT: 12

Monitoring Station Data-SOx Maximum 24-Hour Concentration



WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
MONITORING STATION DATA
SOx MAX 24-HR CONCENTRATION

DATE: 4/15		EXHIBIT: 13



Legend

Project Location

N

0 20 40 80

Kilometers

WZI INC.
BAKERSFIELD, CALIFORNIA

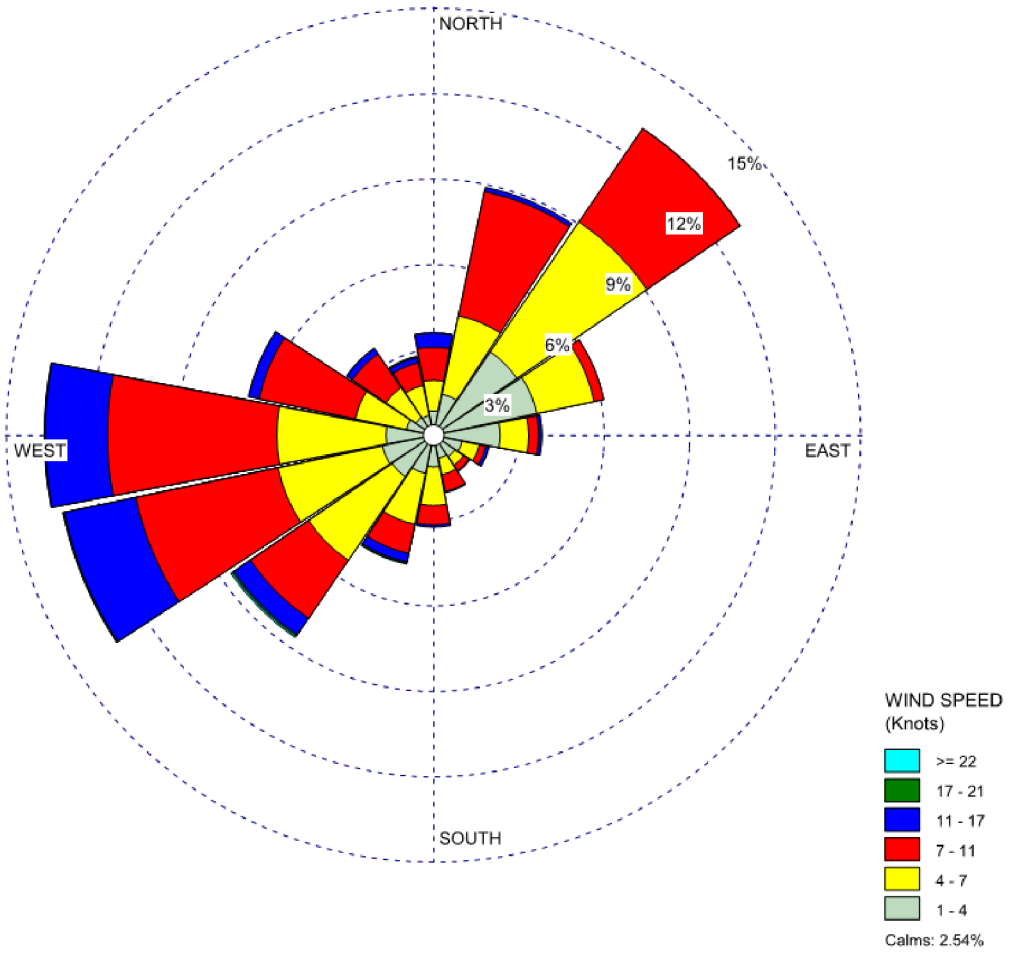
GF INDUSTRIES
JOHE RANCH

100 KM RADIUS MAP

DATE:	4/15		EXHIBIT:	6.4-1

WIND ROSE PLOT:
Fellows, CA

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2004 - 00:00** **End Date: 12/31/2008 - 23:00**	COMPANY NAME: **WZI Inc**	
		MODELER: **Michael Feelemyer**	
	CALM WINDS: **2.54%**	TOTAL COUNT: **43848 hrs.**	
	AVG. WIND SPEED: **5.84 Knots**	DATE: **3/26/2015**	PROJECT NO.: **Johe's Ranch**

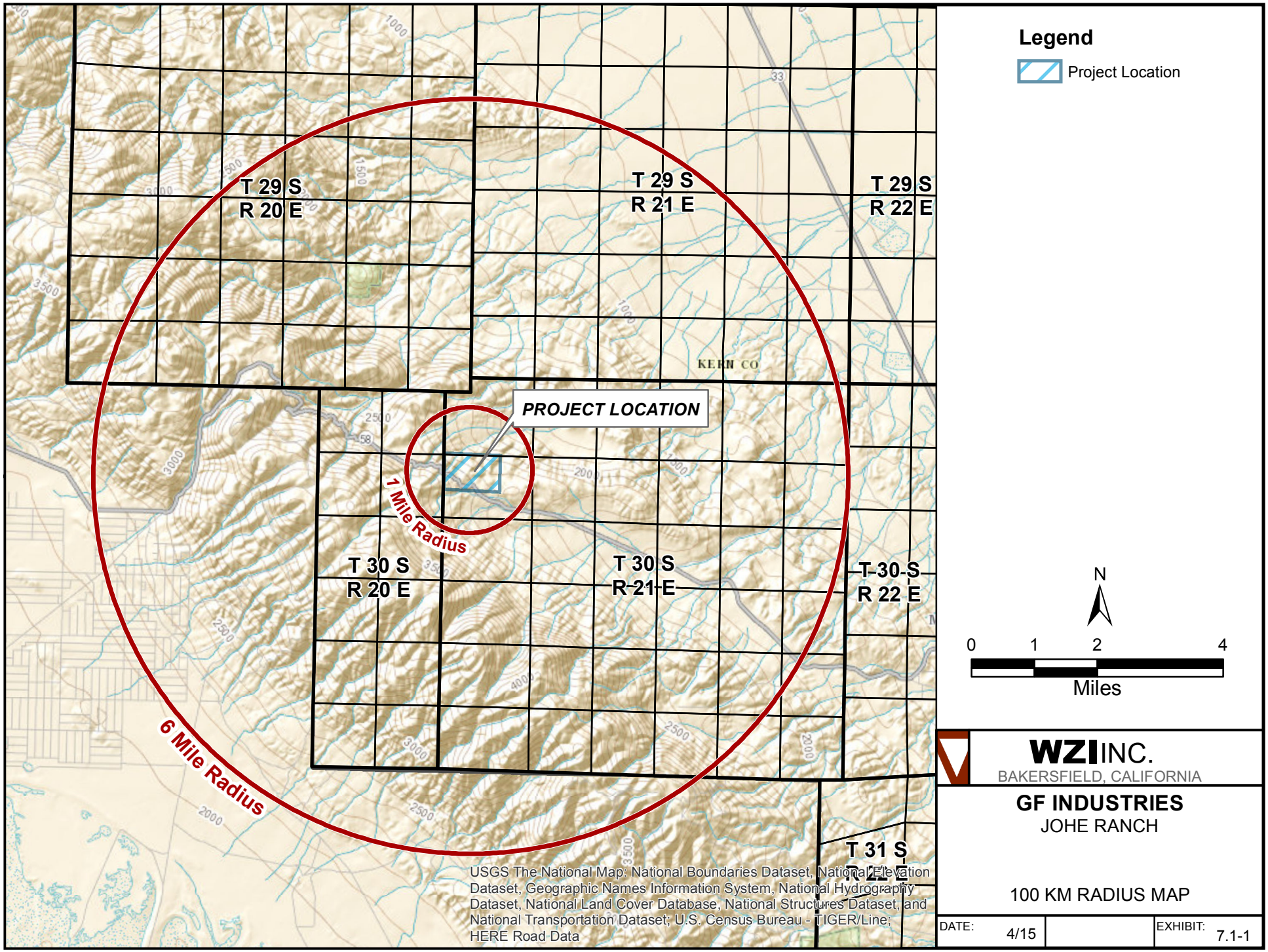
WRPLOT View - Lakes Environmental Software

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

WIND ROSE DIAGRAM

DATE:		EXHIBIT:
4/15		6.5-1



WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

100 KM RADIUS MAP

DATE:	4/15		EXHIBIT:	7.1-1

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Appendix I
Project Emissions Calculation

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GF Industries Calculations

I. Topsoil Density: Using the Specific Gravity of Diatomite as 2.5

$$\frac{2500kg}{m^3} * \frac{2.20462lbs}{kg} * \frac{1m^3}{35.3147ft^3} = 156.07\frac{lbs}{ft^3}$$

II. Grading 20 Acres:

$$\frac{20acre}{yr} * \frac{43560ft^2}{acre} * 0.5ft(depth) * \frac{156.07lbs}{ft^3} * \frac{1ton}{2000lbs} = 33{,}992\ tons$$

III. Material Movement Calculation (Loader Bucket Capacity from "RitchieSpecs"):

$$\frac{6.2m^3}{Load} * \frac{35.3147ft^3}{1m^3} * \frac{156.07lbs}{ft^3} * \frac{1ton}{2000lbs} = 17.09\frac{tons}{Load}$$

IV. Cat Loader Bucket Loads Per day at 330,000 tons/yr Production (261 workdays/yr):

$$\frac{330{,}000tons}{yr} * \frac{1yr}{261days} * \frac{1Load}{17.09tons} = \frac{73.98Loads}{day}$$

V. Emission Factor for Unpaved Road Emissions (Example Loader-A)
(AP-42 Section 13.2.2)

$$E = k * \left(\frac{s}{12}\right)^a * (\frac{W}{3})\text{^}b$$

k=1.5 (PM-10)
a=0.9 (PM-10)
b=0.45 (PM-10)
s=8.3 (Silt%)
W=44 tons (Vehicle Weight)

$$E = 1.5 * \left(\frac{8.3}{12}\right)^{0.9} * \left(\frac{44tons}{3}\right)^{0.45} = 3.60$$

VI. Emission Factor for Handling Emissions (example topsoil handling):
(AP-42 Section 13.2.4)

$$E = k(0.0032) * \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \quad E = 0.35 * (0.0032) * \frac{\left(\frac{4.02m}{\frac{s}{5}}\right)^{1.3}}{\left(\frac{3.4}{2}\right)^{1.4}} = 4E-04$$

k=0.35 (PM-10) k=0.053 (PM-2.5)
U=4.02m/s (Closest weather station- Twisselman mean wind speed)
M=3.4 (Material moisture content topsoil)

Handling Emissions

Emission Factor Source: Predictive Emission Factor Equation (AP-42 Section 13.2.4)

Crusthing Plant Hours/day	9
Crusthing Plant Days/year	261
k	0.35 for PM10

mfeelemeyer:
See GF Industries
Calculations Equation "VI"

PM-10

Handling	U' Mean Wind Speed (m/s)	M' Material Moisture Content (%)	Hourly Rate (tons/hr)	Annual Throughput (tons)	E (lb/ton)	Hourly Emissions (lb/hr)	Annual Emissions (tons/yr)
Topsoil Stockpiles	4.02	3.4	2.1	7,478	0.00040	0.00084	0.00150
Scalp Screen Pile	4.02	11	19.65	30,000	0.00008	0.00152	0.00116
Main Stockpile (handling 1)	4.02	11	112.3	300,000	0.00008	0.00871	0.01163
Main Stockpile (handling 2)	4.02	11	112.3	300,000	0.00008	0.00871	0.01163
			Handled	637,478	**Totals:**	**0.01978**	**0.02593**

PM-2.5

Handling	Mean Wind Speed (mph)	Material Moisture Content (%)	Hourly Rate (tons/hr)	Annual Throughput (tons)	E (lb/ton)	Hourly Emissions (lb/hr)	Annual Emissions (tons/yr)
Topsoil Stockpiles	4.02	3.4	2.1	7,478	6.08E-05	0.00013	0.00023
Scalp Screen Pile	4.02	11	19.65	30,000	1.17E-05	0.00023	0.00018
Main Stockpile	4.02	11	112.3	300,000	1.17E-05	0.00132	0.00176
Main Stockpile (handling 2)	4.02	11	112.3	300,000	1.17E-05	0.00132	0.00176
					Totals:	**0.00300**	**0.00393**

(Reference AP-42 Section 13.2.5)

Stockpile Threshold Friction Velocity							
Days with Wind Velocity above Threshold Value	**Mean Wind Speed (mph)**	**Max Wind Speed (mph)**	**Max Friction Velocity (m/s)**	**Threshold Friction Velocity (m/s)**	**PM10 Emission Factor (lb/acre/hr)**	**Daily Emissions (lb/acre/day)**	**Annual Emissions (tons/acre/yr)**
Threshold	9	43	1.02	1.02	0	0.00	0.00
Average	9	40	0.95	1.02	0.00	0.00	0.00

Month	Year	Avg (mph)	High (mph)
Jan	2015	7.5	33
Feb	2014	10.2	48
Mar	2014	10	46
Apr	2014	9.8	41
May	2014	8.7	38
Jun	2014	9.2	50
Jul	2014	8.7	29
Aug	2014	9.7	36
Sep	2014	7.3	30
Oct	2014	8.5	39
Nov	2014	7.8	39
Dec	2014	10.4	52
	Average	**8.98**	**40**

*Taken from McKittrick Weather Station at Twisselman, CA (US MTWMC1)
www.wunderground.com

Open Mine Pit

AP-42 Reference:	Pit Grading:	Sec-8.19.1-1 (PM10 is 52% of TSP; PM-2.5 is 15% of PM10)
	Erosion:	Sec-11.9 Table 11.9-4 (Pit Grading & Exposed area Emission Factors)

Hours/day 10.2
Days/year 261

Pile Description	Area (acres) over 20 year span	Acre/yr	Annual Throughput (tons)	Hourly Rate (tons/hr)	E (lb/ton)	TSP- E (lbs/hr)	TSP (tons/yr)	52% of TSP PM-10 (tons/yr)	15% of PM10 PM2.5
Pit Grading (PM10)	88	20	33,992	12.77	0.058	0.74	0.99	0.51	0.08
Disturbed Mining Area Erosion Calculation:					E (tons/acre-yr)	TSP- E (tons/yr)	E (tons/yr) with Palliative		
Exposed Active Erosion	20	5			0.38	1.90	x	0.99	0.15
Exposed Inactive Erosion		15			0.38	5.70	0.171	0.09	0.01
							Total:	1.59	0.24
							Total (watered): (65% reduction)	**0.56**	**0.083**
							3x/day water		

mfeelemeyer:
See GF Industries Calculations Equation "II"

mfeelemeyer:
Exposed area not used treated with 97% effective palliative

*While the maximum exposed land (no vegetation) will be 20-acres, normal operations will use no more than 2-3 acres each day for mining. The remaining exposed area will be crusted over as a result of a palliative and the areas being disturbed will also receive water application 3x/day. A conservative estimate of 5 acres being disturbed on any given day is used.

Month	Year	Avg Wind Speed (MPH)	
Jan	2015	8	
Feb	2014	8.4	
Mar	2014	9.8	
Apr	2014	10.1	
May	2014	9.7	
Jun	2014	9.6	
Jul	2014	8.8	
Aug	2014	8.6	
Sep	2014	8.4	
Oct	2014	7.7	
Nov	2014	8.2	
Dec	2014	9.7	
	Average	**8.92**	**4.02 m/s**

*Taken from McKittrick Weather Station at Twisselman, CA (US MTWMC1)
www.wunderground.com

With 330,000Tons/yr Production

Overall Project Air Emissions

OVERALL	ROG	Nox	CO	SO2	PM-10	PM-2.5
Unmitigated	0.47	4.98	4.42	0.019	25.25	3.96
Mitigated	0.47	4.98	4.42	0.019	7.16	1.25

Area & Screening Sources

MITIGATED	PM-10	ROG	Nox	CO	SOx	PM-2.5	UNMITIGATED	PM-10	ROG	Nox	CO	SOx	PM-2.5
	TONS/YR							TONS/YR					
Unpaved Roads	5.75	0	0	0	0	0.862	Unpaved Roads	16.42	0	0	0	0	2.463
Handling Emissions	0.0259	0	0	0	0	0.004	Handling Emissions	0.0259	0	0	0	0	0.004
Screening Plant (Fugitive)	0.20	0	0	0	0	0.030	Screening Plant (Fugitive)	6.58	0	0	0	0	0.987
Screning Plant (Engine)	1.27E-03	0.0014	0.0262	0.0046	0.0069		Screning Plant (Engine)	0.00	0.0014	0.0262	0.0046	0.0069	
Topsoil Grading (stockpile)	0.556	0.00	0.00	0.00	0.00	0.083	Topsoil Grading (stockpile)	1.590	0	0	0	0	0.238
Wind Erosion Exposed Area		0.00	0.00	0.00	0.00		Wind Erosion Exposed Area		0	0	0	0	
Off Road Equipment	0.14	0.31	3.65	1.72	3.90E-03	0.128		0.14	0.31	3.65	1.72	3.90E-03	0.128
TOTAL	**6.68**	**0.31**	**3.68**	**1.72**	**0.0108**	**1.11**	**TOTAL**	**24.76**	**0.31**	**3.68**	**1.72**	**0.0108**	**3.82**

Mobile Sources

(CalEEmod)	ROG	Nox	CO	SO2	Fug PM10	Ex PM10	PM-10	Fug PM2.5	Ex PM2.5	PM-2.5
	TONS/YR									
Haul Trucks	0.16	1.30	2.67	7.95E-03	0.4575	0.0198	0.48	0.1229	0.0182	0.14
Worker Trips	0.0028	0.0031	0.0306	0.0001	0.0049	0.0000	0.0050	0.0013	0.0000	0.0014
TOTAL	**0.162**	**1.306**	**2.699**	**0.008**			**0.489**			**0.145**

Broken out into Category:

Construction

MITIGATED	ROG	Nox	CO	SO2	PM-10	PM-2.5	UNMITIGATED	ROG	Nox	CO	SO2	PM-10	PM-2.5
Off Road Equipment	0.16	1.82	0.86	0.0019	0.07	0.06	Off Road Equipment	0.16	1.82	0.86	0.0019	0.07	0.06
Unpaved Roads	0.00	0.00	0.00	0.00	2.87	0.43	Unpaved Roads	0.00	0.00	0.00	0.00	8.21	1.23
Topsoil Grading	0.00	0.00	0.00	0.00			Topsoil Grading	0.00	0.00	0.00	0.00		
Wind Erosion Exposed Area	0.00	0.00	0.00	0.00	0.28	0.04	Wind Erosion Exposed Area	0.00	0.00	0.00	0.00	0.79	0.08
Total	**0.16**	**1.82**	**0.86**	**0.0019**	**3.22**	**0.54**		**0.16**	**1.82**	**0.86**	**0.0019**	**9.07**	**1.37**

Operations - Area

MITIGATED	ROG	Nox	CO	SO2	PM-10	PM-2.5	UNMITIGATED	ROG	Nox	CO	SO2	PM-10	PM-2.5
Off Road Equipment	0.16	1.82	0.86	0.00	0.07	0.06	Off Road Equipment	0.16	1.82	0.86	0.0019	0.07	0.06
Unpaved Roads	0.00	0.00	0.00	0.00	2.87	0.43	Unpaved Roads	0.00	0.00	0.00	0.00	8.21	1.23
Topsoil Grading	0.00	0.00	0.00	0.00			Topsoil Grading	0.00	0.00	0.00	0.00		
Wind Erosion Exposed Area	0.00	0.00	0.00	0.00	0.28	0.04	Wind Erosion Exposed Area	0.00	0.00	0.00	0.00	0.79	0.16
Handling Emissions	0	0	0	0	0.0259	3.70E-03	Handling Emissions	0.00	0.00	0.00	0.00	0.0259	2.27E-04
Screening Plant (Fugitive)	0	0	0	0	0.20	0.0303	Screening Plant (Fugitive)	0.00	0.00	0.00	0.00	6.58	0.99
Screning Plant (Engine)	0.0014	0.0262	0.0046	0.0069	1.27E-03	0	Screning Plant (Engine)	0.0014	0.03	0.00	0.01	0	0
Total	**0.1564**	**1.8511**	**0.8647**	**0.0088**	**3.4524**	**0.5707**		**0.1564**	**1.8511**	**0.8647**	**0.0088**	**15.6765**	**2.4439**

Operations - Mobile Sources

	ROG	Nox	CO	SO2	PM-10	PM-2.5		ROG	Nox	CO	SO2	PM-10	PM-2.5
Haul Trucks	0.159	1.303	2.669	0.008	0.484	0.143	Haul Trucks	0.159	1.303	2.669	0.008	0.484	0.143
Worker Trips	0.003	0.003	0.031	0.000	0.005	0.001	Worker Trips	0.003	0.003	0.031	0.000	0.005	0.001
Total	0.16	1.31	2.70	0.01	0.49	0.14		0.16	1.31	2.70	0.0080	0.49	0.14
Total Operational	**0.319**	**3.157**	**3.564**	**0.017**	**3.942**	**0.715**		**0.319**	**3.157**	**3.564**	**0.017**	**16.166**	**2.588**

Screening Plant Emissions

Screening Plant Operating Hours

Hours/day 1

Days/year 90

Emission Factor Source: AP-42 Table 11.19.2-2

WZI Inc: AP-42: Table 11.19.2-2

mfeelemeyer: AP-42: Table 11.19.2-2

	Equipment Description	Emission Factor PM (lb/ton)	Throughput (tons/hr)	Uncontrolled Emissions of PM10 (lb/hr)	Uncontrolled Emissions of PM10/2.5 (tons/yr)	Controlled (99%) Emission Factor PM (lb/ton)	Controlled (99%) Emissions of PM10 (tons/yr)	PM-2.5 (tons/yr)	PM-2.5 (unmitigated)
1	Vibrating Feeder	0.072	1000	72.00	3.24	0.0022	0.0990		
2	5'x7' deck screen	0.072	1000	72.00	3.24	0.0022	0.0990		
3	39" Main Feed Conveyor	0.0011	1000	1.10	0.05	4.60E-05	0.0021		
4	48" Under screen Prod Conv	0.0011	333	0.37	0.02	4.60E-05	0.0007		
5	28" Side Conveyor (A)	0.0011	333	0.37	0.02	4.60E-05	0.0007		
6	28" Side Conveyor (B)	0.0011	333	0.37	0.02	4.60E-05	0.0007		
			Totals	146.20	6.58		**0.20**	**0.0303**	0.987

Diesel Engine Emissions	Horse power - Prime (hp)	Emission Factor (g/hp-hr)	Emissions (lb/hr)	Emissions (tons/yr)
ROG	114	0.12	0.03	1.36E-03
NOx	114	2.32	0.58	2.62E-02
CO	114	0.41	0.10	4.64E-03
PM	114	0.112	0.03	1.27E-03
SOx	114	0.61	0.15	6.90E-03

Unpaved Road Emissions

Emission Calculation: (Reference AP-42 Section 13.2.2)

Vehicle Type	Quantity	Horsepower (hp)	Load Factor	Operating Schedule (hrs/day)	Operating Schedule (days/yr)	Trips	ADT Length (mi)	Mean Vehicle Weight (tons)	Notes
Tire Truck (off-hwy)	1	205	1	1	261	1	1	14.25	
Loader-A	1	415	0.39	10.5	261	1	12.82	44	In quarry
Loader-B	1	285	0.39	10.5	261	1	12.82	28	In quarry
Haul Trucks	45.07550146	x	x	x	261	1	0.255	40	In quarry
	Road Moisture Content:	7.9							
	Silt Content (Haul Roads)	8.3							

mfeelemeyer:
See GF Industries Calculations Equation "V"

Unpaved Road Emissions

	Calculation		PM-10				PM-2.5			
Vehicle Type	E (lb/VMT)	Total Emissions (lb/day)	Total Emissions (tons/year)	Mitigated Emissions (65% reduction)	Category		15% of PM10			Unmitigated
Tire Truck (off-hwy)	2.17	2.17	0.28	0.10	0.10	Off-Road Truck	0.0149	0.0149	Off road truck	0.042
Loader-A	3.60	46.22	6.03	2.11	3.834	In Mine PM Emissions	0.3167	0.5751	Mine Emission	0.905
Loader-B	2.94	37.71	4.92	1.72			0.2584			0.738
Haul Trucks	3.45	39.69	5.18	1.81	1.813	Haul Trucks	0.2719	0.2719	Haul Trucks	0.777
Total		125.80	16.42	5.75			**0.862**			2.463
Mitigation 3x/day water: 65% reduction			**5.746**							

mfeelemeyer:
Distance Measured from center of Mine pit to farthest edge for max possible travel per load

mfeelemeyer:
See GF Industries Calculations Equations "III" and "IV"

mfeelemeyer:
Number of loads multiplied by Distance for overall daily travel max

Average Trip Length Determination

Area	Acreage	Distance per Load push into Stockpile	Number of Loads per day	Distance Travel Per Day (miles)	
Mine 1	58.00	0.25	73.98	18.495	
Mine 2	17.00	0.15	73.98	11.097	
Mine 3	13.00	0.12	73.98	8.878	
Total	88.00	0.52	221.94	**12.82**	**Average**

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Appendix II
AERMOD/HARP Health Risk Impacts

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FILE: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\HARP\2012_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.52E-06	7.05E-02	8.97E-02	248003	3913869	11
147	GRID	2.43E-06	6.83E-02	7.79E-02	248028	3913869	11
145	GRID	2.32E-06	6.51E-02	6.84E-02	247978	3913869	11
452	GRID	2.27E-06	6.37E-02	8.52E-02	248000	3913900	11
153	GRID	2.19E-06	6.14E-02	7.90E-02	248178	3913869	11
152	GRID	2.18E-06	6.14E-02	7.94E-02	248153	3913869	11
154	GRID	2.17E-06	6.10E-02	7.78E-02	248203	3913869	11
155	GRID	2.16E-06	6.05E-02	7.53E-02	248228	3913869	11
157	GRID	2.15E-06	6.01E-02	7.87E-02	248278	3913869	11
156	GRID	2.15E-06	6.03E-02	7.63E-02	248253	3913869	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.52E-06	7.05E-02	8.97E-02	248003	3913869	11
147	GRID	2.43E-06	6.83E-02	7.79E-02	248028	3913869	11
145	GRID	2.32E-06	6.51E-02	6.84E-02	247978	3913869	11
452	GRID	2.27E-06	6.37E-02	8.52E-02	248000	3913900	11
152	GRID	2.18E-06	6.14E-02	7.94E-02	248153	3913869	11
153	GRID	2.19E-06	6.14E-02	7.90E-02	248178	3913869	11
154	GRID	2.17E-06	6.10E-02	7.78E-02	248203	3913869	11
155	GRID	2.16E-06	6.05E-02	7.53E-02	248228	3913869	11
156	GRID	2.15E-06	6.03E-02	7.63E-02	248253	3913869	11
151	GRID	2.14E-06	6.02E-02	7.89E-02	248128	3913869	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
175	GRID	9.41E-07	2.64E-02	1.23E-01	248728	3913869	11
174	GRID	9.93E-07	2.79E-02	1.23E-01	248703	3913869	11
170	GRID	1.29E-06	3.62E-02	1.22E-01	248603	3913869	11
169	GRID	1.37E-06	3.84E-02	1.21E-01	248578	3913869	11
176	GRID	8.89E-07	2.50E-02	1.20E-01	248753	3913869	11
171	GRID	1.20E-06	3.36E-02	1.20E-01	248628	3913869	11
173	GRID	1.05E-06	2.95E-02	1.20E-01	248678	3913869	11
459	GRID	8.76E-07	2.46E-02	1.17E-01	248700	3913900	11
168	GRID	1.44E-06	4.03E-02	1.17E-01	248553	3913869	11
458	GRID	1.10E-06	3.08E-02	1.15E-01	248600	3913900	11

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  TOXIC

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:     82 Source(s);      82 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      6.7 MB of RAM.

 **Input Runstream File:          Johe-2012_TOXIC.DTA

 **Output Print File:             Johe-2012_TOXIC.LST
```

```
 **File for Summary of Results:   H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air
Study\HRA\Johe-2012_TOXIC.SUM
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        03:21:45

                            PAGE   2
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  *** METEOROLOGICAL DAYS SELECTED FOR
PROCESSING ***
                                                                   (1=YES; 0=NO)

            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

                NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS
INCLUDED IN THE DATA FILE.


                                  *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED
CATEGORIES ***
                                                                (METERS/SEC)

                                                       1.54,   3.09,   5.14,   8.23,  10.80,
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        03:21:45

                            PAGE   3
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                    *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA
***

   Surface file:   23155_12.SFC
           Met Version:  14134
   Profile file:   23155_12.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                  Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                  Year:   2012                                     Year:   2012

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
 12 01 01   1 01   -1.2  0.034 -9.000 -9.000 -999.   15.      3.0  0.05   0.99   1.00
```

```
0.92  127.   10.0  278.1    2.0
 12 01 01   1 02   -6.0  0.076 -9.000 -9.000 -999.   50.      6.5  0.05   0.99   1.00
2.03  125.   10.0  278.8    2.0
 12 01 01   1 03   -2.0  0.044 -9.000 -9.000 -999.   22.      3.8  0.05   0.99   1.00
1.18  124.   10.0  277.0    2.0
 12 01 01   1 04   -1.6  0.039 -9.000 -9.000 -999.   18.      3.2  0.03   0.99   1.00
1.13  117.   10.0  275.9    2.0
 12 01 01   1 05   -1.8  0.041 -9.000 -9.000 -999.   20.      3.3  0.03   0.99   1.00
1.21   83.   10.0  275.4    2.0
 12 01 01   1 06   -0.3  0.017 -9.000 -9.000 -999.    5.      1.4  0.02   0.99   1.00
0.53   50.   10.0  275.4    2.0
 12 01 01   1 07   -0.7  0.025 -9.000 -9.000 -999.   10.      2.0  0.03   0.99   1.00
0.75   86.   10.0  273.8    2.0
 12 01 01   1 08   -1.5  0.039 -9.000 -9.000 -999.   18.      3.5  0.05   0.99   0.61
1.04  129.   10.0  275.9    2.0
 12 01 01   1 09   13.7  0.117  0.229  0.013   31.   96.    -10.4  0.05   0.99   0.35
1.25  132.   10.0  279.9    2.0
 12 01 01   1 10   61.4  0.111  0.588  0.012  119.   88.     -2.0  0.04   0.99   0.26
0.99  176.   10.0  282.5    2.0
 12 01 01   1 11   95.7  0.126  0.941  0.012  312.  107.     -1.9  0.03   0.99   0.23
1.21  190.   10.0  285.4    2.0
 12 01 01   1 12  113.8  0.114  1.122  0.020  444.   92.     -1.2  0.02   0.99   0.22
1.11  252.   10.0  288.1    2.0
 12 01 01   1 13  114.5  0.168  1.175  0.021  507.  165.     -3.7  0.02   0.99   0.22
1.94  260.   10.0  290.4    2.0
 12 01 01   1 14   97.9  0.150  1.150  0.021  555.  139.     -3.1  0.02   0.99   0.23
1.69  268.   10.0  292.0    2.0
 12 01 01   1 15   65.1  0.107  1.022  0.021  587.   84.     -1.7  0.02   0.99   0.26
1.11  263.   10.0  294.2    2.0
 12 01 01   1 16   17.7  0.179  0.665  0.021  594.  182.    -29.0  0.03   0.99   0.35
2.40  292.   10.0  293.8    2.0
 12 01 01   1 17   -7.9  0.086 -9.000 -9.000 -999.   65.      7.3  0.02   0.99   0.61
2.76  316.   10.0  289.2    2.0
 12 01 01   1 18   -1.7  0.039 -9.000 -9.000 -999.   19.      3.1  0.02   0.99   1.00
1.21  350.   10.0  285.4    2.0
 12 01 01   1 19   -3.6  0.057 -9.000 -9.000 -999.   33.      4.6  0.02   0.99   1.00
1.79  337.   10.0  283.1    2.0
 12 01 01   1 20   -5.3  0.068 -9.000 -9.000 -999.   43.      5.4  0.02   0.99   1.00
2.18  315.   10.0  280.9    2.0
 12 01 01   1 21   -2.0  0.042 -9.000 -9.000 -999.   21.      3.4  0.02   0.99   1.00
1.33  330.   10.0  280.4    2.0
 12 01 01   1 22   -1.5  0.038 -9.000 -9.000 -999.   18.      3.3  0.05   0.99   1.00
1.03  136.   10.0  280.9    2.0
 12 01 01   1 23   -0.7  0.026 -9.000 -9.000 -999.   10.      2.2  0.04   0.99   1.00
0.74  173.   10.0  279.2    2.0
 12 01 01   1 24   -1.0  0.030 -9.000 -9.000 -999.   12.      2.4  0.02   0.99   1.00
0.92   57.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.0 1  127.    0.92   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***       03:21:45

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
SCREEN	1ST HIGHEST VALUE IS	7.17527 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	6.67106 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.20520 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.87031 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.36267 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.34430 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.72062 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.18526 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.12174 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.04961 AT (249400.00, 3913100.00, 710.20, 1321.50, 0.00)	DC	
OREPILE1	1ST HIGHEST VALUE IS	20.22881 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	16.36755 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	14.64920 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.39470 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	13.61183 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	12.68354 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	12.37840 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	12.13627 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	11.80320 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	10.67418 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
STOCKPL3	1ST HIGHEST VALUE IS	23.94922 AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	23.59612 AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	22.27170 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	22.12482 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	22.09811 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	21.45072 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	20.43185 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	19.70724 AT (247828.00, 3913719.00, 752.90, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	19.28483 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	19.27151 AT (247828.00, 3913769.00, 756.17, 1321.50, 0.00)	DC	
TOP1	1ST HIGHEST VALUE IS	32.84711 AT (247978.00, 3913869.00, 728.04,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      28.29244 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      27.00285 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      26.07747 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      25.69951 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      25.58371 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      25.22275 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      24.67650 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      24.52631 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      23.60812 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TOP2       1ST HIGHEST VALUE IS      35.21114 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      33.42715 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      32.10174 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      31.97002 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      31.86779 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      31.39828 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      31.29872 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      30.81401 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      30.21386 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      30.17372 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC

TOP3       1ST HIGHEST VALUE IS      53.28497 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      52.94879 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      52.83382 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      49.82249 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      48.36621 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      47.63343 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      45.02592 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      37.61816 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      34.76155 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      34.01217 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP4      1ST HIGHEST VALUE IS      41.04019 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      33.44991 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      32.22225 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      32.15701 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      31.82388 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      31.06915 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      31.06108 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      29.47974 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      27.79223 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      26.29171 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP5      1ST HIGHEST VALUE IS      33.45069 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      31.40907 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      29.36423 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      27.20379 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      25.88831 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      25.22877 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      24.35928 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      23.36636 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      22.39546 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      21.27190 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                              PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP6	1ST HIGHEST VALUE IS	51.26730 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	46.79130 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	43.85008 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	42.52641 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	42.29519 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	40.90688 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	36.09434 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	32.44826 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	32.07994 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	31.79039 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
TOP7	1ST HIGHEST VALUE IS	42.66277 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	39.08307 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	33.13881 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	31.80340 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	30.78629 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	29.42974 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	28.03355 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	26.19974 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	24.53647 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	24.18195 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
STOCKPL4	1ST HIGHEST VALUE IS	20.70376 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	18.79112 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	18.57906 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	13.87086 AT (249100.00, 3912700.00, 734.75, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	13.75032 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	13.43878 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	12.63802 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	12.28306 AT (249278.00, 3913019.00, 732.94, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	11.66536 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	11.65978 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
STOCKPL1	1ST HIGHEST VALUE IS	36.48590 AT (248703.00, 3912894.00, 760.49,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      33.94528 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      32.35062 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      31.95879 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      31.18541 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      30.73427 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      30.62196 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      28.38829 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      26.91798 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      25.21766 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        03:21:45

                            PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                          ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                     AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

STOCKPL2  1ST HIGHEST VALUE IS      24.13417 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      23.72139 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      22.53602 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      21.93846 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      21.12330 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      20.35980 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      20.18643 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      19.39426 AT (  247828.00,  3913719.00,   752.90,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      19.37626 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      19.15221 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC

TOP8      1ST HIGHEST VALUE IS      16.56010 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      13.88649 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      12.31141 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.55251 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      11.48044 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.78055 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.41924 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.31001 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.17580 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.97616 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC

TOP9      1ST HIGHEST VALUE IS      15.80074 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      14.74291 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      13.13436 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.92728 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      12.01450 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      11.29860 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.63219 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.16841 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.90203 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.40002 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC

TOP10     1ST HIGHEST VALUE IS      17.31155 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      15.76900 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      14.24603 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.87399 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      12.10556 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      11.38873 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.67056 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.22769 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.75970 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.34827 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE   8
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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                    NETWORK
GROUP ID                          AVERAGE CONC                  RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TOP11     1ST HIGHEST VALUE IS      24.25180 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      20.95128 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.01368 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.45167 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      15.13928 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      14.77214 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      14.52103 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      13.99308 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      12.54454 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      12.22428 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC

TOP12     1ST HIGHEST VALUE IS      27.42757 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      25.37811 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      21.10489 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      18.94608 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      17.24474 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      16.62025 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      15.80262 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      14.70701 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      14.03320 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      12.59632 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC

TOP13     1ST HIGHEST VALUE IS      28.23925 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      23.08583 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      20.18251 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      18.34581 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      18.01317 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      16.71593 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      15.94503 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      15.04407 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      15.02061 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      12.82990 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP14     1ST HIGHEST VALUE IS      24.61829 AT (  249278.00,  3913119.00,   697.37,
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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      20.58482 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      19.11586 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      17.33364 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      16.73436 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      15.97105 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      14.70679 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      14.00648 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      13.32872 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      11.51249 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***          03:21:45

                               PAGE   9
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                          ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                         AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

TOP15     1ST HIGHEST VALUE IS      21.19794 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      19.46747 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.38913 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.13796 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      14.99780 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      13.94755 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      12.92526 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      12.34895 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      11.67410 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.10481 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP16     1ST HIGHEST VALUE IS      24.00273 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      21.14451 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.96880 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      17.19487 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      15.89912 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      14.70786 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      13.41505 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      12.96458 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      11.74128 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.88339 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

20ACRE    1ST HIGHEST VALUE IS      18.30341 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      17.65320 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      16.89639 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.54791 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      15.72916 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      15.72217 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      15.61507 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      15.51362 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      15.46888 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      15.42668 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC

MOB_0001  1ST HIGHEST VALUE IS       1.18649 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.08017 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.93322 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.91750 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.88375 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.86139 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.83628 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.80632 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.77753 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.72838 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                              PAGE  10
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0002	1ST HIGHEST VALUE IS	1.07699 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.00408 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.89699 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.85726 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.85105 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.81824 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.78062 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.76386 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.74445 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.72245 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
MOB_0003	1ST HIGHEST VALUE IS	1.00804 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.95027 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.94166 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.90361 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.82609 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.78973 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.75096 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.72689 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.71645 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.69723 AT (	249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
MOB_0004	1ST HIGHEST VALUE IS	0.94219 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.93653 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.91817 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.89132 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.88978 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.87294 AT (	249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.86481 AT (	249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.82730 AT (	249278.00, 3913394.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.73014 AT (	249278.00, 3913419.00, 678.34, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.72272 AT (	249300.00, 3913300.00, 685.31, 1321.50, 0.00)	DC	
MOB_0005	1ST HIGHEST VALUE IS	0.77345 AT (	249278.00, 3913444.00, 674.15,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.73748 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.70731 AT (  249278.00,  3913419.00,   678.34,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.70322 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.68905 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.66991 AT (  249278.00,  3913469.00,   671.76,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.65386 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.64373 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.62119 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.61533 AT (  249300.00,  3913500.00,   677.25,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE  11
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0006  1ST HIGHEST VALUE IS       0.83395 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.76400 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.75046 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.70452 AT (  249278.00,  3913469.00,   671.76,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.68463 AT (  249278.00,  3913494.00,   669.56,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.65444 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.63899 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.63002 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.60338 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.58610 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC

MOB_0007  1ST HIGHEST VALUE IS       0.96800 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.95147 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.93259 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.78619 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       0.73360 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.68308 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.66089 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.65981 AT (  248878.00,  3913869.00,   644.41,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.65615 AT (  248803.00,  3913869.00,   649.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.65260 AT (  248828.00,  3913869.00,   648.40,
1321.50,    0.00)  DC

MOB_0008  1ST HIGHEST VALUE IS       1.34207 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.24229 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.24107 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.06571 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.01586 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.95292 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.95087 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.90577 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.87677 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.82798 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC

MOB_0009  1ST HIGHEST VALUE IS       1.70746 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.63984 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.58712 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.42996 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.42449 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.40564 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.38487 AT (  248628.00,  3913869.00,   684.63,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.35114 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.29235 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.25009 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                              PAGE  12
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0010	1ST HIGHEST VALUE IS	2.43385 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.13238 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.94485 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.73902 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.66267 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.65988 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.64030 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.63570 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.58573 AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.55606 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0011	1ST HIGHEST VALUE IS	3.59248 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.48069 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.19949 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.10470 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.03802 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.94313 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.72703 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.69585 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.48491 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.37194 AT (248800.00, 3913900.00, 657.91, 1321.50, 0.00)	DC	
MOB_0012	1ST HIGHEST VALUE IS	2.85521 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.23083 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.10873 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.04231 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.73048 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.54791 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.48860 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.48375 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.35146 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.18203 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0013	1ST HIGHEST VALUE IS	3.39105 AT (248428.00, 3913869.00, 678.70,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.61938 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.60218 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.50514 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.31776 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.16952 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.10086 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.00276 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.84965 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.56815 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE  13
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **

                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0014  1ST HIGHEST VALUE IS       4.58579 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.53393 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.27579 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.26377 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       3.91279 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.79298 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.55859 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.42457 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.25580 AT (  248603.00,  3913869.00,   688.47,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.20399 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC

MOB_0015  1ST HIGHEST VALUE IS       6.73790 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.45552 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.40374 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.86731 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.39415 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.18790 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.53772 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.52255 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.96622 AT (  248603.00,  3913869.00,   688.47,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.93208 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC

MOB_0016  1ST HIGHEST VALUE IS       7.73297 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.63478 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.15388 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.55288 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.32157 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.46082 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.29615 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.68733 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.53152 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.42895 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC

MOB_0017  1ST HIGHEST VALUE IS       7.92322 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.87840 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.28555 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.78958 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.42003 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.52558 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.45437 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.71917 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.64529 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.57321 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
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NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

MOB_0018 1ST HIGHEST VALUE IS 7.19180 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 6.90725 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 6.79142 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 6.08013 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 5.89161 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 5.29642 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 5.25054 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 4.84961 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 4.58924 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 4.23334 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC

MOB_0019 1ST HIGHEST VALUE IS 4.48493 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 3.91444 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 3.91357 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 3.90393 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 3.13045 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 2.66561 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 2.61400 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 2.58549 AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 2.25164 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 2.01446 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00) DC

MOB_0020 1ST HIGHEST VALUE IS 14.36509 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 10.62935 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 9.45423 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 8.79544 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 5.37983 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 5.26266 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 5.18939 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 3.91022 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 3.14511 AT (248200.00, 3913900.00, 700.22, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 2.96254 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC

MOB_0021 1ST HIGHEST VALUE IS 13.29356 AT (248253.00, 3913869.00, 696.56,

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.43352 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      12.28381 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.55510 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.56560 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.42750 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.26707 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       7.17019 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       6.58219 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       6.12990 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0022  1ST HIGHEST VALUE IS      12.76730 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.72165 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       9.94963 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       9.57764 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       8.22519 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.17712 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       6.31161 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       6.25890 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.93358 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.84420 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC

MOB_0023  1ST HIGHEST VALUE IS       8.65009 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.43545 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.76113 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.54773 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.95203 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.85331 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.08460 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.23588 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.95289 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.07778 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

MOB_0024  1ST HIGHEST VALUE IS       6.90072 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.67007 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.64084 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.25395 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.22428 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.54168 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.86794 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.46675 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.18084 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.06880 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC

MOB_0025  1ST HIGHEST VALUE IS       8.04127 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.86339 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.85315 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.51815 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.26530 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       6.04259 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.16649 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.33268 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.41635 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.11581 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE  16
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0026	1ST HIGHEST VALUE IS	11.45956	AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	7.65651	AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	7.62501	AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.91710	AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.37924	AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.85876	AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.76547	AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.96323	AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.50768	AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.48208	AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
TKD_0001	1ST HIGHEST VALUE IS	9.28185	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	9.02857	AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	9.01268	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	8.69312	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	8.01843	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	7.92668	AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	7.34072	AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	6.73726	AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	6.67346	AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	6.08843	AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKD_0002	1ST HIGHEST VALUE IS	6.02427	AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.95743	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.82322	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.81107	AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.71544	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.41499	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.23195	AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	5.09197	AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.77935	AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.60194	AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
TKD_0003	1ST HIGHEST VALUE IS	4.62485	AT (248628.00, 3912894.00, 763.08,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.61985 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.56866 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.50606 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.49676 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.44110 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.42266 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.35977 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.34407 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.16216 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***          03:21:45

                             PAGE  17
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

TKD_0004  1ST HIGHEST VALUE IS       4.39063 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.29368 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.13269 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.82746 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       3.39520 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.31860 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.02735 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.98736 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.82387 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.71965 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC

TKD_0005  1ST HIGHEST VALUE IS       3.95757 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.77745 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.73762 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.52494 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       3.29890 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.27608 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.09560 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.83057 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.70654 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.42043 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC

TKD_0006  1ST HIGHEST VALUE IS       3.12805 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.91070 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.89871 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.82585 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.66497 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.61073 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.59451 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.41612 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.29466 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.14520 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC

TKD_0007  1ST HIGHEST VALUE IS       3.12999 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.07810 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.06041 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.05150 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       3.01588 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.99805 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.98665 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.82717 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.74952 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.57379 AT (  248600.00,  3912800.00,   762.78,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE  18
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
TKD_0008	1ST HIGHEST VALUE IS	5.96974 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
	2ND HIGHEST VALUE IS	5.86202 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00) DC
	3RD HIGHEST VALUE IS	5.53667 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
	4TH HIGHEST VALUE IS	5.36417 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00) DC
	5TH HIGHEST VALUE IS	4.83840 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
	6TH HIGHEST VALUE IS	4.16572 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
	7TH HIGHEST VALUE IS	3.70289 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00) DC
	8TH HIGHEST VALUE IS	3.55370 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
	9TH HIGHEST VALUE IS	3.29169 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00) DC
	10TH HIGHEST VALUE IS	2.97782 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
TKD_0009	1ST HIGHEST VALUE IS	4.49365 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
	2ND HIGHEST VALUE IS	4.41925 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
	3RD HIGHEST VALUE IS	4.30875 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00) DC
	4TH HIGHEST VALUE IS	4.05145 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
	5TH HIGHEST VALUE IS	3.96276 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00) DC
	6TH HIGHEST VALUE IS	3.56912 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
	7TH HIGHEST VALUE IS	3.15691 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
	8TH HIGHEST VALUE IS	2.85387 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00) DC
	9TH HIGHEST VALUE IS	2.74362 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
	10TH HIGHEST VALUE IS	2.72758 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00) DC
TKD_0010	1ST HIGHEST VALUE IS	3.41038 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00) DC
	2ND HIGHEST VALUE IS	3.34121 AT (248453.00, 3912894.00, 772.72, 1321.50, 0.00) DC
	3RD HIGHEST VALUE IS	3.06732 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00) DC
	4TH HIGHEST VALUE IS	2.96227 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00) DC
	5TH HIGHEST VALUE IS	2.89719 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
	6TH HIGHEST VALUE IS	2.84227 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
	7TH HIGHEST VALUE IS	2.73735 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
	8TH HIGHEST VALUE IS	2.53728 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
	9TH HIGHEST VALUE IS	2.33143 AT (248428.00, 3912894.00, 776.83, 1321.50, 0.00) DC
	10TH HIGHEST VALUE IS	2.31867 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
TKD_0011	1ST HIGHEST VALUE IS	2.96032 AT (248503.00, 3912894.00, 767.88,

1321.50,   0.00) DC
2ND HIGHEST VALUE IS   2.94840 AT (248528.00, 3912894.00,   766.57,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   2.81498 AT (248553.00, 3912894.00,   765.26,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   2.75460 AT (248478.00, 3912894.00,   770.34,
1321.50,   0.00) DC
5TH HIGHEST VALUE IS   2.73561 AT (248578.00, 3912894.00,   764.35,
1321.50,   0.00) DC
6TH HIGHEST VALUE IS   2.69285 AT (248603.00, 3912894.00,   763.73,
1321.50,   0.00) DC
7TH HIGHEST VALUE IS   2.61791 AT (248628.00, 3912894.00,   763.08,
1321.50,   0.00) DC
8TH HIGHEST VALUE IS   2.49568 AT (248653.00, 3912894.00,   762.44,
1321.50,   0.00) DC
9TH HIGHEST VALUE IS   2.29150 AT (248678.00, 3912894.00,   761.55,
1321.50,   0.00) DC
10TH HIGHEST VALUE IS   2.14917 AT (248453.00, 3912894.00,   772.72,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 ***   ***
*** 03:21:45

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**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM PERIOD (8784 HRS)
RESULTS ***

** CONC OF TOXIC   IN MICROGRAMS/M**3
**

NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - - -

TKD_0012 1ST HIGHEST VALUE IS   2.50909 AT (248603.00, 3912894.00,   763.73,
1321.50,   0.00) DC
2ND HIGHEST VALUE IS   2.49882 AT (248578.00, 3912894.00,   764.35,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   2.46026 AT (248628.00, 3912894.00,   763.08,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   2.45340 AT (248553.00, 3912894.00,   765.26,
1321.50,   0.00) DC
5TH HIGHEST VALUE IS   2.37902 AT (248653.00, 3912894.00,   762.44,
1321.50,   0.00) DC
6TH HIGHEST VALUE IS   2.36062 AT (248528.00, 3912894.00,   766.57,
1321.50,   0.00) DC
7TH HIGHEST VALUE IS   2.23706 AT (248503.00, 3912894.00,   767.88,
1321.50,   0.00) DC
8TH HIGHEST VALUE IS   2.22124 AT (248678.00, 3912894.00,   761.55,
1321.50,   0.00) DC
9TH HIGHEST VALUE IS   2.00058 AT (248703.00, 3912894.00,   760.49,
1321.50,   0.00) DC
10TH HIGHEST VALUE IS   1.79694 AT (248728.00, 3912894.00,   759.43,
1321.50,   0.00) DC

TKD_0013 1ST HIGHEST VALUE IS   2.03232 AT (248503.00, 3912894.00,   767.88,
1321.50,   0.00) DC
2ND HIGHEST VALUE IS   1.97063 AT (248478.00, 3912894.00,   770.34,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   1.96787 AT (248528.00, 3912894.00,   766.57,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   1.88096 AT (248553.00, 3912894.00,   765.26,
1321.50,   0.00) DC

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          5TH HIGHEST VALUE IS       1.83531 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.81973 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.79302 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.78986 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.74844 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.67916 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC

TKD_0014  1ST HIGHEST VALUE IS       1.81019 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.80574 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.78617 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.76608 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.74216 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.68489 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.67657 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.58785 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.55129 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.53994 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC

TKS_0001  1ST HIGHEST VALUE IS       8.37313 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.05968 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.74066 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.33280 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.56996 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.90848 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.75316 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       5.20638 AT (  248600.00,  3912800.00,   762.78,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.89803 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.99580 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE  20
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0002	1ST HIGHEST VALUE IS	4.13568 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.97385 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.90045 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.87243 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.86669 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.85575 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.66592 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.55824 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.50066 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.03414 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKS_0003	1ST HIGHEST VALUE IS	2.87332 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.56418 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.27592 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.17652 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.12051 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.99292 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.95764 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.93741 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.92163 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.88440 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
TKS_0004	1ST HIGHEST VALUE IS	2.31151 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.17257 AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.86246 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.75213 AT (248900.00, 3912700.00, 742.91, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.70517 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.57617 AT (249003.00, 3912894.00, 746.85, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.42628 AT (248900.00, 3912600.00, 741.62, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.41082 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.37319 AT (248700.00, 3912500.00, 745.10, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.36793 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
TKS_0005	1ST HIGHEST VALUE IS	2.29728 AT (248900.00, 3912800.00, 744.32,		

1321.50,   0.00) DC
2ND HIGHEST VALUE IS   1.93095 AT (248900.00, 3912700.00,   742.91,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   1.76605 AT (249000.00, 3912800.00,   740.70,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   1.68326 AT (249028.00, 3912894.00,   742.50,
1321.50,   0.00) DC
5TH HIGHEST VALUE IS   1.65451 AT (248800.00, 3912800.00,   751.06,
1321.50,   0.00) DC
6TH HIGHEST VALUE IS   1.62736 AT (248900.00, 3912600.00,   741.62,
1321.50,   0.00) DC
7TH HIGHEST VALUE IS   1.59106 AT (249003.00, 3912894.00,   746.85,
1321.50,   0.00) DC
8TH HIGHEST VALUE IS   1.46143 AT (249000.00, 3912700.00,   738.47,
1321.50,   0.00) DC
9TH HIGHEST VALUE IS   1.34940 AT (249053.00, 3912894.00,   737.19,
1321.50,   0.00) DC
10TH HIGHEST VALUE IS   1.28728 AT (248800.00, 3912500.00,   740.11,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 ***   ***
*** 03:21:45

PAGE 21
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM PERIOD (8784 HRS)
RESULTS ***

** CONC OF TOXIC   IN MICROGRAMS/M**3
**

NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - - -

TKS_0006 1ST HIGHEST VALUE IS   2.03362 AT (248900.00, 3912800.00,   744.32,
1321.50,   0.00) DC
2ND HIGHEST VALUE IS   1.93408 AT (249000.00, 3912800.00,   740.70,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   1.88720 AT (249028.00, 3912894.00,   742.50,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   1.87703 AT (248900.00, 3912700.00,   742.91,
1321.50,   0.00) DC
5TH HIGHEST VALUE IS   1.78342 AT (249053.00, 3912894.00,   737.19,
1321.50,   0.00) DC
6TH HIGHEST VALUE IS   1.64964 AT (249000.00, 3912700.00,   738.47,
1321.50,   0.00) DC
7TH HIGHEST VALUE IS   1.52750 AT (248900.00, 3912600.00,   741.62,
1321.50,   0.00) DC
8TH HIGHEST VALUE IS   1.47659 AT (249078.00, 3912894.00,   734.41,
1321.50,   0.00) DC
9TH HIGHEST VALUE IS   1.46862 AT (249100.00, 3912800.00,   740.52,
1321.50,   0.00) DC
10TH HIGHEST VALUE IS   1.42437 AT (249103.00, 3912894.00,   736.25,
1321.50,   0.00) DC

TKS_0007 1ST HIGHEST VALUE IS   1.91739 AT (249078.00, 3912894.00,   734.41,
1321.50,   0.00) DC
2ND HIGHEST VALUE IS   1.80560 AT (249053.00, 3912894.00,   737.19,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   1.66587 AT (249103.00, 3912894.00,   736.25,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   1.43312 AT (249000.00, 3912600.00,   735.26,
1321.50,   0.00) DC

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          5TH HIGHEST VALUE IS       1.41888 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.41717 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.24932 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.23798 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.20997 AT (  248900.00,  3912500.00,   732.80,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.20208 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC

TKS_0008  1ST HIGHEST VALUE IS       2.32118 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.15361 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.01443 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.91129 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.77969 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.74971 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.73407 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.54419 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.48318 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.42798 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC

TKS_0009  1ST HIGHEST VALUE IS       2.49878 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.20892 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.14289 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.09680 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.06270 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.86325 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.85017 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.82667 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.80084 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.75808 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                              PAGE  22
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0010	1ST HIGHEST VALUE IS	2.24482 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.04924 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.00538 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.86730 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.84201 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.75333 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.59058 AT (249100.00, 3912800.00, 740.52, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.45221 AT (249000.00, 3912700.00, 738.47, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.41986 AT (249100.00, 3912700.00, 734.75, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.34801 AT (249200.00, 3912800.00, 739.73, 1321.50, 0.00)	DC	
TKM_0001	1ST HIGHEST VALUE IS	14.81801 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	14.40351 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	14.37644 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	13.83294 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	12.72203 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	12.60881 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	11.61853 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	10.63167 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	10.57720 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	9.52842 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKM_0002	1ST HIGHEST VALUE IS	14.22374 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	13.93492 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	13.78007 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	13.27250 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	12.32422 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	12.23065 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	11.15268 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	10.40226 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	10.14074 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	8.94864 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
TKM_0003	1ST HIGHEST VALUE IS	12.50530 AT (248803.00, 3912894.00, 759.41,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.46704 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      12.05989 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.65357 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.24458 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.91939 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.20091 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.65893 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.63349 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.21149 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                             PAGE  23
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKM_0004  1ST HIGHEST VALUE IS      12.49454 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.16748 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.72403 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.66261 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.53459 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      11.39143 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.78786 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.60278 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.53288 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.18653 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC

TKM_0005  1ST HIGHEST VALUE IS       9.12989 AT (  248978.00,  3912894.00,   751.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.50027 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.04231 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.82161 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.66565 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.11895 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.86689 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.82825 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.68273 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.17306 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC

TKM_0006  1ST HIGHEST VALUE IS       8.50416 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.65858 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.33304 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.68389 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.32645 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.16259 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.80096 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.57387 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.51433 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.22933 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC

TKM_0007  1ST HIGHEST VALUE IS       5.86346 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.22177 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.01388 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.78358 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.62944 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.34466 AT (  249278.00,  3913019.00,   732.94,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.31615 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.28798 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.05832 AT (  249278.00,  3913044.00,   725.42,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.92609 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        03:21:45

                              PAGE  24
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8784 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKM_0008	1ST HIGHEST VALUE IS	2.78822	AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.18017	AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.11709	AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.05460	AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.99234	AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.92155	AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.91980	AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.79852	AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.70564	AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.66201	AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
TKM_0009	1ST HIGHEST VALUE IS	3.06040	AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.48198	AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.35335	AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.26141	AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.19901	AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.12704	AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.04749	AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.91970	AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.88799	AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.76807	AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 *** ***
*** 03:21:45

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

DATE
NETWORK

GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

SCREEN HIGH 1ST HIGH VALUE IS 1056.44926 ON 12053120: AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00) DC

OREPILE1 HIGH 1ST HIGH VALUE IS 3476.95824 ON 12041803: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

STOCKPL3 HIGH 1ST HIGH VALUE IS 2345.82651 ON 12022007: AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC

TOP1 HIGH 1ST HIGH VALUE IS 3121.64019 ON 12042803: AT (248528.00, 3913869.00, 690.60, 1321.50, 0.00) DC

TOP2 HIGH 1ST HIGH VALUE IS 3564.45458 ON 12042803: AT (248528.00, 3913869.00, 690.60, 1321.50, 0.00) DC

TOP3 HIGH 1ST HIGH VALUE IS 4177.52440 ON 12070403: AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00) DC

TOP4 HIGH 1ST HIGH VALUE IS 3489.22668 ON 12111502: AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC

TOP5 HIGH 1ST HIGH VALUE IS 3181.68746 ON 12042803: AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC

TOP6 HIGH 1ST HIGH VALUE IS 3964.39878 ON 12042803: AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC

TOP7 HIGH 1ST HIGH VALUE IS 3513.36396 ON 12042803: AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC

STOCKPL4 HIGH 1ST HIGH VALUE IS 2172.36315 ON 12062703: AT (249278.00, 3913444.00, 674.15, 1321.50, 0.00) DC

STOCKPL1 HIGH 1ST HIGH VALUE IS 2872.12164 ON 12030905: AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC

STOCKPL2 HIGH 1ST HIGH VALUE IS 2382.64291 ON 12121702: AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC

TOP8 HIGH 1ST HIGH VALUE IS 3225.64678 ON 12041803: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP9 HIGH 1ST HIGH VALUE IS 2889.14306 ON 12041803: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

TOP10 HIGH 1ST HIGH VALUE IS 3232.43088 ON 12041803: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP11 HIGH 1ST HIGH VALUE IS 3334.42520 ON 12062703: AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00) DC

TOP12 HIGH 1ST HIGH VALUE IS 3598.30756 ON 12092103: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP13 HIGH 1ST HIGH VALUE IS 3753.61203 ON 12041803: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP14 HIGH 1ST HIGH VALUE IS 3887.46071 ON 12041803: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP15 HIGH 1ST HIGH VALUE IS 3519.14494 ON 12041803: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

TOP16 HIGH 1ST HIGH VALUE IS 3741.76941 ON 12041803: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

20ACRE HIGH 1ST HIGH VALUE IS 1907.47844 ON 12031203: AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00) DC

MOB_0001 HIGH 1ST HIGH VALUE IS 163.82478 ON 12120906: AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00) DC

MOB_0002 HIGH 1ST HIGH VALUE IS 158.62414 ON 12042723: AT (249278.00, 3913444.00, 674.15, 1321.50, 0.00) DC

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 *** ***
*** 03:21:45

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0003 HIGH 1ST HIGH VALUE IS	155.87826	ON 12042723:	AT (249278.00, 3913494.00, 669.56, 1321.50, 0.00)	DC	
MOB_0004 HIGH 1ST HIGH VALUE IS	190.19946	ON 12120906:	AT (249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
MOB_0005 HIGH 1ST HIGH VALUE IS	148.17532	ON 12042723:	AT (249278.00, 3913594.00, 656.05, 1321.50, 0.00)	DC	
MOB_0006 HIGH 1ST HIGH VALUE IS	159.39359	ON 12120906:	AT (249278.00, 3913469.00, 671.76, 1321.50, 0.00)	DC	
MOB_0007 HIGH 1ST HIGH VALUE IS	174.43826	ON 12011406:	AT (248853.00, 3913869.00, 646.51, 1321.50, 0.00)	DC	
MOB_0008 HIGH 1ST HIGH VALUE IS	183.23275	ON 12011406:	AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0009 HIGH 1ST HIGH VALUE IS	218.59263	ON 12011406:	AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
MOB_0010 HIGH 1ST HIGH VALUE IS	244.18012	ON 12031203:	AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0011 HIGH 1ST HIGH VALUE IS	251.65824	ON 12092904:	AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
MOB_0012 HIGH 1ST HIGH VALUE IS	335.63237	ON 12092904:	AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0013 HIGH 1ST HIGH VALUE IS	247.86000	ON 12031204:	AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
MOB_0014 HIGH 1ST HIGH VALUE IS	265.77451	ON 12092904:	AT (248603.00, 3913869.00, 688.47, 1321.50, 0.00)	DC	
MOB_0015 HIGH 1ST HIGH VALUE IS	312.26976	ON 12122505:	AT (248603.00, 3913869.00, 688.47, 1321.50, 0.00)	DC	

MOB_0016 HIGH   1ST HIGH VALUE IS   326.65147 ON 12120102: AT (248528.00,
3913869.00,   690.60, 1321.50,   0.00) DC

MOB_0017 HIGH   1ST HIGH VALUE IS   329.25784 ON 12120102: AT (248478.00,
3913869.00,   689.71, 1321.50,   0.00) DC

MOB_0018 HIGH   1ST HIGH VALUE IS   322.16165 ON 12122505: AT (248453.00,
3913869.00,   684.29, 1321.50,   0.00) DC

MOB_0019 HIGH   1ST HIGH VALUE IS   314.14539 ON 12111319: AT (248478.00,
3913869.00,   689.71, 1321.50,   0.00) DC

MOB_0020 HIGH   1ST HIGH VALUE IS   515.06528 ON 12011406: AT (248353.00,
3913869.00,   695.67, 1321.50,   0.00) DC

MOB_0021 HIGH   1ST HIGH VALUE IS   368.22237 ON 12040804: AT (248178.00,
3913869.00,   711.44, 1321.50,   0.00) DC

MOB_0022 HIGH   1ST HIGH VALUE IS   399.92262 ON 12031902: AT (248178.00,
3913869.00,   711.44, 1321.50,   0.00) DC

MOB_0023 HIGH   1ST HIGH VALUE IS   405.52842 ON 12011406: AT (248203.00,
3913869.00,   709.39, 1321.50,   0.00) DC

MOB_0024 HIGH   1ST HIGH VALUE IS   291.58789 ON 12013107: AT (248153.00,
3913869.00,   712.09, 1321.50,   0.00) DC

MOB_0025 HIGH   1ST HIGH VALUE IS   349.89636 ON 12122107: AT (247978.00,
3913869.00,   728.04, 1321.50,   0.00) DC

MOB_0026 HIGH   1ST HIGH VALUE IS   379.26292 ON 12012501: AT (248003.00,
3913869.00,   723.78, 1321.50,   0.00) DC

TKD_0001 HIGH   1ST HIGH VALUE IS   535.79412 ON 12010106: AT (248478.00,
3912894.00,   770.34, 1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                    ***   06/10/15
 *** AERMET - VERSION 14134 ***   ***
                   ***   03:21:45

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 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                              *** THE SUMMARY OF HIGHEST 1-HR RESULTS
***

                                    ** CONC OF TOXIC   IN MICROGRAMS/M**3
         **

                                                         DATE
                                         NETWORK
GROUP ID   AVERAGE CONC   (YYMMDDHH)   RECEPTOR (XR,
YR, ZELEV, ZHILL, ZFLAG)   OF TYPE GRID-ID
- -
- -

TKD_0002 HIGH   1ST HIGH VALUE IS   407.90445 ON 12120523: AT (248728.00,
3912894.00,   759.43, 1321.50,   0.00) DC

TKD_0003 HIGH   1ST HIGH VALUE IS   393.52436 ON 12022524: AT (248628.00,
3912894.00,   763.08, 1321.50,   0.00) DC

TKD_0004 HIGH   1ST HIGH VALUE IS   313.68356 ON 12040306: AT (248700.00,
3912800.00,   757.08, 1321.50,   0.00) DC

TKD_0005 HIGH   1ST HIGH VALUE IS   296.66141 ON 12020407: AT (248753.00,
3912894.00,   758.66, 1321.50,   0.00) DC

TKD_0006 HIGH   1ST HIGH VALUE IS   212.14342 ON 12020407: AT (248800.00,

3912700.00, 751.66, 1321.50, 0.00) DC

TKD_0007 HIGH 1ST HIGH VALUE IS 342.12823 ON 12020407: AT (248700.00,
3912800.00, 757.08, 1321.50, 0.00) DC

TKD_0008 HIGH 1ST HIGH VALUE IS 432.81583 ON 12120523: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0009 HIGH 1ST HIGH VALUE IS 379.92473 ON 12040306: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0010 HIGH 1ST HIGH VALUE IS 273.10579 ON 12020407: AT (248678.00,
3912894.00, 761.55, 1321.50, 0.00) DC

TKD_0011 HIGH 1ST HIGH VALUE IS 263.20663 ON 12040306: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKD_0012 HIGH 1ST HIGH VALUE IS 294.25598 ON 12040306: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0013 HIGH 1ST HIGH VALUE IS 204.64892 ON 12040306: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0014 HIGH 1ST HIGH VALUE IS 249.83843 ON 12040306: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKS_0001 HIGH 1ST HIGH VALUE IS 631.96953 ON 12020407: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKS_0002 HIGH 1ST HIGH VALUE IS 412.15534 ON 12121702: AT (248700.00,
3912800.00, 757.08, 1321.50, 0.00) DC

TKS_0003 HIGH 1ST HIGH VALUE IS 407.03793 ON 12020407: AT (248800.00,
3912800.00, 751.06, 1321.50, 0.00) DC

TKS_0004 HIGH 1ST HIGH VALUE IS 241.34753 ON 12020407: AT (248900.00,
3912700.00, 742.91, 1321.50, 0.00) DC

TKS_0005 HIGH 1ST HIGH VALUE IS 326.31789 ON 12020407: AT (248900.00,
3912800.00, 744.32, 1321.50, 0.00) DC

TKS_0006 HIGH 1ST HIGH VALUE IS 262.44065 ON 12121702: AT (249000.00,
3912700.00, 738.47, 1321.50, 0.00) DC

TKS_0007 HIGH 1ST HIGH VALUE IS 240.21372 ON 12020407: AT (249100.00,
3912700.00, 734.75, 1321.50, 0.00) DC

TKS_0008 HIGH 1ST HIGH VALUE IS 256.36059 ON 12020407: AT (249053.00,
3912894.00, 737.19, 1321.50, 0.00) DC

TKS_0009 HIGH 1ST HIGH VALUE IS 281.08102 ON 12020407: AT (249078.00,
3912894.00, 734.41, 1321.50, 0.00) DC

TKS_0010 HIGH 1ST HIGH VALUE IS 303.78570 ON 12121702: AT (249103.00,
3912894.00, 736.25, 1321.50, 0.00) DC

TKM_0001 HIGH 1ST HIGH VALUE IS 796.26873 ON 12010106: AT (248478.00,
3912894.00, 770.34, 1321.50, 0.00) DC

TKM_0002 HIGH 1ST HIGH VALUE IS 718.46987 ON 12040306: AT (248753.00,
3912894.00, 758.66, 1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 *** ***
*** 03:21:45

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS

***

** CONC OF TOXIC IN MICROGRAMS/M**3
**

GROUP ID	NETWORK AVERAGE CONC OF TYPE	DATE (YYMMDDHH) GRID-ID	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)
TKM_0003 HIGH 1ST HIGH VALUE IS	745.12735	ON 12010106: DC	AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)
TKM_0004 HIGH 1ST HIGH VALUE IS	867.56382	ON 12022524: DC	AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)
TKM_0005 HIGH 1ST HIGH VALUE IS	663.49500	ON 12121702: DC	AT (248978.00, 3912894.00, 751.88, 1321.50, 0.00)
TKM_0006 HIGH 1ST HIGH VALUE IS	607.76847	ON 12121702: DC	AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)
TKM_0007 HIGH 1ST HIGH VALUE IS	418.82520	ON 12042723: DC	AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)
TKM_0008 HIGH 1ST HIGH VALUE IS	457.14050	ON 12042723: DC	AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)
TKM_0009 HIGH 1ST HIGH VALUE IS	467.99087	ON 12042723: DC	AT (249278.00, 3913319.00, 680.43, 1321.50, 0.00)

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 *** ***
*** 03:21:45

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 287 Informational Message(s)

A Total of 8784 Hours Were Processed

A Total of 130 Calm Hours Identified

A Total of 157 Missing Hours Identified (1.79 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 1134 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

FILE: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\HARP\2013_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.81E-06	7.86E-02	1.03E-01	248003	3913869	11
147	GRID	2.70E-06	7.57E-02	8.24E-02	248028	3913869	11
145	GRID	2.57E-06	7.20E-02	7.18E-02	247978	3913869	11
452	GRID	2.52E-06	7.06E-02	8.73E-02	248000	3913900	11
153	GRID	2.43E-06	6.82E-02	9.65E-02	248178	3913869	11
152	GRID	2.42E-06	6.81E-02	9.44E-02	248153	3913869	11
154	GRID	2.42E-06	6.79E-02	9.79E-02	248203	3913869	11
156	GRID	2.40E-06	6.71E-02	9.76E-02	248253	3913869	11
155	GRID	2.40E-06	6.74E-02	9.82E-02	248228	3913869	11
157	GRID	2.38E-06	6.66E-02	9.55E-02	248278	3913869	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.81E-06	7.86E-02	1.03E-01	248003	3913869	11
147	GRID	2.70E-06	7.57E-02	8.24E-02	248028	3913869	11
145	GRID	2.57E-06	7.20E-02	7.18E-02	247978	3913869	11
452	GRID	2.52E-06	7.06E-02	8.73E-02	248000	3913900	11
153	GRID	2.43E-06	6.82E-02	9.65E-02	248178	3913869	11
152	GRID	2.42E-06	6.81E-02	9.44E-02	248153	3913869	11
154	GRID	2.42E-06	6.79E-02	9.79E-02	248203	3913869	11
155	GRID	2.40E-06	6.74E-02	9.82E-02	248228	3913869	11
156	GRID	2.40E-06	6.71E-02	9.76E-02	248253	3913869	11
151	GRID	2.37E-06	6.67E-02	9.16E-02	248128	3913869	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
166	GRID	1.62E-06	4.52E-02	1.33E-01	248503	3913869	11
165	GRID	1.73E-06	4.84E-02	1.33E-01	248478	3913869	11
164	GRID	1.85E-06	5.17E-02	1.30E-01	248453	3913869	11
167	GRID	1.50E-06	4.21E-02	1.30E-01	248528	3913869	11
163	GRID	1.97E-06	5.48E-02	1.25E-01	248428	3913869	11
457	GRID	1.35E-06	3.77E-02	1.24E-01	248500	3913900	11
168	GRID	1.40E-06	3.92E-02	1.23E-01	248553	3913869	11
162	GRID	2.07E-06	5.77E-02	1.18E-01	248403	3913869	11
456	GRID	1.73E-06	4.84E-02	1.16E-01	248400	3913900	11
169	GRID	1.29E-06	3.63E-02	1.12E-01	248578	3913869	11

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♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                   ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  TOXIC

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:     82 Source(s);      82 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      6.7 MB of RAM.

 **Input Runstream File:          Johe-2013_TOXIC.DTA

 **Output Print File:             Johe-2013_TOXIC.LST
```

**File for Summary of Results: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\Johe-2013_TOXIC.SUM

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/10/15
*** AERMET - VERSION 14134 *** *** *** 08:56:14

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_13.SFC
Met Version: 14134
Profile file: 23155_13.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2013 Year: 2013

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*      W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
 13 01 01   1 01   -3.8  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
```

```
1.72  115.   10.0  278.1    2.0
 13 01 01   1 02   -9.3  0.095 -9.000 -9.000 -999.   71.      8.4  0.03   0.99   1.00
2.79  116.   10.0  277.5    2.0
 13 01 01   1 03  -11.3  0.198 -9.000 -9.000 -999.  212.     62.0  0.05   0.99   1.00
3.05  122.   10.0  278.1    2.0
 13 01 01   1 04   -2.2  0.046 -9.000 -9.000 -999.   63.      4.0  0.03   0.99   1.00
1.35   97.   10.0  277.5    2.0
 13 01 01   1 05   -2.6  0.048 -9.000 -9.000 -999.   25.      3.8  0.02   0.99   1.00
1.50  357.   10.0  276.4    2.0
 13 01 01   1 06   -8.5  0.126 -9.000 -9.000 -999.  107.     20.9  0.02   0.99   1.00
2.74   19.   10.0  278.1    2.0
 13 01 01   1 07   -3.6  0.064 -9.000 -9.000 -999.   40.      6.6  0.02   0.99   1.00
2.03   12.   10.0  277.5    2.0
 13 01 01   1 08   -3.2  0.062 -9.000 -9.000 -999.   37.      6.8  0.02   0.99   0.61
1.96  330.   10.0  278.8    2.0
 13 01 01   1 09   20.0  0.262  0.341  0.005   71.  322.    -81.0  0.04   0.99   0.35
3.44  165.   10.0  278.1    2.0
 13 01 01   1 10   65.7  0.231  0.714  0.005  199.  266.    -16.8  0.04   0.99   0.26
2.72  155.   10.0  279.2    2.0
 13 01 01   1 11   97.1  0.124  1.145  0.006  556.  111.     -1.8  0.02   0.99   0.23
1.25  237.   10.0  280.4    2.0
 13 01 01   1 12  113.8  0.086  1.411  0.008  885.   61.     -1.0  0.02   0.99   0.22
0.72  257.   10.0  283.8    2.0
 13 01 01   1 13  114.2  0.126  1.432  0.007  922.  108.     -1.6  0.02   0.99   0.22
1.31   15.   10.0  285.4    2.0
 13 01 01   1 14   95.7  0.213  1.365  0.006  951.  235.     -9.0  0.03   0.99   0.23
2.57  293.   10.0  286.4    2.0
 13 01 01   1 15   32.4  0.271  0.954  0.006  961.  338.    -54.8  0.02   0.99   0.26
3.95  343.   10.0  285.9    2.0
 13 01 01   1 16   15.9  0.366  0.754  0.006  965.  531.   -276.1  0.02   0.99   0.35
5.62  353.   10.0  284.9    2.0
 13 01 01   1 17  -15.1  0.256 -9.000 -9.000 -999.  318.    100.3  0.02   0.99   0.61
4.34  341.   10.0  283.1    2.0
 13 01 01   1 18   -8.3  0.086 -9.000 -9.000 -999.   97.      6.8  0.02   0.99   1.00
2.69  345.   10.0  279.9    2.0
 13 01 01   1 19   -8.4  0.086 -9.000 -9.000 -999.   61.      6.9  0.02   0.99   1.00
2.71  331.   10.0  279.9    2.0
 13 01 01   1 20   -7.9  0.085 -9.000 -9.000 -999.   59.      6.9  0.03   0.99   1.00
2.54  298.   10.0  279.2    2.0
 13 01 01   1 21   -3.9  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
1.77  280.   10.0  278.1    2.0
 13 01 01   1 22   -8.1  0.084 -9.000 -9.000 -999.   59.      6.6  0.02   0.99   1.00
2.69  309.   10.0  276.4    2.0
 13 01 01   1 23   -4.4  0.062 -9.000 -9.000 -999.   37.      4.9  0.02   0.99   1.00
1.96  340.   10.0  275.4    2.0
 13 01 01   1 24   -3.5  0.056 -9.000 -9.000 -999.   32.      4.6  0.03   0.99   1.00
1.67   62.   10.0  276.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 13 01 01 01   10.0 1  115.    1.72   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
```

NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

SCREEN 1ST HIGHEST VALUE IS 8.61524 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 8.13556 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 7.68459 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 7.25374 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 6.71229 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 5.94916 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 5.90800 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 5.15960 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 5.13526 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 4.47960 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00) DC

OREPILE1 1ST HIGHEST VALUE IS 22.39659 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 17.44164 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 16.46541 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 14.82410 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 14.73308 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 13.55403 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 13.19213 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 12.86913 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 12.19742 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 11.98935 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00) DC

STOCKPL3 1ST HIGHEST VALUE IS 25.76354 AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 25.47575 AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 21.22333 AT (247828.00, 3913719.00, 752.90, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 20.97363 AT (247828.00, 3913769.00, 756.17, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 20.32205 AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 19.97240 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 19.93086 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 19.90011 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 19.77093 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 19.58647 AT (247828.00, 3913744.00, 752.07, 1321.50, 0.00) DC

TOP1 1ST HIGHEST VALUE IS 35.89197 AT (247978.00, 3913869.00, 728.04,

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      31.26393 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      30.06672 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      28.85701 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      28.46366 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      28.36130 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      27.95595 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      27.22048 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      27.18893 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      26.20340 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                       *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **

                 NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TOP2       1ST HIGHEST VALUE IS      37.95952 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      35.90566 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      35.48989 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      35.42910 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      35.05856 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      34.75987 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      34.30963 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      33.49564 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      33.42181 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      32.59572 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC

TOP3       1ST HIGHEST VALUE IS      58.74598 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      58.71014 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      58.47957 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      54.32044 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      54.10084 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      51.66731 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      48.83151 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      41.71569 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      37.72869 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      37.57381 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP4      1ST HIGHEST VALUE IS      44.89960 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      36.88218 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      35.65808 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      35.48468 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      35.28230 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      34.53136 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      34.15465 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      32.64396 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      30.16205 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      29.14192 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP5      1ST HIGHEST VALUE IS      37.08047 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      34.93215 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      32.62447 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      30.23876 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      28.67099 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      27.98344 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      27.05605 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      25.81450 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      24.19967 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      23.22392 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                              PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP6	1ST HIGHEST VALUE IS	55.77168 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	52.34136 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	48.86304 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	47.27148 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	47.10230 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	44.93077 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	39.42450 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	35.94883 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	34.79758 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	33.57117 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
TOP7	1ST HIGHEST VALUE IS	47.19239 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	43.37481 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	36.74657 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	35.26376 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	34.20223 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	32.57321 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	30.37164 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	27.24927 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	27.19009 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	27.13972 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
STOCKPL4	1ST HIGHEST VALUE IS	19.21963 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	17.92402 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	16.98402 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.83962 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	13.66982 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	13.41008 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	13.05201 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	13.04583 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	12.98662 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	12.97054 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
STOCKPL1	1ST HIGHEST VALUE IS	35.16983 AT (248703.00, 3912894.00, 760.49,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      32.19773 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      31.57172 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      30.59239 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      30.30314 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      29.26286 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      28.65325 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      26.61005 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      24.99439 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      24.25384 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        08:56:14

                            PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

STOCKPL2  1ST HIGHEST VALUE IS      25.96406 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      25.69065 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      21.07070 AT (  247828.00,  3913719.00,   752.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      20.55002 AT (  247828.00,  3913769.00,   756.17,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      20.41930 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      20.30332 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      19.93777 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      19.89469 AT (  247828.00,  3913794.00,   761.90,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      19.31291 AT (  247828.00,  3913744.00,   752.07,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      19.24677 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TOP8      1ST HIGHEST VALUE IS      18.07128 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      14.51843 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      13.05734 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.14463 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      11.71325 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      11.34446 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      11.21752 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      11.04446 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.98821 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.92571 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC

TOP9      1ST HIGHEST VALUE IS      16.78951 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      15.88473 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      14.84905 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.96960 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.71010 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      11.40975 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      11.34882 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.98782 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.47121 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.29822 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC

TOP10     1ST HIGHEST VALUE IS      18.91154 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      16.63296 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      14.86614 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.68682 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.93476 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      11.83356 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      11.63412 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.98230 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.81811 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.30823 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         08:56:14

                              PAGE   8
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP11	1ST HIGHEST VALUE IS	27.40523 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	23.23908 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	18.76688 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	17.53150 AT (	249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	16.47291 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	15.61311 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	15.16757 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	14.69387 AT (	249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	14.53536 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	14.05982 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
TOP12	1ST HIGHEST VALUE IS	30.94495 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	28.62621 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	22.61357 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	19.23671 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	17.75800 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	17.56832 AT (	249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	17.08511 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	16.72318 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	15.69717 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	14.60484 AT (	249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
TOP13	1ST HIGHEST VALUE IS	31.88297 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	25.41934 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	21.17050 AT (	249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	20.84241 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	18.68650 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	17.96403 AT (	249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	17.80369 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	16.66568 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	16.39790 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	14.39183 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
TOP14	1ST HIGHEST VALUE IS	27.47147 AT (	249278.00, 3913119.00, 697.37,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      23.24885 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      20.41084 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      19.86495 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      17.49584 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      16.24830 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      15.73308 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      14.81519 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      14.45430 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      12.93949 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        08:56:14

                           PAGE   9
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **


                  NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

TOP15     1ST HIGHEST VALUE IS      23.90679 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      21.39925 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      20.10426 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.52006 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      14.90186 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      14.38749 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      14.01852 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      13.09352 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      12.96190 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      11.29673 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP16     1ST HIGHEST VALUE IS      26.90351 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      23.06669 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      20.46248 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      17.44114 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      16.01484 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      15.55789 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      14.80262 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      13.91927 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      13.23976 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.77648 AT (  249278.00,  3913069.00,   714.81,
1321.50,    0.00)  DC

20ACRE    1ST HIGHEST VALUE IS      20.39510 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      19.58460 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.70887 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      18.36390 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      17.49637 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      17.46239 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      17.40105 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      17.30854 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      17.23721 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      17.11825 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC

MOB_0001  1ST HIGHEST VALUE IS       1.30646 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.18179 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.01393 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.97864 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.89206 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.84329 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.81520 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.80664 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.80407 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.75898 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  10
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0002	1ST HIGHEST VALUE IS	1.14275 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.10590 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.99456 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.93422 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.87860 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.87471 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.79340 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.73730 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.73204 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.72427 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
MOB_0003	1ST HIGHEST VALUE IS	1.04770 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.02734 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.99395 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.94475 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.91799 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.86653 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.79621 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.72571 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.69481 AT (	249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.68404 AT (	249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
MOB_0004	1ST HIGHEST VALUE IS	1.03457 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.02671 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.99759 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.93997 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.92956 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.85391 AT (	249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.81545 AT (	249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.81401 AT (	249278.00, 3913394.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.77672 AT (	249300.00, 3913300.00, 685.31, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.75289 AT (	249278.00, 3913419.00, 678.34, 1321.50, 0.00)	DC	
MOB_0005	1ST HIGHEST VALUE IS	0.80349 AT (	248403.00, 3913869.00, 674.11,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.76856 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.76755 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.74067 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.73519 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.72469 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.70913 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.69317 AT (  249278.00,  3913469.00,   671.76,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.67683 AT (  249278.00,  3913419.00,   678.34,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.64343 AT (  249278.00,  3913344.00,   680.59,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  11
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0006  1ST HIGHEST VALUE IS       0.89678 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.83099 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.78683 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.69192 AT (  249278.00,  3913494.00,   669.56,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.68290 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.67392 AT (  249278.00,  3913469.00,   671.76,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.66341 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.65552 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.62199 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.61845 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC

MOB_0007  1ST HIGHEST VALUE IS       1.02873 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.01466 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.00573 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.80643 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       0.75032 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.68668 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.68638 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.65996 AT (  248700.00,  3913900.00,   657.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.65118 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.63090 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC

MOB_0008  1ST HIGHEST VALUE IS       1.44065 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.32515 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.32445 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.16383 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.05759 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.01014 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.97456 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.97430 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.88847 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.80545 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC

MOB_0009  1ST HIGHEST VALUE IS       1.85342 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.76532 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.72068 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.53357 AT (  248628.00,  3913869.00,   684.63,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.53067 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.52112 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.51571 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.40001 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.39071 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.38277 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  12
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0010	1ST HIGHEST VALUE IS	2.62941 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.24066 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.98015 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.81550 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.78014 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.74973 AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.69432 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.57987 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.49903 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.48344 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
MOB_0011	1ST HIGHEST VALUE IS	3.78998 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.51699 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.11962 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.09987 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.89460 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.86175 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.69333 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.66985 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.43539 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.41110 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
MOB_0012	1ST HIGHEST VALUE IS	2.72231 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.40068 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.89910 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.86667 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.67286 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.61392 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.43689 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.38499 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.17291 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.10136 AT (248400.00, 3914000.00, 653.15, 1321.50, 0.00)	DC	
MOB_0013	1ST HIGHEST VALUE IS	3.64548 AT (248428.00, 3913869.00, 678.70,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.83355 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.71485 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.34714 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.33938 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.27758 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.13933 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.98031 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.76997 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.71781 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  13
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0014  1ST HIGHEST VALUE IS       4.92796 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.88421 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.55661 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.55447 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.18183 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.87329 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.82805 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.70457 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.46837 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.22438 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC

MOB_0015  1ST HIGHEST VALUE IS       7.24877 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.90146 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.84152 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.27337 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.57428 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.45702 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.87016 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.22249 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.21545 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.18372 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC

MOB_0016  1ST HIGHEST VALUE IS       8.29390 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.20140 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.64137 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.77240 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.74076 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.86496 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.01385 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.94026 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.74486 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.26907 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC

MOB_0017  1ST HIGHEST VALUE IS       8.49295 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.46677 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.78181 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.00309 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.87664 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.92763 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.09899 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       5.03776 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.93516 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.37769 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  14
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0018	1ST HIGHEST VALUE IS	7.71653 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	7.40877 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	7.24354 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	6.49964 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	6.02424 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.68925 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.60208 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.92660 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.50932 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.50583 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
MOB_0019	1ST HIGHEST VALUE IS	4.26084 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.18728 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	4.16226 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.65339 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.97806 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.43127 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.39831 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.31889 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.26374 AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.11589 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
MOB_0020	1ST HIGHEST VALUE IS	15.37292 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	11.37468 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	10.10660 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	8.13836 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.48205 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.47778 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.88589 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.46400 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.39961 AT (248200.00, 3913900.00, 700.22, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.74967 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
MOB_0021	1ST HIGHEST VALUE IS	14.24665 AT (248253.00, 3913869.00, 696.56,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      13.22734 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      13.08196 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.00523 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.20675 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.65693 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       7.90841 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       7.38865 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       7.04170 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       5.77145 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         08:56:14

                              PAGE  15
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0022  1ST HIGHEST VALUE IS      13.69169 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.58754 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      10.66063 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.26544 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       8.77703 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.33084 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       6.59907 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       5.84650 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       5.15601 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       5.05396 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC

MOB_0023  1ST HIGHEST VALUE IS       9.26908 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       9.10052 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       8.29206 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.95393 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.85708 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.45120 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.44080 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.56606 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.77362 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.81257 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

MOB_0024  1ST HIGHEST VALUE IS       7.39857 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.17631 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.10337 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.63248 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.20732 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.17041 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.68464 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.55882 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.42753 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.82607 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC

MOB_0025  1ST HIGHEST VALUE IS       8.63573 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.41585 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       8.41232 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       8.04720 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.51906 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       6.35595 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.76766 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.12168 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.33136 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.09758 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                              PAGE  16
 **MODELOPTs:    RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0026	1ST HIGHEST VALUE IS	12.31274 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	8.18528 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	7.88319 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.66175 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.51931 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.61305 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.40444 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.65895 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.60792 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.42577 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
TKD_0001	1ST HIGHEST VALUE IS	9.23250 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	9.06837 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	8.60414 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	8.41480 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	7.61777 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	7.30135 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	6.43644 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	6.24299 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	5.29629 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	5.22854 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
TKD_0002	1ST HIGHEST VALUE IS	5.99512 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.99151 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.71244 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.70776 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.36487 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.05470 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.00597 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.47932 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.45135 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.01585 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
TKD_0003	1ST HIGHEST VALUE IS	4.73480 AT (248653.00, 3912894.00, 762.44,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.63978 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.49998 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.49022 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.29467 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.17198 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.99883 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.93469 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.86688 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.66278 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  17
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKD_0004  1ST HIGHEST VALUE IS       4.04190 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.02475 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.91284 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.71896 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       3.35193 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.31300 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.06571 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.88515 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.88282 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.63588 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC

TKD_0005  1ST HIGHEST VALUE IS       3.87720 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.64320 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.62953 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.27268 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       3.13183 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.99188 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.90948 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.73581 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.65864 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.40114 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC

TKD_0006  1ST HIGHEST VALUE IS       2.98284 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.81158 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.75708 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.73653 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.72744 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.59735 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.46064 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.25511 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.16296 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.16204 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC

TKD_0007  1ST HIGHEST VALUE IS       3.11366 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.10896 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.98339 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.96080 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.89645 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.88942 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.81320 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.68400 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.63920 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.46276 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                              PAGE  18
 **MODELOPTs:    RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKD_0008	1ST HIGHEST VALUE IS	5.55448 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.46190 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.39155 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.22940 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.68215 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.02102 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.80610 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.38071 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.00891 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.79755 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
TKD_0009	1ST HIGHEST VALUE IS	4.25454 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.15043 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	4.03253 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	4.02132 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.81722 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.45775 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.06654 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.94266 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.64213 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.45806 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00)	DC	
TKD_0010	1ST HIGHEST VALUE IS	3.52360 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.44745 AT (248453.00, 3912894.00, 772.72, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.12675 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.99139 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.77814 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.58693 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.50165 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.40617 AT (248428.00, 3912894.00, 776.83, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.39718 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.24471 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
TKD_0011	1ST HIGHEST VALUE IS	3.07332 AT (248503.00, 3912894.00, 767.88,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.02043 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.86888 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.82042 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.74674 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.55010 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.37705 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.28737 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.18437 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.16718 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  19
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

TKD_0012  1ST HIGHEST VALUE IS       2.55091 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.50051 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.45232 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.41970 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.32896 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.25768 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.13886 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.04072 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.90141 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.86655 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC

TKD_0013  1ST HIGHEST VALUE IS       2.10268 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.04824 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.00298 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.92038 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.87394 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.83681 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.77999 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.65094 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.57345 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.52770 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC

TKD_0014  1ST HIGHEST VALUE IS       1.81095 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.79336 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.73350 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.70438 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.67431 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.63686 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.62223 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.57504 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.52658 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.44713 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TKS_0001  1ST HIGHEST VALUE IS       7.73015 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.67426 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.38565 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.10850 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.30647 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.98305 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.42635 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.74457 AT (  248600.00,  3912800.00,   762.78,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.57810 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.93526 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  20
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0002	1ST HIGHEST VALUE IS	3.96169 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.93060 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.89794 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.84353 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.62798 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.62010 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.54325 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.29134 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.26183 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.02812 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKS_0003	1ST HIGHEST VALUE IS	2.77202 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.38260 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.19515 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.18854 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.18612 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.04860 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.93707 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.88725 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.79458 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.71716 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
TKS_0004	1ST HIGHEST VALUE IS	2.25814 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.07027 AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.71193 AT (248900.00, 3912700.00, 742.91, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.70947 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.61676 AT (249003.00, 3912894.00, 746.85, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.51572 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.42864 AT (248700.00, 3912500.00, 745.10, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.41543 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.37016 AT (248900.00, 3912600.00, 741.62, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.36289 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
TKS_0005	1ST HIGHEST VALUE IS	2.23316 AT (248900.00, 3912800.00, 744.32,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.83584 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.65302 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.64578 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.54358 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.48899 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.47362 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.41703 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.36411 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.29454 AT (  248800.00,  3912500.00,   740.11,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  21
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKS_0006  1ST HIGHEST VALUE IS       1.94788 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.85965 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.73386 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.70000 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.65875 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.60779 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.41638 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.39960 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.38191 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.35496 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC

TKS_0007  1ST HIGHEST VALUE IS       1.75898 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.66373 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.53268 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.37403 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.34116 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.29323 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.28950 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.22497 AT (  248900.00,  3912500.00,   732.80,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.20646 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.10096 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC

TKS_0008  1ST HIGHEST VALUE IS       2.23011 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.04891 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.88678 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.79452 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.76483 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.64140 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.55586 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.51243 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.44282 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.30712 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC

TKS_0009  1ST HIGHEST VALUE IS       2.40019 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.10927 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.08446 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.05832 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.91359 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.80894 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.78802 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.77766 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.70973 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.70311 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  22
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0010	1ST HIGHEST VALUE IS	2.11675 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.98085 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.95100 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.78899 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.73545 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.57285 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.50339 AT (249100.00, 3912800.00, 740.52, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.36621 AT (249000.00, 3912700.00, 738.47, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.31394 AT (249153.00, 3912894.00, 743.23, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.30774 AT (249200.00, 3912800.00, 739.73, 1321.50, 0.00)	DC	
TKM_0001	1ST HIGHEST VALUE IS	14.72995 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	14.48558 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	13.64369 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	13.43503 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	12.12595 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	11.53220 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	10.19739 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.82962 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	8.30211 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	8.25339 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
TKM_0002	1ST HIGHEST VALUE IS	14.13907 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	13.93479 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	13.12705 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	12.98150 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	11.82921 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	11.12669 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	10.03928 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.48165 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	8.14493 AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	7.96267 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
TKM_0003	1ST HIGHEST VALUE IS	12.35289 AT (248778.00, 3912894.00, 758.97,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.27723 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.66276 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.58623 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.72066 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.12155 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.33353 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.85103 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       7.87043 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       7.76888 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  23
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKM_0004  1ST HIGHEST VALUE IS      12.00925 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.88916 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.84626 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.61563 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.08502 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.82677 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.26284 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.57500 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.81099 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.05704 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC

TKM_0005  1ST HIGHEST VALUE IS       8.84818 AT (  248978.00,  3912894.00,   751.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.29755 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.81647 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.54858 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.29722 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.20874 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.57879 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.48059 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.35487 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.14441 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC

TKM_0006  1ST HIGHEST VALUE IS       8.14686 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.25583 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.17178 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.35276 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.33779 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.11315 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.54741 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.37736 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.29558 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.03405 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC

TKM_0007  1ST HIGHEST VALUE IS       5.67504 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.06508 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.99658 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.68360 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.49424 AT (  249278.00,  3913019.00,   732.94,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.48932 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.16785 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.10270 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.07204 AT (  249278.00,  3913044.00,   725.42,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.93559 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/10/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:56:14

                             PAGE  24
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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                NETWORK
GROUP ID                        AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKM_0008  1ST HIGHEST VALUE IS       2.97118 AT (  249278.00,  3913069.00,   714.81,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.20007 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.03344 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.01936 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.99961 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.98915 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.87668 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.86900 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.77253 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.65721 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC

TKM_0009  1ST HIGHEST VALUE IS       3.29149 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.61411 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.41863 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.17981 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.16094 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.12754 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.11888 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.00230 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.93852 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.76938 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***          06/10/15
 *** AERMET - VERSION  14134 ***   ***
                ***         08:56:14

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **

                                                    DATE
                                  NETWORK
```

GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

SCREEN HIGH 1ST HIGH VALUE IS 1009.29409 ON 13062801: AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00) DC

OREPILE1 HIGH 1ST HIGH VALUE IS 2869.92005 ON 13110605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

STOCKPL3 HIGH 1ST HIGH VALUE IS 2637.06333 ON 13013004: AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00) DC

TOP1 HIGH 1ST HIGH VALUE IS 3273.77302 ON 13040303: AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC

TOP2 HIGH 1ST HIGH VALUE IS 3649.36985 ON 13092407: AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC

TOP3 HIGH 1ST HIGH VALUE IS 3972.25968 ON 13092407: AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC

TOP4 HIGH 1ST HIGH VALUE IS 3594.44834 ON 13091303: AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC

TOP5 HIGH 1ST HIGH VALUE IS 3278.54532 ON 13040303: AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC

TOP6 HIGH 1ST HIGH VALUE IS 3944.92267 ON 13091303: AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC

TOP7 HIGH 1ST HIGH VALUE IS 3633.76816 ON 13091303: AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC

STOCKPL4 HIGH 1ST HIGH VALUE IS 2584.39031 ON 13020805: AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00) DC

STOCKPL1 HIGH 1ST HIGH VALUE IS 3506.17564 ON 13020405: AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC

STOCKPL2 HIGH 1ST HIGH VALUE IS 2654.64867 ON 13020805: AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC

TOP8 HIGH 1ST HIGH VALUE IS 2707.46635 ON 13110605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP9 HIGH 1ST HIGH VALUE IS 2721.38398 ON 13110605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP10 HIGH 1ST HIGH VALUE IS 2838.48355 ON 13110605: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

TOP11 HIGH 1ST HIGH VALUE IS 3301.11263 ON 13070605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP12 HIGH 1ST HIGH VALUE IS 3409.81292 ON 13070605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP13 HIGH 1ST HIGH VALUE IS 3664.65267 ON 13070605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP14 HIGH 1ST HIGH VALUE IS 3266.43389 ON 13110605: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP15 HIGH 1ST HIGH VALUE IS 2961.13719 ON 13110605: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

TOP16 HIGH 1ST HIGH VALUE IS 3291.21897 ON 13110605: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

20ACRE HIGH 1ST HIGH VALUE IS 2058.77268 ON 13012004: AT (248503.00, 3913869.00, 691.51, 1321.50, 0.00) DC

MOB_0001 HIGH 1ST HIGH VALUE IS 165.91180 ON 13042604: AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00) DC

MOB_0002 HIGH 1ST HIGH VALUE IS 191.56065 ON 13020221: AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00) DC

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 *** ***
*** 08:56:14

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0003 HIGH	1ST HIGH VALUE IS	176.55596	ON 13020221: AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
MOB_0004 HIGH	1ST HIGH VALUE IS	146.69282	ON 13042604: AT (249278.00, 3913419.00, 678.34, 1321.50, 0.00)	DC	
MOB_0005 HIGH	1ST HIGH VALUE IS	146.09757	ON 13042604: AT (249278.00, 3913469.00, 671.76, 1321.50, 0.00)	DC	
MOB_0006 HIGH	1ST HIGH VALUE IS	180.14350	ON 13010403: AT (249278.00, 3913744.00, 671.35, 1321.50, 0.00)	DC	
MOB_0007 HIGH	1ST HIGH VALUE IS	177.08821	ON 13011304: AT (248978.00, 3913869.00, 629.62, 1321.50, 0.00)	DC	
MOB_0008 HIGH	1ST HIGH VALUE IS	205.59277	ON 13022505: AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
MOB_0009 HIGH	1ST HIGH VALUE IS	216.31907	ON 13011304: AT (248903.00, 3913869.00, 638.38, 1321.50, 0.00)	DC	
MOB_0010 HIGH	1ST HIGH VALUE IS	238.19781	ON 13010508: AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
MOB_0011 HIGH	1ST HIGH VALUE IS	328.34601	ON 13022505: AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0012 HIGH	1ST HIGH VALUE IS	334.46684	ON 13010508: AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0013 HIGH	1ST HIGH VALUE IS	308.10913	ON 13012004: AT (248600.00, 3913900.00, 678.79, 1321.50, 0.00)	DC	
MOB_0014 HIGH	1ST HIGH VALUE IS	269.87471	ON 13100102: AT (248603.00, 3913869.00, 688.47, 1321.50, 0.00)	DC	
MOB_0015 HIGH	1ST HIGH VALUE IS	308.08288	ON 13012619: AT (248628.00, 3913869.00, 684.63, 1321.50, 0.00)	DC	

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MOB_0016 HIGH   1ST HIGH VALUE IS     318.66819  ON 13012619: AT (  248578.00,
3913869.00,   689.32,  1321.50,    0.00)  DC

MOB_0017 HIGH   1ST HIGH VALUE IS     319.02866  ON 13012619: AT (  248528.00,
3913869.00,   690.60,  1321.50,    0.00)  DC

MOB_0018 HIGH   1ST HIGH VALUE IS     314.43812  ON 13012619: AT (  248478.00,
3913869.00,   689.71,  1321.50,    0.00)  DC

MOB_0019 HIGH   1ST HIGH VALUE IS     321.42692  ON 13010403: AT (  248553.00,
3913869.00,   689.20,  1321.50,    0.00)  DC

MOB_0020 HIGH   1ST HIGH VALUE IS     472.57461  ON 13011619: AT (  248353.00,
3913869.00,   695.67,  1321.50,    0.00)  DC

MOB_0021 HIGH   1ST HIGH VALUE IS     376.63535  ON 13011923: AT (  248178.00,
3913869.00,   711.44,  1321.50,    0.00)  DC

MOB_0022 HIGH   1ST HIGH VALUE IS     430.73653  ON 13013003: AT (  248178.00,
3913869.00,   711.44,  1321.50,    0.00)  DC

MOB_0023 HIGH   1ST HIGH VALUE IS     385.47859  ON 13011619: AT (  248203.00,
3913869.00,   709.39,  1321.50,    0.00)  DC

MOB_0024 HIGH   1ST HIGH VALUE IS     298.43338  ON 13012619: AT (  248203.00,
3913869.00,   709.39,  1321.50,    0.00)  DC

MOB_0025 HIGH   1ST HIGH VALUE IS     358.79363  ON 13011705: AT (  247978.00,
3913869.00,   728.04,  1321.50,    0.00)  DC

MOB_0026 HIGH   1ST HIGH VALUE IS     374.67646  ON 13022505: AT (  248000.00,
3913900.00,   725.84,  1321.50,    0.00)  DC

TKD_0001 HIGH   1ST HIGH VALUE IS     450.00409  ON 13020607: AT (  248703.00,
3912894.00,   760.49,  1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        06/10/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        08:56:14

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                    *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                        ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **

                                                          DATE
                                      NETWORK
GROUP ID                             AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - -

TKD_0002 HIGH   1ST HIGH VALUE IS     397.58488  ON 13011704: AT (  248478.00,
3912894.00,   770.34,  1321.50,    0.00)  DC

TKD_0003 HIGH   1ST HIGH VALUE IS     372.35395  ON 13013004: AT (  248728.00,
3912894.00,   759.43,  1321.50,    0.00)  DC

TKD_0004 HIGH   1ST HIGH VALUE IS     368.23745  ON 13013004: AT (  248700.00,
3912800.00,   757.08,  1321.50,    0.00)  DC

TKD_0005 HIGH   1ST HIGH VALUE IS     314.41895  ON 13012601: AT (  248700.00,
3912800.00,   757.08,  1321.50,    0.00)  DC

TKD_0006 HIGH   1ST HIGH VALUE IS     248.21913  ON 13020805: AT (  248700.00,
```

3912800.00, 757.08, 1321.50, 0.00) DC

TKD_0007 HIGH 1ST HIGH VALUE IS 327.32408 ON 13011703: AT (248753.00,
3912894.00, 758.66, 1321.50, 0.00) DC

TKD_0008 HIGH 1ST HIGH VALUE IS 417.95398 ON 13022104: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0009 HIGH 1ST HIGH VALUE IS 441.89185 ON 13013004: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0010 HIGH 1ST HIGH VALUE IS 290.91476 ON 13013004: AT (248553.00,
3912894.00, 765.26, 1321.50, 0.00) DC

TKD_0011 HIGH 1ST HIGH VALUE IS 303.16441 ON 13013004: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKD_0012 HIGH 1ST HIGH VALUE IS 341.83786 ON 13013004: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0013 HIGH 1ST HIGH VALUE IS 249.53707 ON 13013004: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0014 HIGH 1ST HIGH VALUE IS 311.10669 ON 13013004: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKS_0001 HIGH 1ST HIGH VALUE IS 632.01650 ON 13020405: AT (248628.00,
3912894.00, 763.08, 1321.50, 0.00) DC

TKS_0002 HIGH 1ST HIGH VALUE IS 450.84178 ON 13020805: AT (248700.00,
3912800.00, 757.08, 1321.50, 0.00) DC

TKS_0003 HIGH 1ST HIGH VALUE IS 319.97053 ON 13020805: AT (248800.00,
3912700.00, 751.66, 1321.50, 0.00) DC

TKS_0004 HIGH 1ST HIGH VALUE IS 322.29171 ON 13020405: AT (248900.00,
3912800.00, 744.32, 1321.50, 0.00) DC

TKS_0005 HIGH 1ST HIGH VALUE IS 392.05999 ON 13011703: AT (249028.00,
3912894.00, 742.50, 1321.50, 0.00) DC

TKS_0006 HIGH 1ST HIGH VALUE IS 356.52306 ON 13011703: AT (249128.00,
3912894.00, 738.84, 1321.50, 0.00) DC

TKS_0007 HIGH 1ST HIGH VALUE IS 285.17317 ON 13013004: AT (248900.00,
3912500.00, 732.80, 1321.50, 0.00) DC

TKS_0008 HIGH 1ST HIGH VALUE IS 325.27952 ON 13020405: AT (249053.00,
3912894.00, 737.19, 1321.50, 0.00) DC

TKS_0009 HIGH 1ST HIGH VALUE IS 347.72094 ON 13020805: AT (249028.00,
3912894.00, 742.50, 1321.50, 0.00) DC

TKS_0010 HIGH 1ST HIGH VALUE IS 334.79133 ON 13011703: AT (249278.00,
3912994.00, 737.31, 1321.50, 0.00) DC

TKM_0001 HIGH 1ST HIGH VALUE IS 702.80233 ON 13020607: AT (248703.00,
3912894.00, 760.49, 1321.50, 0.00) DC

TKM_0002 HIGH 1ST HIGH VALUE IS 766.30263 ON 13021804: AT (248478.00,
3912894.00, 770.34, 1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                  *** 06/10/15
 *** AERMET - VERSION 14134 *** ***
                  *** 08:56:14

 **MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS

***

** CONC OF TOXIC IN MICROGRAMS/M**3
**

GROUP ID	NETWORK AVERAGE CONC OF TYPE	DATE (YYMMDDHH) GRID-ID	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)
TKM_0003 HIGH	1ST HIGH VALUE IS	679.72392	ON 13012601: AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00) DC
TKM_0004 HIGH	1ST HIGH VALUE IS	806.89877	ON 13022104: AT (248928.00, 3912894.00, 758.01, 1321.50, 0.00) DC
TKM_0005 HIGH	1ST HIGH VALUE IS	662.76142	ON 13020805: AT (248978.00, 3912894.00, 751.88, 1321.50, 0.00) DC
TKM_0006 HIGH	1ST HIGH VALUE IS	702.46596	ON 13020805: AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00) DC
TKM_0007 HIGH	1ST HIGH VALUE IS	432.17385	ON 13010403: AT (249278.00, 3913344.00, 680.59, 1321.50, 0.00) DC
TKM_0008 HIGH	1ST HIGH VALUE IS	453.51493	ON 13010403: AT (249278.00, 3913369.00, 680.65, 1321.50, 0.00) DC
TKM_0009 HIGH	1ST HIGH VALUE IS	471.46108	ON 13010403: AT (249278.00, 3913394.00, 680.21, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/10/15
*** AERMET - VERSION 14134 *** ***
*** 08:56:14

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 468 Informational Message(s)

A Total of 8760 Hours Were Processed

A Total of 406 Calm Hours Identified

A Total of 62 Missing Hours Identified (0.71 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 1134 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

FILE: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\HARP\2009_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.42E-06	6.78E-02	8.75E-02	248003	3913869	11
147	GRID	2.33E-06	6.53E-02	7.58E-02	248028	3913869	11
145	GRID	2.25E-06	6.31E-02	6.62E-02	247978	3913869	11
452	GRID	2.15E-06	6.01E-02	8.23E-02	248000	3913900	11
152	GRID	2.01E-06	5.65E-02	9.73E-02	248153	3913869	11
148	GRID	2.01E-06	5.66E-02	7.32E-02	248053	3913869	11
151	GRID	1.99E-06	5.58E-02	9.31E-02	248128	3913869	11
153	GRID	1.99E-06	5.59E-02	1.01E-01	248178	3913869	11
150	GRID	1.96E-06	5.53E-02	8.76E-02	248103	3913869	11
154	GRID	1.95E-06	5.48E-02	1.03E-01	248203	3913869	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.42E-06	6.78E-02	8.75E-02	248003	3913869	11
147	GRID	2.33E-06	6.53E-02	7.58E-02	248028	3913869	11
145	GRID	2.25E-06	6.31E-02	6.62E-02	247978	3913869	11
452	GRID	2.15E-06	6.01E-02	8.23E-02	248000	3913900	11
148	GRID	2.01E-06	5.66E-02	7.32E-02	248053	3913869	11
152	GRID	2.01E-06	5.65E-02	9.73E-02	248153	3913869	11
153	GRID	1.99E-06	5.59E-02	1.01E-01	248178	3913869	11
151	GRID	1.99E-06	5.58E-02	9.31E-02	248128	3913869	11
150	GRID	1.96E-06	5.53E-02	8.76E-02	248103	3913869	11
154	GRID	1.95E-06	5.48E-02	1.03E-01	248203	3913869	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
174	GRID	9.26E-07	2.60E-02	1.22E-01	248703	3913869	11
175	GRID	8.44E-07	2.37E-02	1.21E-01	248728	3913869	11
173	GRID	1.02E-06	2.87E-02	1.20E-01	248678	3913869	11
176	GRID	7.71E-07	2.17E-02	1.17E-01	248753	3913869	11
459	GRID	8.18E-07	2.30E-02	1.16E-01	248700	3913900	11
172	GRID	1.13E-06	3.17E-02	1.15E-01	248653	3913869	11
177	GRID	7.08E-07	1.99E-02	1.09E-01	248778	3913869	11
171	GRID	1.23E-06	3.46E-02	1.06E-01	248628	3913869	11
156	GRID	1.89E-06	5.28E-02	1.06E-01	248253	3913869	11
157	GRID	1.86E-06	5.21E-02	1.05E-01	248278	3913869	11

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♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:29:06

                           PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 - - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  TOXIC

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:     82 Source(s);      82 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      6.7 MB of RAM.

 **Input Runstream File:          Johe-2009_TOXIC.DTA

 **Output Print File:             Johe-2009_TOXIC.LST
```

 **File for Summary of Results: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\Johe-2009_TOXIC.SUM
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                 ***   06/09/15
 *** AERMET - VERSION 14134 *** ***
                 ***   11:29:06

                            PAGE   2
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                        *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                                (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

               NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

                                     *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                             (METERS/SEC)

                                                    1.54,   3.09,   5.14,   8.23, 10.80,
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                 ***   06/09/15
 *** AERMET - VERSION 14134 *** ***
                 ***   11:29:06

                            PAGE   3
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                      *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file: 23155_09.SFC
          Met Version: 14134
   Profile file: 23155_09.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:   23155   Upper air station no.:   23230
                 Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
                 Year: 2009   Year: 2009

 First 24 hours of scalar data
 YR MO DY JDY HR   H0   U*   W* DT/DZ ZICNV ZIMCH M-O LEN   Z0 BOWEN ALBEDO REF WS   WD   HT REF TA   HT
- -
 09 01 01   1 01   -1.9 0.049 -9.000 -9.000 -999.   26.   5.5 0.02   0.99   1.00

```
1.55  338.   10.0  278.1    2.0
 09 01 01   1 02   -3.8  0.069 -9.000 -9.000 -999.   43.      7.7  0.02   0.99   1.00
2.20  300.   10.0  278.1    2.0
 09 01 01   1 03   -2.7  0.058 -9.000 -9.000 -999.   33.      6.5  0.02   0.99   1.00
1.81  242.   10.0  278.1    2.0
 09 01 01   1 04   -5.8  0.102 -9.000 -9.000 -999.   78.     16.3  0.04   0.99   1.00
2.20  175.   10.0  278.1    2.0
 09 01 01   1 05   -2.2  0.054 -9.000 -9.000 -999.   30.      6.4  0.04   0.99   1.00
1.50  164.   10.0  278.1    2.0
 09 01 01   1 06   -0.7  0.031 -9.000 -9.000 -999.   13.      3.6  0.03   0.99   1.00
0.92   74.   10.0  278.1    2.0
 09 01 01   1 07   -1.3  0.041 -9.000 -9.000 -999.   20.      4.8  0.03   0.99   1.00
1.20   95.   10.0  278.1    2.0
 09 01 01   1 08   -0.9  0.035 -9.000 -9.000 -999.   16.      4.2  0.03   0.99   0.61
1.04  114.   10.0  277.5    2.0
 09 01 01   1 09   -0.3  0.071 -9.000 -9.000 -999.   45.     97.2  0.05   0.99   0.35
1.04  148.   10.0  277.5    2.0
 09 01 01   1 10   11.1  0.066  0.338  0.014  125.   41.     -2.3  0.02   0.99   0.26
0.70   33.   10.0  278.1    2.0
 09 01 01   1 11   19.5  0.106  0.482  0.015  206.   82.     -5.4  0.02   0.99   0.23
1.28  346.   10.0  278.1    2.0
 09 01 01   1 12   23.9  0.094  0.567  0.015  274.   69.     -3.1  0.02   0.99   0.22
1.06  256.   10.0  278.8    2.0
 09 01 01   1 13   23.8  0.115  0.602  0.015  327.   94.     -5.7  0.02   0.99   0.22
1.36  224.   10.0  278.8    2.0
 09 01 01   1 14   19.4  0.111  0.583  0.016  365.   89.     -6.3  0.02   0.99   0.23
1.33  219.   10.0  278.1    2.0
 09 01 01   1 15   11.0  0.147  0.492  0.016  385.  136.    -25.9  0.03   0.99   0.26
1.93  209.   10.0  278.8    2.0
 09 01 01   1 16   -0.9  0.169 -9.000 -9.000 -999.  166.    501.3  0.03   0.99   0.35
2.54  204.   10.0  278.1    2.0
 09 01 01   1 17   -2.6  0.059 -9.000 -9.000 -999.   45.      7.0  0.03   0.99   0.61
1.74  189.   10.0  278.1    2.0
 09 01 01   1 18   -2.3  0.055 -9.000 -9.000 -999.   31.      6.3  0.03   0.99   1.00
1.62  198.   10.0  278.1    2.0
 09 01 01   1 19   -0.8  0.032 -9.000 -9.000 -999.   14.      3.7  0.02   0.99   1.00
0.99  223.   10.0  278.1    2.0
 09 01 01   1 20   -3.3  0.065 -9.000 -9.000 -999.   40.      7.4  0.02   0.99   1.00
1.99  219.   10.0  277.5    2.0
 09 01 01   1 21   -2.8  0.060 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.79  206.   10.0  277.5    2.0
 09 01 01   1 22   -3.9  0.071 -9.000 -9.000 -999.   45.      8.2  0.03   0.99   1.00
2.10  192.   10.0  277.5    2.0
 09 01 01   1 23   -2.9  0.061 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.81  188.   10.0  277.0    2.0
 09 01 01   1 24   -1.0  0.035 -9.000 -9.000 -999.   16.      4.0  0.02   0.99   1.00
1.08  238.   10.0  277.0    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1  338.    1.55   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         11:29:06

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
SCREEN	1ST HIGHEST VALUE IS	8.37549 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	8.15923 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	7.46772 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	7.04409 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	6.32421 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	6.31179 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.40574 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.67272 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.51370 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.95914 AT (249400.00, 3913100.00, 710.20, 1321.50, 0.00)	DC	
OREPILE1	1ST HIGHEST VALUE IS	20.64556 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	17.06004 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	15.33546 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.26375 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	13.59849 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	12.71286 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	11.69654 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	11.39840 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	9.51552 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	9.27153 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
STOCKPL3	1ST HIGHEST VALUE IS	24.99720 AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	24.75295 AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	20.81938 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	20.70371 AT (247828.00, 3913719.00, 752.90, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	20.56992 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	20.41679 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	19.56282 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	19.39037 AT (247828.00, 3913769.00, 756.17, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	18.72473 AT (247828.00, 3913744.00, 752.07, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	18.13255 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
TOP1	1ST HIGHEST VALUE IS	31.99561 AT (247978.00, 3913869.00, 728.04,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      27.27937 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      25.14731 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      25.12198 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      24.59258 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      23.87627 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      23.83942 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      23.83665 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      23.75480 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      23.64110 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:29:06

                             PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                    AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

TOP2      1ST HIGHEST VALUE IS      36.66949 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      34.84918 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      31.09940 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      30.52821 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      30.44483 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      30.32119 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      30.14995 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      30.00625 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      29.96787 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      29.96110 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC

TOP3      1ST HIGHEST VALUE IS      50.98124 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      50.14974 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      50.07509 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      48.95028 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      48.64623 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      47.37529 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      45.44958 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      37.81422 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      34.83127 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      32.25574 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP4      1ST HIGHEST VALUE IS      39.93174 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      32.14659 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      31.51199 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      30.59011 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      30.34813 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      30.21285 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      30.18924 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      29.71145 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      27.91322 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      25.30996 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC

TOP5      1ST HIGHEST VALUE IS      31.66443 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      29.47200 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      27.09428 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      25.47251 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      24.28128 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      24.24415 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      24.14429 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      23.58342 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      22.39838 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      20.61043 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***          11:29:06

                              PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP6	1ST HIGHEST VALUE IS	50.24472 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	45.68368 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	42.64180 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	42.04489 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	40.61378 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	39.52344 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	36.54512 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	33.04441 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	31.49619 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	30.68716 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
TOP7	1ST HIGHEST VALUE IS	39.97229 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	37.48365 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	31.24903 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	30.28103 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	30.22215 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	29.62101 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	28.16700 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	25.55667 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	24.67956 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	22.50266 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
STOCKPL4	1ST HIGHEST VALUE IS	18.82806 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	17.22030 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	16.85177 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.31222 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	13.48699 AT (249278.00, 3913019.00, 732.94, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	13.12008 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	13.03561 AT (249100.00, 3912700.00, 734.75, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	12.15917 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	11.88990 AT (249300.00, 3913000.00, 736.76, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	11.82493 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
STOCKPL1	1ST HIGHEST VALUE IS	32.21226 AT (248703.00, 3912894.00, 760.49,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      30.24025 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      29.27618 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      29.08530 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      29.03883 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      29.00806 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      28.17850 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      26.66478 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      25.75296 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      23.51891 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:29:06

                             PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

STOCKPL2  1ST HIGHEST VALUE IS      25.13350 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      24.65514 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      21.03588 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      20.26941 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      19.81168 AT (  247828.00,  3913719.00,   752.90,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      19.09220 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      19.05904 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      18.02197 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      17.82418 AT (  247828.00,  3913769.00,   756.17,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      17.63726 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TOP8      1ST HIGHEST VALUE IS      16.99245 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      14.61022 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      12.97827 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.52925 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      11.24785 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.12434 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.76971 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.67240 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.63551 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.50908 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC

TOP9      1ST HIGHEST VALUE IS      16.41152 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      15.40729 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      13.66950 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.88658 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      12.29399 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.59041 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.20739 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.08937 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.06584 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.81537 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC

TOP10     1ST HIGHEST VALUE IS      17.96701 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      16.41672 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      14.98613 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      13.47647 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.99519 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.10079 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.63104 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.49278 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.46310 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.34153 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         11:29:06

                              PAGE   8
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
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                    NETWORK
GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TOP11     1ST HIGHEST VALUE IS      25.22130 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      21.47572 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.87334 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.92317 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      15.08606 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      14.56102 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      14.23318 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      13.99142 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      11.58031 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.01288 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP12     1ST HIGHEST VALUE IS      29.41985 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      25.90175 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      21.95475 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      19.67010 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      16.96954 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      16.62998 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      16.08669 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      15.08308 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      13.36612 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      11.34350 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP13     1ST HIGHEST VALUE IS      29.20565 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      23.81225 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      21.08724 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      18.37181 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      18.34017 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      17.03688 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      15.30798 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      14.80965 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      12.17481 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.84508 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP14     1ST HIGHEST VALUE IS      25.03281 AT (  249278.00,  3913119.00,   697.37,
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1321.50,    0.00)  DC
           2ND HIGHEST VALUE IS      21.43356 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
           3RD HIGHEST VALUE IS      19.90100 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
           4TH HIGHEST VALUE IS      18.04579 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
           5TH HIGHEST VALUE IS      17.38547 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
           6TH HIGHEST VALUE IS      15.59978 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
           7TH HIGHEST VALUE IS      13.03570 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
           8TH HIGHEST VALUE IS      12.63802 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
           9TH HIGHEST VALUE IS      10.63003 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          10TH HIGHEST VALUE IS       9.62088 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         11:29:06

                             PAGE   9
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                     AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

TOP15      1ST HIGHEST VALUE IS      22.09402 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
           2ND HIGHEST VALUE IS      19.97472 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
           3RD HIGHEST VALUE IS      18.97644 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
           4TH HIGHEST VALUE IS      16.92374 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
           5TH HIGHEST VALUE IS      15.30296 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
           6TH HIGHEST VALUE IS      12.92852 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
           7TH HIGHEST VALUE IS      10.85326 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
           8TH HIGHEST VALUE IS      10.57524 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
           9TH HIGHEST VALUE IS       9.23377 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          10TH HIGHEST VALUE IS       8.53647 AT (  249278.00,  3913069.00,   714.81,
1321.50,    0.00)  DC

TOP16      1ST HIGHEST VALUE IS      24.79677 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
           2ND HIGHEST VALUE IS      21.62740 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
           3RD HIGHEST VALUE IS      19.66851 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
           4TH HIGHEST VALUE IS      17.95390 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      15.82581 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      12.98220 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.86885 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.72900 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.04075 AT (  249278.00,  3913069.00,   714.81,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.62381 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC

20ACRE    1ST HIGHEST VALUE IS      18.28514 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      17.59074 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      17.01559 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.39714 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      15.43211 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      15.39360 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      15.21958 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      15.12211 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      15.10284 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      15.03614 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC

MOB_0001  1ST HIGHEST VALUE IS       1.19563 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.05418 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.00140 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.93131 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.88316 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.85020 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.78724 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.69638 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.63428 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.61325 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***          11:29:06

                              PAGE  10
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0002	1ST HIGHEST VALUE IS	1.16911 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.03660 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.95372 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.88560 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.83490 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.80935 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.78047 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.74372 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.68531 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.60975 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
MOB_0003	1ST HIGHEST VALUE IS	1.10486 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.01585 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.01231 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.92674 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.84016 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.77516 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.74735 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.72529 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.69240 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.68126 AT (	249300.00, 3913300.00, 685.31, 1321.50, 0.00)	DC	
MOB_0004	1ST HIGHEST VALUE IS	0.99324 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.97389 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.92892 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.89359 AT (	249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.88686 AT (	249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.86734 AT (	249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.82949 AT (	249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.74495 AT (	249278.00, 3913394.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.70865 AT (	249300.00, 3913300.00, 685.31, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.70467 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
MOB_0005	1ST HIGHEST VALUE IS	0.72743 AT (	249278.00, 3913269.00, 680.21,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.69421 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.69415 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.68205 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.67970 AT (  249278.00,  3913419.00,   678.34,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.66422 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.65825 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.61016 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.60200 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.59326 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:29:06

                            PAGE  11
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

MOB_0006  1ST HIGHEST VALUE IS       0.81049 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.74622 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.72060 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.65543 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.65404 AT (  249278.00,  3913469.00,   671.76,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.64333 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.62289 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.59366 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.58781 AT (  249278.00,  3913494.00,   669.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.56732 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC

MOB_0007  1ST HIGHEST VALUE IS       0.96402 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.96210 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.89760 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.76894 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       0.72784 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.69390 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.67006 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.66812 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.64915 AT (  248803.00,  3913869.00,   649.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.63250 AT (  248700.00,  3913900.00,   657.89,
1321.50,    0.00)  DC

MOB_0008  1ST HIGHEST VALUE IS       1.36789 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.28098 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.25351 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.11050 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.03452 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.00640 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.93605 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.89913 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.88283 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.84260 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC

MOB_0009  1ST HIGHEST VALUE IS       1.76404 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.73163 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.60779 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.51841 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.49076 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.44375 AT (  248628.00,  3913869.00,   684.63,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.44192 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.37806 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.33180 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.23652 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         11:29:06

                             PAGE  12
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0010	1ST HIGHEST VALUE IS	2.49967 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.13991 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.94023 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.77015 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.72975 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.68387 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.66696 AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.63104 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.53248 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.51964 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
MOB_0011	1ST HIGHEST VALUE IS	3.62199 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.49068 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.22904 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.03863 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.02282 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.88042 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.71957 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.63138 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.39875 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.30328 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
MOB_0012	1ST HIGHEST VALUE IS	2.89602 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.34494 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.02769 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.88506 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.63442 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.58812 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.48153 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.39743 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.23557 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.06692 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0013	1ST HIGHEST VALUE IS	3.52672 AT (248428.00, 3913869.00, 678.70,		

1321.50, 0.00) DC
2ND HIGHEST VALUE IS 2.75138 AT (248403.00, 3913869.00, 674.11,
1321.50, 0.00) DC
3RD HIGHEST VALUE IS 2.61507 AT (248378.00, 3913869.00, 681.85,
1321.50, 0.00) DC
4TH HIGHEST VALUE IS 2.53060 AT (248653.00, 3913869.00, 676.56,
1321.50, 0.00) DC
5TH HIGHEST VALUE IS 2.33846 AT (248600.00, 3913900.00, 678.79,
1321.50, 0.00) DC
6TH HIGHEST VALUE IS 2.23173 AT (248453.00, 3913869.00, 684.29,
1321.50, 0.00) DC
7TH HIGHEST VALUE IS 2.04197 AT (248400.00, 3913900.00, 668.77,
1321.50, 0.00) DC
8TH HIGHEST VALUE IS 2.00627 AT (248678.00, 3913869.00, 666.82,
1321.50, 0.00) DC
9TH HIGHEST VALUE IS 1.74295 AT (248703.00, 3913869.00, 658.19,
1321.50, 0.00) DC
10TH HIGHEST VALUE IS 1.64731 AT (248300.00, 3913900.00, 683.45,
1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 11:29:06

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3
**

GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
MOB_0014	1ST HIGHEST VALUE IS	4.50995 AT (248528.00, 3913869.00, 690.60, 1321.50, 0.00) DC	
	2ND HIGHEST VALUE IS	4.48575 AT (248503.00, 3913869.00, 691.51, 1321.50, 0.00) DC	
	3RD HIGHEST VALUE IS	4.33422 AT (248553.00, 3913869.00, 689.20, 1321.50, 0.00) DC	
	4TH HIGHEST VALUE IS	4.23351 AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC	
	5TH HIGHEST VALUE IS	3.99084 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC	
	6TH HIGHEST VALUE IS	3.82431 AT (248578.00, 3913869.00, 689.32, 1321.50, 0.00) DC	
	7TH HIGHEST VALUE IS	3.69075 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC	
	8TH HIGHEST VALUE IS	3.42271 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00) DC	
	9TH HIGHEST VALUE IS	3.31696 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC	
	10TH HIGHEST VALUE IS	3.28120 AT (248603.00, 3913869.00, 688.47, 1321.50, 0.00) DC	
MOB_0015	1ST HIGHEST VALUE IS	6.65968 AT (248503.00, 3913869.00, 691.51, 1321.50, 0.00) DC	
	2ND HIGHEST VALUE IS	6.47699 AT (248528.00, 3913869.00, 690.60, 1321.50, 0.00) DC	
	3RD HIGHEST VALUE IS	6.40629 AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC	
	4TH HIGHEST VALUE IS	5.97776 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC	

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          5TH HIGHEST VALUE IS       5.48066 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.34682 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.61747 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.43069 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.98253 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.93494 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC

MOB_0016  1ST HIGHEST VALUE IS       7.68512 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.65058 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.20934 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.65921 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.48952 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.58459 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.22205 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.70431 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.34163 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.20737 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC

MOB_0017  1ST HIGHEST VALUE IS       7.92207 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.84721 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.36008 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.90040 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.59016 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.63590 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.38592 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.72078 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.59951 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.31342 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         11:29:06

                             PAGE  14
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0018	1ST HIGHEST VALUE IS	7.09779 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	6.97019 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.79363 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	6.22652 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.98423 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.44351 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.21050 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.77525 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.65044 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.09662 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
MOB_0019	1ST HIGHEST VALUE IS	4.41343 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.03282 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.96798 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.63434 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.91995 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.50562 AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.46034 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.43693 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.41931 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.15736 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
MOB_0020	1ST HIGHEST VALUE IS	14.38814 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	10.88140 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	9.73112 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	8.38192 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.71230 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.31923 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.80942 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.64813 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.38398 AT (248200.00, 3913900.00, 700.22, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.84397 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
MOB_0021	1ST HIGHEST VALUE IS	13.38535 AT (248253.00, 3913869.00, 696.56,		

1321.50,   0.00) DC
2ND HIGHEST VALUE IS   12.67950 AT (248203.00, 3913869.00,   709.39,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   12.41587 AT (248228.00, 3913869.00,   704.33,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   11.79569 AT (248278.00, 3913869.00,   694.01,
1321.50,   0.00) DC
5TH HIGHEST VALUE IS   10.59803 AT (248178.00, 3913869.00,   711.44,
1321.50,   0.00) DC
6TH HIGHEST VALUE IS   8.12714 AT (248303.00, 3913869.00,   697.89,
1321.50,   0.00) DC
7TH HIGHEST VALUE IS   8.11530 AT (248153.00, 3913869.00,   712.09,
1321.50,   0.00) DC
8TH HIGHEST VALUE IS   6.91535 AT (248128.00, 3913869.00,   710.48,
1321.50,   0.00) DC
9TH HIGHEST VALUE IS   6.49404 AT (248200.00, 3913900.00,   700.22,
1321.50,   0.00) DC
10TH HIGHEST VALUE IS   5.67376 AT (248328.00, 3913869.00,   698.55,
1321.50,   0.00) DC

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 ***   ***
*** 11:29:06

PAGE 15
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS)
RESULTS ***

** CONC OF TOXIC   IN MICROGRAMS/M**3
**

NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - -

MOB_0022 1ST HIGHEST VALUE IS   12.86760 AT (248203.00, 3913869.00,   709.39,
1321.50,   0.00) DC
2ND HIGHEST VALUE IS   11.72410 AT (248178.00, 3913869.00,   711.44,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   10.15475 AT (248153.00, 3913869.00,   712.09,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   9.80191 AT (248128.00, 3913869.00,   710.48,
1321.50,   0.00) DC
5TH HIGHEST VALUE IS   8.32008 AT (248228.00, 3913869.00,   704.33,
1321.50,   0.00) DC
6TH HIGHEST VALUE IS   8.29794 AT (248103.00, 3913869.00,   709.38,
1321.50,   0.00) DC
7TH HIGHEST VALUE IS   6.18625 AT (248078.00, 3913869.00,   708.07,
1321.50,   0.00) DC
8TH HIGHEST VALUE IS   6.06410 AT (248253.00, 3913869.00,   696.56,
1321.50,   0.00) DC
9TH HIGHEST VALUE IS   4.92217 AT (248100.00, 3913900.00,   704.14,
1321.50,   0.00) DC
10TH HIGHEST VALUE IS   4.89040 AT (248200.00, 3913900.00,   700.22,
1321.50,   0.00) DC

MOB_0023 1ST HIGHEST VALUE IS   8.56589 AT (248103.00, 3913869.00,   709.38,
1321.50,   0.00) DC
2ND HIGHEST VALUE IS   8.39862 AT (248128.00, 3913869.00,   710.48,
1321.50,   0.00) DC
3RD HIGHEST VALUE IS   7.89228 AT (248078.00, 3913869.00,   708.07,
1321.50,   0.00) DC
4TH HIGHEST VALUE IS   6.70310 AT (248153.00, 3913869.00,   712.09,
1321.50,   0.00) DC

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          5TH HIGHEST VALUE IS       5.98735 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.70981 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.30887 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.21323 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.67691 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.85313 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

MOB_0024  1ST HIGHEST VALUE IS       7.03514 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.61796 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.58648 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.32774 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.30675 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.36878 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.59660 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.48423 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.44578 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.84747 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC

MOB_0025  1ST HIGHEST VALUE IS       8.25734 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.93335 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.77165 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.59083 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.37341 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.93138 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.01254 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.02513 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.32150 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.15869 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:29:06

                             PAGE  16
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

MOB_0026 1ST HIGHEST VALUE IS 11.51972 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 7.78696 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 7.74170 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 5.80319 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 5.45330 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 4.51082 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 3.47705 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 2.80046 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 2.71082 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 2.34961 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00) DC

TKD_0001 1ST HIGHEST VALUE IS 8.30907 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 8.30062 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 8.29954 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 7.71381 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 7.22765 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 6.75703 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 6.39919 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 6.00789 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 5.85916 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 5.12358 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00) DC

TKD_0002 1ST HIGHEST VALUE IS 5.42378 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 5.41166 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 5.37832 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 5.31973 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 5.14729 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 4.78608 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 4.57278 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 4.30592 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 4.20166 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 4.08970 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00) DC

TKD_0003 1ST HIGHEST VALUE IS 4.22591 AT (248653.00, 3912894.00, 762.44,

1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   4.18804 AT (248678.00, 3912894.00,   761.55,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   4.00925 AT (248628.00, 3912894.00,   763.08,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   4.00247 AT (248753.00, 3912894.00,   758.66,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   3.96363 AT (248703.00, 3912894.00,   760.49,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   3.91830 AT (248728.00, 3912894.00,   759.43,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   3.88303 AT (248778.00, 3912894.00,   758.97,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   3.83006 AT (248578.00, 3912894.00,   764.35,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   3.82717 AT (248553.00, 3912894.00,   765.26,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   3.79623 AT (248603.00, 3912894.00,   763.73,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/09/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   11:29:06

                            PAGE 17
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS)
RESULTS ***

                                    ** CONC OF TOXIC   IN MICROGRAMS/M**3
         **

                  NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - -

TKD_0004 1ST HIGHEST VALUE IS   4.03781 AT (248728.00, 3912894.00,   759.43,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   3.97861 AT (248753.00, 3912894.00,   758.66,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   3.69641 AT (248703.00, 3912894.00,   760.49,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   3.46309 AT (248778.00, 3912894.00,   758.97,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   2.99086 AT (248803.00, 3912894.00,   759.41,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   2.94505 AT (248678.00, 3912894.00,   761.55,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   2.64570 AT (248828.00, 3912894.00,   759.89,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   2.62821 AT (248700.00, 3912800.00,   757.08,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   2.59721 AT (248653.00, 3912894.00,   762.44,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   2.45911 AT (248853.00, 3912894.00,   759.57,
1321.50,   0.00) DC

TKD_0005 1ST HIGHEST VALUE IS   3.56454 AT (248728.00, 3912894.00,   759.43,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   3.52009 AT (248703.00, 3912894.00,   760.49,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   3.29113 AT (248678.00, 3912894.00,   761.55,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   3.28905 AT (248753.00, 3912894.00,   758.66,
1321.50,   0.00) DC

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          5TH HIGHEST VALUE IS       3.02386 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.93054 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.82141 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.60799 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.43680 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.31813 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC

TKD_0006  1ST HIGHEST VALUE IS       2.88248 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.75785 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.65450 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.58143 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.55520 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.51740 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.51641 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.30816 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.23909 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.01848 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC

TKD_0007  1ST HIGHEST VALUE IS       3.03323 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.00288 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.98370 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.86290 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.83558 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.80133 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.78972 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.63097 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.61725 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.59253 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         11:29:06

                              PAGE  18
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKD_0008	1ST HIGHEST VALUE IS	5.51001 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.24143 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.08468 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	4.74873 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.29833 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.65866 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.41319 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.19303 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.05428 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.77063 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
TKD_0009	1ST HIGHEST VALUE IS	4.09824 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.06567 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.77909 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.73202 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.53718 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.19568 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.75915 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.63884 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.51041 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.41550 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
TKD_0010	1ST HIGHEST VALUE IS	3.21185 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.11531 AT (248453.00, 3912894.00, 772.72, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.77084 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.61433 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.58878 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.57196 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.56546 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.36478 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.10243 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.04731 AT (248428.00, 3912894.00, 776.83, 1321.50, 0.00)	DC	
TKD_0011	1ST HIGHEST VALUE IS	2.80272 AT (248503.00, 3912894.00, 767.88,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.74229 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.52628 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.49260 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.41145 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.39948 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.38430 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.34088 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.14419 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.89868 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:29:06

                             PAGE  19
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKD_0012  1ST HIGHEST VALUE IS       2.22400 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.21165 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.20111 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.19779 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.18667 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.16098 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.10179 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.07351 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.86581 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.64618 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC

TKD_0013  1ST HIGHEST VALUE IS       1.93877 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.84945 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.81562 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.65863 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.62583 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.62527 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.61635 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.59574 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.58990 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.58266 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC

TKD_0014  1ST HIGHEST VALUE IS       1.65534 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.64513 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.64295 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.59765 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.57300 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.54214 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.50613 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.49892 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.48153 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.44750 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TKS_0001  1ST HIGHEST VALUE IS       7.71895 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.42865 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.92210 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.51805 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.77081 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.30380 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.18856 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.84595 AT (  248600.00,  3912800.00,   762.78,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.59786 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.95560 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:29:06

                             PAGE  20
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0002	1ST HIGHEST VALUE IS	3.71811 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.69954 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.64890 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.56264 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.54150 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.52674 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.31800 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.29337 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.27944 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.01326 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
TKS_0003	1ST HIGHEST VALUE IS	2.46253 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.38327 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.08554 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.01845 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.00495 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.98456 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.97298 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.85670 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.81758 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.76600 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
TKS_0004	1ST HIGHEST VALUE IS	2.12446 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.88418 AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.74093 AT (249003.00, 3912894.00, 746.85, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.70817 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.58056 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.53077 AT (248900.00, 3912700.00, 742.91, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.50522 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.45106 AT (248978.00, 3912894.00, 751.88, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.39995 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.37111 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
TKS_0005	1ST HIGHEST VALUE IS	1.99370 AT (248900.00, 3912800.00, 744.32,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.78660 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.77342 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.63393 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.56748 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.54862 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.53495 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.46944 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.29456 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.27379 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:29:06

                           PAGE  21
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **


                  NETWORK
GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

TKS_0006  1ST HIGHEST VALUE IS       1.87211 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.76913 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.74189 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.73930 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.64957 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.50784 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.50780 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.49180 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.46570 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.41777 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC

TKS_0007  1ST HIGHEST VALUE IS       1.76442 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.60917 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.58649 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.34003 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.30132 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.21903 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.20852 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.16702 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.12356 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.07784 AT (  249000.00,  3912500.00,   729.06,
1321.50,    0.00)  DC

TKS_0008  1ST HIGHEST VALUE IS       1.98683 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.87085 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.78085 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.75263 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.62227 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.60737 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.55080 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.34158 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.32139 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.32061 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC

TKS_0009  1ST HIGHEST VALUE IS       2.28692 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.03239 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.01210 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.87983 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.78038 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.61425 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.60852 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.58049 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.57426 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.57396 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:29:06

                             PAGE  22
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0010	1ST HIGHEST VALUE IS	2.08405 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.86540 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.77133 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.71404 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.60115 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.58507 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.46766 AT (249100.00, 3912800.00, 740.52, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.38786 AT (249278.00, 3912994.00, 737.31, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.34637 AT (249278.00, 3913019.00, 732.94, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.33766 AT (249300.00, 3913000.00, 736.76, 1321.50, 0.00)	DC	
TKM_0001	1ST HIGHEST VALUE IS	13.25661 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	13.25561 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	13.24118 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	12.22844 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	11.49101 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	10.72810 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	10.15414 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.53679 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	9.20821 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	8.11488 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
TKM_0002	1ST HIGHEST VALUE IS	12.79284 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	12.71250 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	12.70080 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	11.76225 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	11.25176 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	10.31127 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	9.73542 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.35836 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	8.82071 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	7.95602 AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	
TKM_0003	1ST HIGHEST VALUE IS	11.44864 AT (248828.00, 3912894.00, 759.89,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.15489 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.12635 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.47959 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.36529 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.21062 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.75288 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.65636 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.49965 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       7.83667 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                ***         11:29:06

                            PAGE  23
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                       *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKM_0004  1ST HIGHEST VALUE IS      11.40200 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      10.84451 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      10.78926 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.63130 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.60425 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.72030 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.47865 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.07764 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.34511 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.14829 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC

TKM_0005  1ST HIGHEST VALUE IS       8.26625 AT (  248978.00,  3912894.00,   751.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.66762 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.78127 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.27350 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       4.76999 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.59525 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.56666 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.51972 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.37635 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.05055 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC

TKM_0006  1ST HIGHEST VALUE IS       7.74396 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.21929 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.64055 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.07930 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.81161 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.74204 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.40195 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.34020 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.21641 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.99887 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC

TKM_0007  1ST HIGHEST VALUE IS       5.39760 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.00835 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.69662 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.56353 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.47492 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.31698 AT (  249278.00,  3913019.00,   732.94,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.18433 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.06502 AT (  249278.00,  3913044.00,   725.42,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.02908 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.86395 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                ***        11:29:06

                            PAGE  24
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKM_0008	1ST HIGHEST VALUE IS	2.75304 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.18006 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.05369 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.90124 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.88057 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.67275 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.55849 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.51989 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.48143 AT (249300.00, 3912600.00, 717.64, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.45406 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
TKM_0009	1ST HIGHEST VALUE IS	3.00483 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.46461 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.35641 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.21320 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.04203 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.81077 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.66401 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.61653 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.56471 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.54648 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 11:29:06

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

DATE
NETWORK

GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

SCREEN HIGH 1ST HIGH VALUE IS 1091.44152 ON 09122107: AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00) DC

OREPILE1 HIGH 1ST HIGH VALUE IS 3016.56513 ON 09121701: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

STOCKPL3 HIGH 1ST HIGH VALUE IS 2996.43466 ON 09012019: AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC

TOP1 HIGH 1ST HIGH VALUE IS 3170.78442 ON 09092605: AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00) DC

TOP2 HIGH 1ST HIGH VALUE IS 3633.50695 ON 09101102: AT (248528.00, 3913869.00, 690.60, 1321.50, 0.00) DC

TOP3 HIGH 1ST HIGH VALUE IS 4015.29634 ON 09021006: AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00) DC

TOP4 HIGH 1ST HIGH VALUE IS 3594.45032 ON 09101102: AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC

TOP5 HIGH 1ST HIGH VALUE IS 3259.92807 ON 09101102: AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC

TOP6 HIGH 1ST HIGH VALUE IS 3959.80424 ON 09041101: AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC

TOP7 HIGH 1ST HIGH VALUE IS 3633.77020 ON 09101102: AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC

STOCKPL4 HIGH 1ST HIGH VALUE IS 2766.97979 ON 09121620: AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00) DC

STOCKPL1 HIGH 1ST HIGH VALUE IS 3393.95262 ON 09011009: AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00) DC

STOCKPL2 HIGH 1ST HIGH VALUE IS 2866.07385 ON 09012019: AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC

TOP8 HIGH 1ST HIGH VALUE IS 2825.34795 ON 09102405: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP9 HIGH 1ST HIGH VALUE IS 3346.60942 ON 09102405: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

TOP10 HIGH 1ST HIGH VALUE IS 3372.16769 ON 09102405: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP11 HIGH 1ST HIGH VALUE IS 3263.13973 ON 09081004: AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00) DC

TOP12 HIGH 1ST HIGH VALUE IS 3494.69794 ON 09081004: AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00) DC

TOP13 HIGH 1ST HIGH VALUE IS 3516.92983 ON 09071901: AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00) DC

TOP14 HIGH 1ST HIGH VALUE IS 3330.63013 ON 09081004: AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00) DC

TOP15 HIGH 1ST HIGH VALUE IS 3548.33512 ON 09011507: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP16 HIGH 1ST HIGH VALUE IS 3402.15913 ON 09121701: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

```
20ACRE   HIGH   1ST HIGH VALUE IS    2115.26876  ON 09013005: AT (  248728.00,
3913869.00,   656.12,  1321.50,    0.00)  DC

MOB_0001 HIGH   1ST HIGH VALUE IS     175.32618  ON 09011507: AT (  249278.00,
3913169.00,   690.37,  1321.50,    0.00)  DC

MOB_0002 HIGH   1ST HIGH VALUE IS     226.43473  ON 09122107: AT (  249278.00,
3913144.00,   693.10,  1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***       11:29:06

                            PAGE  26
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **

                                                          DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

MOB_0003 HIGH   1ST HIGH VALUE IS     209.74851  ON 09122107: AT (  249278.00,
3913169.00,   690.37,  1321.50,    0.00)  DC

MOB_0004 HIGH   1ST HIGH VALUE IS     185.69011  ON 09011507: AT (  249278.00,
3913294.00,   680.20,  1321.50,    0.00)  DC

MOB_0005 HIGH   1ST HIGH VALUE IS     159.54758  ON 09013005: AT (  248978.00,
3913869.00,   629.62,  1321.50,    0.00)  DC

MOB_0006 HIGH   1ST HIGH VALUE IS     175.73794  ON 09013005: AT (  248953.00,
3913869.00,   630.98,  1321.50,    0.00)  DC

MOB_0007 HIGH   1ST HIGH VALUE IS     174.43547  ON 09013005: AT (  248928.00,
3913869.00,   632.98,  1321.50,    0.00)  DC

MOB_0008 HIGH   1ST HIGH VALUE IS     201.80716  ON 09013005: AT (  248878.00,
3913869.00,   644.41,  1321.50,    0.00)  DC

MOB_0009 HIGH   1ST HIGH VALUE IS     215.23407  ON 09013005: AT (  248853.00,
3913869.00,   646.51,  1321.50,    0.00)  DC

MOB_0010 HIGH   1ST HIGH VALUE IS     248.32759  ON 09012608: AT (  248853.00,
3913869.00,   646.51,  1321.50,    0.00)  DC

MOB_0011 HIGH   1ST HIGH VALUE IS     266.85525  ON 09012608: AT (  248803.00,
3913869.00,   649.48,  1321.50,    0.00)  DC

MOB_0012 HIGH   1ST HIGH VALUE IS     306.84514  ON 09102303: AT (  248678.00,
3913869.00,   666.82,  1321.50,    0.00)  DC

MOB_0013 HIGH   1ST HIGH VALUE IS     259.59910  ON 09012608: AT (  248703.00,
3913869.00,   658.19,  1321.50,    0.00)  DC

MOB_0014 HIGH   1ST HIGH VALUE IS     269.94724  ON 09121706: AT (  248628.00,
3913869.00,   684.63,  1321.50,    0.00)  DC

MOB_0015 HIGH   1ST HIGH VALUE IS     314.35362  ON 09010806: AT (  248603.00,
3913869.00,   688.47,  1321.50,    0.00)  DC
```

MOB_0016 HIGH   1ST HIGH VALUE IS   327.69422 ON 09010806: AT (248553.00,
3913869.00,   689.20, 1321.50,   0.00) DC

MOB_0017 HIGH   1ST HIGH VALUE IS   330.02763 ON 09010806: AT (248503.00,
3913869.00,   691.51, 1321.50,   0.00) DC

MOB_0018 HIGH   1ST HIGH VALUE IS   316.34288 ON 09010806: AT (248453.00,
3913869.00,   684.29, 1321.50,   0.00) DC

MOB_0019 HIGH   1ST HIGH VALUE IS   381.37491 ON 09122003: AT (248478.00,
3913869.00,   689.71, 1321.50,   0.00) DC

MOB_0020 HIGH   1ST HIGH VALUE IS   516.63158 ON 09082605: AT (248353.00,
3913869.00,   695.67, 1321.50,   0.00) DC

MOB_0021 HIGH   1ST HIGH VALUE IS   358.91824 ON 09110706: AT (248303.00,
3913869.00,   697.89, 1321.50,   0.00) DC

MOB_0022 HIGH   1ST HIGH VALUE IS   413.21083 ON 09011823: AT (248178.00,
3913869.00,   711.44, 1321.50,   0.00) DC

MOB_0023 HIGH   1ST HIGH VALUE IS   409.61760 ON 09082605: AT (248203.00,
3913869.00,   709.39, 1321.50,   0.00) DC

MOB_0024 HIGH   1ST HIGH VALUE IS   309.35527 ON 09010806: AT (248178.00,
3913869.00,   711.44, 1321.50,   0.00) DC

MOB_0025 HIGH   1ST HIGH VALUE IS   320.72418 ON 09010806: AT (248128.00,
3913869.00,   710.48, 1321.50,   0.00) DC

MOB_0026 HIGH   1ST HIGH VALUE IS   375.72423 ON 09032006: AT (248003.00,
3913869.00,   723.78, 1321.50,   0.00) DC

TKD_0001 HIGH   1ST HIGH VALUE IS   458.68956 ON 09041903: AT (248478.00,
3912894.00,   770.34, 1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
***   06/09/15
*** AERMET - VERSION 14134 ***   ***
***   11:29:06

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**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS
***

** CONC OF TOXIC   IN MICROGRAMS/M**3
**

DATE
NETWORK
GROUP ID   AVERAGE CONC   (YYMMDDHH)   RECEPTOR (XR,
YR, ZELEV, ZHILL, ZFLAG)   OF TYPE GRID-ID
- -
- -

TKD_0002 HIGH   1ST HIGH VALUE IS   419.21924 ON 09041906: AT (248653.00,
3912894.00,   762.44, 1321.50,   0.00) DC

TKD_0003 HIGH   1ST HIGH VALUE IS   375.09194 ON 09052622: AT (248578.00,
3912894.00,   764.35, 1321.50,   0.00) DC

TKD_0004 HIGH   1ST HIGH VALUE IS   345.31394 ON 09121620: AT (248778.00,
3912894.00,   758.97, 1321.50,   0.00) DC

TKD_0005 HIGH   1ST HIGH VALUE IS   355.31675 ON 09122107: AT (248953.00,
3912894.00,   756.22, 1321.50,   0.00) DC

TKD_0006 HIGH   1ST HIGH VALUE IS   279.57803 ON 09121620: AT (248700.00,

3912800.00, 757.08, 1321.50, 0.00) DC

TKD_0007 HIGH 1ST HIGH VALUE IS 326.28875 ON 09122107: AT (248778.00,
3912894.00, 758.97, 1321.50, 0.00) DC

TKD_0008 HIGH 1ST HIGH VALUE IS 491.32877 ON 09012019: AT (248553.00,
3912894.00, 765.26, 1321.50, 0.00) DC

TKD_0009 HIGH 1ST HIGH VALUE IS 445.93674 ON 09012019: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKD_0010 HIGH 1ST HIGH VALUE IS 367.35295 ON 09011719: AT (248478.00,
3912894.00, 770.34, 1321.50, 0.00) DC

TKD_0011 HIGH 1ST HIGH VALUE IS 370.91927 ON 09011719: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0012 HIGH 1ST HIGH VALUE IS 338.36475 ON 09011719: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0013 HIGH 1ST HIGH VALUE IS 295.68258 ON 09011719: AT (248503.00,
3912894.00, 767.88, 1321.50, 0.00) DC

TKD_0014 HIGH 1ST HIGH VALUE IS 245.66465 ON 09013005: AT (248528.00,
3913869.00, 690.60, 1321.50, 0.00) DC

TKS_0001 HIGH 1ST HIGH VALUE IS 629.80877 ON 09121620: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKS_0002 HIGH 1ST HIGH VALUE IS 545.18399 ON 09121620: AT (248700.00,
3912800.00, 757.08, 1321.50, 0.00) DC

TKS_0003 HIGH 1ST HIGH VALUE IS 393.04541 ON 09121620: AT (248800.00,
3912700.00, 751.66, 1321.50, 0.00) DC

TKS_0004 HIGH 1ST HIGH VALUE IS 315.53492 ON 09122107: AT (249003.00,
3912894.00, 746.85, 1321.50, 0.00) DC

TKS_0005 HIGH 1ST HIGH VALUE IS 336.10843 ON 09012019: AT (248900.00,
3912600.00, 741.62, 1321.50, 0.00) DC

TKS_0006 HIGH 1ST HIGH VALUE IS 331.56849 ON 09121620: AT (249000.00,
3912700.00, 738.47, 1321.50, 0.00) DC

TKS_0007 HIGH 1ST HIGH VALUE IS 305.09290 ON 09011507: AT (249278.00,
3913019.00, 732.94, 1321.50, 0.00) DC

TKS_0008 HIGH 1ST HIGH VALUE IS 326.23131 ON 09121620: AT (249100.00,
3912700.00, 734.75, 1321.50, 0.00) DC

TKS_0009 HIGH 1ST HIGH VALUE IS 426.99956 ON 09121620: AT (249028.00,
3912894.00, 742.50, 1321.50, 0.00) DC

TKS_0010 HIGH 1ST HIGH VALUE IS 353.93937 ON 09121620: AT (249103.00,
3912894.00, 736.25, 1321.50, 0.00) DC

TKM_0001 HIGH 1ST HIGH VALUE IS 743.14362 ON 09041903: AT (248478.00,
3912894.00, 770.34, 1321.50, 0.00) DC

TKM_0002 HIGH 1ST HIGH VALUE IS 709.84382 ON 09012719: AT (248703.00,
3912894.00, 760.49, 1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 11:29:06

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS

***

** CONC OF TOXIC IN MICROGRAMS/M**3
**

GROUP ID	NETWORK AVERAGE CONC OF TYPE	DATE (YYMMDDHH) GRID-ID	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)
TKM_0003 HIGH	1ST HIGH VALUE IS	719.07933	ON 09120303: AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
TKM_0004 HIGH	1ST HIGH VALUE IS	807.41191	ON 09121620: AT (248928.00, 3912894.00, 758.01, 1321.50, 0.00) DC
TKM_0005 HIGH	1ST HIGH VALUE IS	773.49599	ON 09121620: AT (248978.00, 3912894.00, 751.88, 1321.50, 0.00) DC
TKM_0006 HIGH	1ST HIGH VALUE IS	819.29639	ON 09121620: AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00) DC
TKM_0007 HIGH	1ST HIGH VALUE IS	389.37327	ON 09102405: AT (249278.00, 3913019.00, 732.94, 1321.50, 0.00) DC
TKM_0008 HIGH	1ST HIGH VALUE IS	487.25570	ON 09102405: AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00) DC
TKM_0009 HIGH	1ST HIGH VALUE IS	584.32480	ON 09011507: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 11:29:06

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 842 Informational Message(s)

A Total of 8760 Hours Were Processed

A Total of 610 Calm Hours Identified

A Total of 232 Missing Hours Identified (2.65 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 1134 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

FILE: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\HARP\2010_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.42E-06	6.78E-02	8.75E-02	248003	3913869	11
147	GRID	2.33E-06	6.53E-02	7.58E-02	248028	3913869	11
145	GRID	2.25E-06	6.31E-02	6.62E-02	247978	3913869	11
452	GRID	2.15E-06	6.01E-02	8.23E-02	248000	3913900	11
152	GRID	2.01E-06	5.65E-02	9.73E-02	248153	3913869	11
148	GRID	2.01E-06	5.66E-02	7.32E-02	248053	3913869	11
151	GRID	1.99E-06	5.58E-02	9.31E-02	248128	3913869	11
153	GRID	1.99E-06	5.59E-02	1.01E-01	248178	3913869	11
150	GRID	1.96E-06	5.53E-02	8.76E-02	248103	3913869	11
154	GRID	1.95E-06	5.48E-02	1.03E-01	248203	3913869	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.42E-06	6.78E-02	8.75E-02	248003	3913869	11
147	GRID	2.33E-06	6.53E-02	7.58E-02	248028	3913869	11
145	GRID	2.25E-06	6.31E-02	6.62E-02	247978	3913869	11
452	GRID	2.15E-06	6.01E-02	8.23E-02	248000	3913900	11
148	GRID	2.01E-06	5.66E-02	7.32E-02	248053	3913869	11
152	GRID	2.01E-06	5.65E-02	9.73E-02	248153	3913869	11
153	GRID	1.99E-06	5.59E-02	1.01E-01	248178	3913869	11
151	GRID	1.99E-06	5.58E-02	9.31E-02	248128	3913869	11
150	GRID	1.96E-06	5.53E-02	8.76E-02	248103	3913869	11
154	GRID	1.95E-06	5.48E-02	1.03E-01	248203	3913869	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
174	GRID	9.26E-07	2.60E-02	1.22E-01	248703	3913869	11
175	GRID	8.44E-07	2.37E-02	1.21E-01	248728	3913869	11
173	GRID	1.02E-06	2.87E-02	1.20E-01	248678	3913869	11
176	GRID	7.71E-07	2.17E-02	1.17E-01	248753	3913869	11
459	GRID	8.18E-07	2.30E-02	1.16E-01	248700	3913900	11
172	GRID	1.13E-06	3.17E-02	1.15E-01	248653	3913869	11
177	GRID	7.08E-07	1.99E-02	1.09E-01	248778	3913869	11
171	GRID	1.23E-06	3.46E-02	1.06E-01	248628	3913869	11
156	GRID	1.89E-06	5.28E-02	1.06E-01	248253	3913869	11
157	GRID	1.86E-06	5.21E-02	1.05E-01	248278	3913869	11

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  TOXIC

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:     82 Source(s);      82 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      6.7 MB of RAM.

 **Input Runstream File:          Johe-2010_TOXIC.DTA

 **Output Print File:             Johe-2010_TOXIC.LST
```

 **File for Summary of Results: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\Johe-2010_TOXIC.SUM
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                  ***   06/09/15
 *** AERMET - VERSION 14134 *** ***
                  ***   16:46:19

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

   NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

                                    1.54,   3.09,   5.14,   8.23, 10.80,
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                  ***   06/09/15
 *** AERMET - VERSION 14134 *** ***
                  ***   16:46:19

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file: 23155_10.SFC
          Met Version: 14134
   Profile file: 23155_10.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:   23155   Upper air station no.:   23230
                  Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
                  Year: 2010   Year: 2010

 First 24 hours of scalar data
 YR MO DY JDY HR   H0   U*   W* DT/DZ ZICNV ZIMCH M-O LEN   Z0 BOWEN ALBEDO REF WS   WD   HT REF TA   HT
- -
 10 01 01   1 01 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0 0.03   0.56   1.00

```
0.00    0.   10.0  278.8    2.0
 10 01 01   1 02 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 03 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 04   -8.1  0.088 -9.000 -9.000 -999.   63.      7.6  0.05   0.56   1.00
2.36  133.   10.0  279.2    2.0
 10 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  279.2    2.0
 10 01 01   1 06 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 07   -7.6  0.085 -9.000 -9.000 -999.   59.      7.1  0.04   0.56   1.00
2.36  155.   10.0  279.2    2.0
 10 01 01   1 08    1.4 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   0.61
0.00    0.   10.0  279.9    2.0
 10 01 01   1 09   10.4 -9.000 -9.000 -9.000   73. -999. -99999.0  0.03   0.56   0.35
0.00    0.   10.0  282.5    2.0
 10 01 01   1 10   44.8  0.150  0.625  0.008  195.  139.     -6.8  0.03   0.56   0.26
1.76  281.   10.0  285.4    2.0
 10 01 01   1 11   69.2  0.225  0.827  0.006  294.  257.    -14.9  0.03   0.56   0.23
2.86  274.   10.0  285.9    2.0
 10 01 01   1 12   81.4  0.226  0.985  0.005  422.  258.    -12.7  0.02   0.56   0.22
2.98  257.   10.0  285.4    2.0
 10 01 01   1 13   81.2  0.173  1.037  0.005  494.  173.     -5.7  0.03   0.56   0.22
1.99  270.   10.0  284.9    2.0
 10 01 01   1 14   69.0  0.218  1.039  0.005  585.  244.    -13.5  0.03   0.56   0.23
2.74  297.   10.0  285.9    2.0
 10 01 01   1 15   44.8  0.220  0.927  0.005  638.  248.    -21.5  0.02   0.56   0.26
3.10  308.   10.0  287.0    2.0
 10 01 01   1 16   10.7  0.182  0.578  0.005  649.  187.    -50.7  0.03   0.56   0.35
2.52  272.   10.0  286.4    2.0
 10 01 01   1 17   -3.7  0.059 -9.000 -9.000 -999.   50.      5.1  0.02   0.56   0.61
1.82  239.   10.0  285.4    2.0
 10 01 01   1 18   -5.2  0.070 -9.000 -9.000 -999.   45.      6.0  0.04   0.56   1.00
1.96  152.   10.0  284.2    2.0
 10 01 01   1 19   -4.5  0.066 -9.000 -9.000 -999.   41.      5.7  0.05   0.56   1.00
1.76  142.   10.0  283.8    2.0
 10 01 01   1 20   -2.9  0.051 -9.000 -9.000 -999.   28.      4.2  0.03   0.56   1.00
1.50   96.   10.0  281.4    2.0
 10 01 01   1 21  -14.8  0.131 -9.000 -9.000 -999.  114.     13.8  0.02   0.56   1.00
3.27   27.   10.0  282.0    2.0
 10 01 01   1 22  -14.4  0.128 -9.000 -9.000 -999.  110.     13.2  0.02   0.56   1.00
3.25   28.   10.0  282.0    2.0
 10 01 01   1 23   -9.7  0.093 -9.000 -9.000 -999.   69.      7.5  0.02   0.56   1.00
2.88   48.   10.0  282.0    2.0
 10 01 01   1 24   -7.1  0.124 -9.000 -9.000 -999.  105.     24.5  0.04   0.56   1.00
2.37  159.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01   10.0 1 -999.  -99.00   278.8   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
SCREEN	1ST HIGHEST VALUE IS	7.18975 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	6.72757 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.39051 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.90061 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.60400 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.55086 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.73877 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.03134 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.89104 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.62025 AT (249400.00, 3913100.00, 710.20, 1321.50, 0.00)	DC	
OREPILE1	1ST HIGHEST VALUE IS	17.90604 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	14.54405 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	12.70503 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	12.69575 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	11.38012 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	10.82565 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	9.23828 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.20116 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	8.74120 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	8.64534 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
STOCKPL3	1ST HIGHEST VALUE IS	23.77232 AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	23.45223 AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	19.44402 AT (247828.00, 3913719.00, 752.90, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	18.97416 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	18.66603 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	18.30456 AT (247828.00, 3913769.00, 756.17, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	18.03406 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	17.56580 AT (247828.00, 3913744.00, 752.07, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	17.27655 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	17.20368 AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)	DC	
TOP1	1ST HIGHEST VALUE IS	30.58973 AT (247978.00, 3913869.00, 728.04,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      26.17784 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      24.10328 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      23.66487 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      23.60832 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      22.72608 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      22.25064 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      21.67745 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      20.86434 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      19.76234 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        16:46:19

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                     AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -


TOP2      1ST HIGHEST VALUE IS      34.66255 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      32.89415 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      29.39068 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      29.03212 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      29.00784 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      28.91878 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      28.86960 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      28.47410 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      27.84459 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      26.88460 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC

TOP3      1ST HIGHEST VALUE IS      48.59869 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      47.41036 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      46.64824 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      46.20544 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      46.06035 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      43.18506 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      41.74301 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      31.86884 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      30.74380 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      28.72468 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

TOP4      1ST HIGHEST VALUE IS      38.18518 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      30.77053 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      29.79291 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      28.75334 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      28.26904 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      27.53081 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      26.59061 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      24.71296 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      22.72457 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      22.57477 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP5      1ST HIGHEST VALUE IS      30.49240 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      28.13522 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      25.49092 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      24.01489 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      22.37987 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      21.56000 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      20.54789 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      19.51765 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      19.27773 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      18.05126 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP6	1ST HIGHEST VALUE IS	47.90101 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	40.53844 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	38.79870 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	38.37224 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	37.71548 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	36.15133 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	31.03402 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	30.12222 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	28.18235 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	26.95662 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
TOP7	1ST HIGHEST VALUE IS	38.03664 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	36.01514 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	29.18597 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	27.44531 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	26.23675 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	24.60278 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	22.94496 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	21.78957 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	21.70793 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	21.66393 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
STOCKPL4	1ST HIGHEST VALUE IS	16.67141 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	15.29993 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	15.15105 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	13.23923 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	12.18826 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	11.75934 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	11.56024 AT (249100.00, 3912700.00, 734.75, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	11.50248 AT (249278.00, 3913019.00, 732.94, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	11.07110 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	10.63990 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
STOCKPL1	1ST HIGHEST VALUE IS	30.90595 AT (248703.00, 3912894.00, 760.49,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      28.86631 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      28.05147 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      27.62769 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      27.31534 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      26.54207 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      26.47510 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      26.01217 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      23.63594 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      23.60484 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        16:46:19

                            PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

STOCKPL2  1ST HIGHEST VALUE IS      23.49663 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      23.07690 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.67539 AT (  247828.00,  3913719.00,   752.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      18.57931 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      17.80909 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      17.56937 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      17.15925 AT (  247828.00,  3913769.00,   756.17,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      17.12928 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      17.12202 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      16.66314 AT (  247828.00,  3913744.00,   752.07,
1321.50,    0.00)  DC

TOP8      1ST HIGHEST VALUE IS      14.57391 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.32751 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      10.63881 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       9.96265 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       9.04558 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.85065 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.60385 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.53790 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.36827 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.30010 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC

TOP9      1ST HIGHEST VALUE IS      13.92873 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      13.06024 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.40898 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.35250 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       9.77906 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.27546 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.02144 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.01436 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       7.91187 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       7.77944 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC

TOP10     1ST HIGHEST VALUE IS      15.35607 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      13.86878 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      12.67086 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.02561 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       9.40135 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.11207 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.06060 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       7.70160 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       7.66905 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       7.57057 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE   8
 **MODELOPTs:    RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
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                    NETWORK
GROUP ID                          AVERAGE CONC                  RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TOP11     1ST HIGHEST VALUE IS      22.09010 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      18.59683 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      16.00677 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      13.78229 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      13.59702 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      12.28197 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      11.57403 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      11.39475 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.25950 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.79541 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP12     1ST HIGHEST VALUE IS      25.69158 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      22.63126 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      18.84516 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.31149 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      14.31635 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      13.68653 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      13.36949 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      13.05449 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      11.69063 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.98294 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP13     1ST HIGHEST VALUE IS      25.59470 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      20.60498 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      17.79211 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      16.52817 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      15.00487 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      14.85986 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      12.41128 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      12.25643 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      11.53881 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      10.26485 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

TOP14     1ST HIGHEST VALUE IS      21.80469 AT (  249278.00,  3913119.00,   697.37,
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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      18.64805 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      17.05060 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      15.63877 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      14.94984 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      12.45490 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.74298 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      10.42026 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.21938 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.18975 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        16:46:19

                            PAGE   9
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                         AVERAGE CONC               RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

TOP15     1ST HIGHEST VALUE IS      19.20392 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      17.19766 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      16.34790 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      14.23416 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      12.31690 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.32444 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.40820 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.08152 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.86519 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.07796 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC

TOP16     1ST HIGHEST VALUE IS      21.54699 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      18.59876 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      16.91833 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      14.97783 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      12.63976 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.74705 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.10083 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.36316 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.33939 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.92914 AT (  249278.00,  3913069.00,   714.81,
1321.50,    0.00)  DC

20ACRE    1ST HIGHEST VALUE IS      17.60107 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      16.89363 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      16.39884 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      15.63779 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      14.48377 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      14.46166 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      14.30203 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      14.27384 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      14.12529 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      14.01136 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC

MOB_0001  1ST HIGHEST VALUE IS       1.05638 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.93103 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.88332 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.82651 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.78515 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.75252 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.67208 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.62965 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.62116 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.61892 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE  10
 **MODELOPTs:    RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0002	1ST HIGHEST VALUE IS	1.01699 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.91510 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.82927 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.78467 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.73551 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.71466 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.69436 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.64912 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.58130 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.57107 AT (249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
MOB_0003	1ST HIGHEST VALUE IS	0.95893 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.89050 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.88957 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.81584 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.74389 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.68581 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.66017 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.64546 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.60126 AT (249300.00, 3913300.00, 685.31, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.59875 AT (249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
MOB_0004	1ST HIGHEST VALUE IS	0.86988 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.84850 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.82157 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.78525 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.77994 AT (249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.76576 AT (249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.70600 AT (249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.62939 AT (249278.00, 3913394.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.62561 AT (249300.00, 3913300.00, 685.31, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.60833 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
MOB_0005	1ST HIGHEST VALUE IS	0.66482 AT (248403.00, 3913869.00, 674.11,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.63809 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.62940 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.59533 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.59175 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.58167 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.57264 AT (  249278.00,  3913419.00,   678.34,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.53254 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.52376 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.52353 AT (  249278.00,  3913469.00,   671.76,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         16:46:19

                             PAGE  11
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **


                  NETWORK
GROUP ID                     AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

MOB_0006  1ST HIGHEST VALUE IS       0.76571 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.68921 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.65609 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.62722 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.62013 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.60043 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.59381 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.56600 AT (  248803.00,  3913869.00,   649.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.55613 AT (  249278.00,  3913444.00,   674.15,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.54943 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC

MOB_0007  1ST HIGHEST VALUE IS       0.89314 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.85162 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.85050 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.77272 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       0.76510 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.74276 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.71944 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.67834 AT (  248803.00,  3913869.00,   649.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.64844 AT (  248700.00,  3913900.00,   657.89,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.63017 AT (  248828.00,  3913869.00,   648.40,
1321.50,    0.00)  DC

MOB_0008  1ST HIGHEST VALUE IS       1.17455 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.16527 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.15747 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.95943 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.95107 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.94000 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.93038 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.91341 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.91282 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.85052 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC

MOB_0009  1ST HIGHEST VALUE IS       1.56876 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.52575 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.43065 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.38500 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.38172 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.31445 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.27532 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.26866 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.26711 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.25882 AT (  248628.00,  3913869.00,   684.63,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                             PAGE  12
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0010	1ST HIGHEST VALUE IS	2.18743 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.96453 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.92956 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.90708 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.69960 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.63746 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.60588 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.47683 AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.47380 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.46882 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
MOB_0011	1ST HIGHEST VALUE IS	3.25931 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.53569 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.39159 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.04744 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.91156 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.84240 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.75272 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.48143 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.33487 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.32628 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
MOB_0012	1ST HIGHEST VALUE IS	3.10570 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.14385 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.05402 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.75924 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.58236 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.48567 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.48283 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.33446 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.21968 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.07375 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0013	1ST HIGHEST VALUE IS	3.24782 AT (248428.00, 3913869.00, 678.70,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.62426 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.57046 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.48069 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.46428 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.08802 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.89186 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.88717 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.60793 AT (  248300.00,  3913900.00,   683.45,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.57948 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE  13
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **

                 NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0014  1ST HIGHEST VALUE IS       4.19346 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.09753 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.97361 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.87985 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       3.78944 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.71359 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.49917 AT (  248603.00,  3913869.00,   688.47,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.43089 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.30312 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.11715 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC

MOB_0015  1ST HIGHEST VALUE IS       6.12339 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.00048 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.84248 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.59270 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.49918 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.02125 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.60286 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.39217 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.79283 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.53246 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC

MOB_0016  1ST HIGHEST VALUE IS       7.10991 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.94850 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.76217 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.47200 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.09795 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.46615 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.30290 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.52906 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.07022 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.00707 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC

MOB_0017  1ST HIGHEST VALUE IS       7.30411 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.17298 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.90603 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.67241 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.20349 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.64040 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.36742 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.55478 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.11397 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.11394 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE  14
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0018	1ST HIGHEST VALUE IS	6.57557	AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	6.37990	AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.28248	AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.88559	AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.84476	AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.14285	AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.04140	AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.99735	AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.45743	AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.84093	AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
MOB_0019	1ST HIGHEST VALUE IS	4.62101	AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.82489	AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.52625	AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.43962	AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.81206	AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.41984	AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.36551	AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.32119	AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.26781	AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.18358	AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
MOB_0020	1ST HIGHEST VALUE IS	13.47420	AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	10.34186	AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	8.92755	AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	8.38030	AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.80007	AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.01216	AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.68907	AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.53641	AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.22481	AT (248200.00, 3913900.00, 700.22, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.71825	AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
MOB_0021	1ST HIGHEST VALUE IS	12.38006	AT (248253.00, 3913869.00, 696.56,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.15966 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.76007 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.32374 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.25269 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.34311 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       7.94547 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       6.78366 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       6.07489 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       5.56818 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        16:46:19

                             PAGE  15
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **


                  NETWORK
GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

MOB_0022  1ST HIGHEST VALUE IS      11.71600 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      10.97411 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       9.60456 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       9.30355 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       8.24318 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       7.96984 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       6.20295 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       6.04291 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.60317 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.58296 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC

MOB_0023  1ST HIGHEST VALUE IS       8.01946 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.70555 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.39499 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.16305 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       6.10511 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.81512 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.05170 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.82892 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.47984 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.78439 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

MOB_0024  1ST HIGHEST VALUE IS       6.60797 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.17423 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.05245 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.76667 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.46126 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.46817 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.39766 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.39431 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.32823 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.78153 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC

MOB_0025  1ST HIGHEST VALUE IS       7.77080 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.47103 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.20528 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.86749 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.35404 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.44734 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.17649 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.81509 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.28623 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.09246 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE  16
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0026	1ST HIGHEST VALUE IS	10.46695 AT (	248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	7.57472 AT (	248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	7.24664 AT (	247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	6.04219 AT (	248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.04098 AT (	248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.30810 AT (	248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.41190 AT (	248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.65740 AT (	248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.63517 AT (	247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.23047 AT (	248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
TKD_0001	1ST HIGHEST VALUE IS	8.88809 AT (	248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	8.48333 AT (	248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	8.15539 AT (	248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	7.75747 AT (	248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	7.13985 AT (	248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	6.87290 AT (	248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	6.78945 AT (	248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	6.07128 AT (	248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	5.83387 AT (	248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	5.20031 AT (	248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKD_0002	1ST HIGHEST VALUE IS	5.83520 AT (	248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.66406 AT (	248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.43351 AT (	248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.30752 AT (	248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.91719 AT (	248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.79760 AT (	248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.59947 AT (	248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.52891 AT (	248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.42392 AT (	248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.14421 AT (	248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKD_0003	1ST HIGHEST VALUE IS	4.54693 AT (	248678.00, 3912894.00, 761.55,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.49719 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.28422 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.20350 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.15248 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.09959 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.95907 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.95297 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.75202 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.68430 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        16:46:19

                             PAGE  17
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKD_0004  1ST HIGHEST VALUE IS       3.74437 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.65412 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.57522 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.24593 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       3.11724 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.92095 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.85178 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.78080 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.59919 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.53971 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC

TKD_0005  1ST HIGHEST VALUE IS       3.41042 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.23754 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.22257 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       3.10251 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       2.86626 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.82127 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.81182 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.59054 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.51878 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.43038 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC

TKD_0006  1ST HIGHEST VALUE IS       2.62276 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.59514 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.58619 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.54985 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.47401 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.39254 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.39080 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.25731 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.10951 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.10209 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC

TKD_0007  1ST HIGHEST VALUE IS       2.85553 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.85408 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.82871 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.78046 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.74172 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.69619 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.64321 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.55324 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.53868 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.30569 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE  18
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
TKD_0008	1ST HIGHEST VALUE IS	5.13895 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00) DC
	2ND HIGHEST VALUE IS	5.03379 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00) DC
	3RD HIGHEST VALUE IS	5.02577 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
	4TH HIGHEST VALUE IS	4.59366 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
	5TH HIGHEST VALUE IS	4.09643 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
	6TH HIGHEST VALUE IS	3.72537 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00) DC
	7TH HIGHEST VALUE IS	3.58102 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
	8TH HIGHEST VALUE IS	3.11216 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
	9TH HIGHEST VALUE IS	2.73825 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00) DC
	10TH HIGHEST VALUE IS	2.65743 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
TKD_0009	1ST HIGHEST VALUE IS	3.87283 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00) DC
	2ND HIGHEST VALUE IS	3.87156 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
	3RD HIGHEST VALUE IS	3.83924 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00) DC
	4TH HIGHEST VALUE IS	3.68471 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
	5TH HIGHEST VALUE IS	3.33778 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
	6TH HIGHEST VALUE IS	3.00843 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
	7TH HIGHEST VALUE IS	2.87845 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00) DC
	8TH HIGHEST VALUE IS	2.69496 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
	9TH HIGHEST VALUE IS	2.37089 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
	10TH HIGHEST VALUE IS	2.32745 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00) DC
TKD_0010	1ST HIGHEST VALUE IS	3.48446 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00) DC
	2ND HIGHEST VALUE IS	3.31465 AT (248453.00, 3912894.00, 772.72, 1321.50, 0.00) DC
	3RD HIGHEST VALUE IS	3.05144 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00) DC
	4TH HIGHEST VALUE IS	2.74747 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00) DC
	5TH HIGHEST VALUE IS	2.54195 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
	6TH HIGHEST VALUE IS	2.44752 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
	7TH HIGHEST VALUE IS	2.28832 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
	8TH HIGHEST VALUE IS	2.17954 AT (248428.00, 3912894.00, 776.83, 1321.50, 0.00) DC
	9TH HIGHEST VALUE IS	2.10100 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
	10TH HIGHEST VALUE IS	1.95554 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
TKD_0011	1ST HIGHEST VALUE IS	3.02086 AT (248503.00, 3912894.00, 767.88,

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.01131 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.74133 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.66558 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.48203 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.34610 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.25270 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.08734 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.98534 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.89612 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        16:46:19

                             PAGE  19
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKD_0012  1ST HIGHEST VALUE IS       2.44510 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.42872 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.31935 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.25885 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.18973 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.11999 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.02026 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.83115 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.68757 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.64758 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TKD_0013  1ST HIGHEST VALUE IS       2.11231 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.01077 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.98164 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.84813 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.70857 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.68872 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.58779 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.54865 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.50456 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.40079 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC

TKD_0014  1ST HIGHEST VALUE IS       1.68306 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.66192 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.61926 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.58809 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.55194 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.55174 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.50367 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.50337 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.38622 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.29068 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC

TKS_0001  1ST HIGHEST VALUE IS       7.13252 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.89602 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.75879 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.22782 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.68275 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.63841 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.03386 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.36707 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.31108 AT (  248600.00,  3912800.00,   762.78,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.96060 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
               ***         16:46:19

                            PAGE  20
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0002	1ST HIGHEST VALUE IS	3.62352 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.48495 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.46228 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.44178 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.42706 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.42547 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.25325 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.12988 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.05272 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.86109 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKS_0003	1ST HIGHEST VALUE IS	2.41488 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.19647 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.99691 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.99299 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.91181 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.86730 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.80924 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.79845 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.78930 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.71177 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
TKS_0004	1ST HIGHEST VALUE IS	1.96378 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.85166 AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.53063 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.50422 AT (249003.00, 3912894.00, 746.85, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.48135 AT (248900.00, 3912700.00, 742.91, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.47152 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.33012 AT (248700.00, 3912500.00, 745.10, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.30930 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.29448 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.27603 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
TKS_0005	1ST HIGHEST VALUE IS	1.93435 AT (248900.00, 3912800.00, 744.32,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.56649 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.56047 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.53540 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.45313 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.45202 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.31042 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.28490 AT (  248700.00,  3912500.00,   745.10,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.28328 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.23331 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

                              PAGE  21
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKS_0006  1ST HIGHEST VALUE IS       1.68041 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.67609 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.62713 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.59805 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.55009 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.37661 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.35282 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.33045 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.32393 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.29955 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC

TKS_0007  1ST HIGHEST VALUE IS       1.69315 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.57461 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.48397 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.18983 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.17166 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.14839 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.14666 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.08495 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.03365 AT (  248900.00,  3912500.00,   732.80,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.03289 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC

TKS_0008  1ST HIGHEST VALUE IS       1.95743 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.83782 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.74449 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.56401 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.54175 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.53916 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.44252 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.30816 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.26757 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.23172 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC

TKS_0009  1ST HIGHEST VALUE IS       2.05199 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.85718 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.80091 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.79651 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.77918 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.58434 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.57390 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.55390 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.54578 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.52579 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
               ***         16:46:19

                            PAGE  22
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0010	1ST HIGHEST VALUE IS	1.80712 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.69765 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.67469 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.55017 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.52229 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.52044 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.28451 AT (249100.00, 3912800.00, 740.52, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.23115 AT (249000.00, 3912700.00, 738.47, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.22034 AT (249278.00, 3912994.00, 737.31, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.18455 AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00)	DC	
TKM_0001	1ST HIGHEST VALUE IS	14.17234 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	13.55806 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	12.92530 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	12.38112 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	11.34997 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	10.88772 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	10.81202 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.51732 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	9.26001 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	8.10501 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKM_0002	1ST HIGHEST VALUE IS	13.59288 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	13.02637 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	12.40922 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	11.97745 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	10.87641 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	10.54614 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	10.44899 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.13913 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	9.08471 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	7.64969 AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	
TKM_0003	1ST HIGHEST VALUE IS	11.94768 AT (248778.00, 3912894.00, 758.97,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.48608 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.08625 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.77825 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       9.69445 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.59966 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.41309 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.96202 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.36901 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.05286 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:46:19

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKM_0004  1ST HIGHEST VALUE IS      11.44239 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.33194 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.17172 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.78676 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.21457 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.88190 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.62446 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.02740 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.99051 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       7.94704 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC

TKM_0005  1ST HIGHEST VALUE IS       7.76319 AT (  248978.00,  3912894.00,   751.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.50620 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.38174 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.13417 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.04157 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.95423 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.47014 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.36154 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.01497 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.96565 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC

TKM_0006  1ST HIGHEST VALUE IS       7.11619 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       5.76090 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.46015 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.14260 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.93038 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.63969 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.26687 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.10722 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.85280 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.79828 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC

TKM_0007  1ST HIGHEST VALUE IS       4.99720 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.73010 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.61746 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.45571 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.44029 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.21103 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.04126 AT (  249278.00,  3913019.00,   732.94,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.96045 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.95196 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.83929 AT (  249278.00,  3913044.00,   725.42,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
               ***         16:46:19

                            PAGE  24
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKM_0008	1ST HIGHEST VALUE IS	2.41879 AT (	249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.94084 AT (	249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.78385 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.68345 AT (	249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.59052 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.57244 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.53466 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.52630 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.42171 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.37500 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
TKM_0009	1ST HIGHEST VALUE IS	2.63735 AT (	249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.17568 AT (	249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.09595 AT (	249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.94262 AT (	249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.73191 AT (	249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.66473 AT (	249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.63739 AT (	249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.62817 AT (	249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.46839 AT (	249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.45980 AT (	249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 16:46:19

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

DATE
NETWORK

GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

SCREEN HIGH 1ST HIGH VALUE IS 1048.18317 ON 10081720: AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00) DC

OREPILE1 HIGH 1ST HIGH VALUE IS 3272.54196 ON 10061805: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

STOCKPL3 HIGH 1ST HIGH VALUE IS 2609.42167 ON 10052322: AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC

TOP1 HIGH 1ST HIGH VALUE IS 3309.45507 ON 10041406: AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC

TOP2 HIGH 1ST HIGH VALUE IS 3688.81535 ON 10092306: AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC

TOP3 HIGH 1ST HIGH VALUE IS 4142.77504 ON 10092306: AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC

TOP4 HIGH 1ST HIGH VALUE IS 3615.28437 ON 10092306: AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00) DC

TOP5 HIGH 1ST HIGH VALUE IS 3194.05145 ON 10092306: AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC

TOP6 HIGH 1ST HIGH VALUE IS 4013.96835 ON 10092306: AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00) DC

TOP7 HIGH 1ST HIGH VALUE IS 3667.40825 ON 10092306: AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00) DC

STOCKPL4 HIGH 1ST HIGH VALUE IS 2175.57200 ON 10092103: AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00) DC

STOCKPL1 HIGH 1ST HIGH VALUE IS 2957.62587 ON 10082404: AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00) DC

STOCKPL2 HIGH 1ST HIGH VALUE IS 2315.40524 ON 10010317: AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC

TOP8 HIGH 1ST HIGH VALUE IS 2906.68917 ON 10010805: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP9 HIGH 1ST HIGH VALUE IS 2675.39060 ON 10091706: AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00) DC

TOP10 HIGH 1ST HIGH VALUE IS 2927.49746 ON 10010805: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP11 HIGH 1ST HIGH VALUE IS 3757.22423 ON 10061805: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP12 HIGH 1ST HIGH VALUE IS 3761.16051 ON 10061805: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP13 HIGH 1ST HIGH VALUE IS 4166.24478 ON 10061805: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP14 HIGH 1ST HIGH VALUE IS 3788.23210 ON 10061805: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP15 HIGH 1ST HIGH VALUE IS 3501.70091 ON 10020205: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP16 HIGH 1ST HIGH VALUE IS 3723.66290 ON 10061805: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

20ACRE HIGH 1ST HIGH VALUE IS 1911.98353 ON 10032202: AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00) DC

MOB_0001 HIGH 1ST HIGH VALUE IS 184.60506 ON 10021303: AT (249278.00, 3913394.00, 680.21, 1321.50, 0.00) DC

MOB_0002 HIGH 1ST HIGH VALUE IS 174.47924 ON 10021303: AT (249278.00, 3913444.00, 674.15, 1321.50, 0.00) DC

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 16:46:19

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0003 HIGH 1ST HIGH VALUE IS	166.23750	ON 10021303:	AT (249278.00, 3913494.00, 669.56, 1321.50, 0.00)	DC	
MOB_0004 HIGH 1ST HIGH VALUE IS	184.87948	ON 10020205:	AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
MOB_0005 HIGH 1ST HIGH VALUE IS	147.23307	ON 10021303:	AT (249278.00, 3913594.00, 656.05, 1321.50, 0.00)	DC	
MOB_0006 HIGH 1ST HIGH VALUE IS	153.97442	ON 10032202:	AT (248928.00, 3913869.00, 632.98, 1321.50, 0.00)	DC	
MOB_0007 HIGH 1ST HIGH VALUE IS	168.51995	ON 10032202:	AT (248903.00, 3913869.00, 638.38, 1321.50, 0.00)	DC	
MOB_0008 HIGH 1ST HIGH VALUE IS	171.55211	ON 10012608:	AT (249028.00, 3913869.00, 630.32, 1321.50, 0.00)	DC	
MOB_0009 HIGH 1ST HIGH VALUE IS	208.34593	ON 10120204:	AT (248600.00, 3913900.00, 678.79, 1321.50, 0.00)	DC	
MOB_0010 HIGH 1ST HIGH VALUE IS	241.02450	ON 10032202:	AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0011 HIGH 1ST HIGH VALUE IS	291.60142	ON 10091106:	AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0012 HIGH 1ST HIGH VALUE IS	252.24576	ON 10011707:	AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0013 HIGH 1ST HIGH VALUE IS	234.91963	ON 10012608:	AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
MOB_0014 HIGH 1ST HIGH VALUE IS	259.70106	ON 10011107:	AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
MOB_0015 HIGH 1ST HIGH VALUE IS	316.48692	ON 10011107:	AT (248603.00, 3913869.00, 688.47, 1321.50, 0.00)	DC	

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MOB_0016 HIGH   1ST HIGH VALUE IS     330.11841  ON 10011107: AT (  248553.00,
3913869.00,   689.20,  1321.50,    0.00)  DC

MOB_0017 HIGH   1ST HIGH VALUE IS     332.33567  ON 10011107: AT (  248503.00,
3913869.00,   691.51,  1321.50,    0.00)  DC

MOB_0018 HIGH   1ST HIGH VALUE IS     321.13703  ON 10011107: AT (  248453.00,
3913869.00,   684.29,  1321.50,    0.00)  DC

MOB_0019 HIGH   1ST HIGH VALUE IS     303.34576  ON 10011107: AT (  248403.00,
3913869.00,   674.11,  1321.50,    0.00)  DC

MOB_0020 HIGH   1ST HIGH VALUE IS     462.70365  ON 10122805: AT (  248353.00,
3913869.00,   695.67,  1321.50,    0.00)  DC

MOB_0021 HIGH   1ST HIGH VALUE IS     358.61943  ON 10071506: AT (  248303.00,
3913869.00,   697.89,  1321.50,    0.00)  DC

MOB_0022 HIGH   1ST HIGH VALUE IS     394.07038  ON 10120202: AT (  248178.00,
3913869.00,   711.44,  1321.50,    0.00)  DC

MOB_0023 HIGH   1ST HIGH VALUE IS     397.59861  ON 10120202: AT (  248128.00,
3913869.00,   710.48,  1321.50,    0.00)  DC

MOB_0024 HIGH   1ST HIGH VALUE IS     301.87420  ON 10011107: AT (  248178.00,
3913869.00,   711.44,  1321.50,    0.00)  DC

MOB_0025 HIGH   1ST HIGH VALUE IS     312.65269  ON 10011107: AT (  248128.00,
3913869.00,   710.48,  1321.50,    0.00)  DC

MOB_0026 HIGH   1ST HIGH VALUE IS     363.51021  ON 10010220: AT (  248003.00,
3913869.00,   723.78,  1321.50,    0.00)  DC

TKD_0001 HIGH   1ST HIGH VALUE IS     524.89803  ON 10121108: AT (  248478.00,
3912894.00,   770.34,  1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                    ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                   ***        16:46:19

                                   PAGE  27
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                    *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                          ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **

                                                           DATE
                                        NETWORK
GROUP ID                               AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - -

TKD_0002 HIGH   1ST HIGH VALUE IS     415.54575  ON 10121007: AT (  248653.00,
3912894.00,   762.44,  1321.50,    0.00)  DC

TKD_0003 HIGH   1ST HIGH VALUE IS     415.12815  ON 10041104: AT (  248553.00,
3912894.00,   765.26,  1321.50,    0.00)  DC

TKD_0004 HIGH   1ST HIGH VALUE IS     269.76044  ON 10122818: AT (  248700.00,
3912600.00,   757.02,  1321.50,    0.00)  DC

TKD_0005 HIGH   1ST HIGH VALUE IS     263.66774  ON 10052322: AT (  248700.00,
3912800.00,   757.08,  1321.50,    0.00)  DC

TKD_0006 HIGH   1ST HIGH VALUE IS     204.89955  ON 10020205: AT (  249003.00,
```

3912894.00, 746.85, 1321.50, 0.00) DC

TKD_0007 HIGH 1ST HIGH VALUE IS 263.05918 ON 10020205: AT (248928.00,
3912894.00, 758.01, 1321.50, 0.00) DC

TKD_0008 HIGH 1ST HIGH VALUE IS 426.52584 ON 10052322: AT (248553.00,
3912894.00, 765.26, 1321.50, 0.00) DC

TKD_0009 HIGH 1ST HIGH VALUE IS 359.55666 ON 10052322: AT (248578.00,
3912894.00, 764.35, 1321.50, 0.00) DC

TKD_0010 HIGH 1ST HIGH VALUE IS 398.75320 ON 10120224: AT (248453.00,
3912894.00, 772.72, 1321.50, 0.00) DC

TKD_0011 HIGH 1ST HIGH VALUE IS 411.07050 ON 10120223: AT (248503.00,
3912894.00, 767.88, 1321.50, 0.00) DC

TKD_0012 HIGH 1ST HIGH VALUE IS 363.09517 ON 10122818: AT (248553.00,
3912894.00, 765.26, 1321.50, 0.00) DC

TKD_0013 HIGH 1ST HIGH VALUE IS 338.28336 ON 10120223: AT (248503.00,
3912894.00, 767.88, 1321.50, 0.00) DC

TKD_0014 HIGH 1ST HIGH VALUE IS 239.24786 ON 10122818: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKS_0001 HIGH 1ST HIGH VALUE IS 473.89548 ON 10052322: AT (248553.00,
3912894.00, 765.26, 1321.50, 0.00) DC

TKS_0002 HIGH 1ST HIGH VALUE IS 306.08182 ON 10012902: AT (248600.00,
3912500.00, 756.71, 1321.50, 0.00) DC

TKS_0003 HIGH 1ST HIGH VALUE IS 244.73472 ON 10021805: AT (248600.00,
3912400.00, 752.43, 1321.50, 0.00) DC

TKS_0004 HIGH 1ST HIGH VALUE IS 245.51447 ON 10012902: AT (248700.00,
3912500.00, 745.10, 1321.50, 0.00) DC

TKS_0005 HIGH 1ST HIGH VALUE IS 228.38452 ON 10021303: AT (249278.00,
3913469.00, 671.76, 1321.50, 0.00) DC

TKS_0006 HIGH 1ST HIGH VALUE IS 254.32989 ON 10021303: AT (249278.00,
3913469.00, 671.76, 1321.50, 0.00) DC

TKS_0007 HIGH 1ST HIGH VALUE IS 299.44440 ON 10020205: AT (249278.00,
3913019.00, 732.94, 1321.50, 0.00) DC

TKS_0008 HIGH 1ST HIGH VALUE IS 283.54008 ON 10021303: AT (249278.00,
3913494.00, 669.56, 1321.50, 0.00) DC

TKS_0009 HIGH 1ST HIGH VALUE IS 304.88063 ON 10021303: AT (249278.00,
3913519.00, 664.42, 1321.50, 0.00) DC

TKS_0010 HIGH 1ST HIGH VALUE IS 316.17797 ON 10021303: AT (249278.00,
3913544.00, 656.33, 1321.50, 0.00) DC

TKM_0001 HIGH 1ST HIGH VALUE IS 828.34653 ON 10121108: AT (248478.00,
3912894.00, 770.34, 1321.50, 0.00) DC

TKM_0002 HIGH 1ST HIGH VALUE IS 691.39847 ON 10121007: AT (248703.00,
3912894.00, 760.49, 1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 16:46:19

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS

***

** CONC OF TOXIC IN MICROGRAMS/M**3

**

GROUP ID	NETWORK AVERAGE CONC OF TYPE	DATE (YYMMDDHH) GRID-ID	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)
TKM_0003 HIGH	1ST HIGH VALUE IS	774.24895	ON 10121108: AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
TKM_0004 HIGH	1ST HIGH VALUE IS	808.13790	ON 10122822: AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
TKM_0005 HIGH	1ST HIGH VALUE IS	586.10015	ON 10122822: AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00) DC
TKM_0006 HIGH	1ST HIGH VALUE IS	523.20089	ON 10120224: AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00) DC
TKM_0007 HIGH	1ST HIGH VALUE IS	477.81645	ON 10021303: AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00) DC
TKM_0008 HIGH	1ST HIGH VALUE IS	487.07056	ON 10021303: AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00) DC
TKM_0009 HIGH	1ST HIGH VALUE IS	578.63869	ON 10020205: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 16:46:19

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 547 Informational Message(s)

A Total of 8760 Hours Were Processed

A Total of 427 Calm Hours Identified

A Total of 120 Missing Hours Identified (1.37 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 1134 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

FILE: H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\HARP\2011_PMI.txt

EXCEPTION REPORT
(there have been no changes or exceptions)

RECEPTORS WITH HIGHEST CANCER RISK

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.86E-06	8.00E-02	8.80E-02	248003	3913869	11
147	GRID	2.72E-06	7.61E-02	7.49E-02	248028	3913869	11
145	GRID	2.66E-06	7.45E-02	6.72E-02	247978	3913869	11
452	GRID	2.50E-06	7.00E-02	8.15E-02	248000	3913900	11
148	GRID	2.32E-06	6.53E-02	7.19E-02	248053	3913869	11
152	GRID	2.27E-06	6.37E-02	7.47E-02	248153	3913869	11
153	GRID	2.25E-06	6.31E-02	7.53E-02	248178	3913869	11
151	GRID	2.25E-06	6.32E-02	7.48E-02	248128	3913869	11
150	GRID	2.24E-06	6.30E-02	7.44E-02	248103	3913869	11
149	GRID	2.23E-06	6.27E-02	7.35E-02	248078	3913869	11

RECEPTORS WITH HIGHEST CHRONIC HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
146	GRID	2.86E-06	8.00E-02	8.80E-02	248003	3913869	11
147	GRID	2.72E-06	7.61E-02	7.49E-02	248028	3913869	11
145	GRID	2.66E-06	7.45E-02	6.72E-02	247978	3913869	11
452	GRID	2.50E-06	7.00E-02	8.15E-02	248000	3913900	11
148	GRID	2.32E-06	6.53E-02	7.19E-02	248053	3913869	11
152	GRID	2.27E-06	6.37E-02	7.47E-02	248153	3913869	11
151	GRID	2.25E-06	6.32E-02	7.48E-02	248128	3913869	11
153	GRID	2.25E-06	6.31E-02	7.53E-02	248178	3913869	11
150	GRID	2.24E-06	6.30E-02	7.44E-02	248103	3913869	11
149	GRID	2.23E-06	6.27E-02	7.35E-02	248078	3913869	11

RECEPTORS WITH HIGHEST ACUTE HI

REC	TYPE	CANCER	CHRONIC	ACUTE	UTME	UTMN	ZONE
133	GRID	2.83E-07	8.10E-03	1.15E-01	249278	3913794	11
136	GRID	2.73E-07	7.81E-03	1.15E-01	249278	3913819	11
138	GRID	2.64E-07	7.55E-03	1.14E-01	249278	3913844	11
196	GRID	2.64E-07	7.56E-03	1.12E-01	249253	3913869	11
111	GRID	5.27E-07	1.50E-02	1.11E-01	249278	3913544	11
131	GRID	2.96E-07	8.48E-03	1.11E-01	249278	3913769	11
197	GRID	2.53E-07	7.25E-03	1.11E-01	249278	3913869	11
195	GRID	2.76E-07	7.89E-03	1.11E-01	249228	3913869	11
194	GRID	2.90E-07	8.26E-03	1.10E-01	249203	3913869	11
113	GRID	5.05E-07	1.44E-02	1.10E-01	249278	3913569	11

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        21:52:10

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  TOXIC

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates PERIOD Averages

 **This Run Includes:     82 Source(s);      82 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of PERIOD Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      6.7 MB of RAM.

 **Input Runstream File:          Johe-2011_TOXIC.DTA

 **Output Print File:             Johe-2011_TOXIC.LST
```

```
 **File for Summary of Results:   H:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\HRA\Johe-2011_TOXIC.SUM
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        21:52:10

                            PAGE   2
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                          (1=YES; 0=NO)

            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

                NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.


                                  *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                    (METERS/SEC)

                                           1.54,   3.09,   5.14,   8.23,  10.80,
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        21:52:10

                            PAGE   3
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                    *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file:   23155_11.SFC
           Met Version:  14134
   Profile file:   23155_11.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                 Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND METROPOLITAN ARPT, CA
                 Year:   2011                                     Year:   2011

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS   WD     HT  REF TA     HT
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 11 01 01   1 01   -2.8  0.062 -9.000 -9.000 -999.   37.      7.5  0.05   0.99   1.00
```

```
1.65  137.   10.0  278.1    2.0
 11 01 01   1 02   -2.0  0.051 -9.000 -9.000 -999.   28.      6.0  0.03   0.99   1.00
1.50  109.   10.0  279.9    2.0
 11 01 01   1 03   -2.6  0.058 -9.000 -9.000 -999.   33.      6.7  0.03   0.99   1.00
1.69   92.   10.0  279.9    2.0
 11 01 01   1 04   -2.8  0.060 -9.000 -9.000 -999.   35.      7.0  0.03   0.99   1.00
1.76  119.   10.0  279.9    2.0
 11 01 01   1 05   -9.3  0.166 -9.000 -9.000 -999.  162.     43.6  0.05   0.99   1.00
2.69  124.   10.0  280.4    2.0
 11 01 01   1 06  -11.7  0.207 -9.000 -9.000 -999.  226.     68.1  0.05   0.99   1.00
3.15  136.   10.0  279.9    2.0
 11 01 01   1 07   -9.3  0.164 -9.000 -9.000 -999.  159.     42.2  0.05   0.99   1.00
2.67  120.   10.0  278.8    2.0
 11 01 01   1 08   -6.3  0.106 -9.000 -9.000 -999.   83.     16.7  0.05   0.99   0.61
2.20  123.   10.0  278.8    2.0
 11 01 01   1 09    0.0  0.116 -9.000 -9.000 -999.   95.   5143.3  0.04   0.99   0.35
1.62  153.   10.0  281.4    2.0
 11 01 01   1 10   12.1  0.146  0.309  0.005   87.  134.    -22.9  0.02   0.99   0.26
2.06  311.   10.0  283.1    2.0
 11 01 01   1 11   20.8  0.092  0.460  0.005  167.   67.     -3.3  0.02   0.99   0.23
1.01  211.   10.0  284.2    2.0
 11 01 01   1 12   25.4  0.063  0.566  0.005  255.   38.     -1.0  0.02   0.99   0.22
0.60  306.   10.0  285.4    2.0
 11 01 01   1 13   25.6  0.155  0.612  0.005  320.  147.    -13.1  0.05   0.99   0.22
1.70  123.   10.0  285.9    2.0
 11 01 01   1 14   21.4  0.144  0.716  0.005  613.  131.    -12.5  0.04   0.99   0.23
1.65  152.   10.0  286.4    2.0
 11 01 01   1 15   12.6  0.141  0.615  0.006  657.  127.    -19.8  0.02   0.99   0.26
1.93  344.   10.0  285.4    2.0
 11 01 01   1 16    0.4  0.157  0.190  0.006  656.  149.   -929.6  0.02   0.99   0.35
2.44  346.   10.0  283.8    2.0
 11 01 01   1 17   -9.4  0.179 -9.000 -9.000 -999.  182.     54.6  0.02   0.99   0.61
3.17   36.   10.0  282.5    2.0
 11 01 01   1 18   -3.5  0.067 -9.000 -9.000 -999.   51.      7.6  0.02   0.99   1.00
2.06   56.   10.0  282.5    2.0
 11 01 01   1 19   -9.0  0.161 -9.000 -9.000 -999.  155.     41.5  0.03   0.99   1.00
2.84  106.   10.0  282.5    2.0
 11 01 01   1 20   -7.1  0.127 -9.000 -9.000 -999.  109.     25.8  0.03   0.99   1.00
2.47  100.   10.0  283.1    2.0
 11 01 01   1 21   -2.8  0.061 -9.000 -9.000 -999.   38.      7.3  0.04   0.99   1.00
1.71  157.   10.0  282.0    2.0
 11 01 01   1 22  -23.3  0.239 -9.000 -9.000 -999.  280.     52.1  0.05   0.99   1.00
3.76  146.   10.0  282.5    2.0
 11 01 01   1 23  -14.1  0.252 -9.000 -9.000 -999.  304.    102.1  0.05   0.99   1.00
3.68  124.   10.0  283.1    2.0
 11 01 01   1 24   -7.7  0.139 -9.000 -9.000 -999.  131.     31.0  0.05   0.99   1.00
2.42  120.   10.0  283.1    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 11 01 01 01   10.0 1  137.    1.65   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         21:52:10

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                      ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
SCREEN	1ST HIGHEST VALUE IS	6.00189 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.44637 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.00882 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	4.96405 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.94484 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.23282 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.71656 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.29652 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.21510 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.11212 AT (249400.00, 3913100.00, 710.20, 1321.50, 0.00)	DC	
OREPILE1	1ST HIGHEST VALUE IS	15.06273 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	12.45570 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	11.33890 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	10.90927 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	10.86376 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	10.47757 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	10.07740 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	9.82879 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	9.80131 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	9.66305 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
STOCKPL3	1ST HIGHEST VALUE IS	28.90016 AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	28.34906 AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	23.28965 AT (247828.00, 3913719.00, 752.90, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	21.51121 AT (247828.00, 3913769.00, 756.17, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	20.88042 AT (247828.00, 3913744.00, 752.07, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	19.87707 AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	18.66611 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	18.16157 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	17.80767 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	17.62351 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
TOP1	1ST HIGHEST VALUE IS	35.27451 AT (247978.00, 3913869.00, 728.04,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       29.48259 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       27.33371 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       26.74720 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       26.37508 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       25.24128 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       24.62344 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       24.11691 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       23.67707 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       23.33823 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***          21:52:10

                                PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                          ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                         AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

TOP2      1ST HIGHEST VALUE IS       41.73938 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       39.03939 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       34.71820 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       33.94684 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       33.60553 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       33.11003 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       32.44114 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       31.65826 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       30.86277 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       30.68922 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC

TOP3      1ST HIGHEST VALUE IS       54.71976 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       54.31547 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       53.17951 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       52.55325 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS      51.21113 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      49.82700 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      46.88957 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      37.42391 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      35.80326 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      34.20149 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC

TOP4      1ST HIGHEST VALUE IS      43.74596 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      34.49129 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      34.29146 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      32.02467 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      31.29775 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      30.61521 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      30.20314 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      29.43348 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      28.67009 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      27.59410 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC

TOP5      1ST HIGHEST VALUE IS      34.27859 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      31.16181 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      28.20120 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      26.43093 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      24.80076 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      24.21720 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      23.81833 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      23.51299 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      23.22392 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      22.60957 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP6	1ST HIGHEST VALUE IS	54.94708 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	45.27410 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	42.60830 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	42.36954 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	42.28359 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	41.88219 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	37.09374 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	35.53147 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	34.10177 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	31.26046 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
TOP7	1ST HIGHEST VALUE IS	42.40622 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	40.31011 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	32.19628 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	30.57686 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	29.92814 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	29.40547 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	28.99510 AT (248153.00, 3913869.00, 712.09, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	27.94186 AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	25.58820 AT (248203.00, 3913869.00, 709.39, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	24.46342 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
STOCKPL4	1ST HIGHEST VALUE IS	17.17568 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	16.21812 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	16.08805 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.91457 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	14.61198 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	13.15804 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	12.52851 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	12.41792 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	12.38696 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	12.21463 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
STOCKPL1	1ST HIGHEST VALUE IS	31.95121 AT (248703.00, 3912894.00, 760.49,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      29.34060 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      28.83769 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      27.71348 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      27.30838 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      26.48043 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      26.31197 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      24.95580 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      23.24687 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      23.11576 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***          06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         21:52:10

                             PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

STOCKPL2  1ST HIGHEST VALUE IS      28.41976 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      27.67109 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      21.99636 AT (  247828.00,  3913719.00,   752.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      19.55316 AT (  247828.00,  3913769.00,   756.17,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      19.28829 AT (  247828.00,  3913744.00,   752.07,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      18.27332 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      18.10416 AT (  247828.00,  3913794.00,   761.90,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      18.05757 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      17.95771 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      17.61503 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TOP8      1ST HIGHEST VALUE IS      12.32325 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      10.48631 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       9.60305 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       9.46566 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       9.34060 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.31579 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.21498 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.09569 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.06993 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.79404 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC

TOP9      1ST HIGHEST VALUE IS      11.81440 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.09177 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       9.94762 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       9.89276 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       9.41589 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.15236 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.89186 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.86394 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.83793 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.69384 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

TOP10     1ST HIGHEST VALUE IS      13.03493 AT (  249278.00,  3913094.00,   704.48,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.73298 AT (  249300.00,  3913100.00,   702.10,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      10.82480 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       9.94879 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       9.63821 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       9.37429 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.04063 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       8.72965 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       8.70033 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.47098 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                              PAGE   8
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TOP11	1ST HIGHEST VALUE IS	18.29846 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	15.91936 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	13.88535 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	13.04252 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	12.49559 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	11.93476 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	11.67363 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	11.47279 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	11.33386 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	10.58833 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
TOP12	1ST HIGHEST VALUE IS	21.07304 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	19.24904 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	16.27661 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.97442 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	14.23069 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	13.51662 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	13.32311 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	12.72109 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	11.92015 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	11.71702 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
TOP13	1ST HIGHEST VALUE IS	21.36974 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	17.74291 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	15.77901 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	14.92710 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	14.15184 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	13.93922 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	13.31736 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	13.14805 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	12.70818 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	12.37382 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
TOP14	1ST HIGHEST VALUE IS	18.41396 AT (249278.00, 3913119.00, 697.37,		

1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   15.64589 AT (249300.00, 3913100.00,   702.10,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   14.68049 AT (249278.00, 3913144.00,   693.10,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   13.59196 AT (249278.00, 3913169.00,   690.37,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   13.16333 AT (249278.00, 3913094.00,   704.48,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   13.03513 AT (249278.00, 3913194.00,   687.98,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   12.43266 AT (249278.00, 3913219.00,   684.32,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   11.79576 AT (249278.00, 3913244.00,   682.36,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   11.55566 AT (249300.00, 3913200.00,   689.96,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   11.08466 AT (249278.00, 3913269.00,   680.21,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/09/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   21:52:10

                              PAGE   9
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                            *** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS)
RESULTS ***

                                        ** CONC OF TOXIC   IN MICROGRAMS/M**3
         **

                  NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - -

TOP15   1ST HIGHEST VALUE IS   16.09820 AT (249278.00, 3913094.00,   704.48,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   14.56096 AT (249300.00, 3913100.00,   702.10,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   13.99546 AT (249278.00, 3913119.00,   697.37,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   12.43920 AT (249278.00, 3913144.00,   693.10,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   11.89408 AT (249278.00, 3913169.00,   690.37,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   11.49583 AT (249278.00, 3913194.00,   687.98,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   10.99117 AT (249278.00, 3913219.00,   684.32,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   10.50096 AT (249278.00, 3913244.00,   682.36,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   10.25181 AT (249300.00, 3913200.00,   689.96,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   9.87858 AT (249278.00, 3913269.00,   680.21,
1321.50,   0.00) DC

TOP16   1ST HIGHEST VALUE IS   18.13884 AT (249278.00, 3913094.00,   704.48,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   15.78325 AT (249300.00, 3913100.00,   702.10,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   14.53587 AT (249278.00, 3913119.00,   697.37,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   13.39241 AT (249278.00, 3913144.00,   693.10,
1321.50,   0.00) DC

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          5TH HIGHEST VALUE IS      12.84437 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      12.33489 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      11.69152 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      11.07161 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      10.93504 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       9.95621 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC

20ACRE    1ST HIGHEST VALUE IS      20.81315 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      19.72214 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      19.38453 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      18.22469 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      16.72234 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      16.31424 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      16.17342 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS      16.15932 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS      16.11486 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS      16.04276 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC

MOB_0001  1ST HIGHEST VALUE IS       0.97794 AT (  249278.00,  3913144.00,   693.10,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.90796 AT (  249278.00,  3913169.00,   690.37,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.79896 AT (  249278.00,  3913194.00,   687.98,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.75715 AT (  249278.00,  3913119.00,   697.37,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.75629 AT (  249300.00,  3913200.00,   689.96,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.74256 AT (  249278.00,  3913219.00,   684.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.73201 AT (  249278.00,  3913244.00,   682.36,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.72271 AT (  249278.00,  3913269.00,   680.21,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.71219 AT (  249278.00,  3913294.00,   680.20,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.71171 AT (  249278.00,  3913319.00,   680.43,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  10
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0002	1ST HIGHEST VALUE IS	0.91795 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.82832 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.76832 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.75235 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.72272 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.69820 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.67100 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.65989 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.65530 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.64991 AT (249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
MOB_0003	1ST HIGHEST VALUE IS	0.89116 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.87742 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.79470 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.73946 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.68592 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.66680 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.64277 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.62518 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.61990 AT (249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.61627 AT (249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
MOB_0004	1ST HIGHEST VALUE IS	0.77638 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.77205 AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.77133 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.77123 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.75801 AT (249278.00, 3913319.00, 680.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.74722 AT (249278.00, 3913344.00, 680.59, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.74558 AT (249278.00, 3913369.00, 680.65, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.73084 AT (249278.00, 3913394.00, 680.21, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.66135 AT (249278.00, 3913419.00, 678.34, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.63485 AT (249300.00, 3913400.00, 683.44, 1321.50, 0.00)	DC	
MOB_0005	1ST HIGHEST VALUE IS	0.73686 AT (248653.00, 3913869.00, 676.56,		

1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   0.72536 AT (248403.00, 3913869.00,   674.11,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   0.68551 AT (249278.00, 3913444.00,   674.15,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   0.67814 AT (248428.00, 3913869.00,   678.70,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   0.61569 AT (249278.00, 3913419.00,   678.34,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   0.60813 AT (249278.00, 3913469.00,   671.76,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   0.60263 AT (248600.00, 3913900.00,   678.79,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   0.59582 AT (248678.00, 3913869.00,   666.82,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   0.58025 AT (249300.00, 3913500.00,   677.25,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   0.56474 AT (248703.00, 3913869.00,   658.19,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/09/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   21:52:10

                             PAGE 11
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS)
RESULTS ***

                                    ** CONC OF TOXIC   IN MICROGRAMS/M**3
         **

                  NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - -

MOB_0006 1ST HIGHEST VALUE IS   0.85618 AT (248403.00, 3913869.00,   674.11,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   0.81307 AT (248678.00, 3913869.00,   666.82,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   0.75149 AT (248400.00, 3913900.00,   668.77,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   0.70052 AT (248703.00, 3913869.00,   658.19,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   0.68190 AT (248653.00, 3913869.00,   676.56,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   0.67014 AT (248728.00, 3913869.00,   656.12,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   0.62570 AT (248753.00, 3913869.00,   653.88,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   0.61390 AT (249278.00, 3913469.00,   671.76,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   0.61121 AT (249278.00, 3913494.00,   669.56,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   0.59373 AT (248700.00, 3913900.00,   657.89,
1321.50,   0.00) DC

MOB_0007 1ST HIGHEST VALUE IS   1.04545 AT (248678.00, 3913869.00,   666.82,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   1.03106 AT (248403.00, 3913869.00,   674.11,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   0.94822 AT (248400.00, 3913900.00,   668.77,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   0.86359 AT (248703.00, 3913869.00,   658.19,
1321.50,   0.00) DC

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          5TH HIGHEST VALUE IS       0.81616 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.75049 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.71473 AT (  248700.00,  3913900.00,   657.89,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.69214 AT (  248778.00,  3913869.00,   651.26,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.68257 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.65779 AT (  248803.00,  3913869.00,   649.48,
1321.50,    0.00)  DC

MOB_0008  1ST HIGHEST VALUE IS       1.40870 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.37802 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.33917 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.10425 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.09999 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.07901 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.05133 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.96992 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.95423 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.88021 AT (  248753.00,  3913869.00,   653.88,
1321.50,    0.00)  DC

MOB_0009  1ST HIGHEST VALUE IS       1.88163 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.73645 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.64843 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.62866 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.55412 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.51172 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.50525 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.47618 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.36241 AT (  248728.00,  3913869.00,   656.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.34252 AT (  248628.00,  3913869.00,   684.63,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  12
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0010	1ST HIGHEST VALUE IS	2.47048 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.26839 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.14113 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.91392 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.90913 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.86389 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.68207 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.66535 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.52431 AT (248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.49134 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
MOB_0011	1ST HIGHEST VALUE IS	3.80160 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.72653 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.32304 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.26960 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.04416 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.85715 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.77407 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.63523 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.50491 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.47271 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
MOB_0012	1ST HIGHEST VALUE IS	3.01014 AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.54755 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.05090 AT (248703.00, 3913869.00, 658.19, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.78096 AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.75400 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.63794 AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.50457 AT (248778.00, 3913869.00, 651.26, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.48917 AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.36708 AT (248803.00, 3913869.00, 649.48, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.23420 AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
MOB_0013	1ST HIGHEST VALUE IS	3.83041 AT (248428.00, 3913869.00, 678.70,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.01563 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.88637 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.58030 AT (  248653.00,  3913869.00,   676.56,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.54997 AT (  248600.00,  3913900.00,   678.79,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.34714 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.19345 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.91366 AT (  248678.00,  3913869.00,   666.82,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.84063 AT (  248300.00,  3913900.00,   683.45,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.72203 AT (  248703.00,  3913869.00,   658.19,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         21:52:10

                              PAGE  13
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0014  1ST HIGHEST VALUE IS       4.54312 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.44651 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.44507 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.40099 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.28907 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.13575 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.02976 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.89758 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.67829 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.42040 AT (  248603.00,  3913869.00,   688.47,
1321.50,    0.00)  DC

MOB_0015  1ST HIGHEST VALUE IS       6.66469 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.65902 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.53778 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.41173 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.84914 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.84311 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.13181 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.54250 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.42296 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.98434 AT (  248500.00,  3913900.00,   684.57,
1321.50,    0.00)  DC

MOB_0016  1ST HIGHEST VALUE IS       7.77558 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.66264 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.62815 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.04257 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       7.03634 AT (  248503.00,  3913869.00,   691.51,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       6.16563 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.39378 AT (  248528.00,  3913869.00,   690.60,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       5.25685 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.50054 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.43944 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC

MOB_0017  1ST HIGHEST VALUE IS       8.00149 AT (  248403.00,  3913869.00,   674.11,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.89284 AT (  248428.00,  3913869.00,   678.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.80830 AT (  248378.00,  3913869.00,   681.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.27409 AT (  248453.00,  3913869.00,   684.29,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       7.16503 AT (  248353.00,  3913869.00,   695.67,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       6.23067 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.56950 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       5.27675 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.54684 AT (  248400.00,  3913900.00,   668.77,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.43662 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  14
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0018	1ST HIGHEST VALUE IS	7.15714 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	7.13185 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	6.97377 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	6.71942 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	6.35747 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.98430 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.86019 AT (248228.00, 3913869.00, 704.33, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	5.18480 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.92245 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.21615 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
MOB_0019	1ST HIGHEST VALUE IS	4.55737 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.05556 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.96019 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.57242 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.14125 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.72332 AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.65357 AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.53312 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.30840 AT (248400.00, 3913900.00, 668.77, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.22378 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
MOB_0020	1ST HIGHEST VALUE IS	14.83510 AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	11.61642 AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	9.59683 AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	8.46597 AT (248353.00, 3913869.00, 695.67, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.94549 AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.61580 AT (248300.00, 3913900.00, 683.45, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	5.16554 AT (248378.00, 3913869.00, 681.85, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.97799 AT (248403.00, 3913869.00, 674.11, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.55316 AT (248200.00, 3913900.00, 700.22, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.95154 AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00)	DC	
MOB_0021	1ST HIGHEST VALUE IS	13.68858 AT (248203.00, 3913869.00, 709.39,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      13.49603 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      13.07743 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      12.19434 AT (  248278.00,  3913869.00,   694.01,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      11.68088 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.97206 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       8.39228 AT (  248303.00,  3913869.00,   697.89,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       7.59732 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       6.68073 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       6.09628 AT (  248328.00,  3913869.00,   698.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         21:52:10

                              PAGE  15
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                       *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

MOB_0022  1ST HIGHEST VALUE IS      12.86910 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      12.01473 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      10.80524 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.71406 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       9.18638 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       8.77480 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       6.84290 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       6.19591 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       5.27546 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       5.16430 AT (  248200.00,  3913900.00,   700.22,
1321.50,    0.00)  DC

MOB_0023  1ST HIGHEST VALUE IS       8.85550 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.41803 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       8.34554 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.79425 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       6.36232 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.78140 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.69512 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.14739 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.73501 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.10587 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC

MOB_0024  1ST HIGHEST VALUE IS       7.47306 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.78213 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       6.58520 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.47498 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.65423 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.45220 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.77139 AT (  248100.00,  3913900.00,   704.14,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.66498 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.63335 AT (  248178.00,  3913869.00,   711.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.10023 AT (  248203.00,  3913869.00,   709.39,
1321.50,    0.00)  DC

MOB_0025  1ST HIGHEST VALUE IS       8.92346 AT (  247978.00,  3913869.00,   728.04,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       8.30750 AT (  248003.00,  3913869.00,   723.78,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.84410 AT (  248028.00,  3913869.00,   719.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       7.62162 AT (  248053.00,  3913869.00,   713.41,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       6.76224 AT (  248078.00,  3913869.00,   708.07,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.89638 AT (  248000.00,  3913900.00,   725.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.12886 AT (  248103.00,  3913869.00,   709.38,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.08517 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.56356 AT (  247953.00,  3913869.00,   733.12,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.44732 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  16
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0026	1ST HIGHEST VALUE IS	11.48746 AT (248003.00, 3913869.00, 723.78, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	8.20483 AT (248028.00, 3913869.00, 719.90, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	7.77764 AT (247978.00, 3913869.00, 728.04, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.99143 AT (248053.00, 3913869.00, 713.41, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.70796 AT (248000.00, 3913900.00, 725.84, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.59227 AT (248078.00, 3913869.00, 708.07, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.80071 AT (248103.00, 3913869.00, 709.38, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.02813 AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.75649 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.50488 AT (248100.00, 3913900.00, 704.14, 1321.50, 0.00)	DC	
TKD_0001	1ST HIGHEST VALUE IS	9.00774 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	8.69040 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	8.40850 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	7.93125 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	7.62367 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	7.40043 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	7.09434 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	6.86363 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	6.18182 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	6.03126 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
TKD_0002	1ST HIGHEST VALUE IS	5.87497 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.76342 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.55064 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	5.47743 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	5.08882 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	5.02763 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.89904 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.88037 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	4.68976 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	4.66011 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
TKD_0003	1ST HIGHEST VALUE IS	4.57220 AT (248678.00, 3912894.00, 761.55,		

1321.50, 0.00) DC
          2ND HIGHEST VALUE IS   4.56230 AT (248653.00, 3912894.00,   762.44,
1321.50, 0.00) DC
          3RD HIGHEST VALUE IS   4.42955 AT (248553.00, 3912894.00,   765.26,
1321.50, 0.00) DC
          4TH HIGHEST VALUE IS   4.40986 AT (248628.00, 3912894.00,   763.08,
1321.50, 0.00) DC
          5TH HIGHEST VALUE IS   4.34605 AT (248578.00, 3912894.00,   764.35,
1321.50, 0.00) DC
          6TH HIGHEST VALUE IS   4.34123 AT (248703.00, 3912894.00,   760.49,
1321.50, 0.00) DC
          7TH HIGHEST VALUE IS   4.26305 AT (248603.00, 3912894.00,   763.73,
1321.50, 0.00) DC
          8TH HIGHEST VALUE IS   4.13949 AT (248528.00, 3912894.00,   766.57,
1321.50, 0.00) DC
          9TH HIGHEST VALUE IS   4.10911 AT (248728.00, 3912894.00,   759.43,
1321.50, 0.00) DC
         10TH HIGHEST VALUE IS   3.83289 AT (248753.00, 3912894.00,   758.66,
1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/09/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   21:52:10

                              PAGE 17
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS)
RESULTS ***

                                      ** CONC OF TOXIC   IN MICROGRAMS/M**3
        **

                NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - -

TKD_0004 1ST HIGHEST VALUE IS   3.79269 AT (248728.00, 3912894.00,   759.43,
1321.50, 0.00) DC
          2ND HIGHEST VALUE IS   3.76231 AT (248703.00, 3912894.00,   760.49,
1321.50, 0.00) DC
          3RD HIGHEST VALUE IS   3.71709 AT (248753.00, 3912894.00,   758.66,
1321.50, 0.00) DC
          4TH HIGHEST VALUE IS   3.47131 AT (248778.00, 3912894.00,   758.97,
1321.50, 0.00) DC
          5TH HIGHEST VALUE IS   3.15424 AT (248678.00, 3912894.00,   761.55,
1321.50, 0.00) DC
          6TH HIGHEST VALUE IS   3.10092 AT (248803.00, 3912894.00,   759.41,
1321.50, 0.00) DC
          7TH HIGHEST VALUE IS   2.87640 AT (248700.00, 3912800.00,   757.08,
1321.50, 0.00) DC
          8TH HIGHEST VALUE IS   2.87039 AT (248653.00, 3912894.00,   762.44,
1321.50, 0.00) DC
          9TH HIGHEST VALUE IS   2.68825 AT (248828.00, 3912894.00,   759.89,
1321.50, 0.00) DC
         10TH HIGHEST VALUE IS   2.57285 AT (248628.00, 3912894.00,   763.08,
1321.50, 0.00) DC

TKD_0005 1ST HIGHEST VALUE IS   3.61577 AT (248728.00, 3912894.00,   759.43,
1321.50, 0.00) DC
          2ND HIGHEST VALUE IS   3.39199 AT (248753.00, 3912894.00,   758.66,
1321.50, 0.00) DC
          3RD HIGHEST VALUE IS   3.30836 AT (248703.00, 3912894.00,   760.49,
1321.50, 0.00) DC
          4TH HIGHEST VALUE IS   3.01590 AT (248678.00, 3912894.00,   761.55,
1321.50, 0.00) DC

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          5TH HIGHEST VALUE IS       2.92862 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.89268 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.80360 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.60357 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.51446 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.43507 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC

TKD_0006  1ST HIGHEST VALUE IS       2.75057 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.60854 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.56512 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.55681 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.49286 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.38564 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.28126 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.21347 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.09616 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.08256 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC

TKD_0007  1ST HIGHEST VALUE IS       2.85629 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.83687 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.77525 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.75087 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.71453 AT (  248700.00,  3912800.00,   757.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.71294 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.62887 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.57962 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.55503 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.27764 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  18
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKD_0008	1ST HIGHEST VALUE IS	5.33695 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	5.15387 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	5.14050 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	4.84172 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.39541 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.77198 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.76410 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.16799 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.78399 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.65469 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
TKD_0009	1ST HIGHEST VALUE IS	4.03837 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.01654 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.89165 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.76040 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.52099 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.24653 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.92613 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.87740 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.46289 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.36315 AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00)	DC	
TKD_0010	1ST HIGHEST VALUE IS	3.48577 AT (248478.00, 3912894.00, 770.34, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.31476 AT (248453.00, 3912894.00, 772.72, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.06316 AT (248503.00, 3912894.00, 767.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.82860 AT (248528.00, 3912894.00, 766.57, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.67503 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	2.50152 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	2.32024 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	2.26078 AT (248428.00, 3912894.00, 776.83, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	2.20937 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.11186 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
TKD_0011	1ST HIGHEST VALUE IS	3.00713 AT (248528.00, 3912894.00, 766.57,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.00219 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.76043 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.69170 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.58636 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.47033 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.29298 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.11300 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.08388 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.98855 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        21:52:10

                             PAGE  19
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

TKD_0012  1ST HIGHEST VALUE IS       2.43128 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.42141 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.38440 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.33623 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.27390 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.21427 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.03719 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.86449 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.74053 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.72101 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC

TKD_0013  1ST HIGHEST VALUE IS       2.09159 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.00492 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.96904 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.84873 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.74836 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.73833 AT (  248453.00,  3912894.00,   772.72,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.69698 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.62467 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.51794 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.40804 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC

TKD_0014  1ST HIGHEST VALUE IS       1.81529 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.68378 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.67901 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.67698 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.67305 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.63331 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.62346 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.53480 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.51177 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.39724 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC

TKS_0001  1ST HIGHEST VALUE IS       7.25962 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       7.09799 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       7.07967 AT (  248528.00,  3912894.00,   766.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       6.66444 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.91045 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.72869 AT (  248503.00,  3912894.00,   767.88,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       5.11301 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.40152 AT (  248600.00,  3912800.00,   762.78,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.38546 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.97381 AT (  248478.00,  3912894.00,   770.34,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  20
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKS_0002	1ST HIGHEST VALUE IS	3.70027 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.61498 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.58664 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.48627 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.43153 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.33843 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.30520 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.19568 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.14541 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	2.88224 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00)	DC	
TKS_0003	1ST HIGHEST VALUE IS	2.61278 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.12481 AT (248700.00, 3912800.00, 757.08, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.04203 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.98841 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.98786 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.91281 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.78614 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.73230 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.67577 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.65544 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
TKS_0004	1ST HIGHEST VALUE IS	2.08137 AT (248800.00, 3912800.00, 751.06, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.93063 AT (248900.00, 3912800.00, 744.32, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.62896 AT (248900.00, 3912700.00, 742.91, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.50292 AT (248800.00, 3912700.00, 751.66, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.47379 AT (248800.00, 3912600.00, 749.11, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.44259 AT (249003.00, 3912894.00, 746.85, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.32654 AT (248700.00, 3912500.00, 745.10, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.30068 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.27454 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.26723 AT (248900.00, 3912600.00, 741.62, 1321.50, 0.00)	DC	
TKS_0005	1ST HIGHEST VALUE IS	2.12077 AT (248900.00, 3912800.00, 744.32,		

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.69588 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.61049 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.54377 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.47099 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.37416 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.32995 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.32699 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.27970 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.26805 AT (  248700.00,  3912500.00,   745.10,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        21:52:10

                            PAGE  21
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                    ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **


                  NETWORK
GROUP ID                       AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

TKS_0006  1ST HIGHEST VALUE IS       1.76495 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.74039 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.67871 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.63667 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.55079 AT (  248900.00,  3912700.00,   742.91,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.53657 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.39336 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.36282 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.33456 AT (  248900.00,  3912600.00,   741.62,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.30314 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC

TKS_0007  1ST HIGHEST VALUE IS       1.68868 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.54947 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.49702 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.30328 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       1.19816 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.19413 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.17207 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.14791 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.13493 AT (  248900.00,  3912500.00,   732.80,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.08451 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC

TKS_0008  1ST HIGHEST VALUE IS       2.08708 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.91064 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.76644 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.61856 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.60466 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.55497 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.43517 AT (  249000.00,  3912700.00,   738.47,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.41005 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.37114 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.29563 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC

TKS_0009  1ST HIGHEST VALUE IS       2.24297 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       1.95064 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.94493 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.86137 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.79452 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.70660 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.66534 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.65810 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.62563 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.58792 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  22
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

TKS_0010 1ST HIGHEST VALUE IS 1.94011 AT (249053.00, 3912894.00, 737.19, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 1.86227 AT (249078.00, 3912894.00, 734.41, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 1.86153 AT (249103.00, 3912894.00, 736.25, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 1.69888 AT (249128.00, 3912894.00, 738.84, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 1.55994 AT (249000.00, 3912800.00, 740.70, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 1.52100 AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 1.37266 AT (249100.00, 3912800.00, 740.52, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 1.34328 AT (249000.00, 3912700.00, 738.47, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 1.27995 AT (247928.00, 3913869.00, 739.45, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 1.26861 AT (247953.00, 3913869.00, 733.12, 1321.50, 0.00) DC

TKM_0001 1ST HIGHEST VALUE IS 14.36879 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 13.88429 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 13.35210 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 12.65958 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 12.12839 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 11.75709 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 11.29386 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 10.80802 AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 9.70816 AT (248553.00, 3912894.00, 765.26, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 9.55672 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC

TKM_0002 1ST HIGHEST VALUE IS 13.78287 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 13.35201 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 12.81428 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 12.25065 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 11.62064 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 11.24237 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 11.01299 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 10.32636 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 9.40516 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 9.09422 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC

TKM_0003 1ST HIGHEST VALUE IS 12.07973 AT (248778.00, 3912894.00, 758.97,

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1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.76933 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.35227 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      10.98912 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.30458 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.05866 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       9.96635 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.91566 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.28653 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.73270 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         21:52:10

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 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                      *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **


                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

TKM_0004  1ST HIGHEST VALUE IS      11.58651 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS      11.51675 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS      11.48678 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS      11.05565 AT (  248878.00,  3912894.00,   759.11,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS      10.78471 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS      10.31083 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS      10.26631 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       9.69660 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       9.59760 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       8.31182 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC

TKM_0005  1ST HIGHEST VALUE IS       8.24323 AT (  248978.00,  3912894.00,   751.88,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       6.80461 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.29792 AT (  248800.00,  3912800.00,   751.06,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.29186 AT (  248953.00,  3912894.00,   756.22,
1321.50,    0.00)  DC
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          5TH HIGHEST VALUE IS       5.20568 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       5.06707 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.36347 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.32787 AT (  248928.00,  3912894.00,   758.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.00827 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       4.00443 AT (  248903.00,  3912894.00,   758.84,
1321.50,    0.00)  DC

TKM_0006  1ST HIGHEST VALUE IS       7.58116 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       5.77157 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       5.70084 AT (  249003.00,  3912894.00,   746.85,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       5.17258 AT (  249000.00,  3912800.00,   740.70,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       5.16804 AT (  248900.00,  3912800.00,   744.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.78474 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       4.27603 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       4.13298 AT (  249100.00,  3912800.00,   740.52,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       4.11084 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.90895 AT (  249153.00,  3912894.00,   743.23,
1321.50,    0.00)  DC

TKM_0007  1ST HIGHEST VALUE IS       5.23349 AT (  249078.00,  3912894.00,   734.41,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       3.73381 AT (  249103.00,  3912894.00,   736.25,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       3.62003 AT (  249053.00,  3912894.00,   737.19,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.42932 AT (  249128.00,  3912894.00,   738.84,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.41896 AT (  249100.00,  3912700.00,   734.75,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.11223 AT (  249100.00,  3912600.00,   732.72,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.10260 AT (  249028.00,  3912894.00,   742.50,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.98843 AT (  249278.00,  3913019.00,   732.94,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.94730 AT (  249000.00,  3912600.00,   735.26,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.80276 AT (  249000.00,  3912500.00,   729.06,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/09/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        21:52:10

                             PAGE  24
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        *** THE SUMMARY OF MAXIMUM PERIOD (  8760 HRS)
RESULTS ***


                                     ** CONC OF TOXIC    IN MICROGRAMS/M**3
        **
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GROUP ID	NETWORK AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
TKM_0008	1ST HIGHEST VALUE IS	2.36725 AT (249278.00, 3913069.00, 714.81, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.87398 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.82937 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.80896 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.79145 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.77516 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.76842 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.73011 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.65400 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.58876 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	
TKM_0009	1ST HIGHEST VALUE IS	2.58983 AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.11113 AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.02025 AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.95177 AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.93013 AT (249278.00, 3913169.00, 690.37, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.90939 AT (249278.00, 3913194.00, 687.98, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.88178 AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.87891 AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.83647 AT (249278.00, 3913269.00, 680.21, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.70303 AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 21:52:10

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

DATE
NETWORK

GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

SCREEN HIGH 1ST HIGH VALUE IS 914.44044 ON 11070120: AT (249278.00, 3913144.00, 693.10, 1321.50, 0.00) DC

OREPILE1 HIGH 1ST HIGH VALUE IS 3101.65852 ON 11070302: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

STOCKPL3 HIGH 1ST HIGH VALUE IS 2246.52130 ON 11031306: AT (248600.00, 3912800.00, 762.78, 1321.50, 0.00) DC

TOP1 HIGH 1ST HIGH VALUE IS 3170.78376 ON 11091904: AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00) DC

TOP2 HIGH 1ST HIGH VALUE IS 3494.85798 ON 11091904: AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00) DC

TOP3 HIGH 1ST HIGH VALUE IS 3999.42002 ON 11091904: AT (248328.00, 3913869.00, 698.55, 1321.50, 0.00) DC

TOP4 HIGH 1ST HIGH VALUE IS 3548.64759 ON 11091904: AT (248303.00, 3913869.00, 697.89, 1321.50, 0.00) DC

TOP5 HIGH 1ST HIGH VALUE IS 3218.98658 ON 11091904: AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00) DC

TOP6 HIGH 1ST HIGH VALUE IS 3870.01401 ON 11091904: AT (248278.00, 3913869.00, 694.01, 1321.50, 0.00) DC

TOP7 HIGH 1ST HIGH VALUE IS 3530.59863 ON 11091904: AT (248253.00, 3913869.00, 696.56, 1321.50, 0.00) DC

STOCKPL4 HIGH 1ST HIGH VALUE IS 2228.79111 ON 11110423: AT (249278.00, 3913469.00, 671.76, 1321.50, 0.00) DC

STOCKPL1 HIGH 1ST HIGH VALUE IS 2891.86483 ON 11121901: AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC

STOCKPL2 HIGH 1ST HIGH VALUE IS 2210.90638 ON 11012408: AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC

TOP8 HIGH 1ST HIGH VALUE IS 2821.18465 ON 11070302: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP9 HIGH 1ST HIGH VALUE IS 2613.83788 ON 11070302: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP10 HIGH 1ST HIGH VALUE IS 2988.75197 ON 11020420: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP11 HIGH 1ST HIGH VALUE IS 3050.48248 ON 11102002: AT (249278.00, 3913219.00, 684.32, 1321.50, 0.00) DC

TOP12 HIGH 1ST HIGH VALUE IS 3396.01927 ON 11100407: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP13 HIGH 1ST HIGH VALUE IS 3457.70707 ON 11070302: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP14 HIGH 1ST HIGH VALUE IS 3550.98763 ON 11070302: AT (249278.00, 3913119.00, 697.37, 1321.50, 0.00) DC

TOP15 HIGH 1ST HIGH VALUE IS 3598.83986 ON 11020420: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

TOP16 HIGH 1ST HIGH VALUE IS 3365.86905 ON 11070302: AT (249300.00, 3913100.00, 702.10, 1321.50, 0.00) DC

20ACRE HIGH 1ST HIGH VALUE IS 1807.03551 ON 11120902: AT (249278.00, 3913819.00, 661.49, 1321.50, 0.00) DC

MOB_0001 HIGH 1ST HIGH VALUE IS 196.73023 ON 11122206: AT (249278.00, 3913344.00, 680.59, 1321.50, 0.00) DC

MOB_0002 HIGH 1ST HIGH VALUE IS 189.84923 ON 11122206: AT (249278.00, 3913394.00, 680.21, 1321.50, 0.00) DC

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 21:52:10

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF TOXIC IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
MOB_0003 HIGH 1ST HIGH VALUE IS	185.59662	ON 11122206:	AT (249278.00, 3913444.00, 674.15, 1321.50, 0.00)	DC	
MOB_0004 HIGH 1ST HIGH VALUE IS	184.20203	ON 11020420:	AT (249278.00, 3913294.00, 680.20, 1321.50, 0.00)	DC	
MOB_0005 HIGH 1ST HIGH VALUE IS	176.93960	ON 11122206:	AT (249278.00, 3913544.00, 656.33, 1321.50, 0.00)	DC	
MOB_0006 HIGH 1ST HIGH VALUE IS	207.98736	ON 11022303:	AT (249278.00, 3913694.00, 670.63, 1321.50, 0.00)	DC	
MOB_0007 HIGH 1ST HIGH VALUE IS	174.10028	ON 11022303:	AT (249278.00, 3913744.00, 671.35, 1321.50, 0.00)	DC	
MOB_0008 HIGH 1ST HIGH VALUE IS	156.65243	ON 11062805:	AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
MOB_0009 HIGH 1ST HIGH VALUE IS	176.32333	ON 11062805:	AT (248728.00, 3913869.00, 656.12, 1321.50, 0.00)	DC	
MOB_0010 HIGH 1ST HIGH VALUE IS	205.32249	ON 11062805:	AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
MOB_0011 HIGH 1ST HIGH VALUE IS	221.38482	ON 11062805:	AT (248700.00, 3913900.00, 657.89, 1321.50, 0.00)	DC	
MOB_0012 HIGH 1ST HIGH VALUE IS	276.57234	ON 11011007:	AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0013 HIGH 1ST HIGH VALUE IS	282.79110	ON 11062805:	AT (248600.00, 3913900.00, 678.79, 1321.50, 0.00)	DC	
MOB_0014 HIGH 1ST HIGH VALUE IS	259.47459	ON 11022107:	AT (248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
MOB_0015 HIGH 1ST HIGH VALUE IS	308.21293	ON 11122024:	AT (248578.00, 3913869.00, 689.32, 1321.50, 0.00)	DC	

```
MOB_0016 HIGH   1ST HIGH VALUE IS     320.24598  ON 11011802: AT (  248553.00,
3913869.00,   689.20,  1321.50,    0.00)  DC

MOB_0017 HIGH   1ST HIGH VALUE IS     322.36977  ON 11011802: AT (  248503.00,
3913869.00,   691.51,  1321.50,    0.00)  DC

MOB_0018 HIGH   1ST HIGH VALUE IS     311.55743  ON 11011802: AT (  248453.00,
3913869.00,   684.29,  1321.50,    0.00)  DC

MOB_0019 HIGH   1ST HIGH VALUE IS     342.18576  ON 11032805: AT (  248478.00,
3913869.00,   689.71,  1321.50,    0.00)  DC

MOB_0020 HIGH   1ST HIGH VALUE IS     438.58754  ON 11020603: AT (  248353.00,
3913869.00,   695.67,  1321.50,    0.00)  DC

MOB_0021 HIGH   1ST HIGH VALUE IS     386.45028  ON 11022224: AT (  248178.00,
3913869.00,   711.44,  1321.50,    0.00)  DC

MOB_0022 HIGH   1ST HIGH VALUE IS     405.77409  ON 11101406: AT (  248178.00,
3913869.00,   711.44,  1321.50,    0.00)  DC

MOB_0023 HIGH   1ST HIGH VALUE IS     394.30254  ON 11020603: AT (  248203.00,
3913869.00,   709.39,  1321.50,    0.00)  DC

MOB_0024 HIGH   1ST HIGH VALUE IS     298.24343  ON 11021706: AT (  248128.00,
3913869.00,   710.48,  1321.50,    0.00)  DC

MOB_0025 HIGH   1ST HIGH VALUE IS     319.32573  ON 11122024: AT (  248103.00,
3913869.00,   709.38,  1321.50,    0.00)  DC

MOB_0026 HIGH   1ST HIGH VALUE IS     398.98278  ON 11022105: AT (  248003.00,
3913869.00,   723.78,  1321.50,    0.00)  DC

TKD_0001 HIGH   1ST HIGH VALUE IS     476.76675  ON 11011519: AT (  248478.00,
3912894.00,   770.34,  1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***       06/09/15
 *** AERMET - VERSION  14134 ***   ***
                ***        21:52:10

                           PAGE  27
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                         *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                               ** CONC OF TOXIC    IN MICROGRAMS/M**3
         **

                                             DATE
                              NETWORK
GROUP ID                     AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

TKD_0002 HIGH   1ST HIGH VALUE IS     457.34878  ON 11121408: AT (  248478.00,
3912894.00,   770.34,  1321.50,    0.00)  DC

TKD_0003 HIGH   1ST HIGH VALUE IS     444.20483  ON 11121903: AT (  248528.00,
3912894.00,   766.57,  1321.50,    0.00)  DC

TKD_0004 HIGH   1ST HIGH VALUE IS     329.43599  ON 11031306: AT (  248700.00,
3912800.00,   757.08,  1321.50,    0.00)  DC

TKD_0005 HIGH   1ST HIGH VALUE IS     351.92140  ON 11022807: AT (  248700.00,
3912800.00,   757.08,  1321.50,    0.00)  DC

TKD_0006 HIGH   1ST HIGH VALUE IS     235.90340  ON 11012408: AT (  248800.00,
```

3912700.00, 751.66, 1321.50, 0.00) DC

TKD_0007 HIGH 1ST HIGH VALUE IS 263.62685 ON 11020420: AT (248928.00,
3912894.00, 758.01, 1321.50, 0.00) DC

TKD_0008 HIGH 1ST HIGH VALUE IS 431.49461 ON 11012408: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0009 HIGH 1ST HIGH VALUE IS 443.91151 ON 11022807: AT (248553.00,
3912894.00, 765.26, 1321.50, 0.00) DC

TKD_0010 HIGH 1ST HIGH VALUE IS 307.67315 ON 11122418: AT (248478.00,
3912894.00, 770.34, 1321.50, 0.00) DC

TKD_0011 HIGH 1ST HIGH VALUE IS 349.00827 ON 11122418: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0012 HIGH 1ST HIGH VALUE IS 311.09501 ON 11031306: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKD_0013 HIGH 1ST HIGH VALUE IS 261.79439 ON 11122418: AT (248528.00,
3912894.00, 766.57, 1321.50, 0.00) DC

TKD_0014 HIGH 1ST HIGH VALUE IS 275.25505 ON 11022807: AT (248628.00,
3912894.00, 763.08, 1321.50, 0.00) DC

TKS_0001 HIGH 1ST HIGH VALUE IS 685.67423 ON 11012408: AT (248603.00,
3912894.00, 763.73, 1321.50, 0.00) DC

TKS_0002 HIGH 1ST HIGH VALUE IS 470.44028 ON 11012408: AT (248700.00,
3912800.00, 757.08, 1321.50, 0.00) DC

TKS_0003 HIGH 1ST HIGH VALUE IS 304.98252 ON 11012408: AT (248800.00,
3912800.00, 751.06, 1321.50, 0.00) DC

TKS_0004 HIGH 1ST HIGH VALUE IS 267.16278 ON 11012408: AT (248900.00,
3912700.00, 742.91, 1321.50, 0.00) DC

TKS_0005 HIGH 1ST HIGH VALUE IS 328.80086 ON 11012408: AT (248900.00,
3912800.00, 744.32, 1321.50, 0.00) DC

TKS_0006 HIGH 1ST HIGH VALUE IS 322.43672 ON 11012408: AT (249000.00,
3912700.00, 738.47, 1321.50, 0.00) DC

TKS_0007 HIGH 1ST HIGH VALUE IS 309.27499 ON 11122206: AT (249278.00,
3913369.00, 680.65, 1321.50, 0.00) DC

TKS_0008 HIGH 1ST HIGH VALUE IS 324.16649 ON 11122206: AT (249278.00,
3913394.00, 680.21, 1321.50, 0.00) DC

TKS_0009 HIGH 1ST HIGH VALUE IS 354.54667 ON 11122206: AT (249278.00,
3913419.00, 678.34, 1321.50, 0.00) DC

TKS_0010 HIGH 1ST HIGH VALUE IS 368.52943 ON 11012408: AT (249103.00,
3912894.00, 736.25, 1321.50, 0.00) DC

TKM_0001 HIGH 1ST HIGH VALUE IS 743.31982 ON 11022001: AT (248703.00,
3912894.00, 760.49, 1321.50, 0.00) DC

TKM_0002 HIGH 1ST HIGH VALUE IS 736.77641 ON 11022001: AT (248753.00,
3912894.00, 758.66, 1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 21:52:10

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS

***

** CONC OF TOXIC IN MICROGRAMS/M**3
**

GROUP ID	NETWORK AVERAGE CONC OF TYPE	DATE (YYMMDDHH) GRID-ID	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)
TKM_0003 HIGH	1ST HIGH VALUE IS	708.23602	ON 11022001: AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00) DC
TKM_0004 HIGH	1ST HIGH VALUE IS	903.48084	ON 11021103: AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
TKM_0005 HIGH	1ST HIGH VALUE IS	710.13069	ON 11012408: AT (248978.00, 3912894.00, 751.88, 1321.50, 0.00) DC
TKM_0006 HIGH	1ST HIGH VALUE IS	642.96756	ON 11012408: AT (249028.00, 3912894.00, 742.50, 1321.50, 0.00) DC
TKM_0007 HIGH	1ST HIGH VALUE IS	488.10003	ON 11122206: AT (249300.00, 3913200.00, 689.96, 1321.50, 0.00) DC
TKM_0008 HIGH	1ST HIGH VALUE IS	543.24631	ON 11122206: AT (249278.00, 3913244.00, 682.36, 1321.50, 0.00) DC
TKM_0009 HIGH	1ST HIGH VALUE IS	582.37453	ON 11020420: AT (249278.00, 3913094.00, 704.48, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/09/15
*** AERMET - VERSION 14134 *** ***
*** 21:52:10

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 330 Informational Message(s)

A Total of 8760 Hours Were Processed

A Total of 202 Calm Hours Identified

A Total of 128 Missing Hours Identified (1.46 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 1134 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

Appendix III
Johe's Ranch Mine CalEEmod

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East Pit Mine (In Progress)

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	20.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2035
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 20acre exposure at any one time

Construction Phase - 5 days each week and 10.5 hours/day

Off-road Equipment - Equipment owned by operator and use expectations filled in (10.5 hrs/day use for loaders and 1 hr/day max for off highway truck)

Trips and VMT - three workers each day taking 2 trips each for average 8.5 miles each day

Area Coating - no coatings

Vehicle Trips - Haul Trucks material movement to cement plants pre-determined

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	261.00
tblOffRoadEquipment	HorsePower	199.00	415.00
tblOffRoadEquipment	HorsePower	199.00	285.00
tblOffRoadEquipment	HorsePower	400.00	205.00
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Off-Highway Trucks
tblProjectCharacteristics	OperationalYear	2014	2035
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	4.50
tblTripsAndVMT	WorkerTripNumber	10.00	6.00
tblVehicleTrips	CW_TL	14.70	89.00
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	WD_TR	0.00	1.72

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2035	0.1517	0.3268	0.8563	3.9900e-003	2.6100e-003	0.0118	0.0144	7.0000e-004	0.0118	0.0125	0.0000	407.8991	407.8991	0.0122	0.0000	408.1560
Total	**0.1517**	**0.3268**	**0.8563**	**3.9900e-003**	**2.6100e-003**	**0.0118**	**0.0144**	**7.0000e-004**	**0.0118**	**0.0125**	**0.0000**	**407.8991**	**407.8991**	**0.0122**	**0.0000**	**408.1560**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2035	0.1517	6.2000e-004	0.8563	3.9900e-003	2.6100e-003	0.0118	0.0144	7.0000e-004	0.0118	0.0125	0.0000	407.8986	407.8986	0.0122	0.0000	408.1555
Total	**0.1517**	**6.2000e-004**	**0.8563**	**3.9900e-003**	**2.6100e-003**	**0.0118**	**0.0144**	**7.0000e-004**	**0.0118**	**0.0125**	**0.0000**	**407.8986**	**407.8986**	**0.0122**	**0.0000**	**408.1555**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**99.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0562	0.3022	0.8392	5.2000e-003	0.3021	9.2800e-003	0.3114	0.0812	8.5500e-003	0.0897	0.0000	360.4634	360.4634	7.1200e-003	0.0000	360.6131
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0562**	**0.3022**	**0.8394**	**5.2000e-003**	**0.3021**	**9.2800e-003**	**0.3114**	**0.0812**	**8.5500e-003**	**0.0897**	**0.0000**	**360.4638**	**360.4638**	**7.1200e-003**	**0.0000**	**360.6134**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0562	0.3022	0.8392	5.2000e-003	0.3021	9.2800e-003	0.3114	0.0812	8.5500e-003	0.0897	0.0000	360.4634	360.4634	7.1200e-003	0.0000	360.6131
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0562**	**0.3022**	**0.8394**	**5.2000e-003**	**0.3021**	**9.2800e-003**	**0.3114**	**0.0812**	**8.5500e-003**	**0.0897**	**0.0000**	**360.4638**	**360.4638**	**7.1200e-003**	**0.0000**	**360.6134**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mining	Grading	1/1/2035	12/31/2035	5	261	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Mining	Rubber Tired Loaders	1	10.50	415	0.36
Mining	Rubber Tired Loaders	1	10.50	285	0.36
Mining	Off-Highway Trucks	1	1.00	205	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mining	4	6.00	0.00	0.00	4.50	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Mining - 2035

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1508	0.3262	0.8495	3.9600e-003		0.0118	0.0118		0.0118	0.0118	0.0000	406.0454	406.0454	0.0122	0.0000	406.3009
Total	**0.1508**	**0.3262**	**0.8495**	**3.9600e-003**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**406.0454**	**406.0454**	**0.0122**	**0.0000**	**406.3009**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7000e-004	6.2000e-004	6.7800e-003	3.0000e-005	2.6100e-003	3.0000e-005	2.6400e-003	7.0000e-004	2.0000e-005	7.2000e-004	0.0000	1.8537	1.8537	7.0000e-005	0.0000	1.8551
Total	**8.7000e-004**	**6.2000e-004**	**6.7800e-003**	**3.0000e-005**	**2.6100e-003**	**3.0000e-005**	**2.6400e-003**	**7.0000e-004**	**2.0000e-005**	**7.2000e-004**	**0.0000**	**1.8537**	**1.8537**	**7.0000e-005**	**0.0000**	**1.8551**

3.2 Mining - 2035

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1508		0.8495	3.9600e-003		0.0118	0.0118		0.0118	0.0118	0.0000	406.0449	406.0449	0.0122	0.0000	406.3004
Total	**0.1508**		**0.8495**	**3.9600e-003**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**406.0449**	**406.0449**	**0.0122**	**0.0000**	**406.3004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.7000e-004	6.2000e-004	6.7800e-003	3.0000e-005	2.6100e-003	3.0000e-005	2.6400e-003	7.0000e-004	2.0000e-005	7.2000e-004	0.0000	1.8537	1.8537	7.0000e-005	0.0000	1.8551
Total	**8.7000e-004**	**6.2000e-004**	**6.7800e-003**	**3.0000e-005**	**2.6100e-003**	**3.0000e-005**	**2.6400e-003**	**7.0000e-004**	**2.0000e-005**	**7.2000e-004**	**0.0000**	**1.8537**	**1.8537**	**7.0000e-005**	**0.0000**	**1.8551**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0562	0.3022	0.8392	5.2000e-003	0.3021	9.2800e-003	0.3114	0.0812	8.5500e-003	0.0897	0.0000	360.4634	360.4634	7.1200e-003	0.0000	360.6131
Unmitigated	0.0562	0.3022	0.8392	5.2000e-003	0.3021	9.2800e-003	0.3114	0.0812	8.5500e-003	0.0897	0.0000	360.4634	360.4634	7.1200e-003	0.0000	360.6131

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	34.31	0.00	0.00	793,933	793,933
Total	34.31	0.00	0.00	793,933	793,933

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	89.00	6.60	6.60	100.00	0.00	0.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.412644	0.063380	0.154149	0.172864	0.050991	0.007853	0.020339	0.104512	0.001773	0.001608	0.006849	0.000757	0.002282

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Unmitigated	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Johe's Ranch

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	20.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 20acre exposure at any one time

Construction Phase - 5 days each week and 10.5 hours/day

Off-road Equipment - Equipment owned by operator and use expectations filled in (10.5 hrs/day use for loaders and 1 hr/day max for off highway truck)

Trips and VMT - three workers each day taking 2 trips each for average 8.5 miles each day

Area Coating - no coatings

Vehicle Trips - Haul Trucks material movement to cement plants pre-determined

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	435600	0
tblAreaCoating	Area_Nonresidential_Interior	1306800	0
tblConstructionPhase	NumDays	30.00	261.00
tblConstructionPhase	PhaseEndDate	12/30/2016	12/31/2016
tblOffRoadEquipment	HorsePower	199.00	285.00
tblOffRoadEquipment	HorsePower	199.00	415.00
tblOffRoadEquipment	HorsePower	400.00	205.00
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Mining
tblOffRoadEquipment	PhaseName		Mining
tblOffRoadEquipment	PhaseName		Mining
tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	8.50
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblVehicleTrips	CW_TL	14.70	93.00
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	WD_TR	0.00	2.49

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3106	3.6339	1.7120	3.8400e-003	4.9300e-003	0.1370	0.1419	1.3100e-003	0.1261	0.1274	0.0000	360.2672	360.2672	0.1076	0.0000	362.5262
Total	**0.3106**	**3.6339**	**1.7120**	**3.8400e-003**	**4.9300e-003**	**0.1370**	**0.1419**	**1.3100e-003**	**0.1261**	**0.1274**	**0.0000**	**360.2672**	**360.2672**	**0.1076**	**0.0000**	**362.5262**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3105	3.6339	1.7120	3.8400e-003	4.9300e-003	0.1370	0.1419	1.3100e-003	0.1261	0.1274	0.0000	360.2667	360.2667	0.1076	0.0000	362.5258
Total	**0.3105**	**3.6339**	**1.7120**	**3.8400e-003**	**4.9300e-003**	**0.1370**	**0.1419**	**1.3100e-003**	**0.1261**	**0.1274**	**0.0000**	**360.2667**	**360.2667**	**0.1076**	**0.0000**	**362.5258**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1571	1.2841	2.6306	7.8300e-003	0.4575	0.0198	0.4773	0.1229	0.0182	0.1411	0.0000	642.1752	642.1752	0.0204	0.0000	642.6032
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1571**	**1.2841**	**2.6308**	**7.8300e-003**	**0.4575**	**0.0198**	**0.4773**	**0.1229**	**0.0182**	**0.1411**	**0.0000**	**642.1756**	**642.1756**	**0.0204**	**0.0000**	**642.6036**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1571	1.2841	2.6306	7.8300e-003	0.4575	0.0198	0.4773	0.1229	0.0182	0.1411	0.0000	642.1752	642.1752	0.0204	0.0000	642.6032
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1571**	**1.2841**	**2.6308**	**7.8300e-003**	**0.4575**	**0.0198**	**0.4773**	**0.1229**	**0.0182**	**0.1411**	**0.0000**	**642.1756**	**642.1756**	**0.0204**	**0.0000**	**642.6036**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mining	Grading	1/1/2016	12/31/2016	5	261	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Mining	Off-Highway Trucks	1	1.00	205	0.38
Mining	Rubber Tired Loaders	1	10.50	285	0.36
Mining	Rubber Tired Loaders	1	10.50	415	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mining	3	6.00	0.00	0.00	8.50	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Mining - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3077	3.6309	1.6814	3.7800e-003		0.1370	0.1370		0.1260	0.1260	0.0000	355.8172	355.8172	0.1073	0.0000	358.0710
Total	**0.3077**	**3.6309**	**1.6814**	**3.7800e-003**		**0.1370**	**0.1370**		**0.1260**	**0.1260**	**0.0000**	**355.8172**	**355.8172**	**0.1073**	**0.0000**	**358.0710**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-003	3.0500e-003	0.0306	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	4.4500	4.4500	2.5000e-004	0.0000	4.4552
Total	**2.8000e-003**	**3.0500e-003**	**0.0306**	**6.0000e-005**	**4.9300e-003**	**4.0000e-005**	**4.9700e-003**	**1.3100e-003**	**4.0000e-005**	**1.3500e-003**	**0.0000**	**4.4500**	**4.4500**	**2.5000e-004**	**0.0000**	**4.4552**

3.2 Mining - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3077	3.6309	1.6814	3.7800e-003		0.1370	0.1370		0.1260	0.1260	0.0000	355.8167	355.8167	0.1073	0.0000	358.0706
Total	**0.3077**	**3.6309**	**1.6814**	**3.7800e-003**		**0.1370**	**0.1370**		**0.1260**	**0.1260**	**0.0000**	**355.8167**	**355.8167**	**0.1073**	**0.0000**	**358.0706**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-003	3.0500e-003	0.0306	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	4.4500	4.4500	2.5000e-004	0.0000	4.4552
Total	**2.8000e-003**	**3.0500e-003**	**0.0306**	**6.0000e-005**	**4.9300e-003**	**4.0000e-005**	**4.9700e-003**	**1.3100e-003**	**4.0000e-005**	**1.3500e-003**	**0.0000**	**4.4500**	**4.4500**	**2.5000e-004**	**0.0000**	**4.4552**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1571	1.2841	2.6306	7.8300e-003	0.4575	0.0198	0.4773	0.1229	0.0182	0.1411	0.0000	642.1752	642.1752	0.0204	0.0000	642.6032
Unmitigated	0.1571	1.2841	2.6306	7.8300e-003	0.4575	0.0198	0.4773	0.1229	0.0182	0.1411	0.0000	642.1752	642.1752	0.0204	0.0000	642.6032

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	49.76	0.00	0.00	1,203,197	1,203,197
Total	49.76	0.00	0.00	1,203,197	1,203,197

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	93.00	6.60	6.60	100.00	0.00	0.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.413014	0.062673	0.156172	0.176687	0.051255	0.007895	0.018867	0.100331	0.001803	0.001598	0.006448	0.000946	0.002310

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Unmitigated	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.0000e-005**	**0.0000**	**1.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Unmitigated	0.0000	0.0000	0.0000	0.0000
Mitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Johe's Ranch

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	20.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2035
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 20acre exposure at any one time

Construction Phase - 5 days each week and 10.5 hours/day

Off-road Equipment - Equipment owned by operator and use expectations filled in (10.5 hrs/day use for loaders and 1 hr/day max for off highway truck)

Trips and VMT - three workers each day taking 2 trips each for average 8.5 miles each day

Area Coating - no coatings

Vehicle Trips - Haul Trucks material movement to cement plants pre-determined

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	261.00
tblOffRoadEquipment	HorsePower	199.00	415.00
tblOffRoadEquipment	HorsePower	199.00	285.00
tblOffRoadEquipment	HorsePower	400.00	205.00
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Off-Highway Trucks
tblProjectCharacteristics	OperationalYear	2014	2035
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	8.50
tblTripsAndVMT	WorkerTripNumber	10.00	6.00
tblVehicleTrips	CW_TL	14.70	93.00
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	WD_TR	0.00	2.49

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2035	0.1518	0.3273	0.8605	4.0200e-003	4.9300e-003	0.0118	0.0167	1.3100e-003	0.0118	0.0131	0.0000	409.4395	409.4395	0.0123	0.0000	409.6975
Total	**0.1518**	**0.3273**	**0.8605**	**4.0200e-003**	**4.9300e-003**	**0.0118**	**0.0167**	**1.3100e-003**	**0.0118**	**0.0131**	**0.0000**	**409.4395**	**409.4395**	**0.0123**	**0.0000**	**409.6975**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2035	0.1518	1.0500e-003	0.8605	4.0200e-003	4.9300e-003	0.0118	0.0167	1.3100e-003	0.0118	0.0131	0.0000	409.4390	409.4390	0.0123	0.0000	409.6970
Total	**0.1518**	**1.0500e-003**	**0.8605**	**4.0200e-003**	**4.9300e-003**	**0.0118**	**0.0167**	**1.3100e-003**	**0.0118**	**0.0131**	**0.0000**	**409.4390**	**409.4390**	**0.0123**	**0.0000**	**409.6970**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**99.68**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0847	0.4574	1.2669	7.8800e-003	0.4578	0.0141	0.4718	0.1230	0.0130	0.1360	0.0000	546.2055	546.2055	0.0108	0.0000	546.4322
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0848**	**0.4574**	**1.2670**	**7.8800e-003**	**0.4578**	**0.0141**	**0.4718**	**0.1230**	**0.0130**	**0.1360**	**0.0000**	**546.2059**	**546.2059**	**0.0108**	**0.0000**	**546.4325**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0847	0.4574	1.2669	7.8800e-003	0.4578	0.0141	0.4718	0.1230	0.0130	0.1360	0.0000	546.2055	546.2055	0.0108	0.0000	546.4322
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0848**	**0.4574**	**1.2670**	**7.8800e-003**	**0.4578**	**0.0141**	**0.4718**	**0.1230**	**0.0130**	**0.1360**	**0.0000**	**546.2059**	**546.2059**	**0.0108**	**0.0000**	**546.4325**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mining	Grading	1/1/2035	12/31/2035	5	261	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Mining	Rubber Tired Loaders	1	10.50	415	0.36
Mining	Rubber Tired Loaders	1	10.50	285	0.36
Mining	Off-Highway Trucks	1	1.00	205	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mining	4	6.00	0.00	0.00	8.50	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Mining - 2035

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1508	0.3262	0.8495	3.9600e-003		0.0118	0.0118		0.0118	0.0118	0.0000	406.0454	406.0454	0.0122	0.0000	406.3009
Total	**0.1508**	**0.3262**	**0.8495**	**3.9600e-003**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**406.0454**	**406.0454**	**0.0122**	**0.0000**	**406.3009**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4000e-004	1.0500e-003	0.0110	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	3.3941	3.3941	1.2000e-004	0.0000	3.3966
Total	**9.4000e-004**	**1.0500e-003**	**0.0110**	**6.0000e-005**	**4.9300e-003**	**4.0000e-005**	**4.9700e-003**	**1.3100e-003**	**4.0000e-005**	**1.3500e-003**	**0.0000**	**3.3941**	**3.3941**	**1.2000e-004**	**0.0000**	**3.3966**

3.2 Mining - 2035

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1508		0.8495	3.9600e-003		0.0118	0.0118		0.0118	0.0118	0.0000	406.0449	406.0449	0.0122	0.0000	406.3004
Total	**0.1508**		**0.8495**	**3.9600e-003**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**0.0118**	**0.0118**	**0.0000**	**406.0449**	**406.0449**	**0.0122**	**0.0000**	**406.3004**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4000e-004	1.0500e-003	0.0110	6.0000e-005	4.9300e-003	4.0000e-005	4.9700e-003	1.3100e-003	4.0000e-005	1.3500e-003	0.0000	3.3941	3.3941	1.2000e-004	0.0000	3.3966
Total	**9.4000e-004**	**1.0500e-003**	**0.0110**	**6.0000e-005**	**4.9300e-003**	**4.0000e-005**	**4.9700e-003**	**1.3100e-003**	**4.0000e-005**	**1.3500e-003**	**0.0000**	**3.3941**	**3.3941**	**1.2000e-004**	**0.0000**	**3.3966**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0847	0.4574	1.2669	7.8800e-003	0.4578	0.0141	0.4718	0.1230	0.0130	0.1360	0.0000	546.2055	546.2055	0.0108	0.0000	546.4322
Unmitigated	0.0847	0.4574	1.2669	7.8800e-003	0.4578	0.0141	0.4718	0.1230	0.0130	0.1360	0.0000	546.2055	546.2055	0.0108	0.0000	546.4322

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	49.76	0.00	0.00	1,203,197	1,203,197
Total	49.76	0.00	0.00	1,203,197	1,203,197

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	93.00	6.60	6.60	100.00	0.00	0.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.412644	0.063380	0.154149	0.172864	0.050991	0.007853	0.020339	0.104512	0.001773	0.001608	0.006849	0.000757	0.002282

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Unmitigated	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.8000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.8000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

East Pit

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	20.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2016
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - 5 days each week

Off-road Equipment - Owned equipment of operator

Trips and VMT - Worker trips: 3 workers round trip 4.5 miles each way

Vehicle Trips - Haul trucks miles traveled annually for 400k tons/yr material hauling

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	261.00
tblConstructionPhase	PhaseEndDate	12/30/2016	12/31/2016
tblOffRoadEquipment	HorsePower	400.00	205.00
tblOffRoadEquipment	HorsePower	199.00	285.00
tblOffRoadEquipment	HorsePower	199.00	415.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Mining
tblOffRoadEquipment	PhaseName		Mining
tblOffRoadEquipment	PhaseName		Mining
tblProjectCharacteristics	OperationalYear	2014	2016
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripLength	16.80	4.50
tblTripsAndVMT	WorkerTripNumber	8.00	6.00
tblVehicleTrips	CW_TL	14.70	89.00
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	WD_TR	0.00	1.72

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3102	3.6327	1.7007	3.8100e-003	2.6100e-003	0.1370	0.1396	7.0000e-004	0.1260	0.1267	0.0000	358.2490	358.2490	0.1075	0.0000	360.5058
Total	**0.3102**	**3.6327**	**1.7007**	**3.8100e-003**	**2.6100e-003**	**0.1370**	**0.1396**	**7.0000e-004**	**0.1260**	**0.1267**	**0.0000**	**358.2490**	**358.2490**	**0.1075**	**0.0000**	**360.5058**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.3102	3.6327	1.7007	3.8100e-003	2.6100e-003	0.1370	0.1396	7.0000e-004	0.1260	0.1267	0.0000	358.2485	358.2485	0.1075	0.0000	360.5054
Total	**0.3102**	**3.6327**	**1.7007**	**3.8100e-003**	**2.6100e-003**	**0.1370**	**0.1396**	**7.0000e-004**	**0.1260**	**0.1267**	**0.0000**	**358.2485**	**358.2485**	**0.1075**	**0.0000**	**360.5054**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1043	0.8479	1.7416	5.1700e-003	0.3019	0.0131	0.3149	0.0811	0.0120	0.0931	0.0000	423.7969	423.7969	0.0135	0.0000	424.0795
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1044**	**0.8479**	**1.7418**	**5.1700e-003**	**0.3019**	**0.0131**	**0.3149**	**0.0811**	**0.0120**	**0.0931**	**0.0000**	**423.7972**	**423.7972**	**0.0135**	**0.0000**	**424.0798**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1043	0.8479	1.7416	5.1700e-003	0.3019	0.0131	0.3149	0.0811	0.0120	0.0931	0.0000	423.7969	423.7969	0.0135	0.0000	424.0795
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1044**	**0.8479**	**1.7418**	**5.1700e-003**	**0.3019**	**0.0131**	**0.3149**	**0.0811**	**0.0120**	**0.0931**	**0.0000**	**423.7972**	**423.7972**	**0.0135**	**0.0000**	**424.0798**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mining	Grading	1/1/2016	12/31/2016	5	261	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Mining	Off-Highway Trucks	1	1.00	205	0.38
Mining	Rubber Tired Loaders	1	10.50	285	0.36
Mining	Rubber Tired Loaders	1	10.50	415	0.36

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mining	3	6.00	0.00	0.00	4.50	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Mining - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3077	3.6309	1.6814	3.7800e-003		0.1370	0.1370		0.1260	0.1260	0.0000	355.8172	355.8172	0.1073	0.0000	358.0710
Total	**0.3077**	**3.6309**	**1.6814**	**3.7800e-003**	**0.0000**	**0.1370**	**0.1370**	**0.0000**	**0.1260**	**0.1260**	**0.0000**	**355.8172**	**355.8172**	**0.1073**	**0.0000**	**358.0710**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4900e-003	1.8300e-003	0.0193	3.0000e-005	2.6100e-003	2.0000e-005	2.6400e-003	7.0000e-004	2.0000e-005	7.2000e-004	0.0000	2.4318	2.4318	1.4000e-004	0.0000	2.4348
Total	**2.4900e-003**	**1.8300e-003**	**0.0193**	**3.0000e-005**	**2.6100e-003**	**2.0000e-005**	**2.6400e-003**	**7.0000e-004**	**2.0000e-005**	**7.2000e-004**	**0.0000**	**2.4318**	**2.4318**	**1.4000e-004**	**0.0000**	**2.4348**

3.2 Mining - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3077	3.6309	1.6814	3.7800e-003		0.1370	0.1370		0.1260	0.1260	0.0000	355.8167	355.8167	0.1073	0.0000	358.0706
Total	**0.3077**	**3.6309**	**1.6814**	**3.7800e-003**	**0.0000**	**0.1370**	**0.1370**	**0.0000**	**0.1260**	**0.1260**	**0.0000**	**355.8167**	**355.8167**	**0.1073**	**0.0000**	**358.0706**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4900e-003	1.8300e-003	0.0193	3.0000e-005	2.6100e-003	2.0000e-005	2.6400e-003	7.0000e-004	2.0000e-005	7.2000e-004	0.0000	2.4318	2.4318	1.4000e-004	0.0000	2.4348
Total	**2.4900e-003**	**1.8300e-003**	**0.0193**	**3.0000e-005**	**2.6100e-003**	**2.0000e-005**	**2.6400e-003**	**7.0000e-004**	**2.0000e-005**	**7.2000e-004**	**0.0000**	**2.4318**	**2.4318**	**1.4000e-004**	**0.0000**	**2.4348**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1043	0.8479	1.7416	5.1700e-003	0.3019	0.0131	0.3149	0.0811	0.0120	0.0931	0.0000	423.7969	423.7969	0.0135	0.0000	424.0795
Unmitigated	0.1043	0.8479	1.7416	5.1700e-003	0.3019	0.0131	0.3149	0.0811	0.0120	0.0931	0.0000	423.7969	423.7969	0.0135	0.0000	424.0795

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	34.31	0.00	0.00	793,933	793,933
Total	34.31	0.00	0.00	793,933	793,933

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	89.00	6.60	6.60	100.00	0.00	0.00	100	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.413014	0.062673	0.156172	0.176687	0.051255	0.007895	0.018867	0.100331	0.001803	0.001598	0.006448	0.000946	0.002310

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Unmitigated	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.6000e-004	3.6000e-004	0.0000	0.0000	3.8000e-004
Total	**2.0000e-005**	**0.0000**	**1.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**0.0000**	**3.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

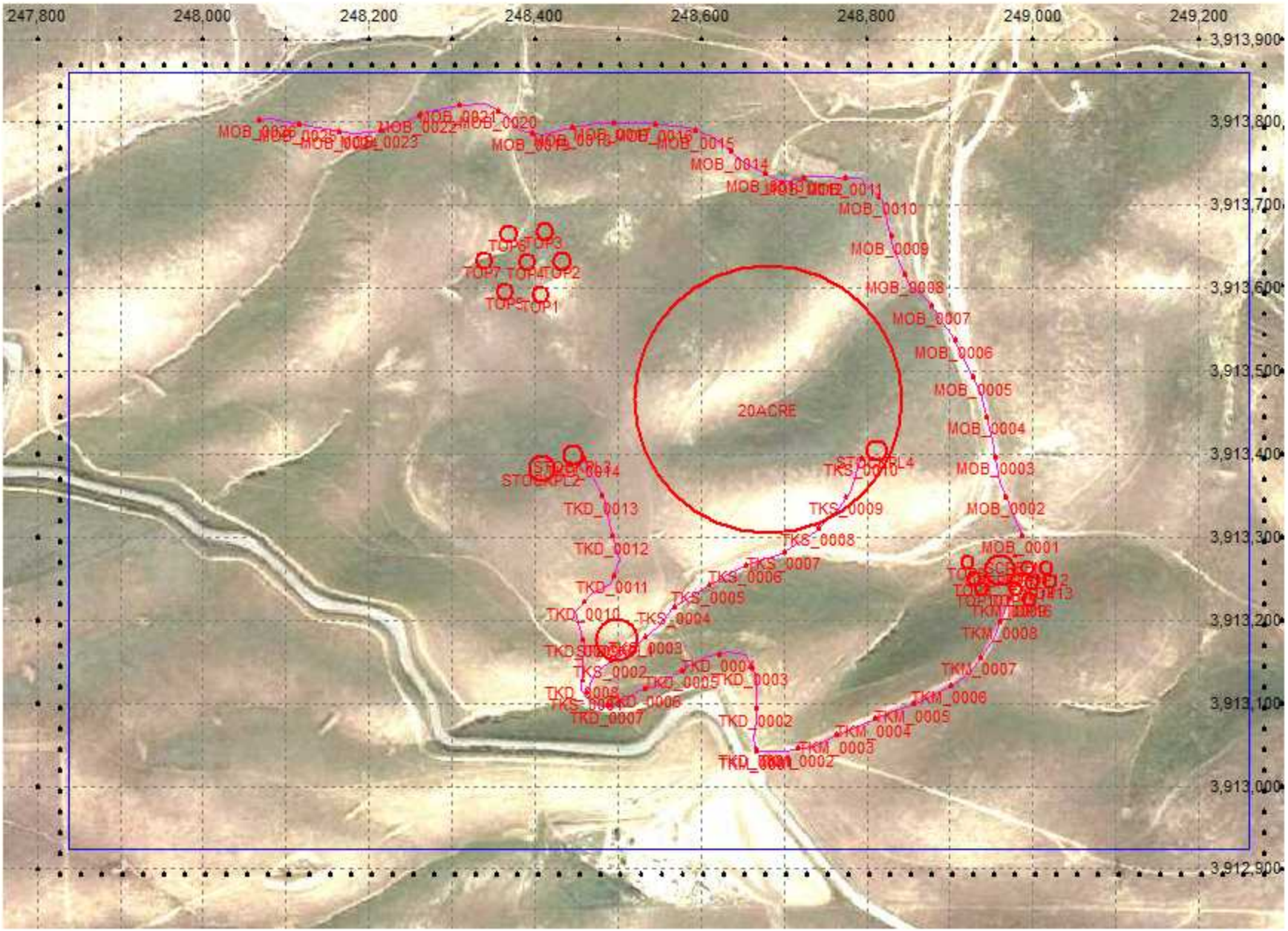
Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix IV
Aermod Scenario 1
Mine Area #1

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Johe's Ranch Mine



Johes Ranch

Scale: 1" = 171.8 Meters

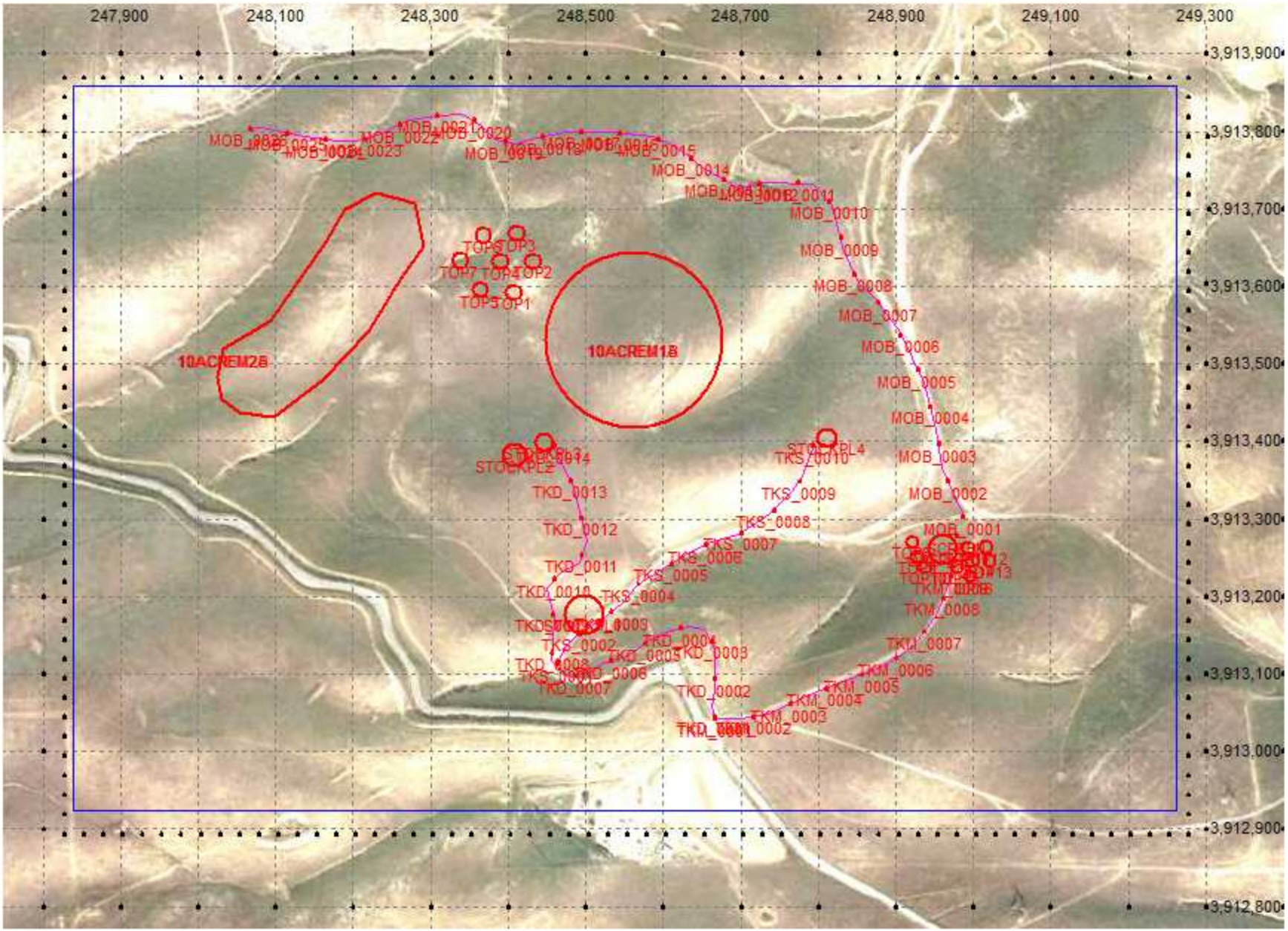
Scenario #1 (20 Acres Exposed in Mine Area #1)

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Appendix V
Aermod Scenario 2
Mine Area #2 & #1

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Johe's Ranch Mine



Johes Ranch

Scale: 1" = 183.9 Meters

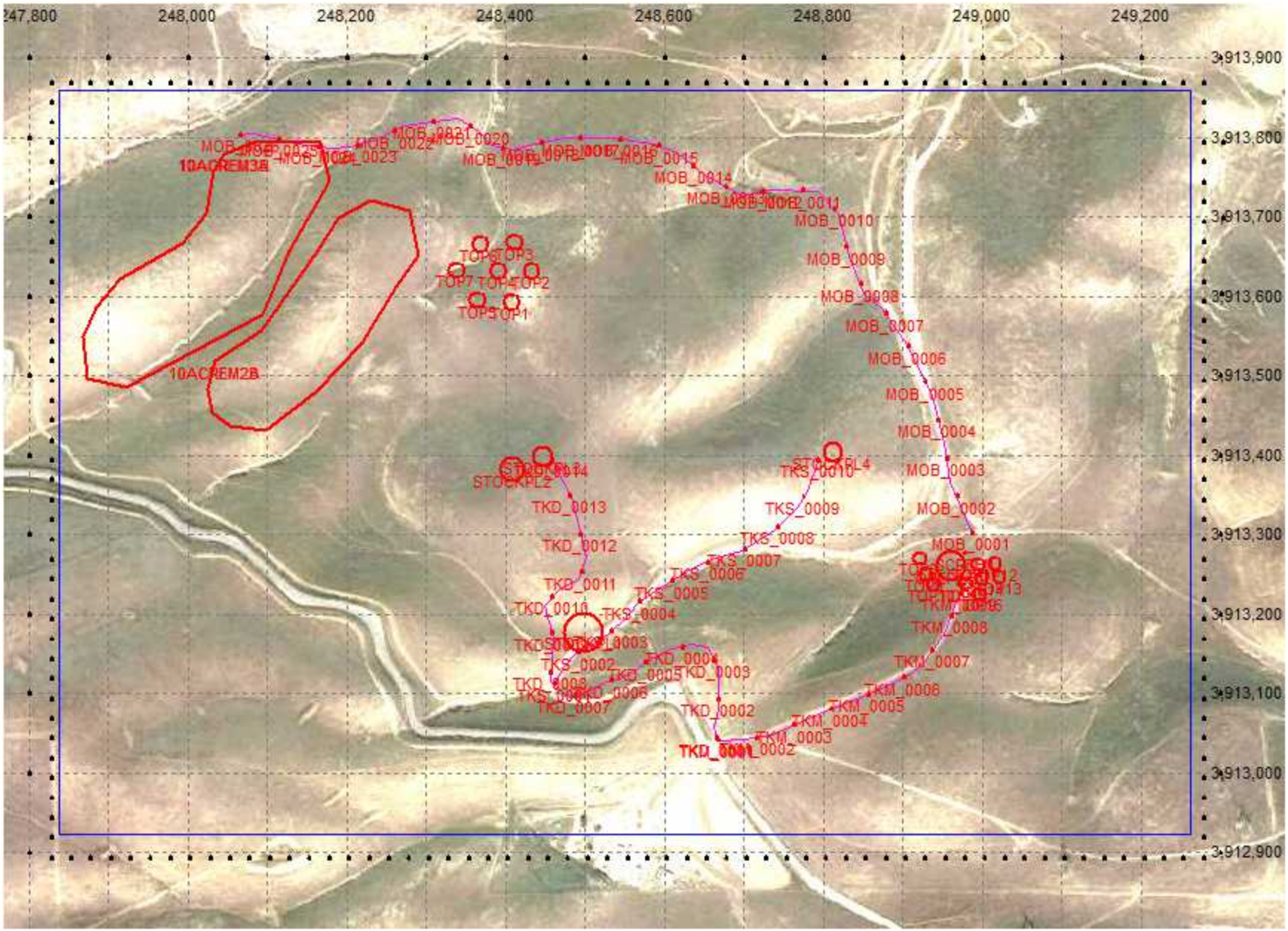
Scenario #2 (10 Acres Mine #1 & 10 Acres Mine #2 Exposed)

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Appendix VI
Aermod Scenario 3
Mine Area #3 & #2

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Johe's Ranch Mine



Johes Ranch

Scale: 1" = 179.4 Meters

Scenario #3 (10 Acres Mine #2 & 10 Acres Mine #3 Exposed)

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Appendix VII
Criteria Pollutant Modeling Results

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	Mine 1				
	μg/m^3				
	1-hr	3-hr	8-hr	24-hr	Annual
NOX	130.58				1.98
SOX	0.27	0.11		0.02	0.01
CO	64.38		18.90		
PM-10				25.35	4.11
PM-2.5				4.02	0.46

Mine-1						
	μg/m^3	1-HR	3-HR	8-HR	24-HR	ANNUAL
NOX	2009	124.845				1.825
NOX	2010	122.965				1.906
NOX	2011	136.2				2.08
NOX	2012	144.0208				2.0482
NOX	2013	124.845				2.0587
SOX	2009	0.30296	0.11469		0.02244	0.0027
SOX	2010	0.31269	0.11868		0.0026	0.02059
SOX	2011	0.24062	0.09438		0.01722	0.00308
SOX	2012	0.23482	0.10799		0.02058	0.00272
SOX	2013	0.25256	0.1028		0.02014	0.00291
PM10	2009				22.465	3.873
PM10	2010				30.4196	4.08
PM10	2011				18.213	4.06
PM10	2012				28.977	4.29
PM10	2013				26.678	4.25
PM2.5	2009				4.33	0.48
PM2.5	2010				4.45	0.4808
PM2.5	2011				3.022	0.462
PM2.5	2012				4.7146	0.4583
PM2.5	2013				3.58	0.4346
CO	2009	67.70528		17.34535		
CO	2010	68.31429		18.09413		
CO	2011	57.6531		15.09174		
CO	2012	69.74341		25.42813		
CO	2013	58.46354		18.52571		

	Mine 2 and Mine 1				
	μg/m^3				
	1-hr	3-hr	8-hr	24-hr	Annual
NOX	122.47				3.84
SOX	0.277	0.10		2.18E-02	4.03E-03
CO	56.71		19.74		
PM-10				31.90	5.07
PM-2.5				5.09	0.81

Mine-2 and Mine-1						
		1-HR	3-HR	8-HR	24-HR	ANNUAL
NOX	2009	115.95				3.737
NOX	2010	121.48				3.57
NOX	2011	129.34				4.09
NOX	2012	125.97				3.82
NOX	2013	119.62				3.96
SOX	2009	0.315	0.1087		0.0258	0.00393
SOX	2010	0.328	0.12		0.0207	0.00376
SOX	2011	0.252	0.1006		0.0219	0.0043
SOX	2012	0.234	0.1017		0.018	0.00402
SOX	2013	0.255	0.0859		0.0226	0.00416
PM10	2009				37.0368	4.8844
PM10	2010				36.42735	4.68496
PM10	2011				27.31054	5.44838
PM10	2012				23.9532	5.0706
PM10	2013				34.789	5.2487
PM2.5	2009				5.967	0.7767
PM2.5	2010				5.5966	0.7458
PM2.5	2011				4.408	0.869
PM2.5	2012				3.903	0.8074
PM2.5	2013				5.582	0.832
CO	2009	53.68		20.28		
CO	2010	56.25		18.71		
CO	2011	59.89		20.36		
CO	2012	58.33		19.9		
CO	2013	55.39		19.44		

	Mine 3 and Mine 2				
	μg/m^3				
	1-hr	3-hr	8-hr	24-hr	Annual
NOX	123.0614				3.2616
SOX	0.22324	0.09208		0.01921	0.003552
CO	58.6342		17.9272		
PM-10				37.75996	5.81832
PM-2.5				5.844	0.916

Mine 3 and Mine 2						
	μg/m^3	1-HR	3-HR	8-HR	24-HR	ANNUAL
NOX	2009	119.5				3.211
NOX	2010	121.69				3.05
NOX	2011	123.912				3.365
NOX	2012	118.255				3.25
NOX	2013	131.95				3.432
SOX	2009	0.231	0.1024		0.0195	0.0035
SOX	2010	0.238	0.1155		0.0199	0.0033
SOX	2011	0.193	0.071		0.01725	0.0037
SOX	2012	0.225	0.0935		0.0171	0.00353
SOX	2013	0.2292	0.078		0.0223	0.00373
PM10	2009				38.0379	5.7158
PM10	2010				46.9508	5.3918
PM10	2011				32.2614	5.938
PM10	2012				32.97718	5.84
PM10	2013				38.5725	6.206
PM2.5	2009				5.99	0.9
PM2.5	2010				6.89	0.851
PM2.5	2011				5.09	0.935
PM2.5	2012				5.09	0.919
PM2.5	2013				6.16	0.975
CO	2009	56.941		17.721		
CO	2010	57.977		16.182		
CO	2011	59.038		17.37		
CO	2012	56.34		17.716		
CO	2013	62.875		20.647		

	Johe's Ranch Average				
	μg/m^3				
	1-hr	3-hr	8-hr	24-hr	Annual
NOX	125.37				3.03
SOX	0.26	0.10		0.02	0.00
CO	59.91		18.85		
PM-10				31.67	5.00
PM-2.5				4.98	0.73

	Standard				
	μg/m^3				
	1-hr	3-hr	8-hr	24-hr	Annual
NOX	188				57
SOX	196	1300		105	
CO	23000		10000		
PM-10				50	20
PM-2.5				35	12

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        08:42:37

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  NOX

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2009_NOX.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2009_NOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        08:42:37

                            PAGE   2
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  *** METEOROLOGICAL DAYS SELECTED FOR
PROCESSING ***
                                                                   (1=YES; 0=NO)

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1 1 1 1   1 1 1 1 1 1 1 1 1 1
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                NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS
INCLUDED IN THE DATA FILE.



                                        *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED
CATEGORIES ***
                                                                (METERS/SEC)

                                                        1.54,   3.09,   5.14,   8.23,  10.80,
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        08:42:37

                            PAGE   3
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA
***

   Surface file:   23155_09.SFC
           Met Version:  14134
   Profile file:   23155_09.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                  Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                  Year:   2009                                     Year:   2009

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
 09 01 01   1 01   -1.9  0.049 -9.000 -9.000 -999.   26.      5.5  0.02   0.99   1.00
```

```
1.55  338.   10.0  278.1    2.0
 09 01 01   1 02   -3.8  0.069 -9.000 -9.000 -999.   43.      7.7  0.02   0.99   1.00
2.20  300.   10.0  278.1    2.0
 09 01 01   1 03   -2.7  0.058 -9.000 -9.000 -999.   33.      6.5  0.02   0.99   1.00
1.81  242.   10.0  278.1    2.0
 09 01 01   1 04   -5.8  0.102 -9.000 -9.000 -999.   78.     16.3  0.04   0.99   1.00
2.20  175.   10.0  278.1    2.0
 09 01 01   1 05   -2.2  0.054 -9.000 -9.000 -999.   30.      6.4  0.04   0.99   1.00
1.50  164.   10.0  278.1    2.0
 09 01 01   1 06   -0.7  0.031 -9.000 -9.000 -999.   13.      3.6  0.03   0.99   1.00
0.92   74.   10.0  278.1    2.0
 09 01 01   1 07   -1.3  0.041 -9.000 -9.000 -999.   20.      4.8  0.03   0.99   1.00
1.20   95.   10.0  278.1    2.0
 09 01 01   1 08   -0.9  0.035 -9.000 -9.000 -999.   16.      4.2  0.03   0.99   0.61
1.04  114.   10.0  277.5    2.0
 09 01 01   1 09   -0.3  0.071 -9.000 -9.000 -999.   45.     97.2  0.05   0.99   0.35
1.04  148.   10.0  277.5    2.0
 09 01 01   1 10   11.1  0.066  0.338  0.014  125.   41.     -2.3  0.02   0.99   0.26
0.70   33.   10.0  278.1    2.0
 09 01 01   1 11   19.5  0.106  0.482  0.015  206.   82.     -5.4  0.02   0.99   0.23
1.28  346.   10.0  278.1    2.0
 09 01 01   1 12   23.9  0.094  0.567  0.015  274.   69.     -3.1  0.02   0.99   0.22
1.06  256.   10.0  278.8    2.0
 09 01 01   1 13   23.8  0.115  0.602  0.015  327.   94.     -5.7  0.02   0.99   0.22
1.36  224.   10.0  278.8    2.0
 09 01 01   1 14   19.4  0.111  0.583  0.016  365.   89.     -6.3  0.02   0.99   0.23
1.33  219.   10.0  278.1    2.0
 09 01 01   1 15   11.0  0.147  0.492  0.016  385.  136.    -25.9  0.03   0.99   0.26
1.93  209.   10.0  278.8    2.0
 09 01 01   1 16   -0.9  0.169 -9.000 -9.000 -999.  166.    501.3  0.03   0.99   0.35
2.54  204.   10.0  278.1    2.0
 09 01 01   1 17   -2.6  0.059 -9.000 -9.000 -999.   45.      7.0  0.03   0.99   0.61
1.74  189.   10.0  278.1    2.0
 09 01 01   1 18   -2.3  0.055 -9.000 -9.000 -999.   31.      6.3  0.03   0.99   1.00
1.62  198.   10.0  278.1    2.0
 09 01 01   1 19   -0.8  0.032 -9.000 -9.000 -999.   14.      3.7  0.02   0.99   1.00
0.99  223.   10.0  278.1    2.0
 09 01 01   1 20   -3.3  0.065 -9.000 -9.000 -999.   40.      7.4  0.02   0.99   1.00
1.99  219.   10.0  277.5    2.0
 09 01 01   1 21   -2.8  0.060 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.79  206.   10.0  277.5    2.0
 09 01 01   1 22   -3.9  0.071 -9.000 -9.000 -999.   45.      8.2  0.03   0.99   1.00
2.10  192.   10.0  277.5    2.0
 09 01 01   1 23   -2.9  0.061 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.81  188.   10.0  277.0    2.0
 09 01 01   1 24   -1.0  0.035 -9.000 -9.000 -999.   16.      4.0  0.02   0.99   1.00
1.08  238.   10.0  277.0    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1  338.    1.55   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        08:42:37

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF NOX      IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	1.82535 AT	(247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.82002 AT	(248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.79269 AT	(248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.78648 AT	(248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.78234 AT	(248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.75868 AT	(247828.00, 3913794.00, 761.90, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.75632 AT	(248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.74841 AT	(248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.74746 AT	(248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.72744 AT	(248878.00, 3912894.00, 759.11, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 08:42:37

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	124.84508	ON 09101102:	AT (248828.00, 3913869.00, 648.40, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	115.75289	ON 09012920:	AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	HIGH 3RD HIGH VALUE IS	110.78642	ON 09121920:	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	HIGH 4TH HIGH VALUE IS	101.89424	ON 09041906:	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	HIGH 5TH HIGH VALUE IS	99.29235	ON 09052621:	AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	HIGH 6TH HIGH VALUE IS	94.75511	ON 09052621:	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	HIGH 7TH HIGH VALUE IS	90.71765	ON 09021105:	AT (248603.00, 3913869.00, 688.47, 1321.50, 0.00)	DC	
	HIGH 8TH HIGH VALUE IS	87.12857	ON 09101001:	AT (248903.00, 3912894.00, 758.84, 1321.50, 0.00)	DC	

HIGH 9TH HIGH VALUE IS 86.18748 ON 09092022: AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
HIGH 10TH HIGH VALUE IS 84.25411 ON 09011419: AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 08:42:37

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 842 Informational Message(s)

A Total of 8760 Hours Were Processed

A Total of 610 Calm Hours Identified

A Total of 232 Missing Hours Identified (2.65 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 996 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used 0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:53:41

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                         ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM10

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2009_PM10.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2009_PM10.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:53:41

                            PAGE   2
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              *** METEOROLOGICAL DAYS SELECTED FOR
PROCESSING ***
                                                                 (1=YES; 0=NO)

            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1

                NOTE:  METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS
INCLUDED IN THE DATA FILE.


                                  *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED
CATEGORIES ***
                                                              (METERS/SEC)

                                                       1.54,    3.09,    5.14,    8.23,  10.80,
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:53:41

                            PAGE   3
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                    *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA
***

   Surface file:   23155_09.SFC
           Met Version:  14134
   Profile file:   23155_09.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                Year:   2009                                     Year:   2009

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - -
 09 01 01   1 01   -1.9  0.049 -9.000 -9.000 -999.   26.      5.5  0.02   0.99   1.00
```

```
1.55  338.   10.0  278.1    2.0
 09 01 01   1 02   -3.8  0.069 -9.000 -9.000 -999.   43.      7.7  0.02   0.99   1.00
2.20  300.   10.0  278.1    2.0
 09 01 01   1 03   -2.7  0.058 -9.000 -9.000 -999.   33.      6.5  0.02   0.99   1.00
1.81  242.   10.0  278.1    2.0
 09 01 01   1 04   -5.8  0.102 -9.000 -9.000 -999.   78.     16.3  0.04   0.99   1.00
2.20  175.   10.0  278.1    2.0
 09 01 01   1 05   -2.2  0.054 -9.000 -9.000 -999.   30.      6.4  0.04   0.99   1.00
1.50  164.   10.0  278.1    2.0
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0.92   74.   10.0  278.1    2.0
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1.20   95.   10.0  278.1    2.0
 09 01 01   1 08   -0.9  0.035 -9.000 -9.000 -999.   16.      4.2  0.03   0.99   0.61
1.04  114.   10.0  277.5    2.0
 09 01 01   1 09   -0.3  0.071 -9.000 -9.000 -999.   45.     97.2  0.05   0.99   0.35
1.04  148.   10.0  277.5    2.0
 09 01 01   1 10   11.1  0.066  0.338  0.014  125.   41.     -2.3  0.02   0.99   0.26
0.70   33.   10.0  278.1    2.0
 09 01 01   1 11   19.5  0.106  0.482  0.015  206.   82.     -5.4  0.02   0.99   0.23
1.28  346.   10.0  278.1    2.0
 09 01 01   1 12   23.9  0.094  0.567  0.015  274.   69.     -3.1  0.02   0.99   0.22
1.06  256.   10.0  278.8    2.0
 09 01 01   1 13   23.8  0.115  0.602  0.015  327.   94.     -5.7  0.02   0.99   0.22
1.36  224.   10.0  278.8    2.0
 09 01 01   1 14   19.4  0.111  0.583  0.016  365.   89.     -6.3  0.02   0.99   0.23
1.33  219.   10.0  278.1    2.0
 09 01 01   1 15   11.0  0.147  0.492  0.016  385.  136.    -25.9  0.03   0.99   0.26
1.93  209.   10.0  278.8    2.0
 09 01 01   1 16   -0.9  0.169 -9.000 -9.000 -999.  166.    501.3  0.03   0.99   0.35
2.54  204.   10.0  278.1    2.0
 09 01 01   1 17   -2.6  0.059 -9.000 -9.000 -999.   45.      7.0  0.03   0.99   0.61
1.74  189.   10.0  278.1    2.0
 09 01 01   1 18   -2.3  0.055 -9.000 -9.000 -999.   31.      6.3  0.03   0.99   1.00
1.62  198.   10.0  278.1    2.0
 09 01 01   1 19   -0.8  0.032 -9.000 -9.000 -999.   14.      3.7  0.02   0.99   1.00
0.99  223.   10.0  278.1    2.0
 09 01 01   1 20   -3.3  0.065 -9.000 -9.000 -999.   40.      7.4  0.02   0.99   1.00
1.99  219.   10.0  277.5    2.0
 09 01 01   1 21   -2.8  0.060 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.79  206.   10.0  277.5    2.0
 09 01 01   1 22   -3.9  0.071 -9.000 -9.000 -999.   45.      8.2  0.03   0.99   1.00
2.10  192.   10.0  277.5    2.0
 09 01 01   1 23   -2.9  0.061 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.81  188.   10.0  277.0    2.0
 09 01 01   1 24   -1.0  0.035 -9.000 -9.000 -999.   16.      4.0  0.02   0.99   1.00
1.08  238.   10.0  277.0    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1  338.    1.55   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:53:41

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV      NODRYDPLT NOWETDPLT

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                     ** CONC OF PM10     IN MICROGRAMS/M**3
        **
```

NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

ALL 1ST HIGHEST VALUE IS 3.87308 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 3.84034 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 3.83750 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 3.81685 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 3.77708 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 3.71514 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 3.70104 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 3.60190 AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 3.56822 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 3.46201 AT (248878.00, 3912894.00, 759.11, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 11:53:41

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

DATE
NETWORK
GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

ALL HIGH 1ST HIGH VALUE IS 22.46491m ON 09021024: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 2ND HIGH VALUE IS 19.26180 ON 09011724: AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00) DC
HIGH 3RD HIGH VALUE IS 16.67070c ON 09010624: AT (248553.00, 3913869.00, 689.20, 1321.50, 0.00) DC
HIGH 4TH HIGH VALUE IS 15.07639 ON 09032324: AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00) DC
HIGH 5TH HIGH VALUE IS 13.82482 ON 09021224: AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00) DC
HIGH 6TH HIGH VALUE IS 13.23563m ON 09020324: AT (248478.00, 3913869.00, 689.71, 1321.50, 0.00) DC
HIGH 7TH HIGH VALUE IS 12.88448b ON 09032024: AT (248428.00, 3913869.00, 678.70, 1321.50, 0.00) DC
HIGH 8TH HIGH VALUE IS 12.28231 ON 09121924: AT (248453.00, 3913869.00, 684.29, 1321.50, 0.00) DC

         HIGH   9TH HIGH VALUE IS   12.10905c ON 09041524: AT (248703.00,
3912894.00,   760.49, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   12.05316 ON 09050624: AT (248703.00,
3912894.00,   760.49, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/05/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   11:53:41

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   842 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   610 Calm Hours Identified

 A Total of   232 Missing Hours Identified (2.65 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   1056   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                         ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM2.5

 **Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check
available guidance.
   Model will process user-specified ranks of high 24-hour values averaged across the
number of years modeled, and
   the multi-year average of individual ANNUAL values, averaged across the number of years
modeled.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3
```

Johe-CRITERIA-20M1_2009_PM2.5
**Approximate Storage Requirements of Model = 3.7 MB of RAM.

**Input Runstream File: Johe-CRITERIA-20M1_(300K-YR)_2009_PM2.5.DTA

**Output Print File: Johe-CRITERIA-20M1_(300K-YR)_2009_PM2.5.LST

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/06/15
*** AERMET - VERSION 14134 *** *** *** 15:22:29

PAGE 2
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/06/15
*** AERMET - VERSION 14134 *** *** *** 15:22:29

PAGE 3
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_09.SFC
Met Version: 14134
Profile file: 23155_09.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2009 Year: 2009

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
09	01	01	1	01	-1.9	0.049	-9.000	-9.000	-999.	26.	5.5	0.02	0.99	1.00	1.55	338.	10.0	278.1	2.0
09	01	01	1	02	-3.8	0.069	-9.000	-9.000	-999.	43.	7.7	0.02	0.99	1.00	2.20	300.	10.0	278.1	2.0
09	01	01	1	03	-2.7	0.058	-9.000	-9.000	-999.	33.	6.5	0.02	0.99	1.00	1.81	242.	10.0	278.1	2.0
09	01	01	1	04	-5.8	0.102	-9.000	-9.000	-999.	78.	16.3	0.04	0.99	1.00	2.20	175.	10.0	278.1	2.0
09	01	01	1	05	-2.2	0.054	-9.000	-9.000	-999.	30.	6.4	0.04	0.99	1.00	1.50	164.	10.0	278.1	2.0
09	01	01	1	06	-0.7	0.031	-9.000	-9.000	-999.	13.	3.6	0.03	0.99	1.00	0.92	74.	10.0	278.1	2.0
09	01	01	1	07	-1.3	0.041	-9.000	-9.000	-999.	20.	4.8	0.03	0.99	1.00	1.20	95.	10.0	278.1	2.0
09	01	01	1	08	-0.9	0.035	-9.000	-9.000	-999.	16.	4.2	0.03	0.99	0.61	1.04	114.	10.0	277.5	2.0
09	01	01	1	09	-0.3	0.071	-9.000	-9.000	-999.	45.	97.2	0.05	0.99	0.35	1.04	148.	10.0	277.5	2.0
09	01	01	1	10	11.1	0.066	0.338	0.014	125.	41.	-2.3	0.02	0.99	0.26	0.70	33.	10.0	278.1	2.0
09	01	01	1	11	19.5	0.106	0.482	0.015	206.	82.	-5.4	0.02	0.99	0.23	1.28	346.	10.0	278.1	2.0
09	01	01	1	12	23.9	0.094	0.567	0.015	274.	69.	-3.1	0.02	0.99	0.22	1.06	256.	10.0	278.8	2.0
09	01	01	1	13	23.8	0.115	0.602	0.015	327.	94.	-5.7	0.02	0.99	0.22	1.36	224.	10.0	278.8	2.0
09	01	01	1	14	19.4	0.111	0.583	0.016	365.	89.	-6.3	0.02	0.99	0.23	1.33	219.	10.0	278.1	2.0
09	01	01	1	15	11.0	0.147	0.492	0.016	385.	136.	-25.9	0.03	0.99	0.26	1.93	209.	10.0	278.8	2.0
09	01	01	1	16	-0.9	0.169	-9.000	-9.000	-999.	166.	501.3	0.03	0.99	0.35	2.54	204.	10.0	278.1	2.0
09	01	01	1	17	-2.6	0.059	-9.000	-9.000	-999.	45.	7.0	0.03	0.99	0.61	1.74	189.	10.0	278.1	2.0
09	01	01	1	18	-2.3	0.055	-9.000	-9.000	-999.	31.	6.3	0.03	0.99	1.00	1.62	198.	10.0	278.1	2.0
09	01	01	1	19	-0.8	0.032	-9.000	-9.000	-999.	14.	3.7	0.02	0.99	1.00	0.99	223.	10.0	278.1	2.0
09	01	01	1	20	-3.3	0.065	-9.000	-9.000	-999.	40.	7.4	0.02	0.99	1.00	1.99	219.	10.0	277.5	2.0
09	01	01	1	21	-2.8	0.060	-9.000	-9.000	-999.	36.	7.0	0.03	0.99	1.00	1.79	206.	10.0	277.5	2.0
09	01	01	1	22	-3.9	0.071	-9.000	-9.000	-999.	45.	8.2	0.03	0.99	1.00	2.10	192.	10.0	277.5	2.0
09	01	01	1	23	-2.9	0.061	-9.000	-9.000	-999.	36.	7.0	0.03	0.99	1.00	1.81	188.	10.0	277.0	2.0
09	01	01	1	24	-1.0	0.035	-9.000	-9.000	-999.	16.	4.0	0.02	0.99	1.00	1.08	238.	10.0	277.0	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
09	01	01	01	10.0	1	338.	1.55	278.2	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/06/15
*** AERMET - VERSION 14134 *** ***
*** 15:22:29

PAGE 4

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER

1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	0.43464	AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.43109	AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.42811	AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.42497	AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.42071	AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.42017	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.41766	AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.41639	AT (248878.00, 3912894.00, 759.11, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.40965	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.40490	AT (248903.00, 3912894.00, 758.84, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/06/15
*** AERMET - VERSION 14134 *** ***
*** 15:22:29

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID	NETWORK	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	3.58022	AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	3.45740	AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.32189	AT (248753.00, 3913869.00, 653.88, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.26871	AT (248128.00, 3913869.00, 710.48, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.26702	AT (248153.00, 3913869.00, 712.09,		

1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   3.26383 AT (248778.00, 3913869.00,   651.26,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   3.22396 AT (248103.00, 3913869.00,   709.38,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   3.20097 AT (248728.00, 3913869.00,   656.12,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   3.19994 AT (248178.00, 3913869.00,   711.44,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   3.15279 AT (248078.00, 3913869.00,   708.07,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/06/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   15:22:29

                             PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                           *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED
OVER   1 YEARS ***

                                    ** CONC OF PM2.5   IN MICROGRAMS/M**3
         **

                NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - -

ALL   1ST HIGHEST VALUE IS   2.90842 AT (248828.00, 3912894.00,   759.89,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   2.82720 AT (247853.00, 3913869.00,   760.30,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   2.76551 AT (247828.00, 3913694.00,   762.96,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   2.68966 AT (248528.00, 3913869.00,   690.60,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   2.64986 AT (248503.00, 3913869.00,   691.51,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   2.63745 AT (247800.00, 3913700.00,   759.04,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   2.63311 AT (248578.00, 3913869.00,   689.32,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   2.58980 AT (248553.00, 3913869.00,   689.20,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   2.53057 AT (248203.00, 3913869.00,   709.39,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   2.52992 AT (248178.00, 3913869.00,   711.44,
1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/06/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   15:22:29

                             PAGE   7
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          842 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          610 Calm Hours Identified

 A Total of          232 Missing Hours Identified (  2.65 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1056       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        23:23:57

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  CO

 **Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                  m for Missing Hours
                                                                  b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2009_CO.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2009_CO.LST


 **File for Summary of Results:   h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air
Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
```

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
   Surface file:   23155_09.SFC
           Met Version:  14134
   Profile file:   23155_09.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                   Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                   Year:   2009                                     Year:   2009

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -
 09 01 01   1 01   -1.9  0.049 -9.000 -9.000 -999.   26.      5.5  0.02   0.99   1.00
1.55  338.   10.0  278.1    2.0
 09 01 01   1 02   -3.8  0.069 -9.000 -9.000 -999.   43.      7.7  0.02   0.99   1.00
```

```
2.20  300.   10.0  278.1    2.0
 09 01 01   1 03   -2.7  0.058 -9.000 -9.000 -999.   33.      6.5  0.02   0.99   1.00
1.81  242.   10.0  278.1    2.0
 09 01 01   1 04   -5.8  0.102 -9.000 -9.000 -999.   78.     16.3  0.04   0.99   1.00
2.20  175.   10.0  278.1    2.0
 09 01 01   1 05   -2.2  0.054 -9.000 -9.000 -999.   30.      6.4  0.04   0.99   1.00
1.50  164.   10.0  278.1    2.0
 09 01 01   1 06   -0.7  0.031 -9.000 -9.000 -999.   13.      3.6  0.03   0.99   1.00
0.92   74.   10.0  278.1    2.0
 09 01 01   1 07   -1.3  0.041 -9.000 -9.000 -999.   20.      4.8  0.03   0.99   1.00
1.20   95.   10.0  278.1    2.0
 09 01 01   1 08   -0.9  0.035 -9.000 -9.000 -999.   16.      4.2  0.03   0.99   0.61
1.04  114.   10.0  277.5    2.0
 09 01 01   1 09   -0.3  0.071 -9.000 -9.000 -999.   45.     97.2  0.05   0.99   0.35
1.04  148.   10.0  277.5    2.0
 09 01 01   1 10   11.1  0.066  0.338  0.014  125.   41.     -2.3  0.02   0.99   0.26
0.70   33.   10.0  278.1    2.0
 09 01 01   1 11   19.5  0.106  0.482  0.015  206.   82.     -5.4  0.02   0.99   0.23
1.28  346.   10.0  278.1    2.0
 09 01 01   1 12   23.9  0.094  0.567  0.015  274.   69.     -3.1  0.02   0.99   0.22
1.06  256.   10.0  278.8    2.0
 09 01 01   1 13   23.8  0.115  0.602  0.015  327.   94.     -5.7  0.02   0.99   0.22
1.36  224.   10.0  278.8    2.0
 09 01 01   1 14   19.4  0.111  0.583  0.016  365.   89.     -6.3  0.02   0.99   0.23
1.33  219.   10.0  278.1    2.0
 09 01 01   1 15   11.0  0.147  0.492  0.016  385.  136.    -25.9  0.03   0.99   0.26
1.93  209.   10.0  278.8    2.0
 09 01 01   1 16   -0.9  0.169 -9.000 -9.000 -999.  166.    501.3  0.03   0.99   0.35
2.54  204.   10.0  278.1    2.0
 09 01 01   1 17   -2.6  0.059 -9.000 -9.000 -999.   45.      7.0  0.03   0.99   0.61
1.74  189.   10.0  278.1    2.0
 09 01 01   1 18   -2.3  0.055 -9.000 -9.000 -999.   31.      6.3  0.03   0.99   1.00
1.62  198.   10.0  278.1    2.0
 09 01 01   1 19   -0.8  0.032 -9.000 -9.000 -999.   14.      3.7  0.02   0.99   1.00
0.99  223.   10.0  278.1    2.0
 09 01 01   1 20   -3.3  0.065 -9.000 -9.000 -999.   40.      7.4  0.02   0.99   1.00
1.99  219.   10.0  277.5    2.0
 09 01 01   1 21   -2.8  0.060 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.79  206.   10.0  277.5    2.0
 09 01 01   1 22   -3.9  0.071 -9.000 -9.000 -999.   45.      8.2  0.03   0.99   1.00
2.10  192.   10.0  277.5    2.0
 09 01 01   1 23   -2.9  0.061 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.81  188.   10.0  277.0    2.0
 09 01 01   1 24   -1.0  0.035 -9.000 -9.000 -999.   16.      4.0  0.02   0.99   1.00
1.08  238.   10.0  277.0    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1  338.    1.55   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         23:23:57

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF CO       IN MICROGRAMS/M**3
        **

                                                    DATE
                                    NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
```

```
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      67.70528  ON 09011009: AT (  248728.60,
3912913.00,   761.39,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      55.22168  ON 09011009: AT (  248654.60,
3912914.00,   763.53,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         23:23:57

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                       *** THE SUMMARY OF HIGHEST  8-HR RESULTS
***


                                           ** CONC OF CO       IN MICROGRAMS/M**3
         **

                                                                    DATE
                                   NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)              RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      17.34535  ON 09011608: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      17.09110  ON 09013108: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         23:23:57

                            PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of           0 Fatal Error Message(s)
 A Total of           1 Warning Message(s)
 A Total of         842 Informational Message(s)

 A Total of        8760 Hours Were Processed

 A Total of         610 Calm Hours Identified

 A Total of         232 Missing Hours Identified (  2.65 Percent)


    ******** FATAL ERROR MESSAGES ********
```

*** NONE ***

******** WARNING MESSAGES ********

ME W186 1006 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used 0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        16:50:09

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  SOX

 **Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                 ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2009_SOX.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2009_SOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 05/20/15
*** AERMET - VERSION 14134 ***   ***
*** 16:50:09

PAGE   2
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 05/20/15
*** AERMET - VERSION 14134 ***   ***
*** 16:50:09

PAGE   3
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_09.SFC
Met Version: 14134
Profile file: 23155_09.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2009   Year: 2009

First 24 hours of scalar data
YR MO DY JDY HR   H0   U*   W* DT/DZ ZICNV ZIMCH M-O LEN   Z0 BOWEN ALBEDO REF WS   WD   HT REF TA   HT
- -
09 01 01   1 01   -1.9 0.049 -9.000 -9.000 -999.   26.   5.5 0.02   0.99   1.00

```
1.55  338.   10.0  278.1    2.0
 09 01 01   1 02   -3.8  0.069 -9.000 -9.000 -999.   43.      7.7  0.02   0.99   1.00
2.20  300.   10.0  278.1    2.0
 09 01 01   1 03   -2.7  0.058 -9.000 -9.000 -999.   33.      6.5  0.02   0.99   1.00
1.81  242.   10.0  278.1    2.0
 09 01 01   1 04   -5.8  0.102 -9.000 -9.000 -999.   78.     16.3  0.04   0.99   1.00
2.20  175.   10.0  278.1    2.0
 09 01 01   1 05   -2.2  0.054 -9.000 -9.000 -999.   30.      6.4  0.04   0.99   1.00
1.50  164.   10.0  278.1    2.0
 09 01 01   1 06   -0.7  0.031 -9.000 -9.000 -999.   13.      3.6  0.03   0.99   1.00
0.92   74.   10.0  278.1    2.0
 09 01 01   1 07   -1.3  0.041 -9.000 -9.000 -999.   20.      4.8  0.03   0.99   1.00
1.20   95.   10.0  278.1    2.0
 09 01 01   1 08   -0.9  0.035 -9.000 -9.000 -999.   16.      4.2  0.03   0.99   0.61
1.04  114.   10.0  277.5    2.0
 09 01 01   1 09   -0.3  0.071 -9.000 -9.000 -999.   45.     97.2  0.05   0.99   0.35
1.04  148.   10.0  277.5    2.0
 09 01 01   1 10   11.1  0.066  0.338  0.014  125.   41.     -2.3  0.02   0.99   0.26
0.70   33.   10.0  278.1    2.0
 09 01 01   1 11   19.5  0.106  0.482  0.015  206.   82.     -5.4  0.02   0.99   0.23
1.28  346.   10.0  278.1    2.0
 09 01 01   1 12   23.9  0.094  0.567  0.015  274.   69.     -3.1  0.02   0.99   0.22
1.06  256.   10.0  278.8    2.0
 09 01 01   1 13   23.8  0.115  0.602  0.015  327.   94.     -5.7  0.02   0.99   0.22
1.36  224.   10.0  278.8    2.0
 09 01 01   1 14   19.4  0.111  0.583  0.016  365.   89.     -6.3  0.02   0.99   0.23
1.33  219.   10.0  278.1    2.0
 09 01 01   1 15   11.0  0.147  0.492  0.016  385.  136.    -25.9  0.03   0.99   0.26
1.93  209.   10.0  278.8    2.0
 09 01 01   1 16   -0.9  0.169 -9.000 -9.000 -999.  166.    501.3  0.03   0.99   0.35
2.54  204.   10.0  278.1    2.0
 09 01 01   1 17   -2.6  0.059 -9.000 -9.000 -999.   45.      7.0  0.03   0.99   0.61
1.74  189.   10.0  278.1    2.0
 09 01 01   1 18   -2.3  0.055 -9.000 -9.000 -999.   31.      6.3  0.03   0.99   1.00
1.62  198.   10.0  278.1    2.0
 09 01 01   1 19   -0.8  0.032 -9.000 -9.000 -999.   14.      3.7  0.02   0.99   1.00
0.99  223.   10.0  278.1    2.0
 09 01 01   1 20   -3.3  0.065 -9.000 -9.000 -999.   40.      7.4  0.02   0.99   1.00
1.99  219.   10.0  277.5    2.0
 09 01 01   1 21   -2.8  0.060 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.79  206.   10.0  277.5    2.0
 09 01 01   1 22   -3.9  0.071 -9.000 -9.000 -999.   45.      8.2  0.03   0.99   1.00
2.10  192.   10.0  277.5    2.0
 09 01 01   1 23   -2.9  0.061 -9.000 -9.000 -999.   36.      7.0  0.03   0.99   1.00
1.81  188.   10.0  277.0    2.0
 09 01 01   1 24   -1.0  0.035 -9.000 -9.000 -999.   16.      4.0  0.02   0.99   1.00
1.08  238.   10.0  277.0    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 09 01 01 01   10.0 1  338.    1.55   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         16:50:09

                               PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV       NODRYDPLT NOWETDPLT

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                     ** CONC OF SOX      IN MICROGRAMS/M**3
        **
```

```
                    NETWORK
GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       0.00270 AT (  247853.50,  3913706.50,   760.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.00247 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.00238 AT (  249251.10,  3913078.60,   708.98,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.00237 AT (  248605.20,  3912914.70,   764.55,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.00237 AT (  248629.90,  3912914.30,   764.03,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.00235 AT (  249251.60,  3913103.30,   700.52,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.00234 AT (  248654.60,  3912914.00,   763.53,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.00233 AT (  249252.20,  3913127.90,   694.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.00232 AT (  248600.00,  3912900.00,   764.08,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.00230 AT (  248679.30,  3912913.70,   762.89,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         16:50:09

                             PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                     ** CONC OF SOX      IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)              RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.30296  ON 09051801: AT (  249251.60,
3913103.30,   700.52,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.23130  ON 09051520: AT (  249251.60,
3913103.30,   700.52,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         16:50:09

                             PAGE   6
```

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.11469	ON 09072024:	AT (249254.50, 3913226.60, 684.80, 1321.50, 0.00)	DC
	HIGH 2ND HIGH VALUE IS	0.09935	ON 09051521:	AT (249251.60, 3913103.30, 700.52, 1321.50, 0.00)	DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   16:50:09

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.02244c	ON 09072024:	AT (249253.90, 3913201.90, 686.37, 1321.50, 0.00)	DC
	HIGH 2ND HIGH VALUE IS	0.01716b	ON 09013124:	AT (247853.50, 3913706.50, 760.35, 1321.50, 0.00)	DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   16:50:09

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          842 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          610 Calm Hours Identified

 A Total of          232 Missing Hours Identified (  2.65 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1006       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***       06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***       09:19:27

                           PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  NOX

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                              ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2010_NOX.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2010_NOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 09:19:27

PAGE 2
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 09:19:27

PAGE 3
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_10.SFC
Met Version: 14134
Profile file: 23155_10.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2010 Year: 2010

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -
 10 01 01   1 01 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
```

```
0.00    0.   10.0  278.8    2.0
 10 01 01   1 02 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 03 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 04   -8.1  0.088 -9.000 -9.000 -999.   63.      7.6  0.05   0.56   1.00
2.36  133.   10.0  279.2    2.0
 10 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  279.2    2.0
 10 01 01   1 06 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 07   -7.6  0.085 -9.000 -9.000 -999.   59.      7.1  0.04   0.56   1.00
2.36  155.   10.0  279.2    2.0
 10 01 01   1 08    1.4 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   0.61
0.00    0.   10.0  279.9    2.0
 10 01 01   1 09   10.4 -9.000 -9.000 -9.000   73. -999. -99999.0  0.03   0.56   0.35
0.00    0.   10.0  282.5    2.0
 10 01 01   1 10   44.8  0.150  0.625  0.008  195.  139.     -6.8  0.03   0.56   0.26
1.76  281.   10.0  285.4    2.0
 10 01 01   1 11   69.2  0.225  0.827  0.006  294.  257.    -14.9  0.03   0.56   0.23
2.86  274.   10.0  285.9    2.0
 10 01 01   1 12   81.4  0.226  0.985  0.005  422.  258.    -12.7  0.02   0.56   0.22
2.98  257.   10.0  285.4    2.0
 10 01 01   1 13   81.2  0.173  1.037  0.005  494.  173.     -5.7  0.03   0.56   0.22
1.99  270.   10.0  284.9    2.0
 10 01 01   1 14   69.0  0.218  1.039  0.005  585.  244.    -13.5  0.03   0.56   0.23
2.74  297.   10.0  285.9    2.0
 10 01 01   1 15   44.8  0.220  0.927  0.005  638.  248.    -21.5  0.02   0.56   0.26
3.10  308.   10.0  287.0    2.0
 10 01 01   1 16   10.7  0.182  0.578  0.005  649.  187.    -50.7  0.03   0.56   0.35
2.52  272.   10.0  286.4    2.0
 10 01 01   1 17   -3.7  0.059 -9.000 -9.000 -999.   50.      5.1  0.02   0.56   0.61
1.82  239.   10.0  285.4    2.0
 10 01 01   1 18   -5.2  0.070 -9.000 -9.000 -999.   45.      6.0  0.04   0.56   1.00
1.96  152.   10.0  284.2    2.0
 10 01 01   1 19   -4.5  0.066 -9.000 -9.000 -999.   41.      5.7  0.05   0.56   1.00
1.76  142.   10.0  283.8    2.0
 10 01 01   1 20   -2.9  0.051 -9.000 -9.000 -999.   28.      4.2  0.03   0.56   1.00
1.50   96.   10.0  281.4    2.0
 10 01 01   1 21  -14.8  0.131 -9.000 -9.000 -999.  114.     13.8  0.02   0.56   1.00
3.27   27.   10.0  282.0    2.0
 10 01 01   1 22  -14.4  0.128 -9.000 -9.000 -999.  110.     13.2  0.02   0.56   1.00
3.25   28.   10.0  282.0    2.0
 10 01 01   1 23   -9.7  0.093 -9.000 -9.000 -999.   69.      7.5  0.02   0.56   1.00
2.88   48.   10.0  282.0    2.0
 10 01 01   1 24   -7.1  0.124 -9.000 -9.000 -999.  105.     24.5  0.04   0.56   1.00
2.37  159.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01   10.0 1 -999.  -99.00   278.8   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        09:19:27

                             PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF NOX      IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	1.90593 AT	(248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	1.87911 AT	(248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.84743 AT	(248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.84337 AT	(248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.82994 AT	(248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.82958 AT	(248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.81772 AT	(248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.80142 AT	(248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.79896 AT	(248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.76625 AT	(248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 09:19:27

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC		DATE (YYMMDDHH)		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	122.96537	ON 10050204:	AT (	248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	117.99639	ON 10121007:	AT (	248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	HIGH 3RD HIGH VALUE IS	112.59806	ON 10111101:	AT (	248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	HIGH 4TH HIGH VALUE IS	102.83621	ON 10010620:	AT (	248653.00, 3913869.00, 676.56, 1321.50, 0.00)	DC	
	HIGH 5TH HIGH VALUE IS	98.93989	ON 10021607:	AT (	248678.00, 3913869.00, 666.82, 1321.50, 0.00)	DC	
	HIGH 6TH HIGH VALUE IS	95.96602	ON 10122822:	AT (	248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	HIGH 7TH HIGH VALUE IS	95.78171	ON 10102103:	AT (	248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	
	HIGH 8TH HIGH VALUE IS	94.62537	ON 10112202:	AT (	248578.00, 3912894.00, 764.35, 1321.50, 0.00)	DC	

         HIGH   9TH HIGH VALUE IS   94.48041 ON 10050124: AT (248578.00,
3912894.00,   764.35, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   91.91464 ON 10101106: AT (248578.00,
3912894.00,   764.35, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/05/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   09:19:27

                            PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   547 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   427 Calm Hours Identified

 A Total of   120 Missing Hours Identified (1.37 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   996   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        17:21:07

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM10

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2010_PM10.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2010_PM10.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/05/15
*** AERMET - VERSION 14134 *** *** *** 17:21:07

PAGE 2
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/05/15
*** AERMET - VERSION 14134 *** *** *** 17:21:07

PAGE 3
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_10.SFC
Met Version: 14134
Profile file: 23155_10.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2010 Year: 2010

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
 10 01 01   1 01 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
```

```
0.00    0.   10.0  278.8    2.0
 10 01 01   1 02 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 03 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 04   -8.1  0.088 -9.000 -9.000 -999.   63.      7.6  0.05   0.56   1.00
2.36  133.   10.0  279.2    2.0
 10 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  279.2    2.0
 10 01 01   1 06 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 07   -7.6  0.085 -9.000 -9.000 -999.   59.      7.1  0.04   0.56   1.00
2.36  155.   10.0  279.2    2.0
 10 01 01   1 08    1.4 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   0.61
0.00    0.   10.0  279.9    2.0
 10 01 01   1 09   10.4 -9.000 -9.000 -9.000   73. -999. -99999.0  0.03   0.56   0.35
0.00    0.   10.0  282.5    2.0
 10 01 01   1 10   44.8  0.150  0.625  0.008  195.  139.     -6.8  0.03   0.56   0.26
1.76  281.   10.0  285.4    2.0
 10 01 01   1 11   69.2  0.225  0.827  0.006  294.  257.    -14.9  0.03   0.56   0.23
2.86  274.   10.0  285.9    2.0
 10 01 01   1 12   81.4  0.226  0.985  0.005  422.  258.    -12.7  0.02   0.56   0.22
2.98  257.   10.0  285.4    2.0
 10 01 01   1 13   81.2  0.173  1.037  0.005  494.  173.     -5.7  0.03   0.56   0.22
1.99  270.   10.0  284.9    2.0
 10 01 01   1 14   69.0  0.218  1.039  0.005  585.  244.    -13.5  0.03   0.56   0.23
2.74  297.   10.0  285.9    2.0
 10 01 01   1 15   44.8  0.220  0.927  0.005  638.  248.    -21.5  0.02   0.56   0.26
3.10  308.   10.0  287.0    2.0
 10 01 01   1 16   10.7  0.182  0.578  0.005  649.  187.    -50.7  0.03   0.56   0.35
2.52  272.   10.0  286.4    2.0
 10 01 01   1 17   -3.7  0.059 -9.000 -9.000 -999.   50.      5.1  0.02   0.56   0.61
1.82  239.   10.0  285.4    2.0
 10 01 01   1 18   -5.2  0.070 -9.000 -9.000 -999.   45.      6.0  0.04   0.56   1.00
1.96  152.   10.0  284.2    2.0
 10 01 01   1 19   -4.5  0.066 -9.000 -9.000 -999.   41.      5.7  0.05   0.56   1.00
1.76  142.   10.0  283.8    2.0
 10 01 01   1 20   -2.9  0.051 -9.000 -9.000 -999.   28.      4.2  0.03   0.56   1.00
1.50   96.   10.0  281.4    2.0
 10 01 01   1 21  -14.8  0.131 -9.000 -9.000 -999.  114.     13.8  0.02   0.56   1.00
3.27   27.   10.0  282.0    2.0
 10 01 01   1 22  -14.4  0.128 -9.000 -9.000 -999.  110.     13.2  0.02   0.56   1.00
3.25   28.   10.0  282.0    2.0
 10 01 01   1 23   -9.7  0.093 -9.000 -9.000 -999.   69.      7.5  0.02   0.56   1.00
2.88   48.   10.0  282.0    2.0
 10 01 01   1 24   -7.1  0.124 -9.000 -9.000 -999.  105.     24.5  0.04   0.56   1.00
2.37  159.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01   10.0 1 -999.  -99.00   278.8   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        17:21:07

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV      NODRYDPLT NOWETDPLT

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                     ** CONC OF PM10     IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	4.08135 AT	(248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.06432 AT	(248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	3.98819 AT	(248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	3.97803 AT	(248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	3.92374 AT	(248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	3.84634 AT	(248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	3.82827 AT	(248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	3.69154 AT	(248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.68876 AT	(248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.53629 AT	(248603.00, 3912894.00, 763.73, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 17:21:07

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC		DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	30.41960b	ON 10120224:	AT (248178.00, 3913869.00, 711.44, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	26.61240	ON 10021824:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	HIGH 3RD HIGH VALUE IS	22.28985c	ON 10011724:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	HIGH 4TH HIGH VALUE IS	22.25606c	ON 10010824:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	HIGH 5TH HIGH VALUE IS	18.82469b	ON 10030624:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	HIGH 6TH HIGH VALUE IS	18.46637	ON 10122824:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	HIGH 7TH HIGH VALUE IS	17.47983	ON 10012924:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	HIGH 8TH HIGH VALUE IS	14.25246b	ON 10050624:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	

         HIGH   9TH HIGH VALUE IS   13.67984 ON 10123024: AT (248628.00,
3912894.00,   763.08, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   12.45159c ON 10121024: AT (248653.00,
3912894.00,   762.44, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/05/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   17:21:07

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   547 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   427 Calm Hours Identified

 A Total of   120 Missing Hours Identified (1.37 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   1056   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM2.5

 **Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check
available guidance.
   Model will process user-specified ranks of high 24-hour values averaged across the
number of years modeled, and
   the multi-year average of individual ANNUAL values, averaged across the number of years
modeled.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3
```

 **Approximate Storage Requirements of Model =   3.7 MB of RAM.

 **Input Runstream File: Johe-CRITERIA-20M1_(300K-YR)_2010_PM2.5.DTA

 **Output Print File: Johe-CRITERIA-20M1_(300K-YR)_2010_PM2.5.LST

 **File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                          *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                                  (1=YES; 0=NO)

            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
              1 1 1 1 1 1 1 1 1   1 1 1 1 1 1

                NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

                                          *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                                  (METERS/SEC)

                                                    1.54,   3.09,   5.14,   8.23, 10.80,

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                            *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file: 23155_10.SFC
          Met Version: 14134
   Profile file: 23155_10.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:   23155   Upper air station no.:   23230
                  Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
                  Year: 2010   Year: 2010

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
10	01	01	1	01	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.03	0.56	1.00	0.00	0.	10.0	278.8	2.0
10	01	01	1	02	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.03	0.56	1.00	0.00	0.	10.0	278.8	2.0
10	01	01	1	03	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.03	0.56	1.00	0.00	0.	10.0	278.8	2.0
10	01	01	1	04	-8.1	0.088	-9.000	-9.000	-999.	63.	7.6	0.05	0.56	1.00	2.36	133.	10.0	279.2	2.0
10	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.03	0.56	1.00	0.00	0.	10.0	279.2	2.0
10	01	01	1	06	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.03	0.56	1.00	0.00	0.	10.0	278.8	2.0
10	01	01	1	07	-7.6	0.085	-9.000	-9.000	-999.	59.	7.1	0.04	0.56	1.00	2.36	155.	10.0	279.2	2.0
10	01	01	1	08	1.4	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.03	0.56	0.61	0.00	0.	10.0	279.9	2.0
10	01	01	1	09	10.4	-9.000	-9.000	-9.000	73.	-999.	-99999.0	0.03	0.56	0.35	0.00	0.	10.0	282.5	2.0
10	01	01	1	10	44.8	0.150	0.625	0.008	195.	139.	-6.8	0.03	0.56	0.26	1.76	281.	10.0	285.4	2.0
10	01	01	1	11	69.2	0.225	0.827	0.006	294.	257.	-14.9	0.03	0.56	0.23	2.86	274.	10.0	285.9	2.0
10	01	01	1	12	81.4	0.226	0.985	0.005	422.	258.	-12.7	0.02	0.56	0.22	2.98	257.	10.0	285.4	2.0
10	01	01	1	13	81.2	0.173	1.037	0.005	494.	173.	-5.7	0.03	0.56	0.22	1.99	270.	10.0	284.9	2.0
10	01	01	1	14	69.0	0.218	1.039	0.005	585.	244.	-13.5	0.03	0.56	0.23	2.74	297.	10.0	285.9	2.0
10	01	01	1	15	44.8	0.220	0.927	0.005	638.	248.	-21.5	0.02	0.56	0.26	3.10	308.	10.0	287.0	2.0
10	01	01	1	16	10.7	0.182	0.578	0.005	649.	187.	-50.7	0.03	0.56	0.35	2.52	272.	10.0	286.4	2.0
10	01	01	1	17	-3.7	0.059	-9.000	-9.000	-999.	50.	5.1	0.02	0.56	0.61	1.82	239.	10.0	285.4	2.0
10	01	01	1	18	-5.2	0.070	-9.000	-9.000	-999.	45.	6.0	0.04	0.56	1.00	1.96	152.	10.0	284.2	2.0
10	01	01	1	19	-4.5	0.066	-9.000	-9.000	-999.	41.	5.7	0.05	0.56	1.00	1.76	142.	10.0	283.8	2.0
10	01	01	1	20	-2.9	0.051	-9.000	-9.000	-999.	28.	4.2	0.03	0.56	1.00	1.50	96.	10.0	281.4	2.0
10	01	01	1	21	-14.8	0.131	-9.000	-9.000	-999.	114.	13.8	0.02	0.56	1.00	3.27	27.	10.0	282.0	2.0
10	01	01	1	22	-14.4	0.128	-9.000	-9.000	-999.	110.	13.2	0.02	0.56	1.00	3.25	28.	10.0	282.0	2.0
10	01	01	1	23	-9.7	0.093	-9.000	-9.000	-999.	69.	7.5	0.02	0.56	1.00	2.88	48.	10.0	282.0	2.0
10	01	01	1	24	-7.1	0.124	-9.000	-9.000	-999.	105.	24.5	0.04	0.56	1.00	2.37	159.	10.0	279.9	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
10	01	01	01	10.0	1	-999.	-99.00	278.8	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/06/15
*** AERMET - VERSION 14134 *** ***
*** 20:43:58

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER

1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC			RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	0.45833	AT	(	248703.00,	3912894.00,	760.49,	1321.50,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.45325	AT	(	248728.00,	3912894.00,	759.43,	1321.50,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.45127	AT	(	248678.00,	3912894.00,	761.55,	1321.50,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.44588	AT	(	248778.00,	3912894.00,	758.97,	1321.50,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.44462	AT	(	248753.00,	3912894.00,	758.66,	1321.50,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.44309	AT	(	248803.00,	3912894.00,	759.41,	1321.50,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.43878	AT	(	248653.00,	3912894.00,	762.44,	1321.50,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.43537	AT	(	248828.00,	3912894.00,	759.89,	1321.50,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.42313	AT	(	248628.00,	3912894.00,	763.08,	1321.50,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.41843	AT	(	248853.00,	3912894.00,	759.57,	1321.50,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/06/15
*** AERMET - VERSION 14134 *** ***
*** 20:43:58

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC			RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	4.71458	AT	(	248178.00,	3913869.00,	711.44,	1321.50,	0.00)	DC	
	2ND HIGHEST VALUE IS	4.70849	AT	(	248203.00,	3913869.00,	709.39,	1321.50,	0.00)	DC	
	3RD HIGHEST VALUE IS	4.63720	AT	(	248153.00,	3913869.00,	712.09,	1321.50,	0.00)	DC	
	4TH HIGHEST VALUE IS	4.61744	AT	(	248228.00,	3913869.00,	704.33,	1321.50,	0.00)	DC	
	5TH HIGHEST VALUE IS	4.47108	AT	(	248128.00,	3913869.00,	710.48,				

1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   4.45228 AT (248253.00, 3913869.00,   696.56,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   4.23552 AT (248703.00, 3912894.00,   760.49,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   4.22899 AT (248103.00, 3913869.00,   709.38,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   4.20360 AT (248278.00, 3913869.00,   694.01,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   4.16680 AT (248100.00, 3913900.00,   704.14,
1321.50,   0.00) DC
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/06/15
 *** AERMET - VERSION 14134 ***   ***
                ***   20:43:58

                           PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                          *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED
OVER   1 YEARS ***

                                    ** CONC OF PM2.5   IN MICROGRAMS/M**3
         **

                NETWORK
GROUP ID   AVERAGE CONC   RECEPTOR (XR, YR, ZELEV,
ZHILL, ZFLAG) OF TYPE GRID-ID
- -
- - - - - - - - - - - - - - -

ALL   1ST HIGHEST VALUE IS   4.02587 AT (248703.00, 3912894.00,   760.49,
1321.50,   0.00) DC
          2ND HIGHEST VALUE IS   3.77055 AT (248678.00, 3912894.00,   761.55,
1321.50,   0.00) DC
          3RD HIGHEST VALUE IS   3.74028 AT (248728.00, 3912894.00,   759.43,
1321.50,   0.00) DC
          4TH HIGHEST VALUE IS   3.38539 AT (248653.00, 3912894.00,   762.44,
1321.50,   0.00) DC
          5TH HIGHEST VALUE IS   3.20407 AT (248753.00, 3912894.00,   758.66,
1321.50,   0.00) DC
          6TH HIGHEST VALUE IS   3.17602 AT (247828.00, 3913794.00,   761.90,
1321.50,   0.00) DC
          7TH HIGHEST VALUE IS   2.95587 AT (248778.00, 3912894.00,   758.97,
1321.50,   0.00) DC
          8TH HIGHEST VALUE IS   2.92870 AT (248628.00, 3912894.00,   763.08,
1321.50,   0.00) DC
          9TH HIGHEST VALUE IS   2.90818 AT (247853.00, 3913869.00,   760.30,
1321.50,   0.00) DC
         10TH HIGHEST VALUE IS   2.87493 AT (248700.00, 3912800.00,   757.08,
1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/06/15
 *** AERMET - VERSION 14134 ***   ***
                ***   20:43:58

                           PAGE   7
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          547 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          427 Calm Hours Identified

 A Total of          120 Missing Hours Identified (  1.37 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1056       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                         ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  CO

 **Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2010_CO.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2010_CO.LST


 **File for Summary of Results:   h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air
Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
```

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
   Surface file:   23155_10.SFC
           Met Version:  14134
   Profile file:   23155_10.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                   Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                   Year:   2010                                     Year:   2010

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -
 10 01 01   1 01 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 02 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
```

```
0.00    0.   10.0  278.8    2.0
 10 01 01   1 03 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 04   -8.1  0.088 -9.000 -9.000 -999.   63.      7.6  0.05   0.56   1.00
2.36  133.   10.0  279.2    2.0
 10 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  279.2    2.0
 10 01 01   1 06 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 07   -7.6  0.085 -9.000 -9.000 -999.   59.      7.1  0.04   0.56   1.00
2.36  155.   10.0  279.2    2.0
 10 01 01   1 08    1.4 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   0.61
0.00    0.   10.0  279.9    2.0
 10 01 01   1 09   10.4 -9.000 -9.000 -9.000   73. -999. -99999.0  0.03   0.56   0.35
0.00    0.   10.0  282.5    2.0
 10 01 01   1 10   44.8  0.150  0.625  0.008  195.  139.     -6.8  0.03   0.56   0.26
1.76  281.   10.0  285.4    2.0
 10 01 01   1 11   69.2  0.225  0.827  0.006  294.  257.    -14.9  0.03   0.56   0.23
2.86  274.   10.0  285.9    2.0
 10 01 01   1 12   81.4  0.226  0.985  0.005  422.  258.    -12.7  0.02   0.56   0.22
2.98  257.   10.0  285.4    2.0
 10 01 01   1 13   81.2  0.173  1.037  0.005  494.  173.     -5.7  0.03   0.56   0.22
1.99  270.   10.0  284.9    2.0
 10 01 01   1 14   69.0  0.218  1.039  0.005  585.  244.    -13.5  0.03   0.56   0.23
2.74  297.   10.0  285.9    2.0
 10 01 01   1 15   44.8  0.220  0.927  0.005  638.  248.    -21.5  0.02   0.56   0.26
3.10  308.   10.0  287.0    2.0
 10 01 01   1 16   10.7  0.182  0.578  0.005  649.  187.    -50.7  0.03   0.56   0.35
2.52  272.   10.0  286.4    2.0
 10 01 01   1 17   -3.7  0.059 -9.000 -9.000 -999.   50.      5.1  0.02   0.56   0.61
1.82  239.   10.0  285.4    2.0
 10 01 01   1 18   -5.2  0.070 -9.000 -9.000 -999.   45.      6.0  0.04   0.56   1.00
1.96  152.   10.0  284.2    2.0
 10 01 01   1 19   -4.5  0.066 -9.000 -9.000 -999.   41.      5.7  0.05   0.56   1.00
1.76  142.   10.0  283.8    2.0
 10 01 01   1 20   -2.9  0.051 -9.000 -9.000 -999.   28.      4.2  0.03   0.56   1.00
1.50   96.   10.0  281.4    2.0
 10 01 01   1 21  -14.8  0.131 -9.000 -9.000 -999.  114.     13.8  0.02   0.56   1.00
3.27   27.   10.0  282.0    2.0
 10 01 01   1 22  -14.4  0.128 -9.000 -9.000 -999.  110.     13.2  0.02   0.56   1.00
3.25   28.   10.0  282.0    2.0
 10 01 01   1 23   -9.7  0.093 -9.000 -9.000 -999.   69.      7.5  0.02   0.56   1.00
2.88   48.   10.0  282.0    2.0
 10 01 01   1 24   -7.1  0.124 -9.000 -9.000 -999.  105.     24.5  0.04   0.56   1.00
2.37  159.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01   10.0 1 -999.  -99.00   278.8   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         00:02:18

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF CO       IN MICROGRAMS/M**3
         **

                                                    DATE
                                    NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
```

```
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      68.31429  ON 10092103: AT (  248700.00,
3912900.00,   761.06,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      66.03215  ON 10082404: AT (  248728.60,
3912913.00,   761.39,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        00:02:18

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                      *** THE SUMMARY OF HIGHEST  8-HR RESULTS
***


                                          ** CONC OF CO       IN MICROGRAMS/M**3
         **

                                                            DATE
                                   NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      18.09413  ON 10122108: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      17.79431  ON 10120208: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        00:02:18

                            PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of             0 Fatal Error Message(s)
 A Total of             1 Warning Message(s)
 A Total of           547 Informational Message(s)

 A Total of          8760 Hours Were Processed

 A Total of           427 Calm Hours Identified

 A Total of           120 Missing Hours Identified (  1.37 Percent)


    ******** FATAL ERROR MESSAGES ********
```

*** NONE ***

******** WARNING MESSAGES ********
ME W186 1006 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                   ***        05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        17:28:30

                             PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  SOX

 **Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2010_SOX.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2010_SOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                    ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                    ***   17:28:30

                               PAGE   2
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23,   10.80,

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                    ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                    ***   17:28:30

                               PAGE   3
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_10.SFC
        Met Version: 14134
Profile file: 23155_10.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
        Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
        Year: 2010   Year: 2010

First 24 hours of scalar data
```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - -
 10 01 01   1 01 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
```

```
0.00    0.   10.0  278.8    2.0
 10 01 01   1 02 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 03 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 04   -8.1  0.088 -9.000 -9.000 -999.   63.      7.6  0.05   0.56   1.00
2.36  133.   10.0  279.2    2.0
 10 01 01   1 05 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  279.2    2.0
 10 01 01   1 06 -999.0 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   1.00
0.00    0.   10.0  278.8    2.0
 10 01 01   1 07   -7.6  0.085 -9.000 -9.000 -999.   59.      7.1  0.04   0.56   1.00
2.36  155.   10.0  279.2    2.0
 10 01 01   1 08    1.4 -9.000 -9.000 -9.000 -999. -999. -99999.0  0.03   0.56   0.61
0.00    0.   10.0  279.9    2.0
 10 01 01   1 09   10.4 -9.000 -9.000 -9.000   73. -999. -99999.0  0.03   0.56   0.35
0.00    0.   10.0  282.5    2.0
 10 01 01   1 10   44.8  0.150  0.625  0.008  195.  139.     -6.8  0.03   0.56   0.26
1.76  281.   10.0  285.4    2.0
 10 01 01   1 11   69.2  0.225  0.827  0.006  294.  257.    -14.9  0.03   0.56   0.23
2.86  274.   10.0  285.9    2.0
 10 01 01   1 12   81.4  0.226  0.985  0.005  422.  258.    -12.7  0.02   0.56   0.22
2.98  257.   10.0  285.4    2.0
 10 01 01   1 13   81.2  0.173  1.037  0.005  494.  173.     -5.7  0.03   0.56   0.22
1.99  270.   10.0  284.9    2.0
 10 01 01   1 14   69.0  0.218  1.039  0.005  585.  244.    -13.5  0.03   0.56   0.23
2.74  297.   10.0  285.9    2.0
 10 01 01   1 15   44.8  0.220  0.927  0.005  638.  248.    -21.5  0.02   0.56   0.26
3.10  308.   10.0  287.0    2.0
 10 01 01   1 16   10.7  0.182  0.578  0.005  649.  187.    -50.7  0.03   0.56   0.35
2.52  272.   10.0  286.4    2.0
 10 01 01   1 17   -3.7  0.059 -9.000 -9.000 -999.   50.      5.1  0.02   0.56   0.61
1.82  239.   10.0  285.4    2.0
 10 01 01   1 18   -5.2  0.070 -9.000 -9.000 -999.   45.      6.0  0.04   0.56   1.00
1.96  152.   10.0  284.2    2.0
 10 01 01   1 19   -4.5  0.066 -9.000 -9.000 -999.   41.      5.7  0.05   0.56   1.00
1.76  142.   10.0  283.8    2.0
 10 01 01   1 20   -2.9  0.051 -9.000 -9.000 -999.   28.      4.2  0.03   0.56   1.00
1.50   96.   10.0  281.4    2.0
 10 01 01   1 21  -14.8  0.131 -9.000 -9.000 -999.  114.     13.8  0.02   0.56   1.00
3.27   27.   10.0  282.0    2.0
 10 01 01   1 22  -14.4  0.128 -9.000 -9.000 -999.  110.     13.2  0.02   0.56   1.00
3.25   28.   10.0  282.0    2.0
 10 01 01   1 23   -9.7  0.093 -9.000 -9.000 -999.   69.      7.5  0.02   0.56   1.00
2.88   48.   10.0  282.0    2.0
 10 01 01   1 24   -7.1  0.124 -9.000 -9.000 -999.  105.     24.5  0.04   0.56   1.00
2.37  159.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 10 01 01 01   10.0 1 -999.  -99.00   278.8   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         17:28:30

                               PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF SOX      IN MICROGRAMS/M**3
        **
```

```
                    NETWORK
GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       0.00260 AT (  247853.50,  3913706.50,   760.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.00238 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.00236 AT (  248605.20,  3912914.70,   764.55,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.00232 AT (  248629.90,  3912914.30,   764.03,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.00231 AT (  248600.00,  3912900.00,   764.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.00226 AT (  248654.60,  3912914.00,   763.53,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.00220 AT (  248679.30,  3912913.70,   762.89,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.00212 AT (  248703.90,  3912913.30,   762.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.00212 AT (  248580.50,  3912915.00,   765.36,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.00209 AT (  248700.00,  3912900.00,   761.06,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                ***         17:28:30

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                     ** CONC OF SOX      IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.31269  ON 10071621: AT (  249251.60,
3913103.30,   700.52,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.21113  ON 10071020: AT (  249252.80,
3913152.60,   691.64,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                ***         17:28:30

                            PAGE   6
```

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.11868	ON 10081721: AT (249252.80, 3913152.60, 691.64, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	0.08082	ON 10071021: AT (249252.80, 3913152.60, 691.64, 1321.50, 0.00)	DC	

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                 ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   17:28:30

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.02059c	ON 10122124: AT (247853.50, 3913706.50, 760.35, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	0.01823	ON 10071624: AT (249252.20, 3913127.90, 694.89, 1321.50, 0.00)	DC	

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                 ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   17:28:30

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          547 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          427 Calm Hours Identified

 A Total of          120 Missing Hours Identified (  1.37 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1006       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        09:56:33

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  NOX

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2011_NOX.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2011_NOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 09:56:33

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 09:56:33

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_11.SFC
Met Version: 14134
Profile file: 23155_11.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2011 Year: 2011

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
11	01	01	1	01	-2.8	0.062	-9.000	-9.000	-999.	37.	7.5	0.05	0.99	1.00					

```
1.65  137.   10.0  278.1    2.0
 11 01 01   1 02   -2.0  0.051 -9.000 -9.000 -999.   28.      6.0  0.03   0.99   1.00
1.50  109.   10.0  279.9    2.0
 11 01 01   1 03   -2.6  0.058 -9.000 -9.000 -999.   33.      6.7  0.03   0.99   1.00
1.69   92.   10.0  279.9    2.0
 11 01 01   1 04   -2.8  0.060 -9.000 -9.000 -999.   35.      7.0  0.03   0.99   1.00
1.76  119.   10.0  279.9    2.0
 11 01 01   1 05   -9.3  0.166 -9.000 -9.000 -999.  162.     43.6  0.05   0.99   1.00
2.69  124.   10.0  280.4    2.0
 11 01 01   1 06  -11.7  0.207 -9.000 -9.000 -999.  226.     68.1  0.05   0.99   1.00
3.15  136.   10.0  279.9    2.0
 11 01 01   1 07   -9.3  0.164 -9.000 -9.000 -999.  159.     42.2  0.05   0.99   1.00
2.67  120.   10.0  278.8    2.0
 11 01 01   1 08   -6.3  0.106 -9.000 -9.000 -999.   83.     16.7  0.05   0.99   0.61
2.20  123.   10.0  278.8    2.0
 11 01 01   1 09    0.0  0.116 -9.000 -9.000 -999.   95.   5143.3  0.04   0.99   0.35
1.62  153.   10.0  281.4    2.0
 11 01 01   1 10   12.1  0.146  0.309  0.005   87.  134.    -22.9  0.02   0.99   0.26
2.06  311.   10.0  283.1    2.0
 11 01 01   1 11   20.8  0.092  0.460  0.005  167.   67.     -3.3  0.02   0.99   0.23
1.01  211.   10.0  284.2    2.0
 11 01 01   1 12   25.4  0.063  0.566  0.005  255.   38.     -1.0  0.02   0.99   0.22
0.60  306.   10.0  285.4    2.0
 11 01 01   1 13   25.6  0.155  0.612  0.005  320.  147.    -13.1  0.05   0.99   0.22
1.70  123.   10.0  285.9    2.0
 11 01 01   1 14   21.4  0.144  0.716  0.005  613.  131.    -12.5  0.04   0.99   0.23
1.65  152.   10.0  286.4    2.0
 11 01 01   1 15   12.6  0.141  0.615  0.006  657.  127.    -19.8  0.02   0.99   0.26
1.93  344.   10.0  285.4    2.0
 11 01 01   1 16    0.4  0.157  0.190  0.006  656.  149.   -929.6  0.02   0.99   0.35
2.44  346.   10.0  283.8    2.0
 11 01 01   1 17   -9.4  0.179 -9.000 -9.000 -999.  182.     54.6  0.02   0.99   0.61
3.17   36.   10.0  282.5    2.0
 11 01 01   1 18   -3.5  0.067 -9.000 -9.000 -999.   51.      7.6  0.02   0.99   1.00
2.06   56.   10.0  282.5    2.0
 11 01 01   1 19   -9.0  0.161 -9.000 -9.000 -999.  155.     41.5  0.03   0.99   1.00
2.84  106.   10.0  282.5    2.0
 11 01 01   1 20   -7.1  0.127 -9.000 -9.000 -999.  109.     25.8  0.03   0.99   1.00
2.47  100.   10.0  283.1    2.0
 11 01 01   1 21   -2.8  0.061 -9.000 -9.000 -999.   38.      7.3  0.04   0.99   1.00
1.71  157.   10.0  282.0    2.0
 11 01 01   1 22  -23.3  0.239 -9.000 -9.000 -999.  280.     52.1  0.05   0.99   1.00
3.76  146.   10.0  282.5    2.0
 11 01 01   1 23  -14.1  0.252 -9.000 -9.000 -999.  304.    102.1  0.05   0.99   1.00
3.68  124.   10.0  283.1    2.0
 11 01 01   1 24   -7.7  0.139 -9.000 -9.000 -999.  131.     31.0  0.05   0.99   1.00
2.42  120.   10.0  283.1    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 11 01 01 01   10.0 1  137.    1.65   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        09:56:33

                             PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF NOX      IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	2.07970	AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.06162	AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	1.92459	AT (247800.00, 3913700.00, 759.04, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	1.91392	AT (247853.00, 3913869.00, 760.30, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	1.91125	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.88853	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.85363	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.85141	AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.83579	AT (247828.00, 3913769.00, 756.17, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.81366	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 09:56:33

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC		DATE (YYMMDDHH)		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	136.20089	ON 11112301:	AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)		DC	
	HIGH 2ND HIGH VALUE IS	125.61608	ON 11011323:	AT (248578.00, 3912894.00, 764.35, 1321.50, 0.00)		DC	
	HIGH 3RD HIGH VALUE IS	117.14614	ON 11012823:	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)		DC	
	HIGH 4TH HIGH VALUE IS	114.68381	ON 11062605:	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)		DC	
	HIGH 5TH HIGH VALUE IS	106.50792	ON 11062605:	AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00)		DC	
	HIGH 6TH HIGH VALUE IS	99.16455	ON 11022224:	AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)		DC	
	HIGH 7TH HIGH VALUE IS	98.28129	ON 11081003:	AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)		DC	
	HIGH 8TH HIGH VALUE IS	97.71821	ON 11112107:	AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)		DC	

         HIGH   9TH HIGH VALUE IS   97.08862 ON 11101807: AT (247828.00,
3913794.00,   761.90, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   95.52721 ON 11012722: AT (247828.00,
3913794.00,   761.90, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/05/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   09:56:33

                            PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   330 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   202 Calm Hours Identified

 A Total of   128 Missing Hours Identified (1.46 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   996   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        22:33:46

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM10

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2011_PM10.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2011_PM10.LST
```

Johe-CRITERIA-20M1_2011_PM10
**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
***   06/05/15
*** AERMET - VERSION 14134 ***   ***
***   22:33:46

PAGE   2
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_11.SFC
Met Version: 14134
Profile file: 23155_11.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2011   Year: 2011

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
 11 01 01   1 01   -2.8  0.062 -9.000 -9.000 -999.   37.      7.5  0.05   0.99   1.00
```

```
1.65  137.   10.0  278.1    2.0
 11 01 01   1 02   -2.0  0.051 -9.000 -9.000 -999.   28.      6.0  0.03   0.99   1.00
1.50  109.   10.0  279.9    2.0
 11 01 01   1 03   -2.6  0.058 -9.000 -9.000 -999.   33.      6.7  0.03   0.99   1.00
1.69   92.   10.0  279.9    2.0
 11 01 01   1 04   -2.8  0.060 -9.000 -9.000 -999.   35.      7.0  0.03   0.99   1.00
1.76  119.   10.0  279.9    2.0
 11 01 01   1 05   -9.3  0.166 -9.000 -9.000 -999.  162.     43.6  0.05   0.99   1.00
2.69  124.   10.0  280.4    2.0
 11 01 01   1 06  -11.7  0.207 -9.000 -9.000 -999.  226.     68.1  0.05   0.99   1.00
3.15  136.   10.0  279.9    2.0
 11 01 01   1 07   -9.3  0.164 -9.000 -9.000 -999.  159.     42.2  0.05   0.99   1.00
2.67  120.   10.0  278.8    2.0
 11 01 01   1 08   -6.3  0.106 -9.000 -9.000 -999.   83.     16.7  0.05   0.99   0.61
2.20  123.   10.0  278.8    2.0
 11 01 01   1 09    0.0  0.116 -9.000 -9.000 -999.   95.   5143.3  0.04   0.99   0.35
1.62  153.   10.0  281.4    2.0
 11 01 01   1 10   12.1  0.146  0.309  0.005   87.  134.    -22.9  0.02   0.99   0.26
2.06  311.   10.0  283.1    2.0
 11 01 01   1 11   20.8  0.092  0.460  0.005  167.   67.     -3.3  0.02   0.99   0.23
1.01  211.   10.0  284.2    2.0
 11 01 01   1 12   25.4  0.063  0.566  0.005  255.   38.     -1.0  0.02   0.99   0.22
0.60  306.   10.0  285.4    2.0
 11 01 01   1 13   25.6  0.155  0.612  0.005  320.  147.    -13.1  0.05   0.99   0.22
1.70  123.   10.0  285.9    2.0
 11 01 01   1 14   21.4  0.144  0.716  0.005  613.  131.    -12.5  0.04   0.99   0.23
1.65  152.   10.0  286.4    2.0
 11 01 01   1 15   12.6  0.141  0.615  0.006  657.  127.    -19.8  0.02   0.99   0.26
1.93  344.   10.0  285.4    2.0
 11 01 01   1 16    0.4  0.157  0.190  0.006  656.  149.   -929.6  0.02   0.99   0.35
2.44  346.   10.0  283.8    2.0
 11 01 01   1 17   -9.4  0.179 -9.000 -9.000 -999.  182.     54.6  0.02   0.99   0.61
3.17   36.   10.0  282.5    2.0
 11 01 01   1 18   -3.5  0.067 -9.000 -9.000 -999.   51.      7.6  0.02   0.99   1.00
2.06   56.   10.0  282.5    2.0
 11 01 01   1 19   -9.0  0.161 -9.000 -9.000 -999.  155.     41.5  0.03   0.99   1.00
2.84  106.   10.0  282.5    2.0
 11 01 01   1 20   -7.1  0.127 -9.000 -9.000 -999.  109.     25.8  0.03   0.99   1.00
2.47  100.   10.0  283.1    2.0
 11 01 01   1 21   -2.8  0.061 -9.000 -9.000 -999.   38.      7.3  0.04   0.99   1.00
1.71  157.   10.0  282.0    2.0
 11 01 01   1 22  -23.3  0.239 -9.000 -9.000 -999.  280.     52.1  0.05   0.99   1.00
3.76  146.   10.0  282.5    2.0
 11 01 01   1 23  -14.1  0.252 -9.000 -9.000 -999.  304.    102.1  0.05   0.99   1.00
3.68  124.   10.0  283.1    2.0
 11 01 01   1 24   -7.7  0.139 -9.000 -9.000 -999.  131.     31.0  0.05   0.99   1.00
2.42  120.   10.0  283.1    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 11 01 01 01   10.0 1  137.    1.65   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         22:33:46

                               PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV       NODRYDPLT NOWETDPLT

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                     ** CONC OF PM10      IN MICROGRAMS/M**3
        **
```

NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

ALL 1ST HIGHEST VALUE IS 4.06057 AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
2ND HIGHEST VALUE IS 4.03313 AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00) DC
3RD HIGHEST VALUE IS 3.95945 AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00) DC
4TH HIGHEST VALUE IS 3.93448 AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00) DC
5TH HIGHEST VALUE IS 3.84786 AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00) DC
6TH HIGHEST VALUE IS 3.84201 AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00) DC
7TH HIGHEST VALUE IS 3.73841 AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00) DC
8TH HIGHEST VALUE IS 3.73238 AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00) DC
9TH HIGHEST VALUE IS 3.61959 AT (248603.00, 3912894.00, 763.73, 1321.50, 0.00) DC
10TH HIGHEST VALUE IS 3.60838 AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 22:33:46

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

DATE
NETWORK
GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

ALL HIGH 1ST HIGH VALUE IS 18.21365c ON 11011824: AT (248528.00, 3913869.00, 690.60, 1321.50, 0.00) DC
HIGH 2ND HIGH VALUE IS 16.40567c ON 11121424: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 3RD HIGH VALUE IS 16.28669 ON 11102224: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 4TH HIGH VALUE IS 15.21828c ON 11020524: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 5TH HIGH VALUE IS 14.99796 ON 11012324: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 6TH HIGH VALUE IS 13.66181 ON 11101824: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 7TH HIGH VALUE IS 13.53586c ON 11120724: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC
HIGH 8TH HIGH VALUE IS 13.52341 ON 11103024: AT (247828.00, 3913694.00, 762.96, 1321.50, 0.00) DC

         HIGH   9TH HIGH VALUE IS   13.48033 ON 11011524: AT (247828.00,
3913694.00,   762.96, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   13.12111c ON 11092024: AT (247828.00,
3913694.00,   762.96, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/05/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   22:33:46

                            PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   330 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   202 Calm Hours Identified

 A Total of   128 Missing Hours Identified (1.46 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   1056   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        06/07/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        01:56:29

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM2.5

 **Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check
available guidance.
   Model will process user-specified ranks of high 24-hour values averaged across the
number of years modeled, and
   the multi-year average of individual ANNUAL values, averaged across the number of years
modeled.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3
```

 **Approximate Storage Requirements of Model =   3.7 MB of RAM.

 **Input Runstream File: Johe-CRITERIA-20M1_(300K-YR)_2011_PM2.5.DTA

 **Output Print File: Johe-CRITERIA-20M1_(300K-YR)_2011_PM2.5.LST

 **File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                          *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                                  (1=YES; 0=NO)

            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
            1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
              1 1 1 1 1 1 1 1 1   1 1 1 1 1 1

                NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

                                          *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                                  (METERS/SEC)

                                                    1.54,   3.09,   5.14,   8.23, 10.80,

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                          *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file: 23155_11.SFC
          Met Version: 14134
   Profile file: 23155_11.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:   23155   Upper air station no.:   23230
                  Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
                  Year: 2011   Year: 2011

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
11	01	01	1	01	-2.8	0.062	-9.000	-9.000	-999.	37.	7.5	0.05	0.99	1.00	1.65	137.	10.0	278.1	2.0
11	01	01	1	02	-2.0	0.051	-9.000	-9.000	-999.	28.	6.0	0.03	0.99	1.00	1.50	109.	10.0	279.9	2.0
11	01	01	1	03	-2.6	0.058	-9.000	-9.000	-999.	33.	6.7	0.03	0.99	1.00	1.69	92.	10.0	279.9	2.0
11	01	01	1	04	-2.8	0.060	-9.000	-9.000	-999.	35.	7.0	0.03	0.99	1.00	1.76	119.	10.0	279.9	2.0
11	01	01	1	05	-9.3	0.166	-9.000	-9.000	-999.	162.	43.6	0.05	0.99	1.00	2.69	124.	10.0	280.4	2.0
11	01	01	1	06	-11.7	0.207	-9.000	-9.000	-999.	226.	68.1	0.05	0.99	1.00	3.15	136.	10.0	279.9	2.0
11	01	01	1	07	-9.3	0.164	-9.000	-9.000	-999.	159.	42.2	0.05	0.99	1.00	2.67	120.	10.0	278.8	2.0
11	01	01	1	08	-6.3	0.106	-9.000	-9.000	-999.	83.	16.7	0.05	0.99	0.61	2.20	123.	10.0	278.8	2.0
11	01	01	1	09	0.0	0.116	-9.000	-9.000	-999.	95.	5143.3	0.04	0.99	0.35	1.62	153.	10.0	281.4	2.0
11	01	01	1	10	12.1	0.146	0.309	0.005	87.	134.	-22.9	0.02	0.99	0.26	2.06	311.	10.0	283.1	2.0
11	01	01	1	11	20.8	0.092	0.460	0.005	167.	67.	-3.3	0.02	0.99	0.23	1.01	211.	10.0	284.2	2.0
11	01	01	1	12	25.4	0.063	0.566	0.005	255.	38.	-1.0	0.02	0.99	0.22	0.60	306.	10.0	285.4	2.0
11	01	01	1	13	25.6	0.155	0.612	0.005	320.	147.	-13.1	0.05	0.99	0.22	1.70	123.	10.0	285.9	2.0
11	01	01	1	14	21.4	0.144	0.716	0.005	613.	131.	-12.5	0.04	0.99	0.23	1.65	152.	10.0	286.4	2.0
11	01	01	1	15	12.6	0.141	0.615	0.006	657.	127.	-19.8	0.02	0.99	0.26	1.93	344.	10.0	285.4	2.0
11	01	01	1	16	0.4	0.157	0.190	0.006	656.	149.	-929.6	0.02	0.99	0.35	2.44	346.	10.0	283.8	2.0
11	01	01	1	17	-9.4	0.179	-9.000	-9.000	-999.	182.	54.6	0.02	0.99	0.61	3.17	36.	10.0	282.5	2.0
11	01	01	1	18	-3.5	0.067	-9.000	-9.000	-999.	51.	7.6	0.02	0.99	1.00	2.06	56.	10.0	282.5	2.0
11	01	01	1	19	-9.0	0.161	-9.000	-9.000	-999.	155.	41.5	0.03	0.99	1.00	2.84	106.	10.0	282.5	2.0
11	01	01	1	20	-7.1	0.127	-9.000	-9.000	-999.	109.	25.8	0.03	0.99	1.00	2.47	100.	10.0	283.1	2.0
11	01	01	1	21	-2.8	0.061	-9.000	-9.000	-999.	38.	7.3	0.04	0.99	1.00	1.71	157.	10.0	282.0	2.0
11	01	01	1	22	-23.3	0.239	-9.000	-9.000	-999.	280.	52.1	0.05	0.99	1.00	3.76	146.	10.0	282.5	2.0
11	01	01	1	23	-14.1	0.252	-9.000	-9.000	-999.	304.	102.1	0.05	0.99	1.00	3.68	124.	10.0	283.1	2.0
11	01	01	1	24	-7.7	0.139	-9.000	-9.000	-999.	131.	31.0	0.05	0.99	1.00	2.42	120.	10.0	283.1	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
11	01	01	01	10.0	1	137.	1.65	278.2	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 01:56:29

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER

1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC			RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	0.46201	AT	(	247828.00,	3913794.00,	761.90,	1321.50,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.46016	AT	(	247828.00,	3913694.00,	762.96,	1321.50,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.44767	AT	(	248703.00,	3912894.00,	760.49,	1321.50,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.44250	AT	(	248728.00,	3912894.00,	759.43,	1321.50,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.44055	AT	(	248678.00,	3912894.00,	761.55,	1321.50,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.43568	AT	(	247800.00,	3913700.00,	759.04,	1321.50,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.43116	AT	(	248753.00,	3912894.00,	758.66,	1321.50,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.42986	AT	(	248778.00,	3912894.00,	758.97,	1321.50,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.42939	AT	(	248653.00,	3912894.00,	762.44,	1321.50,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.42840	AT	(	247828.00,	3913769.00,	756.17,	1321.50,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 01:56:29

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC			RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	3.02262	AT	(	247828.00,	3913794.00,	761.90,	1321.50,	0.00)	DC	
	2ND HIGHEST VALUE IS	2.94582	AT	(	247828.00,	3913694.00,	762.96,	1321.50,	0.00)	DC	
	3RD HIGHEST VALUE IS	2.79403	AT	(	247800.00,	3913700.00,	759.04,	1321.50,	0.00)	DC	
	4TH HIGHEST VALUE IS	2.72653	AT	(	248528.00,	3913869.00,	690.60,	1321.50,	0.00)	DC	
	5TH HIGHEST VALUE IS	2.71118	AT	(	248503.00,	3913869.00,	691.51,				

```
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.69185 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.65876 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.64806 AT (  247828.00,  3913769.00,   756.17,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.61770 AT (  248478.00,  3913869.00,   689.71,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.55238 AT (  248603.00,  3913869.00,   688.47,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/07/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         01:56:29

                            PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                           *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED
OVER   1 YEARS ***


                                    ** CONC OF PM2.5    IN MICROGRAMS/M**3
         **



                  NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       2.73404 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.64376 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.58801 AT (  247828.00,  3913794.00,   761.90,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.45191 AT (  248603.00,  3913869.00,   688.47,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.44677 AT (  248578.00,  3913869.00,   689.32,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.39691 AT (  247828.00,  3913769.00,   756.17,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.31997 AT (  248553.00,  3913869.00,   689.20,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.30502 AT (  247853.00,  3913869.00,   760.30,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.30256 AT (  248628.00,  3913869.00,   684.63,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.29733 AT (  247828.00,  3913719.00,   752.90,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/07/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         01:56:29

                            PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------
```

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          330 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          202 Calm Hours Identified

 A Total of          128 Missing Hours Identified (  1.46 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1056       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 05/21/15
*** AERMET - VERSION 14134 *** ***
*** 00:40:41

PAGE 1
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** MODEL SETUP OPTIONS SUMMARY ***
- -

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.

**Other Options Specified:
CCVR_Sub - Meteorological data includes CCVR substitutions
TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: CO

**Model Calculates 2 Short Term Average(s) of: 1-HR 8-HR

**This Run Includes: 61 Source(s); 1 Source Group(s); and 854 Receptor(s)

**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date: 14134

**Output Options Selected:
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 149.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 3.7 MB of RAM.

**Input Runstream File: Johe-CRITERIA-20_Acres-Vol_2011_CO.DTA

**Output Print File: Johe-CRITERIA-20_Acres-Vol_2011_CO.LST

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
   Surface file:   23155_11.SFC
           Met Version:  14134
   Profile file:   23155_11.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                   Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                   Year:   2011                                     Year:   2011

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -
 11 01 01   1 01   -2.8  0.062 -9.000 -9.000 -999.   37.      7.5  0.05   0.99   1.00
1.65  137.   10.0  278.1    2.0
 11 01 01   1 02   -2.0  0.051 -9.000 -9.000 -999.   28.      6.0  0.03   0.99   1.00
```

```
1.50  109.   10.0  279.9    2.0
 11 01 01   1 03   -2.6  0.058 -9.000 -9.000 -999.   33.      6.7  0.03   0.99   1.00
1.69   92.   10.0  279.9    2.0
 11 01 01   1 04   -2.8  0.060 -9.000 -9.000 -999.   35.      7.0  0.03   0.99   1.00
1.76  119.   10.0  279.9    2.0
 11 01 01   1 05   -9.3  0.166 -9.000 -9.000 -999.  162.     43.6  0.05   0.99   1.00
2.69  124.   10.0  280.4    2.0
 11 01 01   1 06  -11.7  0.207 -9.000 -9.000 -999.  226.     68.1  0.05   0.99   1.00
3.15  136.   10.0  279.9    2.0
 11 01 01   1 07   -9.3  0.164 -9.000 -9.000 -999.  159.     42.2  0.05   0.99   1.00
2.67  120.   10.0  278.8    2.0
 11 01 01   1 08   -6.3  0.106 -9.000 -9.000 -999.   83.     16.7  0.05   0.99   0.61
2.20  123.   10.0  278.8    2.0
 11 01 01   1 09    0.0  0.116 -9.000 -9.000 -999.   95.   5143.3  0.04   0.99   0.35
1.62  153.   10.0  281.4    2.0
 11 01 01   1 10   12.1  0.146  0.309  0.005   87.  134.    -22.9  0.02   0.99   0.26
2.06  311.   10.0  283.1    2.0
 11 01 01   1 11   20.8  0.092  0.460  0.005  167.   67.     -3.3  0.02   0.99   0.23
1.01  211.   10.0  284.2    2.0
 11 01 01   1 12   25.4  0.063  0.566  0.005  255.   38.     -1.0  0.02   0.99   0.22
0.60  306.   10.0  285.4    2.0
 11 01 01   1 13   25.6  0.155  0.612  0.005  320.  147.    -13.1  0.05   0.99   0.22
1.70  123.   10.0  285.9    2.0
 11 01 01   1 14   21.4  0.144  0.716  0.005  613.  131.    -12.5  0.04   0.99   0.23
1.65  152.   10.0  286.4    2.0
 11 01 01   1 15   12.6  0.141  0.615  0.006  657.  127.    -19.8  0.02   0.99   0.26
1.93  344.   10.0  285.4    2.0
 11 01 01   1 16    0.4  0.157  0.190  0.006  656.  149.   -929.6  0.02   0.99   0.35
2.44  346.   10.0  283.8    2.0
 11 01 01   1 17   -9.4  0.179 -9.000 -9.000 -999.  182.     54.6  0.02   0.99   0.61
3.17   36.   10.0  282.5    2.0
 11 01 01   1 18   -3.5  0.067 -9.000 -9.000 -999.   51.      7.6  0.02   0.99   1.00
2.06   56.   10.0  282.5    2.0
 11 01 01   1 19   -9.0  0.161 -9.000 -9.000 -999.  155.     41.5  0.03   0.99   1.00
2.84  106.   10.0  282.5    2.0
 11 01 01   1 20   -7.1  0.127 -9.000 -9.000 -999.  109.     25.8  0.03   0.99   1.00
2.47  100.   10.0  283.1    2.0
 11 01 01   1 21   -2.8  0.061 -9.000 -9.000 -999.   38.      7.3  0.04   0.99   1.00
1.71  157.   10.0  282.0    2.0
 11 01 01   1 22  -23.3  0.239 -9.000 -9.000 -999.  280.     52.1  0.05   0.99   1.00
3.76  146.   10.0  282.5    2.0
 11 01 01   1 23  -14.1  0.252 -9.000 -9.000 -999.  304.    102.1  0.05   0.99   1.00
3.68  124.   10.0  283.1    2.0
 11 01 01   1 24   -7.7  0.139 -9.000 -9.000 -999.  131.     31.0  0.05   0.99   1.00
2.42  120.   10.0  283.1    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 11 01 01 01   10.0 1  137.    1.65   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         00:40:41

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                       ** CONC OF CO       IN MICROGRAMS/M**3
        **

                                                    DATE
                                    NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
```

```
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      57.65311  ON 11081704: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      57.22252  ON 11092204: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        05/21/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        00:40:41

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                      *** THE SUMMARY OF HIGHEST  8-HR RESULTS
***


                                    ** CONC OF CO       IN MICROGRAMS/M**3
         **

                                                            DATE
                                         NETWORK
GROUP ID                                AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      15.09174  ON 11101808: AT (  247800.00,
3913700.00,   759.04,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      14.88772  ON 11103008: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        05/21/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        00:40:41

                            PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of           0 Fatal Error Message(s)
 A Total of           1 Warning Message(s)
 A Total of         330 Informational Message(s)

 A Total of        8760 Hours Were Processed

 A Total of         202 Calm Hours Identified

 A Total of         128 Missing Hours Identified (  1.46 Percent)


    ******** FATAL ERROR MESSAGES ********
```

*** NONE ***

******** WARNING MESSAGES ********
ME W186 1006 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                   ***        05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        18:06:54

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  SOX

 **Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2011_SOX.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2011_SOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                 ***   05/20/15
*** AERMET - VERSION 14134 ***   ***
                 ***   18:06:54

PAGE   2
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                 ***   05/20/15
*** AERMET - VERSION 14134 ***   ***
                 ***   18:06:54

PAGE   3
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_11.SFC
Met Version: 14134
Profile file: 23155_11.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2011   Year: 2011

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
 11 01 01   1 01   -2.8  0.062 -9.000 -9.000 -999.   37.      7.5  0.05   0.99   1.00
```

```
1.65  137.   10.0  278.1    2.0
 11 01 01   1 02   -2.0  0.051 -9.000 -9.000 -999.   28.      6.0  0.03   0.99   1.00
1.50  109.   10.0  279.9    2.0
 11 01 01   1 03   -2.6  0.058 -9.000 -9.000 -999.   33.      6.7  0.03   0.99   1.00
1.69   92.   10.0  279.9    2.0
 11 01 01   1 04   -2.8  0.060 -9.000 -9.000 -999.   35.      7.0  0.03   0.99   1.00
1.76  119.   10.0  279.9    2.0
 11 01 01   1 05   -9.3  0.166 -9.000 -9.000 -999.  162.     43.6  0.05   0.99   1.00
2.69  124.   10.0  280.4    2.0
 11 01 01   1 06  -11.7  0.207 -9.000 -9.000 -999.  226.     68.1  0.05   0.99   1.00
3.15  136.   10.0  279.9    2.0
 11 01 01   1 07   -9.3  0.164 -9.000 -9.000 -999.  159.     42.2  0.05   0.99   1.00
2.67  120.   10.0  278.8    2.0
 11 01 01   1 08   -6.3  0.106 -9.000 -9.000 -999.   83.     16.7  0.05   0.99   0.61
2.20  123.   10.0  278.8    2.0
 11 01 01   1 09    0.0  0.116 -9.000 -9.000 -999.   95.   5143.3  0.04   0.99   0.35
1.62  153.   10.0  281.4    2.0
 11 01 01   1 10   12.1  0.146  0.309  0.005   87.  134.    -22.9  0.02   0.99   0.26
2.06  311.   10.0  283.1    2.0
 11 01 01   1 11   20.8  0.092  0.460  0.005  167.   67.     -3.3  0.02   0.99   0.23
1.01  211.   10.0  284.2    2.0
 11 01 01   1 12   25.4  0.063  0.566  0.005  255.   38.     -1.0  0.02   0.99   0.22
0.60  306.   10.0  285.4    2.0
 11 01 01   1 13   25.6  0.155  0.612  0.005  320.  147.    -13.1  0.05   0.99   0.22
1.70  123.   10.0  285.9    2.0
 11 01 01   1 14   21.4  0.144  0.716  0.005  613.  131.    -12.5  0.04   0.99   0.23
1.65  152.   10.0  286.4    2.0
 11 01 01   1 15   12.6  0.141  0.615  0.006  657.  127.    -19.8  0.02   0.99   0.26
1.93  344.   10.0  285.4    2.0
 11 01 01   1 16    0.4  0.157  0.190  0.006  656.  149.   -929.6  0.02   0.99   0.35
2.44  346.   10.0  283.8    2.0
 11 01 01   1 17   -9.4  0.179 -9.000 -9.000 -999.  182.     54.6  0.02   0.99   0.61
3.17   36.   10.0  282.5    2.0
 11 01 01   1 18   -3.5  0.067 -9.000 -9.000 -999.   51.      7.6  0.02   0.99   1.00
2.06   56.   10.0  282.5    2.0
 11 01 01   1 19   -9.0  0.161 -9.000 -9.000 -999.  155.     41.5  0.03   0.99   1.00
2.84  106.   10.0  282.5    2.0
 11 01 01   1 20   -7.1  0.127 -9.000 -9.000 -999.  109.     25.8  0.03   0.99   1.00
2.47  100.   10.0  283.1    2.0
 11 01 01   1 21   -2.8  0.061 -9.000 -9.000 -999.   38.      7.3  0.04   0.99   1.00
1.71  157.   10.0  282.0    2.0
 11 01 01   1 22  -23.3  0.239 -9.000 -9.000 -999.  280.     52.1  0.05   0.99   1.00
3.76  146.   10.0  282.5    2.0
 11 01 01   1 23  -14.1  0.252 -9.000 -9.000 -999.  304.    102.1  0.05   0.99   1.00
3.68  124.   10.0  283.1    2.0
 11 01 01   1 24   -7.7  0.139 -9.000 -9.000 -999.  131.     31.0  0.05   0.99   1.00
2.42  120.   10.0  283.1    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 11 01 01 01   10.0 1  137.    1.65   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         18:06:54

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV       NODRYDPLT NOWETDPLT

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                     ** CONC OF SOX      IN MICROGRAMS/M**3
        **
```

```
                    NETWORK
GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       0.00308 AT (  247853.50,  3913706.50,   760.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.00282 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.00235 AT (  248605.20,  3912914.70,   764.55,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.00232 AT (  248629.90,  3912914.30,   764.03,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.00230 AT (  248600.00,  3912900.00,   764.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.00228 AT (  248654.60,  3912914.00,   763.53,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.00224 AT (  247853.90,  3913730.90,   750.07,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.00223 AT (  248679.30,  3912913.70,   762.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.00217 AT (  248703.90,  3912913.30,   762.01,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.00213 AT (  248700.00,  3912900.00,   761.06,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         18:06:54

                             PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF SOX      IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.24062  ON 11070901: AT (  249251.60,
3913103.30,   700.52,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.20355  ON 11073122: AT (  249252.20,
3913127.90,   694.89,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         18:06:54

                             PAGE   6
```

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.09438	ON 11070903: AT (249251.60, 3913103.30, 700.52, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	0.07221	ON 11070903: AT (249252.20, 3913127.90, 694.89, 1321.50, 0.00)	DC	

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   18:06:54

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.01722	ON 11103024: AT (247853.50, 3913706.50, 760.35, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	0.01496c	ON 11021224: AT (247853.50, 3913706.50, 760.35, 1321.50, 0.00)	DC	

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   18:06:54

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          330 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          202 Calm Hours Identified

 A Total of          128 Missing Hours Identified (  1.46 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1006       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        10:35:33

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  NOX

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2012_NOX.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2012_NOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/05/15
*** AERMET - VERSION 14134 *** *** *** 10:35:33

PAGE 2
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/05/15
*** AERMET - VERSION 14134 *** *** *** 10:35:33

PAGE 3
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_12.SFC
Met Version: 14134
Profile file: 23155_12.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2012 Year: 2012

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
12	01	01	1	01	-1.2	0.034	-9.000	-9.000	-999.	15.	3.0	0.05	0.99	1.00					

```
0.92  127.   10.0  278.1    2.0
 12 01 01   1 02   -6.0  0.076 -9.000 -9.000 -999.   50.      6.5  0.05   0.99   1.00
2.03  125.   10.0  278.8    2.0
 12 01 01   1 03   -2.0  0.044 -9.000 -9.000 -999.   22.      3.8  0.05   0.99   1.00
1.18  124.   10.0  277.0    2.0
 12 01 01   1 04   -1.6  0.039 -9.000 -9.000 -999.   18.      3.2  0.03   0.99   1.00
1.13  117.   10.0  275.9    2.0
 12 01 01   1 05   -1.8  0.041 -9.000 -9.000 -999.   20.      3.3  0.03   0.99   1.00
1.21   83.   10.0  275.4    2.0
 12 01 01   1 06   -0.3  0.017 -9.000 -9.000 -999.    5.      1.4  0.02   0.99   1.00
0.53   50.   10.0  275.4    2.0
 12 01 01   1 07   -0.7  0.025 -9.000 -9.000 -999.   10.      2.0  0.03   0.99   1.00
0.75   86.   10.0  273.8    2.0
 12 01 01   1 08   -1.5  0.039 -9.000 -9.000 -999.   18.      3.5  0.05   0.99   0.61
1.04  129.   10.0  275.9    2.0
 12 01 01   1 09   13.7  0.117  0.229  0.013   31.   96.    -10.4  0.05   0.99   0.35
1.25  132.   10.0  279.9    2.0
 12 01 01   1 10   61.4  0.111  0.588  0.012  119.   88.     -2.0  0.04   0.99   0.26
0.99  176.   10.0  282.5    2.0
 12 01 01   1 11   95.7  0.126  0.941  0.012  312.  107.     -1.9  0.03   0.99   0.23
1.21  190.   10.0  285.4    2.0
 12 01 01   1 12  113.8  0.114  1.122  0.020  444.   92.     -1.2  0.02   0.99   0.22
1.11  252.   10.0  288.1    2.0
 12 01 01   1 13  114.5  0.168  1.175  0.021  507.  165.     -3.7  0.02   0.99   0.22
1.94  260.   10.0  290.4    2.0
 12 01 01   1 14   97.9  0.150  1.150  0.021  555.  139.     -3.1  0.02   0.99   0.23
1.69  268.   10.0  292.0    2.0
 12 01 01   1 15   65.1  0.107  1.022  0.021  587.   84.     -1.7  0.02   0.99   0.26
1.11  263.   10.0  294.2    2.0
 12 01 01   1 16   17.7  0.179  0.665  0.021  594.  182.    -29.0  0.03   0.99   0.35
2.40  292.   10.0  293.8    2.0
 12 01 01   1 17   -7.9  0.086 -9.000 -9.000 -999.   65.      7.3  0.02   0.99   0.61
2.76  316.   10.0  289.2    2.0
 12 01 01   1 18   -1.7  0.039 -9.000 -9.000 -999.   19.      3.1  0.02   0.99   1.00
1.21  350.   10.0  285.4    2.0
 12 01 01   1 19   -3.6  0.057 -9.000 -9.000 -999.   33.      4.6  0.02   0.99   1.00
1.79  337.   10.0  283.1    2.0
 12 01 01   1 20   -5.3  0.068 -9.000 -9.000 -999.   43.      5.4  0.02   0.99   1.00
2.18  315.   10.0  280.9    2.0
 12 01 01   1 21   -2.0  0.042 -9.000 -9.000 -999.   21.      3.4  0.02   0.99   1.00
1.33  330.   10.0  280.4    2.0
 12 01 01   1 22   -1.5  0.038 -9.000 -9.000 -999.   18.      3.3  0.05   0.99   1.00
1.03  136.   10.0  280.9    2.0
 12 01 01   1 23   -0.7  0.026 -9.000 -9.000 -999.   10.      2.2  0.04   0.99   1.00
0.74  173.   10.0  279.2    2.0
 12 01 01   1 24   -1.0  0.030 -9.000 -9.000 -999.   12.      2.4  0.02   0.99   1.00
0.92   57.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.0 1  127.    0.92   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         10:35:33

                                PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV      NODRYDPLT NOWETDPLT

                                *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                 ** CONC OF NOX      IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	2.04818	AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	2.04236	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	2.01874	AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	2.00481	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	2.00455	AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	1.98931	AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	1.98188	AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	1.95546	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	1.94681	AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	1.94151	AT (248878.00, 3912894.00, 759.11, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 10:35:33

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC		DATE (YYMMDDHH)		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	144.02078	ON 12110203:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)		DC	
	HIGH 2ND HIGH VALUE IS	135.29928	ON 12013006:	AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)		DC	
	HIGH 3RD HIGH VALUE IS	125.70049	ON 12101104:	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)		DC	
	HIGH 4TH HIGH VALUE IS	117.61161	ON 12042802:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)		DC	
	HIGH 5TH HIGH VALUE IS	116.50856	ON 12121006:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)		DC	
	HIGH 6TH HIGH VALUE IS	112.00999	ON 12041903:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)		DC	
	HIGH 7TH HIGH VALUE IS	110.87507	ON 12090920:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)		DC	
	HIGH 8TH HIGH VALUE IS	110.32235	ON 12051606:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)		DC	

HIGH 9TH HIGH VALUE IS 103.46170 ON 12111302: AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC
HIGH 10TH HIGH VALUE IS 101.11198 ON 12041420: AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/05/15
*** AERMET - VERSION 14134 *** ***
*** 10:35:33

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 1 Warning Message(s)
A Total of 287 Informational Message(s)

A Total of 8784 Hours Were Processed

A Total of 130 Calm Hours Identified

A Total of 157 Missing Hours Identified (1.79 Percent)

******** FATAL ERROR MESSAGES ********
*** NONE ***

******** WARNING MESSAGES ********
ME W186 996 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used 0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/06/15
 *** AERMET - VERSION  14134 ***   ***
                 ***       04:08:10

                           PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                             ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM10

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2012_PM10.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2012_PM10.LST
```

Johe-CRITERIA-20M1_2012_PM10
**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/06/15
*** AERMET - VERSION 14134 *** *** *** 04:08:10

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/06/15
*** AERMET - VERSION 14134 *** *** *** 04:08:10

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_12.SFC
Met Version: 14134
Profile file: 23155_12.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2012 Year: 2012

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
12	01	01	1	01	-1.2	0.034	-9.000	-9.000	-999.	15.	3.0	0.05	0.99	1.00					

```
0.92  127.   10.0  278.1    2.0
 12 01 01   1 02   -6.0  0.076 -9.000 -9.000 -999.   50.      6.5  0.05   0.99   1.00
2.03  125.   10.0  278.8    2.0
 12 01 01   1 03   -2.0  0.044 -9.000 -9.000 -999.   22.      3.8  0.05   0.99   1.00
1.18  124.   10.0  277.0    2.0
 12 01 01   1 04   -1.6  0.039 -9.000 -9.000 -999.   18.      3.2  0.03   0.99   1.00
1.13  117.   10.0  275.9    2.0
 12 01 01   1 05   -1.8  0.041 -9.000 -9.000 -999.   20.      3.3  0.03   0.99   1.00
1.21   83.   10.0  275.4    2.0
 12 01 01   1 06   -0.3  0.017 -9.000 -9.000 -999.    5.      1.4  0.02   0.99   1.00
0.53   50.   10.0  275.4    2.0
 12 01 01   1 07   -0.7  0.025 -9.000 -9.000 -999.   10.      2.0  0.03   0.99   1.00
0.75   86.   10.0  273.8    2.0
 12 01 01   1 08   -1.5  0.039 -9.000 -9.000 -999.   18.      3.5  0.05   0.99   0.61
1.04  129.   10.0  275.9    2.0
 12 01 01   1 09   13.7  0.117  0.229  0.013   31.   96.    -10.4  0.05   0.99   0.35
1.25  132.   10.0  279.9    2.0
 12 01 01   1 10   61.4  0.111  0.588  0.012  119.   88.     -2.0  0.04   0.99   0.26
0.99  176.   10.0  282.5    2.0
 12 01 01   1 11   95.7  0.126  0.941  0.012  312.  107.     -1.9  0.03   0.99   0.23
1.21  190.   10.0  285.4    2.0
 12 01 01   1 12  113.8  0.114  1.122  0.020  444.   92.     -1.2  0.02   0.99   0.22
1.11  252.   10.0  288.1    2.0
 12 01 01   1 13  114.5  0.168  1.175  0.021  507.  165.     -3.7  0.02   0.99   0.22
1.94  260.   10.0  290.4    2.0
 12 01 01   1 14   97.9  0.150  1.150  0.021  555.  139.     -3.1  0.02   0.99   0.23
1.69  268.   10.0  292.0    2.0
 12 01 01   1 15   65.1  0.107  1.022  0.021  587.   84.     -1.7  0.02   0.99   0.26
1.11  263.   10.0  294.2    2.0
 12 01 01   1 16   17.7  0.179  0.665  0.021  594.  182.    -29.0  0.03   0.99   0.35
2.40  292.   10.0  293.8    2.0
 12 01 01   1 17   -7.9  0.086 -9.000 -9.000 -999.   65.      7.3  0.02   0.99   0.61
2.76  316.   10.0  289.2    2.0
 12 01 01   1 18   -1.7  0.039 -9.000 -9.000 -999.   19.      3.1  0.02   0.99   1.00
1.21  350.   10.0  285.4    2.0
 12 01 01   1 19   -3.6  0.057 -9.000 -9.000 -999.   33.      4.6  0.02   0.99   1.00
1.79  337.   10.0  283.1    2.0
 12 01 01   1 20   -5.3  0.068 -9.000 -9.000 -999.   43.      5.4  0.02   0.99   1.00
2.18  315.   10.0  280.9    2.0
 12 01 01   1 21   -2.0  0.042 -9.000 -9.000 -999.   21.      3.4  0.02   0.99   1.00
1.33  330.   10.0  280.4    2.0
 12 01 01   1 22   -1.5  0.038 -9.000 -9.000 -999.   18.      3.3  0.05   0.99   1.00
1.03  136.   10.0  280.9    2.0
 12 01 01   1 23   -0.7  0.026 -9.000 -9.000 -999.   10.      2.2  0.04   0.99   1.00
0.74  173.   10.0  279.2    2.0
 12 01 01   1 24   -1.0  0.030 -9.000 -9.000 -999.   12.      2.4  0.02   0.99   1.00
0.92   57.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.0 1  127.    0.92   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         06/06/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        04:08:10

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF PM10     IN MICROGRAMS/M**3
        **
```

GROUP ID	NETWORK AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	4.29074 AT	(248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC	
	2ND HIGHEST VALUE IS	4.28531 AT	(248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	3RD HIGHEST VALUE IS	4.23378 AT	(248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC	
	4TH HIGHEST VALUE IS	4.18810 AT	(248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC	
	5TH HIGHEST VALUE IS	4.16010 AT	(248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	6TH HIGHEST VALUE IS	4.12864 AT	(248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC	
	7TH HIGHEST VALUE IS	4.03916 AT	(248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	8TH HIGHEST VALUE IS	4.03689 AT	(248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC	
	9TH HIGHEST VALUE IS	3.90825 AT	(248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC	
	10TH HIGHEST VALUE IS	3.90452 AT	(248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/06/15
*** AERMET - VERSION 14134 *** ***
*** 04:08:10

**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC		DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	28.97760m	ON 12013024:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	20.00725	ON 12020824:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	HIGH 3RD HIGH VALUE IS	19.71226	ON 12022524:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	HIGH 4TH HIGH VALUE IS	19.48459	ON 12030224:	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC	
	HIGH 5TH HIGH VALUE IS	17.46297	ON 12122824:	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	HIGH 6TH HIGH VALUE IS	14.95478	ON 12101124:	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	HIGH 7TH HIGH VALUE IS	14.20114	ON 12041924:	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC	
	HIGH 8TH HIGH VALUE IS	13.79416m	ON 12090924:	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC	

         HIGH   9TH HIGH VALUE IS   13.12827m ON 12090924: AT (248628.00,
3912894.00,   763.08, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   12.57362m ON 12012124: AT (248728.00,
3912894.00,   759.43, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/06/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   04:08:10

                            PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   287 Informational Message(s)

 A Total of   8784 Hours Were Processed

 A Total of   130 Calm Hours Identified

 A Total of   157 Missing Hours Identified (1.79 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   1056   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM2.5

 **Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check
available guidance.
   Model will process user-specified ranks of high 24-hour values averaged across the
number of years modeled, and
   the multi-year average of individual ANNUAL values, averaged across the number of years
modeled.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3
```

Johe-CRITERIA-20M1_2012_PM2.5
**Approximate Storage Requirements of Model =   3.7 MB of RAM.

**Input Runstream File: Johe-CRITERIA-20M1_(300K-YR)_2012_PM2.5.DTA

**Output Print File: Johe-CRITERIA-20M1_(300K-YR)_2012_PM2.5.LST

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 ***   ***
*** 07:30:41

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**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
 1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 ***   ***
*** 07:30:41

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**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_12.SFC
Met Version: 14134
Profile file: 23155_12.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2012   Year: 2012

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
12	01	01	1	01	-1.2	0.034	-9.000	-9.000	-999.	15.	3.0	0.05	0.99	1.00	0.92	127.	10.0	278.1	2.0
12	01	01	1	02	-6.0	0.076	-9.000	-9.000	-999.	50.	6.5	0.05	0.99	1.00	2.03	125.	10.0	278.8	2.0
12	01	01	1	03	-2.0	0.044	-9.000	-9.000	-999.	22.	3.8	0.05	0.99	1.00	1.18	124.	10.0	277.0	2.0
12	01	01	1	04	-1.6	0.039	-9.000	-9.000	-999.	18.	3.2	0.03	0.99	1.00	1.13	117.	10.0	275.9	2.0
12	01	01	1	05	-1.8	0.041	-9.000	-9.000	-999.	20.	3.3	0.03	0.99	1.00	1.21	83.	10.0	275.4	2.0
12	01	01	1	06	-0.3	0.017	-9.000	-9.000	-999.	5.	1.4	0.02	0.99	1.00	0.53	50.	10.0	275.4	2.0
12	01	01	1	07	-0.7	0.025	-9.000	-9.000	-999.	10.	2.0	0.03	0.99	1.00	0.75	86.	10.0	273.8	2.0
12	01	01	1	08	-1.5	0.039	-9.000	-9.000	-999.	18.	3.5	0.05	0.99	0.61	1.04	129.	10.0	275.9	2.0
12	01	01	1	09	13.7	0.117	0.229	0.013	31.	96.	-10.4	0.05	0.99	0.35	1.25	132.	10.0	279.9	2.0
12	01	01	1	10	61.4	0.111	0.588	0.012	119.	88.	-2.0	0.04	0.99	0.26	0.99	176.	10.0	282.5	2.0
12	01	01	1	11	95.7	0.126	0.941	0.012	312.	107.	-1.9	0.03	0.99	0.23	1.21	190.	10.0	285.4	2.0
12	01	01	1	12	113.8	0.114	1.122	0.020	444.	92.	-1.2	0.02	0.99	0.22	1.11	252.	10.0	288.1	2.0
12	01	01	1	13	114.5	0.168	1.175	0.021	507.	165.	-3.7	0.02	0.99	0.22	1.94	260.	10.0	290.4	2.0
12	01	01	1	14	97.9	0.150	1.150	0.021	555.	139.	-3.1	0.02	0.99	0.23	1.69	268.	10.0	292.0	2.0
12	01	01	1	15	65.1	0.107	1.022	0.021	587.	84.	-1.7	0.02	0.99	0.26	1.11	263.	10.0	294.2	2.0
12	01	01	1	16	17.7	0.179	0.665	0.021	594.	182.	-29.0	0.03	0.99	0.35	2.40	292.	10.0	293.8	2.0
12	01	01	1	17	-7.9	0.086	-9.000	-9.000	-999.	65.	7.3	0.02	0.99	0.61	2.76	316.	10.0	289.2	2.0
12	01	01	1	18	-1.7	0.039	-9.000	-9.000	-999.	19.	3.1	0.02	0.99	1.00	1.21	350.	10.0	285.4	2.0
12	01	01	1	19	-3.6	0.057	-9.000	-9.000	-999.	33.	4.6	0.02	0.99	1.00	1.79	337.	10.0	283.1	2.0
12	01	01	1	20	-5.3	0.068	-9.000	-9.000	-999.	43.	5.4	0.02	0.99	1.00	2.18	315.	10.0	280.9	2.0
12	01	01	1	21	-2.0	0.042	-9.000	-9.000	-999.	21.	3.4	0.02	0.99	1.00	1.33	330.	10.0	280.4	2.0
12	01	01	1	22	-1.5	0.038	-9.000	-9.000	-999.	18.	3.3	0.05	0.99	1.00	1.03	136.	10.0	280.9	2.0
12	01	01	1	23	-0.7	0.026	-9.000	-9.000	-999.	10.	2.2	0.04	0.99	1.00	0.74	173.	10.0	279.2	2.0
12	01	01	1	24	-1.0	0.030	-9.000	-9.000	-999.	12.	2.4	0.02	0.99	1.00	0.92	57.	10.0	279.9	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
12	01	01	01	10.0	1	127.	0.92	278.2	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 07:30:41

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER

1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC			RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	0.48081	AT	(	248828.00,	3912894.00,	759.89,	1321.50,	0.00)	DC	
	2ND HIGHEST VALUE IS	0.47855	AT	(	248803.00,	3912894.00,	759.41,	1321.50,	0.00)	DC	
	3RD HIGHEST VALUE IS	0.47364	AT	(	248703.00,	3912894.00,	760.49,	1321.50,	0.00)	DC	
	4TH HIGHEST VALUE IS	0.47297	AT	(	248853.00,	3912894.00,	759.57,	1321.50,	0.00)	DC	
	5TH HIGHEST VALUE IS	0.47229	AT	(	248778.00,	3912894.00,	758.97,	1321.50,	0.00)	DC	
	6TH HIGHEST VALUE IS	0.47115	AT	(	248728.00,	3912894.00,	759.43,	1321.50,	0.00)	DC	
	7TH HIGHEST VALUE IS	0.46544	AT	(	248753.00,	3912894.00,	758.66,	1321.50,	0.00)	DC	
	8TH HIGHEST VALUE IS	0.46493	AT	(	248678.00,	3912894.00,	761.55,	1321.50,	0.00)	DC	
	9TH HIGHEST VALUE IS	0.46087	AT	(	248878.00,	3912894.00,	759.11,	1321.50,	0.00)	DC	
	10TH HIGHEST VALUE IS	0.45194	AT	(	248653.00,	3912894.00,	762.44,	1321.50,	0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 07:30:41

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC			RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)					OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	4.44931	AT	(	248703.00,	3912894.00,	760.49,	1321.50,	0.00)	DC	
	2ND HIGHEST VALUE IS	4.30828	AT	(	248728.00,	3912894.00,	759.43,	1321.50,	0.00)	DC	
	3RD HIGHEST VALUE IS	4.09262	AT	(	248678.00,	3912894.00,	761.55,	1321.50,	0.00)	DC	
	4TH HIGHEST VALUE IS	4.00242	AT	(	248753.00,	3912894.00,	758.66,	1321.50,	0.00)	DC	
	5TH HIGHEST VALUE IS	3.99794	AT	(	248778.00,	3912894.00,	758.97,				

```
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       3.99240 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.87399 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.65465 AT (  248578.00,  3912894.00,   764.35,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.65082 AT (  248553.00,  3912894.00,   765.26,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.46453 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/07/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        07:30:41

                             PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                            *** THE SUMMARY OF MAXIMUM   2ND-HIGHEST 24-HR RESULTS AVERAGED
OVER   1 YEARS ***

                                    ** CONC OF PM2.5    IN MICROGRAMS/M**3
         **

                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       2.96979 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.90795 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       2.84817 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       2.74054 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       2.66261 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       2.66107 AT (  248153.00,  3913869.00,   712.09,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       2.59161 AT (  248128.00,  3913869.00,   710.48,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       2.57209 AT (  248253.00,  3913869.00,   696.56,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       2.54789 AT (  248603.00,  3912894.00,   763.73,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       2.52755 AT (  248228.00,  3913869.00,   704.33,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/07/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        07:30:41

                             PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------
```

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          287 Informational Message(s)

 A Total of         8784 Hours Were Processed

 A Total of          130 Calm Hours Identified

 A Total of          157 Missing Hours Identified (  1.79 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1056       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  CO

 **Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2012_CO.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2012_CO.LST


 **File for Summary of Results:   h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air
Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
```

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                ***   05/21/15
 *** AERMET - VERSION 14134 ***   ***
                ***   01:21:04

                           PAGE   3
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
   Surface file:   23155_12.SFC
          Met Version:  14134
   Profile file:   23155_12.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                  Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                  Year:   2012                                     Year:   2012

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
 12 01 01   1 01   -1.2  0.034 -9.000 -9.000 -999.   15.      3.0  0.05   0.99   1.00
0.92  127.   10.0  278.1    2.0
 12 01 01   1 02   -6.0  0.076 -9.000 -9.000 -999.   50.      6.5  0.05   0.99   1.00
```

```
2.03  125.   10.0  278.8    2.0
 12 01 01   1 03   -2.0  0.044 -9.000 -9.000 -999.   22.      3.8  0.05   0.99   1.00
1.18  124.   10.0  277.0    2.0
 12 01 01   1 04   -1.6  0.039 -9.000 -9.000 -999.   18.      3.2  0.03   0.99   1.00
1.13  117.   10.0  275.9    2.0
 12 01 01   1 05   -1.8  0.041 -9.000 -9.000 -999.   20.      3.3  0.03   0.99   1.00
1.21   83.   10.0  275.4    2.0
 12 01 01   1 06   -0.3  0.017 -9.000 -9.000 -999.    5.      1.4  0.02   0.99   1.00
0.53   50.   10.0  275.4    2.0
 12 01 01   1 07   -0.7  0.025 -9.000 -9.000 -999.   10.      2.0  0.03   0.99   1.00
0.75   86.   10.0  273.8    2.0
 12 01 01   1 08   -1.5  0.039 -9.000 -9.000 -999.   18.      3.5  0.05   0.99   0.61
1.04  129.   10.0  275.9    2.0
 12 01 01   1 09   13.7  0.117  0.229  0.013   31.   96.    -10.4  0.05   0.99   0.35
1.25  132.   10.0  279.9    2.0
 12 01 01   1 10   61.4  0.111  0.588  0.012  119.   88.     -2.0  0.04   0.99   0.26
0.99  176.   10.0  282.5    2.0
 12 01 01   1 11   95.7  0.126  0.941  0.012  312.  107.     -1.9  0.03   0.99   0.23
1.21  190.   10.0  285.4    2.0
 12 01 01   1 12  113.8  0.114  1.122  0.020  444.   92.     -1.2  0.02   0.99   0.22
1.11  252.   10.0  288.1    2.0
 12 01 01   1 13  114.5  0.168  1.175  0.021  507.  165.     -3.7  0.02   0.99   0.22
1.94  260.   10.0  290.4    2.0
 12 01 01   1 14   97.9  0.150  1.150  0.021  555.  139.     -3.1  0.02   0.99   0.23
1.69  268.   10.0  292.0    2.0
 12 01 01   1 15   65.1  0.107  1.022  0.021  587.   84.     -1.7  0.02   0.99   0.26
1.11  263.   10.0  294.2    2.0
 12 01 01   1 16   17.7  0.179  0.665  0.021  594.  182.    -29.0  0.03   0.99   0.35
2.40  292.   10.0  293.8    2.0
 12 01 01   1 17   -7.9  0.086 -9.000 -9.000 -999.   65.      7.3  0.02   0.99   0.61
2.76  316.   10.0  289.2    2.0
 12 01 01   1 18   -1.7  0.039 -9.000 -9.000 -999.   19.      3.1  0.02   0.99   1.00
1.21  350.   10.0  285.4    2.0
 12 01 01   1 19   -3.6  0.057 -9.000 -9.000 -999.   33.      4.6  0.02   0.99   1.00
1.79  337.   10.0  283.1    2.0
 12 01 01   1 20   -5.3  0.068 -9.000 -9.000 -999.   43.      5.4  0.02   0.99   1.00
2.18  315.   10.0  280.9    2.0
 12 01 01   1 21   -2.0  0.042 -9.000 -9.000 -999.   21.      3.4  0.02   0.99   1.00
1.33  330.   10.0  280.4    2.0
 12 01 01   1 22   -1.5  0.038 -9.000 -9.000 -999.   18.      3.3  0.05   0.99   1.00
1.03  136.   10.0  280.9    2.0
 12 01 01   1 23   -0.7  0.026 -9.000 -9.000 -999.   10.      2.2  0.04   0.99   1.00
0.74  173.   10.0  279.2    2.0
 12 01 01   1 24   -1.0  0.030 -9.000 -9.000 -999.   12.      2.4  0.02   0.99   1.00
0.92   57.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.0 1  127.    0.92   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         01:21:04

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF CO       IN MICROGRAMS/M**3
        **

                                                    DATE
                                    NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
```

```
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      69.74341  ON 12013006: AT (  248600.00,
3912800.00,   762.78,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      63.89410  ON 12090204: AT (  248600.00,
3912900.00,   764.08,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                ***         01:21:04

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                *** THE SUMMARY OF HIGHEST  8-HR RESULTS
***


                                    ** CONC OF CO       IN MICROGRAMS/M**3
        **

                                                          DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS      25.42813  ON 12011808: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS      19.43898c ON 12011708: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                ***         01:21:04

                            PAGE   6
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of           0 Fatal Error Message(s)
 A Total of           1 Warning Message(s)
 A Total of         287 Informational Message(s)

 A Total of        8784 Hours Were Processed

 A Total of         130 Calm Hours Identified

 A Total of         157 Missing Hours Identified (  1.79 Percent)


    ******** FATAL ERROR MESSAGES ********
```

*** NONE ***

******** WARNING MESSAGES ********
ME W186 1006 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                   ***        05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***       18:47:16

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  SOX

 **Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);      1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2012_SOX.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2012_SOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   18:47:16

                             PAGE   2
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
             1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   18:47:16

                             PAGE   3
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_12.SFC
Met Version: 14134
Profile file: 23155_12.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2012   Year: 2012

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 12 01 01   1 01   -1.2  0.034 -9.000 -9.000 -999.   15.      3.0  0.05   0.99   1.00
```

```
0.92  127.   10.0  278.1    2.0
 12 01 01   1 02   -6.0  0.076 -9.000 -9.000 -999.   50.      6.5  0.05   0.99   1.00
2.03  125.   10.0  278.8    2.0
 12 01 01   1 03   -2.0  0.044 -9.000 -9.000 -999.   22.      3.8  0.05   0.99   1.00
1.18  124.   10.0  277.0    2.0
 12 01 01   1 04   -1.6  0.039 -9.000 -9.000 -999.   18.      3.2  0.03   0.99   1.00
1.13  117.   10.0  275.9    2.0
 12 01 01   1 05   -1.8  0.041 -9.000 -9.000 -999.   20.      3.3  0.03   0.99   1.00
1.21   83.   10.0  275.4    2.0
 12 01 01   1 06   -0.3  0.017 -9.000 -9.000 -999.    5.      1.4  0.02   0.99   1.00
0.53   50.   10.0  275.4    2.0
 12 01 01   1 07   -0.7  0.025 -9.000 -9.000 -999.   10.      2.0  0.03   0.99   1.00
0.75   86.   10.0  273.8    2.0
 12 01 01   1 08   -1.5  0.039 -9.000 -9.000 -999.   18.      3.5  0.05   0.99   0.61
1.04  129.   10.0  275.9    2.0
 12 01 01   1 09   13.7  0.117  0.229  0.013   31.   96.    -10.4  0.05   0.99   0.35
1.25  132.   10.0  279.9    2.0
 12 01 01   1 10   61.4  0.111  0.588  0.012  119.   88.     -2.0  0.04   0.99   0.26
0.99  176.   10.0  282.5    2.0
 12 01 01   1 11   95.7  0.126  0.941  0.012  312.  107.     -1.9  0.03   0.99   0.23
1.21  190.   10.0  285.4    2.0
 12 01 01   1 12  113.8  0.114  1.122  0.020  444.   92.     -1.2  0.02   0.99   0.22
1.11  252.   10.0  288.1    2.0
 12 01 01   1 13  114.5  0.168  1.175  0.021  507.  165.     -3.7  0.02   0.99   0.22
1.94  260.   10.0  290.4    2.0
 12 01 01   1 14   97.9  0.150  1.150  0.021  555.  139.     -3.1  0.02   0.99   0.23
1.69  268.   10.0  292.0    2.0
 12 01 01   1 15   65.1  0.107  1.022  0.021  587.   84.     -1.7  0.02   0.99   0.26
1.11  263.   10.0  294.2    2.0
 12 01 01   1 16   17.7  0.179  0.665  0.021  594.  182.    -29.0  0.03   0.99   0.35
2.40  292.   10.0  293.8    2.0
 12 01 01   1 17   -7.9  0.086 -9.000 -9.000 -999.   65.      7.3  0.02   0.99   0.61
2.76  316.   10.0  289.2    2.0
 12 01 01   1 18   -1.7  0.039 -9.000 -9.000 -999.   19.      3.1  0.02   0.99   1.00
1.21  350.   10.0  285.4    2.0
 12 01 01   1 19   -3.6  0.057 -9.000 -9.000 -999.   33.      4.6  0.02   0.99   1.00
1.79  337.   10.0  283.1    2.0
 12 01 01   1 20   -5.3  0.068 -9.000 -9.000 -999.   43.      5.4  0.02   0.99   1.00
2.18  315.   10.0  280.9    2.0
 12 01 01   1 21   -2.0  0.042 -9.000 -9.000 -999.   21.      3.4  0.02   0.99   1.00
1.33  330.   10.0  280.4    2.0
 12 01 01   1 22   -1.5  0.038 -9.000 -9.000 -999.   18.      3.3  0.05   0.99   1.00
1.03  136.   10.0  280.9    2.0
 12 01 01   1 23   -0.7  0.026 -9.000 -9.000 -999.   10.      2.2  0.04   0.99   1.00
0.74  173.   10.0  279.2    2.0
 12 01 01   1 24   -1.0  0.030 -9.000 -9.000 -999.   12.      2.4  0.02   0.99   1.00
0.92   57.   10.0  279.9    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 12 01 01 01   10.0 1  127.    0.92   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         18:47:16

                                PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV       NODRYDPLT NOWETDPLT

                                *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                 ** CONC OF SOX      IN MICROGRAMS/M**3
        **
```

```
                    NETWORK
GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       0.00272 AT (  247853.50,  3913706.50,   760.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.00265 AT (  248605.20,  3912914.70,   764.55,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.00264 AT (  248629.90,  3912914.30,   764.03,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.00261 AT (  248654.60,  3912914.00,   763.53,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.00258 AT (  248600.00,  3912900.00,   764.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.00256 AT (  248679.30,  3912913.70,   762.89,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.00250 AT (  248703.90,  3912913.30,   762.01,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.00248 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.00246 AT (  248700.00,  3912900.00,   761.06,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.00242 AT (  248728.60,  3912913.00,   761.39,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         18:47:16

                             PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF SOX      IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)              RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.23482  ON 12081804: AT (  249256.30,
3913300.50,   680.20,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.20385  ON 12091424: AT (  249252.20,
3913127.90,   694.89,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***         18:47:16

                             PAGE   6
```

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                *** THE SUMMARY OF HIGHEST  3-HR RESULTS
***


                                    ** CONC OF SOX      IN MICROGRAMS/M**3
         **

                                                            DATE
                                     NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.10799  ON 12082221: AT (  249253.90,
3913201.90,   686.37,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.07600  ON 12072121: AT (  249252.20,
3913127.90,   694.89,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        18:47:16

                            PAGE   7
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                *** THE SUMMARY OF HIGHEST 24-HR RESULTS
***


                                    ** CONC OF SOX      IN MICROGRAMS/M**3
         **

                                                            DATE
                                     NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.02058  ON 12011824: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.01620  ON 12080924: AT (  247853.50,
3913706.50,   760.35,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        18:47:16

                            PAGE   8
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------
```

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          287 Informational Message(s)

 A Total of         8784 Hours Were Processed

 A Total of          130 Calm Hours Identified

 A Total of          157 Missing Hours Identified (  1.79 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1006       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        11:14:58

                           PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                             ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  NOX

 **Model Calculates  1 Short Term Average(s) of:   1-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.8 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20M1_(300K-YR)_2013_NOX.DTA

 **Output Print File:             Johe-CRITERIA-20M1_(300K-YR)_2013_NOX.LST
```

 **File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                 ***   06/05/15
 *** AERMET - VERSION 14134 *** ***
                 ***   11:14:58

                            PAGE   2
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                          *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                                  (1=YES; 0=NO)

           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

                NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

                                       *** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
                                                                  (METERS/SEC)

                                                    1.54,   3.09,   5.14,   8.23, 10.80,
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
                 ***   06/05/15
 *** AERMET - VERSION 14134 *** ***
                 ***   11:14:58

                            PAGE   3
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

                                       *** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

   Surface file: 23155_13.SFC
          Met Version: 14134
   Profile file: 23155_13.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:   23155   Upper air station no.:   23230
                 Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
                 Year: 2013   Year: 2013

 First 24 hours of scalar data
 YR MO DY JDY HR   H0   U*   W* DT/DZ ZICNV ZIMCH M-O LEN   Z0 BOWEN ALBEDO REF WS   WD   HT REF TA   HT
- -
 13 01 01   1 01   -3.8 0.059 -9.000 -9.000 -999.   34.   4.8 0.03   0.99   1.00

```
1.72  115.   10.0  278.1    2.0
 13 01 01   1 02   -9.3  0.095 -9.000 -9.000 -999.   71.      8.4  0.03   0.99   1.00
2.79  116.   10.0  277.5    2.0
 13 01 01   1 03  -11.3  0.198 -9.000 -9.000 -999.  212.     62.0  0.05   0.99   1.00
3.05  122.   10.0  278.1    2.0
 13 01 01   1 04   -2.2  0.046 -9.000 -9.000 -999.   63.      4.0  0.03   0.99   1.00
1.35   97.   10.0  277.5    2.0
 13 01 01   1 05   -2.6  0.048 -9.000 -9.000 -999.   25.      3.8  0.02   0.99   1.00
1.50  357.   10.0  276.4    2.0
 13 01 01   1 06   -8.5  0.126 -9.000 -9.000 -999.  107.     20.9  0.02   0.99   1.00
2.74   19.   10.0  278.1    2.0
 13 01 01   1 07   -3.6  0.064 -9.000 -9.000 -999.   40.      6.6  0.02   0.99   1.00
2.03   12.   10.0  277.5    2.0
 13 01 01   1 08   -3.2  0.062 -9.000 -9.000 -999.   37.      6.8  0.02   0.99   0.61
1.96  330.   10.0  278.8    2.0
 13 01 01   1 09   20.0  0.262  0.341  0.005   71.  322.    -81.0  0.04   0.99   0.35
3.44  165.   10.0  278.1    2.0
 13 01 01   1 10   65.7  0.231  0.714  0.005  199.  266.    -16.8  0.04   0.99   0.26
2.72  155.   10.0  279.2    2.0
 13 01 01   1 11   97.1  0.124  1.145  0.006  556.  111.     -1.8  0.02   0.99   0.23
1.25  237.   10.0  280.4    2.0
 13 01 01   1 12  113.8  0.086  1.411  0.008  885.   61.     -1.0  0.02   0.99   0.22
0.72  257.   10.0  283.8    2.0
 13 01 01   1 13  114.2  0.126  1.432  0.007  922.  108.     -1.6  0.02   0.99   0.22
1.31   15.   10.0  285.4    2.0
 13 01 01   1 14   95.7  0.213  1.365  0.006  951.  235.     -9.0  0.03   0.99   0.23
2.57  293.   10.0  286.4    2.0
 13 01 01   1 15   32.4  0.271  0.954  0.006  961.  338.    -54.8  0.02   0.99   0.26
3.95  343.   10.0  285.9    2.0
 13 01 01   1 16   15.9  0.366  0.754  0.006  965.  531.   -276.1  0.02   0.99   0.35
5.62  353.   10.0  284.9    2.0
 13 01 01   1 17  -15.1  0.256 -9.000 -9.000 -999.  318.    100.3  0.02   0.99   0.61
4.34  341.   10.0  283.1    2.0
 13 01 01   1 18   -8.3  0.086 -9.000 -9.000 -999.   97.      6.8  0.02   0.99   1.00
2.69  345.   10.0  279.9    2.0
 13 01 01   1 19   -8.4  0.086 -9.000 -9.000 -999.   61.      6.9  0.02   0.99   1.00
2.71  331.   10.0  279.9    2.0
 13 01 01   1 20   -7.9  0.085 -9.000 -9.000 -999.   59.      6.9  0.03   0.99   1.00
2.54  298.   10.0  279.2    2.0
 13 01 01   1 21   -3.9  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
1.77  280.   10.0  278.1    2.0
 13 01 01   1 22   -8.1  0.084 -9.000 -9.000 -999.   59.      6.6  0.02   0.99   1.00
2.69  309.   10.0  276.4    2.0
 13 01 01   1 23   -4.4  0.062 -9.000 -9.000 -999.   37.      4.9  0.02   0.99   1.00
1.96  340.   10.0  275.4    2.0
 13 01 01   1 24   -3.5  0.056 -9.000 -9.000 -999.   32.      4.6  0.03   0.99   1.00
1.67   62.   10.0  276.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 13 01 01 01   10.0 1  115.    1.72   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/05/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        11:14:58

                             PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF NOX      IN MICROGRAMS/M**3
        **
```

```
                    NETWORK
GROUP ID                          AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       2.05870 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       2.02406 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       1.99672 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       1.96699 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       1.96381 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       1.96009 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       1.94917 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       1.93757 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       1.90979 AT (  247828.00,  3913694.00,   762.96,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       1.90474 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         06/05/15
 *** AERMET - VERSION  14134 ***   ***
                ***        11:14:58

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF NOX      IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - -

ALL       HIGH   1ST HIGH VALUE IS     124.84542  ON 13091303: AT (  248828.00,
3913869.00,   648.40,  1321.50,    0.00)  DC
          HIGH   2ND HIGH VALUE IS     119.13558  ON 13101602: AT (  248553.00,
3913869.00,   689.20,  1321.50,    0.00)  DC
          HIGH   3RD HIGH VALUE IS     115.64895  ON 13011108: AT (  248703.00,
3912894.00,   760.49,  1321.50,    0.00)  DC
          HIGH   4TH HIGH VALUE IS     115.47831  ON 13020606: AT (  248703.00,
3912894.00,   760.49,  1321.50,    0.00)  DC
          HIGH   5TH HIGH VALUE IS     112.17549  ON 13101501: AT (  248703.00,
3912894.00,   760.49,  1321.50,    0.00)  DC
          HIGH   6TH HIGH VALUE IS     106.75787  ON 13020606: AT (  248678.00,
3912894.00,   761.55,  1321.50,    0.00)  DC
          HIGH   7TH HIGH VALUE IS     103.87397  ON 13103106: AT (  248703.00,
3912894.00,   760.49,  1321.50,    0.00)  DC
          HIGH   8TH HIGH VALUE IS      99.48532  ON 13040106: AT (  248578.00,
3912894.00,   764.35,  1321.50,    0.00)  DC
```

         HIGH   9TH HIGH VALUE IS   96.00814 ON 13011108: AT (248628.00,
3912894.00,   763.08, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   93.57507 ON 13011803: AT (248628.00,
3912894.00,   763.08, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/05/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   11:14:58

                             PAGE   6
 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   468 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   406 Calm Hours Identified

 A Total of   62 Missing Hours Identified (0.71 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   996   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** MODEL SETUP OPTIONS SUMMARY ***

- -

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION. DRYDPLT = F
**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:
1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.

**Other Options Specified:
CCVR_Sub - Meteorological data includes CCVR substitutions
TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: PM10

**Model Calculates 1 Short Term Average(s) of: 24-HR
and Calculates ANNUAL Averages

**This Run Includes: 83 Source(s);   1 Source Group(s); and   844 Receptor(s)

**Model Set To Continue RUNning After the Setup Testing.

**The AERMET Input Meteorological Data Version Date: 14134

**Output Options Selected:
Model Outputs Tables of ANNUAL Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ; Decay Coef. = 0.000   ; Rot. Angle =   0.0
Emission Units = GRAMS/SEC   ; Emission Rate Unit Factor =   0.10000E+07
Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =   3.8 MB of RAM.

**Input Runstream File: Johe-CRITERIA-20M1_(300K-YR)_2013_PM10.DTA

**Output Print File: Johe-CRITERIA-20M1_(300K-YR)_2013_PM10.LST

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/06/15
*** AERMET - VERSION 14134 *** *** *** 09:46:41

PAGE 2
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/06/15
*** AERMET - VERSION 14134 *** *** *** 09:46:41

PAGE 3
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_13.SFC
Met Version: 14134
Profile file: 23155_13.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2013 Year: 2013

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD      HT  REF TA      HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - -
 13 01 01   1 01   -3.8  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
```

```
1.72  115.   10.0  278.1    2.0
 13 01 01   1 02   -9.3  0.095 -9.000 -9.000 -999.   71.      8.4  0.03   0.99   1.00
2.79  116.   10.0  277.5    2.0
 13 01 01   1 03  -11.3  0.198 -9.000 -9.000 -999.  212.     62.0  0.05   0.99   1.00
3.05  122.   10.0  278.1    2.0
 13 01 01   1 04   -2.2  0.046 -9.000 -9.000 -999.   63.      4.0  0.03   0.99   1.00
1.35   97.   10.0  277.5    2.0
 13 01 01   1 05   -2.6  0.048 -9.000 -9.000 -999.   25.      3.8  0.02   0.99   1.00
1.50  357.   10.0  276.4    2.0
 13 01 01   1 06   -8.5  0.126 -9.000 -9.000 -999.  107.     20.9  0.02   0.99   1.00
2.74   19.   10.0  278.1    2.0
 13 01 01   1 07   -3.6  0.064 -9.000 -9.000 -999.   40.      6.6  0.02   0.99   1.00
2.03   12.   10.0  277.5    2.0
 13 01 01   1 08   -3.2  0.062 -9.000 -9.000 -999.   37.      6.8  0.02   0.99   0.61
1.96  330.   10.0  278.8    2.0
 13 01 01   1 09   20.0  0.262  0.341  0.005   71.  322.    -81.0  0.04   0.99   0.35
3.44  165.   10.0  278.1    2.0
 13 01 01   1 10   65.7  0.231  0.714  0.005  199.  266.    -16.8  0.04   0.99   0.26
2.72  155.   10.0  279.2    2.0
 13 01 01   1 11   97.1  0.124  1.145  0.006  556.  111.     -1.8  0.02   0.99   0.23
1.25  237.   10.0  280.4    2.0
 13 01 01   1 12  113.8  0.086  1.411  0.008  885.   61.     -1.0  0.02   0.99   0.22
0.72  257.   10.0  283.8    2.0
 13 01 01   1 13  114.2  0.126  1.432  0.007  922.  108.     -1.6  0.02   0.99   0.22
1.31   15.   10.0  285.4    2.0
 13 01 01   1 14   95.7  0.213  1.365  0.006  951.  235.     -9.0  0.03   0.99   0.23
2.57  293.   10.0  286.4    2.0
 13 01 01   1 15   32.4  0.271  0.954  0.006  961.  338.    -54.8  0.02   0.99   0.26
3.95  343.   10.0  285.9    2.0
 13 01 01   1 16   15.9  0.366  0.754  0.006  965.  531.   -276.1  0.02   0.99   0.35
5.62  353.   10.0  284.9    2.0
 13 01 01   1 17  -15.1  0.256 -9.000 -9.000 -999.  318.    100.3  0.02   0.99   0.61
4.34  341.   10.0  283.1    2.0
 13 01 01   1 18   -8.3  0.086 -9.000 -9.000 -999.   97.      6.8  0.02   0.99   1.00
2.69  345.   10.0  279.9    2.0
 13 01 01   1 19   -8.4  0.086 -9.000 -9.000 -999.   61.      6.9  0.02   0.99   1.00
2.71  331.   10.0  279.9    2.0
 13 01 01   1 20   -7.9  0.085 -9.000 -9.000 -999.   59.      6.9  0.03   0.99   1.00
2.54  298.   10.0  279.2    2.0
 13 01 01   1 21   -3.9  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
1.77  280.   10.0  278.1    2.0
 13 01 01   1 22   -8.1  0.084 -9.000 -9.000 -999.   59.      6.6  0.02   0.99   1.00
2.69  309.   10.0  276.4    2.0
 13 01 01   1 23   -4.4  0.062 -9.000 -9.000 -999.   37.      4.9  0.02   0.99   1.00
1.96  340.   10.0  275.4    2.0
 13 01 01   1 24   -3.5  0.056 -9.000 -9.000 -999.   32.      4.6  0.03   0.99   1.00
1.67   62.   10.0  276.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 13 01 01 01   10.0 1  115.    1.72   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***        06/06/15
 *** AERMET - VERSION  14134 ***   ***
                  ***       09:46:41

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                  *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                   ** CONC OF PM10     IN MICROGRAMS/M**3
        **
```

```
                NETWORK
GROUP ID                        AVERAGE CONC                RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       4.25034 AT (  248703.00,  3912894.00,   760.49,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       4.24782 AT (  248728.00,  3912894.00,   759.43,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       4.18191 AT (  248753.00,  3912894.00,   758.66,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       4.12004 AT (  248678.00,  3912894.00,   761.55,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       4.11698 AT (  248778.00,  3912894.00,   758.97,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       4.02789 AT (  248803.00,  3912894.00,   759.41,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       3.96045 AT (  248653.00,  3912894.00,   762.44,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       3.90679 AT (  248828.00,  3912894.00,   759.89,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       3.78371 AT (  248628.00,  3912894.00,   763.08,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       3.75342 AT (  248853.00,  3912894.00,   759.57,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***         06/06/15
 *** AERMET - VERSION  14134 ***   ***
                ***        09:46:41

                            PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                  *** THE SUMMARY OF HIGHEST 24-HR RESULTS
***


                                     ** CONC OF PM10     IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       HIGH   1ST HIGH VALUE IS      26.67810  ON 13020624: AT (  248803.00,
3912894.00,   759.41,  1321.50,    0.00)  DC
          HIGH   2ND HIGH VALUE IS      20.49399  ON 13012024: AT (  247828.00,
3913694.00,   762.96,  1321.50,    0.00)  DC
          HIGH   3RD HIGH VALUE IS      18.34954  ON 13012924: AT (  247828.00,
3913694.00,   762.96,  1321.50,    0.00)  DC
          HIGH   4TH HIGH VALUE IS      17.75130  ON 13011924: AT (  247828.00,
3913694.00,   762.96,  1321.50,    0.00)  DC
          HIGH   5TH HIGH VALUE IS      15.07990  ON 13020424: AT (  248828.00,
3912894.00,   759.89,  1321.50,    0.00)  DC
          HIGH   6TH HIGH VALUE IS      14.02939  ON 13110924: AT (  247828.00,
3913794.00,   761.90,  1321.50,    0.00)  DC
          HIGH   7TH HIGH VALUE IS      13.81813  ON 13012024: AT (  247828.00,
3913794.00,   761.90,  1321.50,    0.00)  DC
          HIGH   8TH HIGH VALUE IS      13.43774  ON 13013124: AT (  247828.00,
3913794.00,   761.90,  1321.50,    0.00)  DC
```

         HIGH   9TH HIGH VALUE IS   13.23730 ON 13010324: AT (247828.00,
3913794.00,   761.90, 1321.50,   0.00) DC
         HIGH 10TH HIGH VALUE IS   12.26301 ON 13010324: AT (247828.00,
3913694.00,   762.96, 1321.50,   0.00) DC

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   06/06/15
 *** AERMET - VERSION 14134 ***   ***
                 ***   09:46:41

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

 A Total of   0 Fatal Error Message(s)
 A Total of   1 Warning Message(s)
 A Total of   468 Informational Message(s)

 A Total of   8760 Hours Were Processed

 A Total of   406 Calm Hours Identified

 A Total of   62 Missing Hours Identified (0.71 Percent)

    ******** FATAL ERROR MESSAGES ********
               *** NONE ***

    ********   WARNING MESSAGES   ********
 ME W186   1056   MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                   ***        06/07/15
 *** AERMET - VERSION  14134 ***   ***
                  ***        13:09:11

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                              ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  PM2.5

 **Note that special processing requirements apply for the 24-hour PM2.5 NAAQS - check
available guidance.
   Model will process user-specified ranks of high 24-hour values averaged across the
number of years modeled, and
   the multi-year average of individual ANNUAL values, averaged across the number of years
modeled.

 **Model Calculates  1 Short Term Average(s) of:  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     83 Source(s);       1 Source Group(s); and     844 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3
```

Johe-CRITERIA-20M1_2013_PM2.5
**Approximate Storage Requirements of Model = 3.7 MB of RAM.

**Input Runstream File: Johe-CRITERIA-20M1_(300K-YR)_2013_PM2.5.DTA

**Output Print File: Johe-CRITERIA-20M1_(300K-YR)_2013_PM2.5.LST

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Mine-1\Johe-CRITERIA-20M1_(300K-Y

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/07/15
*** AERMET - VERSION 14134 *** *** *** 13:09:11

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch *** 06/07/15
*** AERMET - VERSION 14134 *** *** *** 13:09:11

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_13.SFC
Met Version: 14134
Profile file: 23155_13.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 23155 Upper air station no.: 23230
Name: BAKERSFIELD MEADOWS FIELD, CA Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2013 Year: 2013

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
13	01	01	1	01	-3.8	0.059	-9.000	-9.000	-999.	34.	4.8	0.03	0.99	1.00	1.72	115.	10.0	278.1	2.0
13	01	01	1	02	-9.3	0.095	-9.000	-9.000	-999.	71.	8.4	0.03	0.99	1.00	2.79	116.	10.0	277.5	2.0
13	01	01	1	03	-11.3	0.198	-9.000	-9.000	-999.	212.	62.0	0.05	0.99	1.00	3.05	122.	10.0	278.1	2.0
13	01	01	1	04	-2.2	0.046	-9.000	-9.000	-999.	63.	4.0	0.03	0.99	1.00	1.35	97.	10.0	277.5	2.0
13	01	01	1	05	-2.6	0.048	-9.000	-9.000	-999.	25.	3.8	0.02	0.99	1.00	1.50	357.	10.0	276.4	2.0
13	01	01	1	06	-8.5	0.126	-9.000	-9.000	-999.	107.	20.9	0.02	0.99	1.00	2.74	19.	10.0	278.1	2.0
13	01	01	1	07	-3.6	0.064	-9.000	-9.000	-999.	40.	6.6	0.02	0.99	1.00	2.03	12.	10.0	277.5	2.0
13	01	01	1	08	-3.2	0.062	-9.000	-9.000	-999.	37.	6.8	0.02	0.99	0.61	1.96	330.	10.0	278.8	2.0
13	01	01	1	09	20.0	0.262	0.341	0.005	71.	322.	-81.0	0.04	0.99	0.35	3.44	165.	10.0	278.1	2.0
13	01	01	1	10	65.7	0.231	0.714	0.005	199.	266.	-16.8	0.04	0.99	0.26	2.72	155.	10.0	279.2	2.0
13	01	01	1	11	97.1	0.124	1.145	0.006	556.	111.	-1.8	0.02	0.99	0.23	1.25	237.	10.0	280.4	2.0
13	01	01	1	12	113.8	0.086	1.411	0.008	885.	61.	-1.0	0.02	0.99	0.22	0.72	257.	10.0	283.8	2.0
13	01	01	1	13	114.2	0.126	1.432	0.007	922.	108.	-1.6	0.02	0.99	0.22	1.31	15.	10.0	285.4	2.0
13	01	01	1	14	95.7	0.213	1.365	0.006	951.	235.	-9.0	0.03	0.99	0.23	2.57	293.	10.0	286.4	2.0
13	01	01	1	15	32.4	0.271	0.954	0.006	961.	338.	-54.8	0.02	0.99	0.26	3.95	343.	10.0	285.9	2.0
13	01	01	1	16	15.9	0.366	0.754	0.006	965.	531.	-276.1	0.02	0.99	0.35	5.62	353.	10.0	284.9	2.0
13	01	01	1	17	-15.1	0.256	-9.000	-9.000	-999.	318.	100.3	0.02	0.99	0.61	4.34	341.	10.0	283.1	2.0
13	01	01	1	18	-8.3	0.086	-9.000	-9.000	-999.	97.	6.8	0.02	0.99	1.00	2.69	345.	10.0	279.9	2.0
13	01	01	1	19	-8.4	0.086	-9.000	-9.000	-999.	61.	6.9	0.02	0.99	1.00	2.71	331.	10.0	279.9	2.0
13	01	01	1	20	-7.9	0.085	-9.000	-9.000	-999.	59.	6.9	0.03	0.99	1.00	2.54	298.	10.0	279.2	2.0
13	01	01	1	21	-3.9	0.059	-9.000	-9.000	-999.	34.	4.8	0.03	0.99	1.00	1.77	280.	10.0	278.1	2.0
13	01	01	1	22	-8.1	0.084	-9.000	-9.000	-999.	59.	6.6	0.02	0.99	1.00	2.69	309.	10.0	276.4	2.0
13	01	01	1	23	-4.4	0.062	-9.000	-9.000	-999.	37.	4.9	0.02	0.99	1.00	1.96	340.	10.0	275.4	2.0
13	01	01	1	24	-3.5	0.056	-9.000	-9.000	-999.	32.	4.6	0.03	0.99	1.00	1.67	62.	10.0	276.4	2.0

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
13	01	01	01	10.0	1	115.	1.72	278.2	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 13:09:11

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**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER

1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	0.48044	AT (248703.00, 3912894.00, 760.49, 1321.50, 0.00)	DC		
	2ND HIGHEST VALUE IS	0.47553	AT (248728.00, 3912894.00, 759.43, 1321.50, 0.00)	DC		
	3RD HIGHEST VALUE IS	0.47089	AT (248678.00, 3912894.00, 761.55, 1321.50, 0.00)	DC		
	4TH HIGHEST VALUE IS	0.46621	AT (248778.00, 3912894.00, 758.97, 1321.50, 0.00)	DC		
	5TH HIGHEST VALUE IS	0.46548	AT (248753.00, 3912894.00, 758.66, 1321.50, 0.00)	DC		
	6TH HIGHEST VALUE IS	0.46525	AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC		
	7TH HIGHEST VALUE IS	0.46128	AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC		
	8TH HIGHEST VALUE IS	0.45401	AT (248653.00, 3912894.00, 762.44, 1321.50, 0.00)	DC		
	9TH HIGHEST VALUE IS	0.44946	AT (248853.00, 3912894.00, 759.57, 1321.50, 0.00)	DC		
	10TH HIGHEST VALUE IS	0.43559	AT (248628.00, 3912894.00, 763.08, 1321.50, 0.00)	DC		

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 13:09:11

PAGE 5
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM 1ST-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3
**

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	1ST HIGHEST VALUE IS	4.33261	AT (247828.00, 3913794.00, 761.90, 1321.50, 0.00)	DC		
	2ND HIGHEST VALUE IS	3.94555	AT (248803.00, 3912894.00, 759.41, 1321.50, 0.00)	DC		
	3RD HIGHEST VALUE IS	3.93611	AT (248828.00, 3912894.00, 759.89, 1321.50, 0.00)	DC		
	4TH HIGHEST VALUE IS	3.87675	AT (247853.00, 3913869.00, 760.30, 1321.50, 0.00)	DC		
	5TH HIGHEST VALUE IS	3.86263	AT (248778.00, 3912894.00, 758.97,			

1321.50, 0.00) DC
6TH HIGHEST VALUE IS 3.71025 AT (248753.00, 3912894.00, 758.66,
1321.50, 0.00) DC
7TH HIGHEST VALUE IS 3.70842 AT (248728.00, 3912894.00, 759.43,
1321.50, 0.00) DC
8TH HIGHEST VALUE IS 3.66325 AT (248853.00, 3912894.00, 759.57,
1321.50, 0.00) DC
9TH HIGHEST VALUE IS 3.63138 AT (247828.00, 3913769.00, 756.17,
1321.50, 0.00) DC
10TH HIGHEST VALUE IS 3.49419 AT (247828.00, 3913694.00, 762.96,
1321.50, 0.00) DC
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 13:09:11

PAGE 6
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM 2ND-HIGHEST 24-HR RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM2.5 IN MICROGRAMS/M**3 **

NETWORK
GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
- -

ALL 1ST HIGHEST VALUE IS 3.37583 AT (247828.00, 3913694.00, 762.96,
1321.50, 0.00) DC
2ND HIGHEST VALUE IS 3.23978 AT (247800.00, 3913700.00, 759.04,
1321.50, 0.00) DC
3RD HIGHEST VALUE IS 3.06434 AT (247828.00, 3913794.00, 761.90,
1321.50, 0.00) DC
4TH HIGHEST VALUE IS 2.95905 AT (248778.00, 3912894.00, 758.97,
1321.50, 0.00) DC
5TH HIGHEST VALUE IS 2.94498 AT (248803.00, 3912894.00, 759.41,
1321.50, 0.00) DC
6TH HIGHEST VALUE IS 2.88536 AT (248753.00, 3912894.00, 758.66,
1321.50, 0.00) DC
7TH HIGHEST VALUE IS 2.88018 AT (248728.00, 3912894.00, 759.43,
1321.50, 0.00) DC
8TH HIGHEST VALUE IS 2.82873 AT (248828.00, 3912894.00, 759.89,
1321.50, 0.00) DC
9TH HIGHEST VALUE IS 2.76193 AT (248703.00, 3912894.00, 760.49,
1321.50, 0.00) DC
10TH HIGHEST VALUE IS 2.74735 AT (247853.00, 3913869.00, 760.30,
1321.50, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 *** *** Johes Ranch
*** 06/07/15
*** AERMET - VERSION 14134 *** ***
*** 13:09:11

PAGE 7
**MODELOPTs: RegDFAULT CONC ELEV NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          468 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          406 Calm Hours Identified

 A Total of           62 Missing Hours Identified (  0.71 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1056       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

```
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                    ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  CO

 **Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                               ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2013_CO.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2013_CO.LST


 **File for Summary of Results:   h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air
Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
```

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

```
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
1 1 1 1   1 1 1 1 1 1 1 1 1 1
           1 1 1 1 1 1 1 1 1 1   1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***

(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
   Surface file:   23155_13.SFC
           Met Version:  14134
   Profile file:   23155_13.PFL

   Surface format: FREE

   Profile format: FREE

   Surface station no.:    23155                  Upper air station no.:    23230
                   Name: BAKERSFIELD MEADOWS FIELD, CA              Name: OAKLAND
METROPOLITAN ARPT, CA
                   Year:   2013                                     Year:   2013

 First 24 hours of scalar data
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
 13 01 01   1 01   -3.8  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
1.72  115.   10.0  278.1    2.0
 13 01 01   1 02   -9.3  0.095 -9.000 -9.000 -999.   71.      8.4  0.03   0.99   1.00
```

```
2.79  116.   10.0  277.5    2.0
 13 01 01   1 03  -11.3  0.198 -9.000 -9.000 -999.  212.     62.0  0.05   0.99   1.00
3.05  122.   10.0  278.1    2.0
 13 01 01   1 04   -2.2  0.046 -9.000 -9.000 -999.   63.      4.0  0.03   0.99   1.00
1.35   97.   10.0  277.5    2.0
 13 01 01   1 05   -2.6  0.048 -9.000 -9.000 -999.   25.      3.8  0.02   0.99   1.00
1.50  357.   10.0  276.4    2.0
 13 01 01   1 06   -8.5  0.126 -9.000 -9.000 -999.  107.     20.9  0.02   0.99   1.00
2.74   19.   10.0  278.1    2.0
 13 01 01   1 07   -3.6  0.064 -9.000 -9.000 -999.   40.      6.6  0.02   0.99   1.00
2.03   12.   10.0  277.5    2.0
 13 01 01   1 08   -3.2  0.062 -9.000 -9.000 -999.   37.      6.8  0.02   0.99   0.61
1.96  330.   10.0  278.8    2.0
 13 01 01   1 09   20.0  0.262  0.341  0.005   71.  322.    -81.0  0.04   0.99   0.35
3.44  165.   10.0  278.1    2.0
 13 01 01   1 10   65.7  0.231  0.714  0.005  199.  266.    -16.8  0.04   0.99   0.26
2.72  155.   10.0  279.2    2.0
 13 01 01   1 11   97.1  0.124  1.145  0.006  556.  111.     -1.8  0.02   0.99   0.23
1.25  237.   10.0  280.4    2.0
 13 01 01   1 12  113.8  0.086  1.411  0.008  885.   61.     -1.0  0.02   0.99   0.22
0.72  257.   10.0  283.8    2.0
 13 01 01   1 13  114.2  0.126  1.432  0.007  922.  108.     -1.6  0.02   0.99   0.22
1.31   15.   10.0  285.4    2.0
 13 01 01   1 14   95.7  0.213  1.365  0.006  951.  235.     -9.0  0.03   0.99   0.23
2.57  293.   10.0  286.4    2.0
 13 01 01   1 15   32.4  0.271  0.954  0.006  961.  338.    -54.8  0.02   0.99   0.26
3.95  343.   10.0  285.9    2.0
 13 01 01   1 16   15.9  0.366  0.754  0.006  965.  531.   -276.1  0.02   0.99   0.35
5.62  353.   10.0  284.9    2.0
 13 01 01   1 17  -15.1  0.256 -9.000 -9.000 -999.  318.    100.3  0.02   0.99   0.61
4.34  341.   10.0  283.1    2.0
 13 01 01   1 18   -8.3  0.086 -9.000 -9.000 -999.   97.      6.8  0.02   0.99   1.00
2.69  345.   10.0  279.9    2.0
 13 01 01   1 19   -8.4  0.086 -9.000 -9.000 -999.   61.      6.9  0.02   0.99   1.00
2.71  331.   10.0  279.9    2.0
 13 01 01   1 20   -7.9  0.085 -9.000 -9.000 -999.   59.      6.9  0.03   0.99   1.00
2.54  298.   10.0  279.2    2.0
 13 01 01   1 21   -3.9  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
1.77  280.   10.0  278.1    2.0
 13 01 01   1 22   -8.1  0.084 -9.000 -9.000 -999.   59.      6.6  0.02   0.99   1.00
2.69  309.   10.0  276.4    2.0
 13 01 01   1 23   -4.4  0.062 -9.000 -9.000 -999.   37.      4.9  0.02   0.99   1.00
1.96  340.   10.0  275.4    2.0
 13 01 01   1 24   -3.5  0.056 -9.000 -9.000 -999.   32.      4.6  0.03   0.99   1.00
1.67   62.   10.0  276.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 13 01 01 01   10.0 1  115.    1.72   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/21/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         02:01:49

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                        ** CONC OF CO       IN MICROGRAMS/M**3
        **

                                                    DATE
                                    NETWORK
GROUP ID                            AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR,
```

YR, ZELEV, ZHILL, ZFLAG)   OF TYPE GRID-ID
- -
- -

ALL   HIGH   1ST HIGH VALUE IS   58.46354 ON 13020607: AT (248600.00,
3912900.00,   764.08, 1321.50,   0.00) DC
HIGH   2ND HIGH VALUE IS   56.12324 ON 13110802: AT (247853.50,
3913706.50,   760.35, 1321.50,   0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 05/21/15
*** AERMET - VERSION 14134 ***   ***
*** 02:01:49

PAGE   5
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 8-HR RESULTS
***

** CONC OF CO   IN MICROGRAMS/M**3
**

DATE
NETWORK
GROUP ID   AVERAGE CONC   (YYMMDDHH)   RECEPTOR (XR,
YR, ZELEV, ZHILL, ZFLAG)   OF TYPE GRID-ID
- -
- -

ALL   HIGH   1ST HIGH VALUE IS   18.52571 ON 13020608: AT (248600.00,
3912900.00,   764.08, 1321.50,   0.00) DC
HIGH   2ND HIGH VALUE IS   16.80505 ON 13042708: AT (247853.50,
3913706.50,   760.35, 1321.50,   0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
*** 05/21/15
*** AERMET - VERSION 14134 ***   ***
*** 02:01:49

PAGE   6
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of   0 Fatal Error Message(s)
A Total of   1 Warning Message(s)
A Total of   468 Informational Message(s)

A Total of   8760 Hours Were Processed

A Total of   406 Calm Hours Identified

A Total of   62 Missing Hours Identified (0.71 Percent)

******** FATAL ERROR MESSAGES ********

*** NONE ***

******** WARNING MESSAGES ********
ME W186 1006 MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50

```
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                 ***        05/20/15
 *** AERMET - VERSION  14134 ***   ***
                 ***        19:28:05

                            PAGE   1
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                ***     MODEL SETUP OPTIONS SUMMARY       ***
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - -

 **Model Is Setup For Calculation of Average CONCentration Values.

   --  DEPOSITION LOGIC  --
 **NO GAS DEPOSITION Data Provided.
 **NO PARTICLE DEPOSITION Data Provided.
 **Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
 **Model Uses NO WET DEPLETION.  WETDPLT  =  F

 **Model Uses RURAL Dispersion Only.

 **Model Uses Regulatory DEFAULT Options:
         1. Stack-tip Downwash.
         2. Model Accounts for ELEVated Terrain Effects.
         3. Use Calms Processing Routine.
         4. Use Missing Data Processing Routine.
         5. No Exponential Decay.

 **Other Options Specified:
         CCVR_Sub - Meteorological data includes CCVR substitutions
         TEMP_Sub - Meteorological data includes TEMP substitutions

 **Model Assumes No FLAGPOLE Receptor Heights.

 **The User Specified a Pollutant Type of:  SOX

 **Model Calculates  3 Short Term Average(s) of:   1-HR   3-HR  24-HR
     and Calculates ANNUAL Averages

 **This Run Includes:     61 Source(s);       1 Source Group(s); and     854 Receptor(s)

 **Model Set To Continue RUNning After the Setup Testing.

 **The AERMET Input Meteorological Data Version Date:  14134

 **Output Options Selected:
          Model Outputs Tables of ANNUAL Averages by Receptor
          Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
          Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
          Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

 **NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and
Missing Hours

 **Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =   149.00 ;  Decay Coef. =
0.000     ;  Rot. Angle =     0.0
                  Emission Units = GRAMS/SEC                                ;  Emission
Rate Unit Factor =   0.10000E+07
                  Output Units   = MICROGRAMS/M**3

 **Approximate Storage Requirements of Model =      3.7 MB of RAM.

 **Input Runstream File:          Johe-CRITERIA-20_Acres-Vol_2013_SOX.DTA

 **Output Print File:             Johe-CRITERIA-20_Acres-Vol_2013_SOX.LST
```

**File for Summary of Results: h:\ClientData\ACTIVE\GF Industries\Johe Ranch\Air Study\Aermod\Criteria (330k)\Johe-CRITERIA-20_
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
***   05/20/15
*** AERMET - VERSION 14134 ***   ***
***   19:28:05

PAGE   2
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

```
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
***   05/20/15
*** AERMET - VERSION 14134 ***   ***
***   19:28:05

PAGE   3
**MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: 23155_13.SFC
Met Version: 14134
Profile file: 23155_13.PFL

Surface format: FREE

Profile format: FREE

Surface station no.:   23155   Upper air station no.:   23230
Name: BAKERSFIELD MEADOWS FIELD, CA   Name: OAKLAND METROPOLITAN ARPT, CA
Year: 2013   Year: 2013

First 24 hours of scalar data

```
 YR MO DY JDY HR     H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF
WS   WD     HT  REF TA     HT
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - -
 13 01 01   1 01   -3.8  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
```

```
1.72  115.   10.0  278.1    2.0
 13 01 01   1 02   -9.3  0.095 -9.000 -9.000 -999.   71.      8.4  0.03   0.99   1.00
2.79  116.   10.0  277.5    2.0
 13 01 01   1 03  -11.3  0.198 -9.000 -9.000 -999.  212.     62.0  0.05   0.99   1.00
3.05  122.   10.0  278.1    2.0
 13 01 01   1 04   -2.2  0.046 -9.000 -9.000 -999.   63.      4.0  0.03   0.99   1.00
1.35   97.   10.0  277.5    2.0
 13 01 01   1 05   -2.6  0.048 -9.000 -9.000 -999.   25.      3.8  0.02   0.99   1.00
1.50  357.   10.0  276.4    2.0
 13 01 01   1 06   -8.5  0.126 -9.000 -9.000 -999.  107.     20.9  0.02   0.99   1.00
2.74   19.   10.0  278.1    2.0
 13 01 01   1 07   -3.6  0.064 -9.000 -9.000 -999.   40.      6.6  0.02   0.99   1.00
2.03   12.   10.0  277.5    2.0
 13 01 01   1 08   -3.2  0.062 -9.000 -9.000 -999.   37.      6.8  0.02   0.99   0.61
1.96  330.   10.0  278.8    2.0
 13 01 01   1 09   20.0  0.262  0.341  0.005   71.  322.    -81.0  0.04   0.99   0.35
3.44  165.   10.0  278.1    2.0
 13 01 01   1 10   65.7  0.231  0.714  0.005  199.  266.    -16.8  0.04   0.99   0.26
2.72  155.   10.0  279.2    2.0
 13 01 01   1 11   97.1  0.124  1.145  0.006  556.  111.     -1.8  0.02   0.99   0.23
1.25  237.   10.0  280.4    2.0
 13 01 01   1 12  113.8  0.086  1.411  0.008  885.   61.     -1.0  0.02   0.99   0.22
0.72  257.   10.0  283.8    2.0
 13 01 01   1 13  114.2  0.126  1.432  0.007  922.  108.     -1.6  0.02   0.99   0.22
1.31   15.   10.0  285.4    2.0
 13 01 01   1 14   95.7  0.213  1.365  0.006  951.  235.     -9.0  0.03   0.99   0.23
2.57  293.   10.0  286.4    2.0
 13 01 01   1 15   32.4  0.271  0.954  0.006  961.  338.    -54.8  0.02   0.99   0.26
3.95  343.   10.0  285.9    2.0
 13 01 01   1 16   15.9  0.366  0.754  0.006  965.  531.   -276.1  0.02   0.99   0.35
5.62  353.   10.0  284.9    2.0
 13 01 01   1 17  -15.1  0.256 -9.000 -9.000 -999.  318.    100.3  0.02   0.99   0.61
4.34  341.   10.0  283.1    2.0
 13 01 01   1 18   -8.3  0.086 -9.000 -9.000 -999.   97.      6.8  0.02   0.99   1.00
2.69  345.   10.0  279.9    2.0
 13 01 01   1 19   -8.4  0.086 -9.000 -9.000 -999.   61.      6.9  0.02   0.99   1.00
2.71  331.   10.0  279.9    2.0
 13 01 01   1 20   -7.9  0.085 -9.000 -9.000 -999.   59.      6.9  0.03   0.99   1.00
2.54  298.   10.0  279.2    2.0
 13 01 01   1 21   -3.9  0.059 -9.000 -9.000 -999.   34.      4.8  0.03   0.99   1.00
1.77  280.   10.0  278.1    2.0
 13 01 01   1 22   -8.1  0.084 -9.000 -9.000 -999.   59.      6.6  0.02   0.99   1.00
2.69  309.   10.0  276.4    2.0
 13 01 01   1 23   -4.4  0.062 -9.000 -9.000 -999.   37.      4.9  0.02   0.99   1.00
1.96  340.   10.0  275.4    2.0
 13 01 01   1 24   -3.5  0.056 -9.000 -9.000 -999.   32.      4.6  0.03   0.99   1.00
1.67   62.   10.0  276.4    2.0


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
 13 01 01 01   10.0 1  115.    1.72   278.2   99.0  -99.00  -99.00

 F indicates top of profile (=1) or below (=0)
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         19:28:05

                              PAGE   4
 **MODELOPTs:   RegDFAULT CONC       ELEV       NODRYDPLT NOWETDPLT

                                    *** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER
  1 YEARS ***


                                     ** CONC OF SOX      IN MICROGRAMS/M**3
        **
```

```
                    NETWORK
GROUP ID                          AVERAGE CONC                 RECEPTOR  (XR, YR, ZELEV,
ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - -

ALL       1ST HIGHEST VALUE IS       0.00291 AT (  247853.50,  3913706.50,   760.35,
1321.50,    0.00)  DC
          2ND HIGHEST VALUE IS       0.00262 AT (  247800.00,  3913700.00,   759.04,
1321.50,    0.00)  DC
          3RD HIGHEST VALUE IS       0.00254 AT (  248605.20,  3912914.70,   764.55,
1321.50,    0.00)  DC
          4TH HIGHEST VALUE IS       0.00252 AT (  248629.90,  3912914.30,   764.03,
1321.50,    0.00)  DC
          5TH HIGHEST VALUE IS       0.00248 AT (  248600.00,  3912900.00,   764.08,
1321.50,    0.00)  DC
          6TH HIGHEST VALUE IS       0.00248 AT (  248654.60,  3912914.00,   763.53,
1321.50,    0.00)  DC
          7TH HIGHEST VALUE IS       0.00242 AT (  248679.30,  3912913.70,   762.89,
1321.50,    0.00)  DC
          8TH HIGHEST VALUE IS       0.00234 AT (  248703.90,  3912913.30,   762.01,
1321.50,    0.00)  DC
          9TH HIGHEST VALUE IS       0.00230 AT (  248700.00,  3912900.00,   761.06,
1321.50,    0.00)  DC
         10TH HIGHEST VALUE IS       0.00229 AT (  249252.20,  3913127.90,   694.89,
1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         19:28:05

                              PAGE   5
 **MODELOPTs:   RegDFAULT CONC      ELEV      NODRYDPLT NOWETDPLT

                                                 *** THE SUMMARY OF HIGHEST  1-HR RESULTS
***


                                      ** CONC OF SOX      IN MICROGRAMS/M**3
        **

                                                        DATE
                                    NETWORK
GROUP ID                           AVERAGE CONC     (YYMMDDHH)              RECEPTOR  (XR,
YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS       0.25256  ON 13062801: AT (  249253.40,
3913177.20,   688.20,  1321.50,    0.00)  DC
         HIGH   2ND HIGH VALUE IS       0.22347  ON 13071424: AT (  249253.40,
3913177.20,   688.20,  1321.50,    0.00)  DC


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION  14134 ***   *** Johes Ranch
                  ***         05/20/15
 *** AERMET - VERSION  14134 ***   ***
                  ***         19:28:05

                              PAGE   6
```

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 3-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.10280	ON 13042606: AT (249400.00, 3913300.00, 712.37, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	0.08146	ON 13081906: AT (249251.60, 3913103.30, 700.52, 1321.50, 0.00)	DC	

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   19:28:05

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF SOX   IN MICROGRAMS/M**3 **

GROUP ID	NETWORK AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.02014	ON 13062824: AT (249253.40, 3913177.20, 688.20, 1321.50, 0.00)	DC	
	HIGH 2ND HIGH VALUE IS	0.01765	ON 13110924: AT (247853.50, 3913706.50, 760.35, 1321.50, 0.00)	DC	

 *** RECEPTOR TYPES: GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
♀ *** AERMOD - VERSION 14134 ***   *** Johes Ranch
                  ***   05/20/15
 *** AERMET - VERSION 14134 ***   ***
                  ***   19:28:05

 **MODELOPTs: RegDFAULT CONC   ELEV   NODRYDPLT NOWETDPLT

 *** Message Summary : AERMOD Model Execution ***

  --------- Summary of Total Messages --------

```
 A Total of            0 Fatal Error Message(s)
 A Total of            1 Warning Message(s)
 A Total of          468 Informational Message(s)

 A Total of         8760 Hours Were Processed

 A Total of          406 Calm Hours Identified

 A Total of           62 Missing Hours Identified (  0.71 Percent)


    ******** FATAL ERROR MESSAGES ********
                ***  NONE  ***


    ********   WARNING MESSAGES   ********
 ME W186    1006       MEOPEN: THRESH_1MIN 1-min ASOS wind speed threshold used
0.50
```

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Appendix VIII
Project Specific E.S. EPA VISCREEN Model Results

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Visual Effects Screening Analysis for
Source: JOHES RANCH
Class I Area: DOMELAND WILDERNESS

*** Level-1 Screening ***

Input Emissions for

Particulates	7.16	TON/YR
NOx (as NO2)	4.98	TON/YR
Primary NO2	0.00	TON/YR
Soot	0.00	TON/YR
Primary SO4	0.00	TON/YR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	0.04 ppm
Background Visual Range:	243.00 km
Source-Observer Distance:	143.00 km
Min. Source-Class I Distance:	143.00 km
Max. Source-Class I Distance:	172.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	127.	172.0	41.	2.00	0.030	0.05	0.001
SKY	140.	127.	172.0	41.	2.00	0.005	0.05	0.000
TERRAIN	10.	84.	143.0	84.	2.00	0.034	0.05	0.000
TERRAIN	140.	84.	143.0	84.	2.00	0.003	0.05	0.000

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	5.	44.5	164.	2.00	0.190	0.05	0.003
SKY	140.	5.	44.5	164.	2.00	0.031	0.05	-0.001
TERRAIN	10.	5.	44.5	164.	2.00	0.106	0.05	0.001
TERRAIN	140.	5.	44.5	164.	2.00	0.027	0.05	0.001

Visual Effects Screening Analysis for
Source: JOHES RANCH
Class I Area: SAN RAFAEL WILDERNESS

*** Level-1 Screening ***

Input Emissions for

Particulates	7.16	TON/YR
NOx (as NO2)	4.98	TON/YR
Primary NO2	0.00	TON/YR
Soot	0.00	TON/YR
Primary SO4	0.00	TON/YR

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

Background Ozone:	0.04 ppm
Background Visual Range:	243.00 km
Source-Observer Distance:	45.00 km
Min. Source-Class I Distance:	45.00 km
Max. Source-Class I Distance:	66.00 km
Plume-Source-Observer Angle:	11.25 degrees
Stability:	6
Wind Speed:	1.00 m/s

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	147.	66.0	22.	2.00	0.194	0.05	0.004
SKY	140.	147.	66.0	22.	2.00	0.033	0.05	-0.001
TERRAIN	10.	84.	45.0	84.	2.00	0.444	0.05	0.003
TERRAIN	140.	84.	45.0	84.	2.00	0.018	0.05	0.000

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE Exceeded

					Delta E		Contrast	
Backgrnd	Theta	Azi	Distance	Alpha	Crit	Plume	Crit	Plume
SKY	10.	0.	1.0	168.	2.00	2.722*	0.05	0.050
SKY	140.	0.	1.0	168.	2.00	0.441	0.05	-0.014
TERRAIN	10.	0.	1.0	168.	2.00	4.113*	0.05	0.039
TERRAIN	140.	0.	1.0	168.	2.00	0.481	0.05	0.010

Appendix IX
Greenhouse Gas Emission Calculation

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Johe's Ranch GHG Emissions Mitigated vs. BAU/2008 Baseline

Metric Tons/Year	2020					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	331.922	331.922	0.1074	0	**334.18**
Mobile (workers)	0	4.0952	4.0952	1.80E-04	0	**4.0991**
Mobile (Haul Trucks)	0	714.72	714.72	1.53E-02	0	**715.05**
						1053.3257

Metric Tons/Year	BAU					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	404.0253	404.0253	0.0613	0	**405.31**
Mobile (workers)	0	6.0126	6.0126	1.22E-03	0	**6.0383**
Mobile (Haul Trucks)	0	906.8726	906.8726	0.0954	0	**908.8753**
						1320.2258

Metric Tons/Year	2005					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	404.0253	404.0253	0.0613	0	405.3122
Mobile (workers)	0	6.0126	6.0126	0.00122	0	6.0383
Mobile (Haul Trucks)	0	906.8726	906.8726	0.0954	0	908.8753
						1320.2258

Metric Tons/Year	2000					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	404.0253	404.0253	0.0613	0	405.3122
Mobile (workers)	0	6.0126	6.0126	0.00122	0	6.0383
Mobile (Haul Trucks)	0	906.8726	906.8726	0.0954	0	908.8753
						1320.2258

East Pit GHG Emissions Mitigated vs. BAU/2008 Baseline

Metric Tons/year	2020					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	333.5818	333.5818	0.1079	0	**335.85**
Mobile (workers)	0	2.2347	2.2347	1.00E-04	0	**2.2369**
Mobile (Haul Trucks)	0	471.6735	471.6735	1.04E-02	0	**471.8926**
						809.977

Metric Tons/year	BAU					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	404.0253	404.0253	0.0613	0	405.31
Mobile (workers)	0	3.2803	3.2803	7.30E-04	0	3.2956
Mobile (Haul Trucks)	0	598.5712	598.5712	0.063	0	599.8939
						1008.5017

Metric Tons/year	2005					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	404.0253	404.0253	0.0613	0	405.3122
Mobile (workers)	0	3.2803	3.2803	0.00073	0	3.2956
Mobile (Haul Trucks)	0	598.5712	598.5712	0.063	0	599.8939
						1008.5017

Metric Tons/year	2000					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	404.0253	404.0253	0.0613	0	405.3122
Mobile (workers)	0	3.2803	3.2803	0.00073	0	3.2956
Mobile (Haul Trucks)	0	598.5712	598.5712	0.063	0	599.8939
						1008.5017

Net Change In Emissions For New Location & Same Operation

Metric Tons/year						
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	-1.6598	-1.6598	-0.0005	0	0
Mobile (workers)	0	1.8605	1.8605	0.00008	0	1.8622
Mobile (Haul Trucks)	0	243.0465	243.0465	0.0049	0	243.1574
						245.0196

Metric Tons/year	BAU					
	Bio-CO2	N Bio-CO2	Total CO2	CH4	N2O	CO2e
Area (Equipment)	0	0	0	0	0	0
Mobile (workers)	0	2.7323	2.7323	0.00049	0	2.7427
Mobile (Haul Trucks)	0	308.3014	308.3014	0.0324	0	308.9814
						311.7241

Net Change GHG Summary (Metric Tons/year)

GHG Emissions Summary (Metric Tons/yr)

	Tons/yr
2020 NET	245
BAU	312
Difference	**67**

mfeelemeyer:
This difference accounts for 21% of the GHG reductions required. Therefore the entire net change in emissions of 245 metric tons/year will be 100% accounted for with purchased and surrendered Emission Reduction Credits for CO2e.

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Appendix C.2

Response to Kern County Comments on AQIA

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WZI INC.

June 25, 2020

Mr. Randall Cates
Kern County Planning and Natural Resources

CUP 17, Map117

Re: Johe Ranch Project — Response to Kern County Questions

Dear Mr. Cates,

WZI Inc. is in receipt of requests from the Kern County Planning and Natural Resources Department pertaining to the Air Impact Assessment for the Johe Ranch diatomite mine project. The requests and WZI's responses are below:

a) *The radial stacker shall be addressed in a memo which shall stipulate at a minimum: (a) a radial stacker is proposed to be operated onsite, and (b) whether the radial stacker does or does not change the conclusions in the AQIA)*

Response: The radial stacker was accounted for in the AQIA as a drop point from the material handling equipment, calculated per USEPA AP-42 guidelines. The stacker has been considered in the document, therefore there are no changes to the conclusions.

b) *The Kern County Planning and Natural Resources Department has determined the East Pit Mine shall not be used in baseline emissions, unless it's for cumulative impacts. As such, also state in the supplemental memo, whether emissions calculations numbers in the Air Quality Study will or will not change if the East Pit Mine is not accounted for in baseline emissions.*

Response: Emissions from the existing East Pit Mine were calculated and presented in the study for illustrative purposes only. They were not considered as a baseline and were not used in any significance determination.

Respectfully,

Richard B Wilson, PE
Vice President of Engineering

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Appendix C.3

AQIA Supplemental Memo #1

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WZI INC.

July 24, 2020

Mr. Randall Cates
Kern County Planning and Natural Resources

CUP 17, Map117

Re: Johe Ranch Project — AQIA Supplemental Memo

Dear Mr. Cates,

This memo is to serve as a supplement to the Air Quality Impact Assessment (June 2015, updated June 2019) prepared by WZI Inc. for the Johe Ranch Project. This memo provides the following additional information:

1) The 6-mile radius cumulative project list has been updated by Kern County Planning and Natural Resources Department since the original preparation of the air study. A current cumulative project list is included in this memo as **Attachment 1.** This updated list does not impact the conclusions of the study.
2) Several Exhibits listed in the Table of Contents were not included with the AQIA (June 2015, updated June 2019). These Exhibits are included in this memo as **Attachment 2**. The exhibits are:
    a. Exhibit 6.4-1 Site Location- 100km Radius
    b. Exhibit 6.5.1 Wind Rose Diagram
    c. Exhibit 7.1.1 Cumulative Impacts-Site Plan Review Within 1 & 6 Mile Radius
3) Several Exhibits were sent to the Kern County Planning and Natural Resources Department which were not listed in the Table of Contents. Exhibits labeled Exhibit 6, 7, 8, 9, 10, 11, 12, and 13 are duplicative (i.e. the information is already included as Exhibits 4.6-1, 4.6-2, 4.6-3, 4.6-4, 4.6-5, 4.6-6, 4.6-7 and 4.6-8) and can be removed from the aforementioned AQIA.

Respectfully,

Richard B Wilson, PE
Vice President of Engineering

ATTACHMENT 1

Table -1 Cumulative Projects List

Map ID	Name	Project Location	Request	Case Type Code*	Acreage	APN	Project Status
Projects Within 6-Mile Radius							
1	Cooper, Stanley & Wanda (Cooper Pit #2)	Section 31, T29S/R21E	Surface Mine and Reclamation Plan	CUP 4, Map 96	40	--	Active
2	White Ash Broadcasting, Inc.	McKittrick Summit (Section 30, T30S/R21E)	Transmitter Tower	CUP 10, Map 117	--	--	Approved
3	ARCO	Section 30, T30S/R21E	110-Foot-High Communications Tower	CUP 9, Map 117	--	--	Approved
4	Anterra Services, Inc.	Reward and Highway 58, Near McKittrick (Section 15, T30S/R21E)	Hazardous Waste Treatment and Recycling Facility (Class II Injection Well)	CUP 15, Map 117	8.13	156-110-10	Approved
5	Switzer Mark by Mcintosh and Associates	2 miles north of Highway 58, 10 NE McKittrick	Surface Mine and Reclamation Plan	CUP	38.35	098-080-040	Active
6	Cooper Stanley and Wanda (Cooper Pit #1)	Sections 10, 14 & 15, T30S/R21E	Expand Mine; Create New Mine	CUP 14, Map 117	49.20	--	Active
7	McKittrick Ldt/Dewalt Corp	West of Highway 33, South of Reward, CA	Zoning Change to Natural Resource	ZCC 1, Map 117	11.17	--	Active
8	Sprint/Nextel - Debra Gardner Deptratti	499 Franco Western Road, McKittrick (Section 3, T30S/R21E)	50-Foot Communication Monopole	CUP 12, Map 117	--	156-040-03	Active
9	Renia Boudaghian, Esq., AT&T	Reward Road at Franco Western Road (Section 18, T30S/R22E)	145-Foot Wireless Tower with 5-Foot Lightning Rod	CUP 12, Map 118	17.63	157-090-12	Active

ATTACHMENT 2



Legend

Project Location

N

0 20 40 80

Kilometers

WZI INC.
BAKERSFIELD, CALIFORNIA

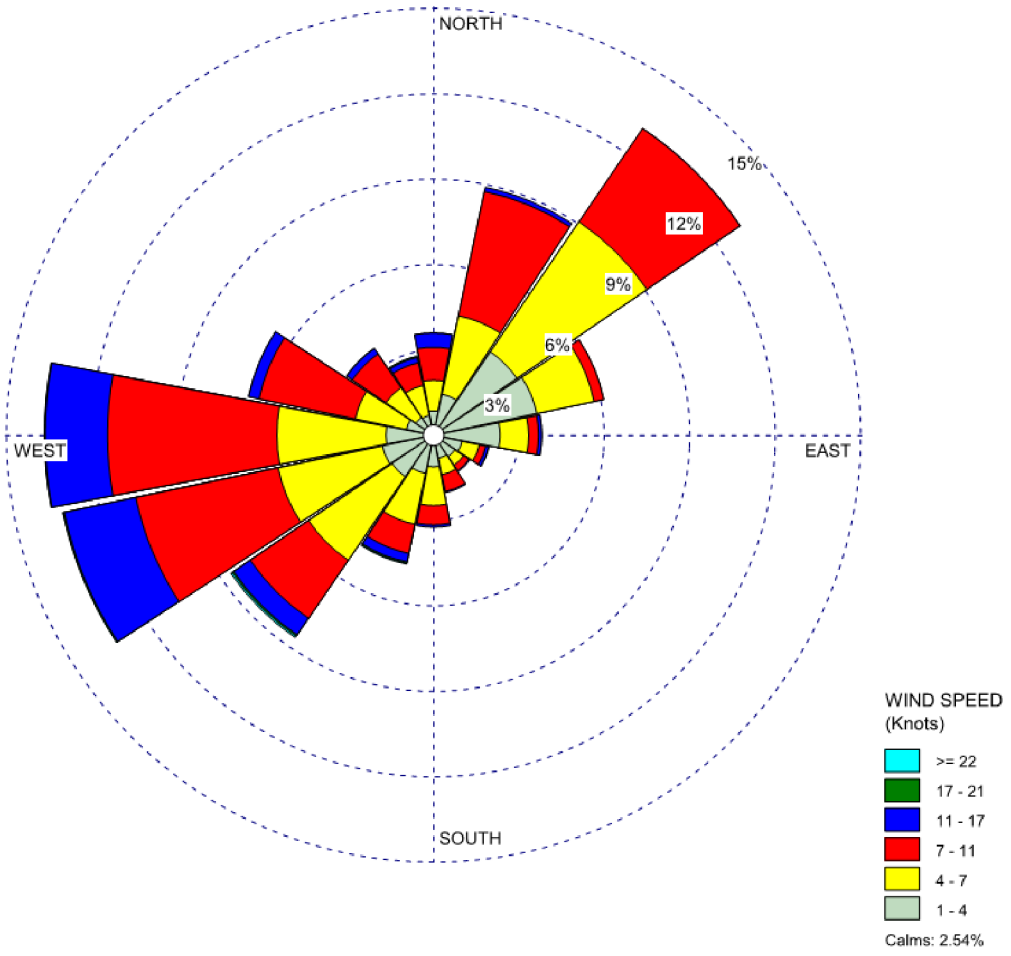
GF INDUSTRIES
JOHE RANCH

100 KM RADIUS MAP

DATE:	4/15		EXHIBIT:	6.4-1

WIND ROSE PLOT:
Fellows, CA

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2004 - 00:00** **End Date: 12/31/2008 - 23:00**	COMPANY NAME: **WZI Inc**	
		MODELER: **Michael Feelemyer**	
	CALM WINDS: **2.54%**	TOTAL COUNT: **43848 hrs.**	
	AVG. WIND SPEED: **5.84 Knots**	DATE: **3/26/2015**	PROJECT NO.: **Johe's Ranch**

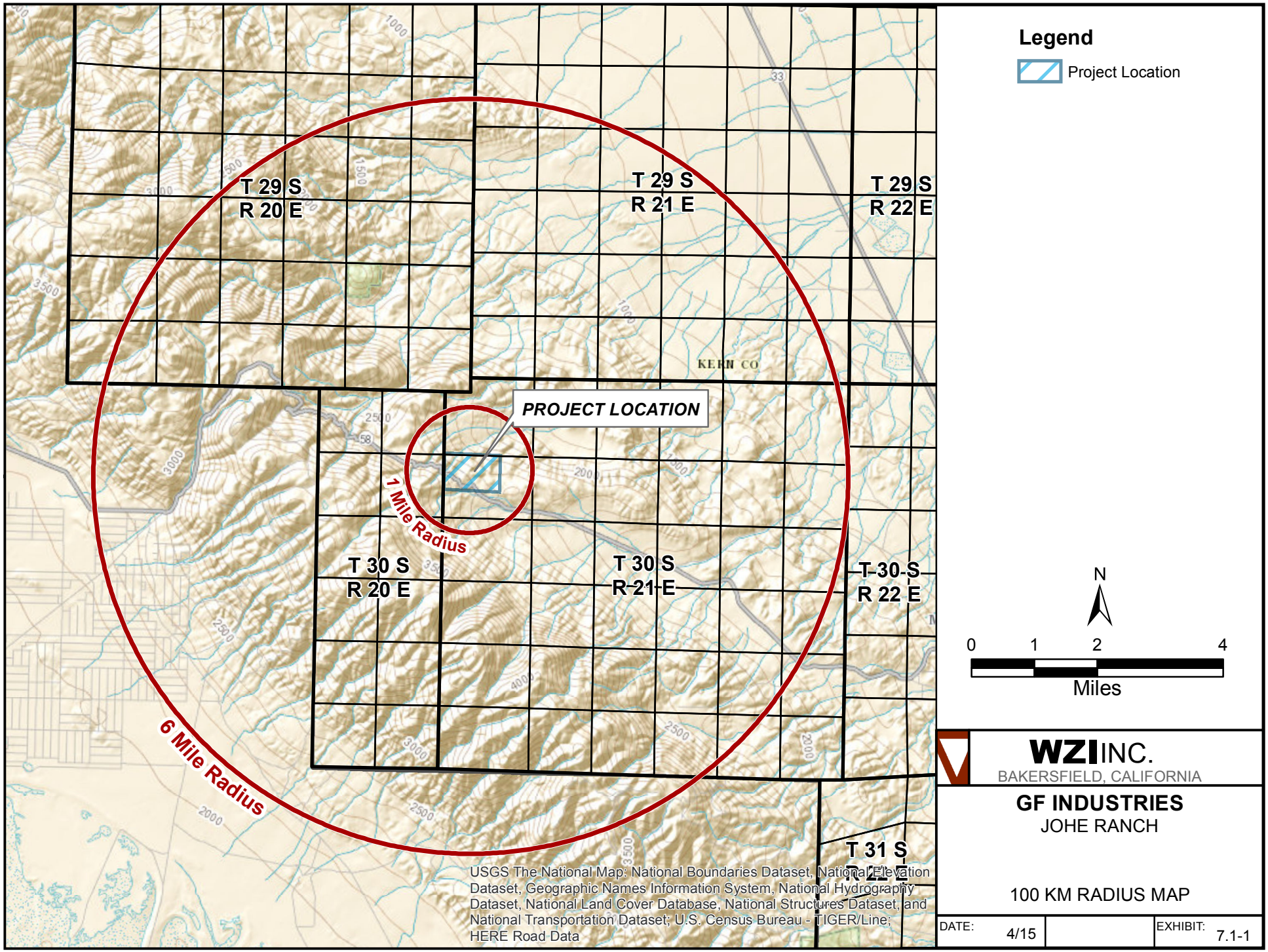
WRPLOT View - Lakes Environmental Software

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

WIND ROSE DIAGRAM

DATE:		EXHIBIT:
4/15		6.5-1



WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

100 KM RADIUS MAP

DATE:	4/15		EXHIBIT:	7.1-1

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Appendix C.4

Friant Ranch SJVAPCD and SCAQMD Amicus Briefs

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SUPREME COURT COPY

CASE NO. S219783

IN THE SUPREME COURT OF CALIFORNIA

SIERRA CLUB, REVIVE THE SAN JOAQUIN, and
LEAGUE OF WOMEN VOTERS OF FRESNO,
Plaintiffs and Appellants

v.

COUNTY OF FRESNO,
Defendant and Respondent

FRIANT RANCH, L.P.,
Real Party in Interest and Respondent

SUPREME COURT
FILED
APR 13 2015
Frank A. McGuire Clerk
Deputy

After a Decision by the Court of Appeal, filed May 27, 2014
Fifth Appellate District Case No. F066798

Appeal from the Superior Court of California, County of Fresno
Case No. 11CECG00726

APPLICATION FOR LEAVE TO FILE AMICUS CURIAE BRIEF OF SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT IN SUPPORT OF DEFENDANT AND RESPONDENT, COUNTY OF FRESNO AND REAL PARTY IN INTEREST AND RESPONDENT, FRIANT RANCH, L.P.

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APPLICATION

Pursuant to California Rules of Court 8.520(f)(1), proposed Amicus Curiae San Joaquin Valley Unified Air Pollution Control District hereby requests permission from the Chief Justice to file an amicus brief in support of Defendant and Respondent, County of Fresno, and Defendant and Real Parties in Interest Friant Ranch, L.P. Pursuant to Rule 8.520(f)(5) of the California Rules of Court, the proposed amicus curiae brief is combined with this Application. The brief addresses the following issue certified by this Court for review:

> Is an EIR adequate when it identifies the health impacts of air pollution and quantifies a project's expected emissions, or does CEQA further require the EIR to *correlate* a project's air quality emissions to specific health impacts?

As of the date of this filing, the deadline for the final reply brief on the merits was March 5, 2015. Accordingly, under Rule 8.520(f)(2), this application and brief are timely.

1. Background and Interest of San Joaquin Valley Unified Air Pollution Control District

The San Joaquin Valley Unified Air Pollution Control District ("Air District") regulates air quality in the eight counties comprising the San Joaquin Valley ("Central Valley"): Kern, Tulare, Madera, Fresno, Merced, San Joaquin, Stanislaus, and Kings, and is primarily responsible for attaining air quality standards within its jurisdiction. After billions of dollars of investment by Central Valley businesses, pioneering air quality regulations, and consistent efforts by residents, the Central Valley air basin has made historic improvements in air quality.

The Central Valley's geographical, topographical and meteorological features create exceptionally challenging air quality

conditions. For example, it receives air pollution transported from the San Francisco Bay Area and northern Central Valley communities, and the southern portion of the Central Valley includes three mountain ranges (Sierra, Tehachapi, and Coastal) that, under some meteorological conditions, effectively trap air pollution. Central Valley air pollution is only a fraction of what the Bay Area and Los Angeles produce, but these natural conditions result in air quality conditions that are only marginally better than Los Angeles, even though about ten times more pollution is emitted in the Los Angeles region. Bay Area air quality is much better than the Central Valley's, even though the Bay Area produces about six times more pollution. The Central Valley also receives air pollution transported from the Bay Area and northern counties in the Central Valley, including Sacramento, and transboundary anthropogenic ozone from as far away as China.

Notwithstanding these challenges, the Central Valley has reduced emissions at the same or better rate than other areas in California and has achieved unparalleled milestones in protecting public health and the environment:

- In the last decade, the Central Valley became the first air basin classified by the federal government under the Clean Air Act as a "serious nonattainment" area to come into attainment of health-based National Ambient Air Quality Standard ("NAAQS") for coarse particulate matter (PM10), an achievement made even more notable given the Valley's extensive agricultural sector. Unhealthy levels of particulate matter can cause and exacerbate a range of chronic and acute illnesses.
- In 2013, the Central Valley became the first air basin in the country to improve from a federal designation of "extreme" nonattainment to

actually attain (and quality for an attainment designation) of the 1-hour ozone NAAQS; ozone creates "smog" and, like PM10, causes adverse health impacts.

- The Central Valley also is in full attainment of federal standards for lead, nitrogen dioxide, sulfur dioxide, and carbon monoxide.
- The Central Valley continues to make progress toward compliance with its last two attainment standards, with the number of exceedences for the 8-hour ozone NAAQS reduced by 74% (for the 1997 standard) and 38% (for the 2008 standard) since 1991, and for the small particulate matter (PM2.5) NAAQS reduced by 85% (for the 1997 standard) and 61% (for the 2006 standard).

Sustained improvement in Central Valley air quality requires a rigorous and comprehensive regulatory framework that includes prohibitions (e.g., on wood-burning fireplaces in new residences), mandates (e.g., requiring the installation of best available pollution reduction technologies on new and modified equipment and industrial operations), innovations (e.g., fees assessed against residential development to fund pollution reduction actions to "offset" vehicular emissions associated with new residences), incentive programs (e.g., funding replacements of older, more polluting heavy duty trucks and school buses)[1], ongoing planning for continued air quality improvements, and enforcement of Air District permits and regulations.

The Air District is also an expert air quality agency for the eight counties and cities in the San Joaquin Valley. In that capacity, the Air District has developed air quality emission guidelines for use by the Central

---

[1] San Joaquin's incentive program has been so successful that through 2012, it has awarded over $ 432 million in incentive funds and has achieved 93,349 tons of lifetime emissions reductions. *See* SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, 2012 PM2.5 PLAN, 6-6 (2012) *available at* http://www.valleyair.org/Workshops/postings/2012/12-20-12PM25/FinalVersion/06%20Chapter%206%20Incentives.pdf.

Valley counties and cities that implement the California Environment Quality Act (CEQA).[2] In its guidance, the Air District has distinguished between toxic air contaminants and criteria air pollutants.[3] Recognizing this distinction, the Air District's CEQA Guidance has adopted distinct thresholds of significance for *criteria* pollutants (i.e., ozone, PM2.5 and their respective precursor pollutants) based upon scientific and factual data which demonstrates the level that can be accommodated on a cumulative basis in the San Joaquin Valley without affecting the attainment of the applicable NAAQS.[4] For *toxic air* pollutants, the District has adopted different thresholds of significance which scientific and factual data demonstrates has the potential to expose sensitive receptors (i.e., children, the elderly) to levels which may result in localized health impacts.[5]

The Air District's CEQA Guidance was followed by the County of Fresno in its environment review of the Friant Ranch project, for which the Air District also served as a commenting agency. The Court of Appeal's holding, however, requiring correlation between the project's criteria

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[2] *See, e.g.*, SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, PLANNING DIVISION, GUIDE FOR ASSESSING AND MITIGATING AIR QUALITY IMPACTS (2015), *available at* http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf ("CEQA Guidance").

[3] Toxic air contaminants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as birth defects. There are currently 189 toxic air contaminants regulated by the United States Environmental Protection Agency ("EPA") and the states pursuant to the Clean Air Act. 42 U.S.C. § 7412. Common TACs include benzene, perchloroethylene and asbestos. *Id.* at 7412(b).

In contrast, there are only six (6) criteria air pollutants: ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide and lead. Although criteria air pollutants can also be harmful to human health, they are distinguishable from toxic air contaminants and are regulated separately. For instance, while criteria pollutants are regulated by numerous sections throughout Title I of the Clean Air Act, the regulation of toxic air contaminants occurs solely under section 112 of the Act. Compare 42 U.S.C. §§ 7407 – 7411 & 7501 – 7515 with 42 U.S.C. § 7411.

[4] See, e.g., CEQA Guidance at http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf, pp. 64-66, 80.

[5] See, e.g., CEQA Guidance at http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf, pp. 66, 99-101.

pollutants and local health impacts, departs from the Air District's Guidance and approved methodology for assessing criteria pollutants. A close reading of the administrative record that gave rise to this issue demonstrates that the Court's holding is based on a misunderstanding of the distinction between toxic air contaminants (for which a local health risk assessment is feasible and routinely performed) and criteria air pollutants (for which a local health risk assessment is not feasible and would result in speculative results).[6] The Air District has a direct interest in ensuring the lawfulness and consistent application of its CEQA Guidance, and will explain how the Court of Appeal departed from the Air District's long-standing CEQA Guidance in addressing criteria pollutants and toxic air contaminants in this amicus brief.

2. How the Proposed Amicus Curiae Brief Will Assist the Court

As counsel for the proposed amicus curiae, we have reviewed the briefs filed in this action. In addition to serving as a "commentary agency" for CEQA purposes over the Friant Ranch project, the Air District has a strong interest in assuring that CEQA is used for its intended purpose, and believes that this Court would benefit from additional briefing explaining the distinction between criteria pollutants and toxic air contaminants and the different methodologies employed by local air pollution control agencies such as the Air District to analyze these two categories of air pollutants under CEQA. The Air District will also explain how the Court of Appeal's opinion is based upon a fundamental misunderstanding of these two different approaches by requiring the County of Fresno to correlate the project's *criteria* pollution emissions with *local* health impacts. In doing

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[6] CEQA does not require speculation. *See, e.g., Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.*, 6 Cal. 4th 1112, 1137 (1993) (upholding EIR that failed to evaluate cumulative toxic air emission increases given absence of any acceptable means for doing so).

so, the Air District will provide helpful analysis to support its position that at least insofar as criteria pollutants are concerned, CEQA does not require an EIR to correlate a project's air quality emissions to specific health impacts, because such an analysis is not reasonably feasible.

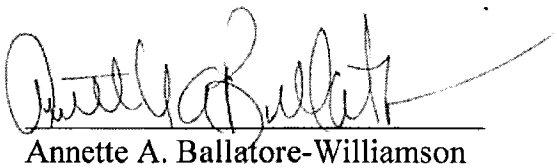
Rule 8.520 Disclosure

Pursuant to Cal. R. 8.520(f)(4), neither the Plaintiffs nor the Defendant or Real Party In Interest or their respective counsel authored this brief in whole or in part. Neither the Plaintiffs nor the Defendant or Real Party in Interest or their respective counsel made any monetary contribution towards or in support of the preparation of this brief.

CONCLUSION

On behalf of the San Joaquin Valley Unified Air Pollution Control District, we respectfully request that this Court accept the filing of the attached brief.

Dated: April 2, 2015



Annette A. Ballatore-Williamson
District Counsel
Attorney for Proposed Amicus Curiae

SAN JOAQUIN VALLEY UNIFIED
AIR POLLUTION CONTROL
DISTRICT

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I. INTRODUCTION.

The San Joaquin Valley Unified Air Pollution Control District ("Air District") respectfully submits that the Court of Appeal erred when it held that the air quality analysis contained in the Environmental Impact Report ("EIR") for the Friant Ranch development project was inadequate under the California Environmental Quality Act ("CEQA") because it did not include an analysis of the correlation between the project's criteria air pollutants and the potential adverse human health impacts. A close reading of the portion of the administrative record that gave rise to this issue demonstrates that the Court's holding is based on a misunderstanding of the distinction between toxic air contaminants and criteria air pollutants.

Toxic air contaminants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious health effects, such as birth defects. There are currently 189 toxic air contaminants (hereinafter referred to as "TACs") regulated by the United States Environmental Protection Agency ("EPA") and the states pursuant to the Clean Air Act. 42 U.S.C. § 7412. Common TACs include benzene, perchloroethylene and asbestos. *Id.* at 7412(b).

In contrast, there are only six (6) criteria air pollutants: ozone, particulate matter, carbon monoxide, nitrogen oxides, sulfur dioxide and lead. Although criteria air pollutants can also be harmful to human health,

they are distinguishable from TACs and are regulated separately. For instance, while criteria pollutants are regulated by numerous sections throughout Title I of the Clean Air Act, the regulation of TACs occurs solely under section 112 of the Act. *Compare* 42 U.S.C. §§ 7407 – 7411 & 7501 – 7515 *with* 42 U.S.C. § 7411.

The most relevant difference between criteria pollutants and TACs for purposes of this case is the manner in which human health impacts are accounted for. While it is common practice to analyze the correlation between an individual facility's TAC emissions and the expected localized human health impacts, such is not the case for criteria pollutants. Instead, the human health impacts associated with criteria air pollutants are analyzed and taken into consideration when EPA sets the national ambient air quality standard ("NAAQS") for each criteria pollutant. 42 U.S.C. § 7409(b)(1). The health impact of a particular criteria pollutant is analyzed on a regional and not a facility level based on how close the area is to complying with (attaining) the NAAQS. Accordingly, while the type of individual facility / health impact analysis that the Court of Appeal has required is a customary practice for TACs, it is not feasible to conduct a similar analysis for criteria air pollutants because currently available computer modeling tools are not equipped for this task.

It is clear from a reading of both the administrative record and the Court of Appeal's decision that the Court did not have the expertise to fully

appreciate the difference between TACs and criteria air pollutants. As a result, the Court has ordered the County of Fresno to conduct an analysis that is not practicable and not likely yield valid information. The Air District respectfully requests that this portion of the Court of Appeal's decision be reversed.

II. THE COURT OF APPEAL ERRED IN FINDING THE FRIANT RANCH EIR INADEQUATE FOR FAILING TO ANALYZE THE SPECIFIC HUMAN HEALTH IMPACTS ASSOCIATED CRITERIA AIR POLLUTANTS.

Although the Air District does not take lightly the amount of air emissions at issue in this case, it submits that the Court of Appeal got it wrong when it required Fresno County to revise the Friant Ranch EIR to include an analysis correlating the criteria air pollutant emissions associated with the project with specific, localized health-impacts. The type of analysis the Court of Appeal has required will not yield reliable information because currently available modeling tools are not well suited for this task. Further, in reviewing this issue de novo, the Court of Appeal failed to appreciate that it lacked the scientific expertise to appreciate the significant differences between a health risk assessment commonly performed for toxic air contaminants and a similar type of analysis it felt should have been conducted for criteria air pollutants.

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A. Currently Available Modeling Tools are not Equipped to Provide a Meaningful Analysis of the Correlation between an Individual Development Project's Air Emissions and Specific Human Health Impacts.

In order to appreciate the problematic nature of the Court of Appeals' decision requiring a health risk type analysis for criteria air pollutants, it is important to understand how the relevant criteria pollutants (ozone and particulate matter) are formed, dispersed and regulated.

Ground level ozone (smog) is not directly emitted into the air, but is formed when precursor pollutants such as oxides of nitrogen (NOx) and volatile organic compounds (VOCs) are emitted into the atmosphere and undergo complex chemical reactions in the process of sunlight.[1] Once formed, ozone can be transported long distances by wind.[2] Because of the complexity of ozone formation, a specific tonnage amount of NOx or VOCs emitted in a particular area does not equate to a particular concentration of ozone in that area. In fact, even rural areas that have relatively low tonnages of emissions of NOx or VOCs can have high levels of ozone concentration simply due to wind transport.[3] Conversely, the San Francisco Bay Area has six times more NOx and VOC emissions per square mile than the San Joaquin Valley, but experiences lower

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[1] *See* United States Environmental Protection Agency, *Ground-level Ozone: Basic Information*, available at: http://www.epa.gov/airquality/ozonepollution/basic.html (visited March 10, 2015).
[2] *Id.*
[3] *Id.*

concentrations of ozone (and better air quality) simply because sea breezes disperse the emissions.[4]

Particulate matter ("PM") can be divided into two categories: directly emitted PM and secondary PM.[5] While directly emitted PM can have a localized impact, the tonnage emitted does not always equate to the local PM concentration because it can be transported long distances by wind.[6] Secondary PM, like ozone, is formed via complex chemical reactions in the atmosphere between precursor chemicals such as sulfur dioxides (SOx) and NOx.[7] Because of the complexity of secondary PM formation, the tonnage of PM-forming precursor emissions in an area does not necessarily result in an equivalent concentration of secondary PM in that area.

The disconnect between the *tonnage* of precursor pollutants (NOx, SOx and VOCs) and the *concentration* of ozone or PM formed is important because it is not necessarily the tonnage of precursor pollutants that causes human health effects, but the concentration of resulting ozone or PM. Indeed, the national ambient air quality standards ("NAAQS"), which are statutorily required to be set by the United States Environmental Protection

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[4] *San Joaquin Valley Air Pollution Control District 2007 Ozone Plan*, Executive Summary p. ES-6, available at: http://www.valleyair.org/Air_Quality_Plans/docs/AQ_Ozone_2007_Adopted/03%20Executive%20Summary.pdf (visited March 10, 2015).

[5] United States Environmental Protection Agency, *Particulate Matter: Basic Information*, available at: http://www.epa.gov/airquality/particlepollution/basic.html (visited March 10, 2015).

[6] *Id.*

[7] *Id.*

Agency ("EPA") at levels that are "requisite to protect the public health," 42 U.S.C. § 7409(b)(1), are established as concentrations of ozone or particulate matter and not as tonnages of their precursor pollutants.[8]

Attainment of a particular NAAQS occurs when the concentration of the relevant pollutant remains below a set threshold on a consistent basis throughout a particular region. For example, the San Joaquin Valley attained the 1-hour ozone NAAQS when ozone concentrations remained at or below 0.124 parts per million Valley-wide on 3 or fewer days over a 3-year period.[9] Because the NAAQS are focused on achieving a particular concentration of pollution region-wide, the Air District's tools and plans for attaining the NAAQS are regional in nature.

For instance, the computer models used to simulate and predict an attainment date for the ozone or particulate matter NAAQS in the San Joaquin Valley are based on regional inputs, such as regional inventories of precursor pollutants (NOx, SOx and VOCs) and the atmospheric chemistry and meteorology of the Valley.[10] At a very basic level, the models simulate future ozone or PM levels based on predicted changes in precursor

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[8] See, e.g., United States Environmental Protection Agency, *Table of National Ambient Air Quality Standards*, available at: http://www.epa.gov/air/criteria.html#3 (visited March 10, 2015).

[9] *San Joaquin Valley Unified Air Pollution Control District 2013 Plan for the Revoked 1-Hour Ozone Standard*, Ch. 2 p. 2-16, available at: http://www.valleyair.org/Air_Quality_Plans/OzoneOneHourPlan2013/02Chapter2ScienceTrendsModeling.pdf (visited March 10, 2015).

[10] *Id.* at Ch. 2 p. 2-19 (visited March 12, 2015); *San Joaquin Valley Unified Air Pollution Control District 2008 PM2.5 Plan*, Appendix F, pp. F-2 – F-5, available at: http://www.valleyair.org/Air_Quality_Plans/docs/AQ_Final_Adopted_PM2.5/20%20Appendix%20F.pdf (visited March 19, 2015).

emissions Valley wide.[11] Because the NAAQS are set levels necessary to protect human health, the closer a region is to attaining a particular NAAQS, the lower the human health impact is from that pollutant.

The goal of these modeling exercises is not to determine whether the emissions generated by a particular factory or development project will affect the date that the Valley attains the NAAQS. Rather, the Air District's modeling and planning strategy is regional in nature and based on the extent to which *all* of the emission-generating sources in the Valley (current and future) must be controlled in order to reach attainment.[12]

Accordingly, the Air District has based its thresholds of significance for CEQA purposes on the levels that scientific and factual data demonstrate that the Valley can accommodate without affecting the attainment date for the NAAQS.[13] The Air District has tied its CEQA significance thresholds to the level at which stationary pollution sources permitted by the Air District must "offset" their emissions.[14] This "offset"

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[11] *Id.*

[12] Although the Air District does have a dispersion modeling tool used during its air permitting process that is used to predict whether a particular project's directly emitted PM will either cause an exceedance of the PM NAAQS or contribute to an existing exceedance, this model bases the prediction on a worst case scenario of emissions and meteorology and has no provision for predicting any associated human health impacts. Further, this analysis is only performed for stationary sources (factories, oil refineries, etc.) that are required to obtain a New Source Review permit from the Air District and not for development projects such as Friant Ranch over which the Air District has no preconstruction permitting authority. *See* San Joaquin Valley Unified Air Pollution Control District Rule 2201 §§ 2.0; 3.3.9; 4.14.1, available at: http://www.valleyair.org/rules/currntrules/Rule2201041l.pdf (visited March 19, 2015).

[13] *San Joaquin Valley Unified Air Pollution Control District Guide to Assessing and Mitigating Air Quality Impacts*, (March 19, 2015) p. 22, available at: http://www.valleyair.org/transportation/CEQA%20Rules/GAMAQI%20Jan%202002%20Rev.pdf (visited March 30, 2015).

[14] *Id.* at pp. 22, 25.

level allows for growth while keeping the cumulative effects of all new sources at a level that will not impede attainment of the NAAQS.[15] In the Valley, these thresholds are 15 tons per year of PM, and 10 tons of NOx or VOC per year. *Sierra Club*, *supra*, 172 Cal.Rptr.3d at 303; AR 4554. Thus, the CEQA air quality analysis for criteria pollutants is not really a localized, project-level impact analysis but one of regional, "cumulative impacts."

Accordingly, the significance thresholds applied in the Friant Ranch EIR (15 tons per year of PM and 10 tons of NOx or VOCs) are not intended to be indicative of any localized human health impact that the project may have. While the health effects of air pollution are of primary concern to the Air District (indeed, the NAAQS are established to protect human health), the Air District is simply not equipped to analyze whether and to what extent the criteria pollutant emissions of an individual CEQA project directly impact human health in a particular area. This is true even for projects with relatively high levels of emissions of criteria pollutant precursor emissions.

For instance, according to the EIR, the Friant Ranch project is estimated to emit 109.52 tons per year of ROG (VOC), 102.19 tons per year of NOx, and 117.38 tons per year of PM. Although these levels well

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[15] [15] *San Joaquin Valley Unified Air Pollution Control District Environmental Review Guidelines* (Aug. 2000) p. 4-11, available at: http://www.valleyair.org/transportation/CEQA%20Rules/ERG%20Adopted%20_August%202000_.pdf (visited March 12, 2015).

exceed the Air District's CEQA significance thresholds, this does not mean that one can easily determine the concentration of ozone or PM that will be created at or near the Friant Ranch site on a particular day or month of the year, or what specific health impacts will occur. Meteorology, the presence of sunlight, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone or PM. This is especially true for a project like Friant Ranch where most of the criteria pollutant emissions derive not from a single "point source," but from area wide sources (consumer products, paint, etc.) or mobile sources (cars and trucks) driving to, from and around the site.

In addition, it would be extremely difficult to model the impact on NAAQS attainment that the emissions from the Friant Ranch project may have. As discussed above, the currently available modeling tools are equipped to model the impact of *all* emission sources in the Valley on attainment. According to the most recent EPA-approved emission inventory, the NOx inventory for the Valley is for the year 2014 is 458.2 tons per day, or 167,243 tons per year and the VOC (or ROG) inventory is 361.7 tons per day, or 132,020.5 tons per year.[16] Running the photochemical grid model used for predicting ozone attainment with the

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[16] *San Joaquin Valley Unified Air Pollution Control District 2007 Ozone Plan*, Appendix B pp. B-6, B-9,
available at:
http://www.valleyair.org/Air_Quality_Plans/docs/AQ_Ozone_2007_Adopted/19%20Appendix%20B%20April%202007.pdf (visited March 12, 2015).

emissions solely from the Friant Ranch project (which equate to less than one-tenth of one percent of the total NOx and VOC in the Valley) is not likely to yield valid information given the relative scale involved.

Finally, even once a model is developed to accurately ascertain local increases in concentrations of photochemical pollutants like ozone and some particulates, it remains impossible, using today's models, to correlate that increase in concentration to a specific health impact. The reason is the same: such models are designed to determine regional, population-wide health impacts, and simply are not accurate when applied at the local level.

For these reasons, it is not the norm for CEQA practitioners, including the Air District, to conduct an analysis of the localized health impacts associated with a project's criteria air pollutant emissions as part of the EIR process. When the accepted scientific method precludes a certain type of analysis, "the court cannot impose a legal standard to the contrary." *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 717 n. 8. However, that is exactly what the Court of Appeal has done in this case. Its decision upends the way CEQA air quality analysis of criteria pollutants occurs and should be reversed.

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B. The Court of Appeal Improperly Extrapolated a Request for a Health Risk Assessment for Toxic Air Contaminants into a Requirement that the EIR contain an Analysis of Localized Health Impacts Associated with Criteria Air Pollutants.

The Court of Appeal's error in requiring the new health impact analysis for criteria air pollutants clearly stems from a misunderstanding of terms of art commonly used in the air pollution field. More specifically, the Court of Appeal (and Appellants Sierra Club et al.) appear to have confused the health risk analysis ("HRA") performed to determine the health impacts associated with a project's toxic air contaminants ("TACs"), with an analysis correlating a project's criteria air pollutants (ozone, PM and the like) with specific localized health impacts.

The first type of analysis, the HRA, is commonly performed during the Air District's stationary source permitting process for projects that emit TACs and is, thus, incorporated into the CEQA review process. An HRA is a comprehensive analysis to evaluate and predict the dispersion of TACs emitted by a project and the potential for exposure of human populations. It also assesses and quantifies both the individual and population-wide health risks associated with those levels of exposure. There is no similar analysis conducted for criteria air pollutants. Thus, the second type of analysis (required by the Court of Appeal), is not currently part of the Air District's process because, as outlined above, the health risks associated

with exposure to criteria pollutants are evaluated on a regional level based on the region's attainment of the NAAQS.

The root of this confusion between the types of analyses conducted for TACs versus criteria air pollutants appears to stem from a comment that was presented to Fresno County by the City of Fresno during the administrative process.

In its comments on the draft EIR, the City of Fresno (the only party to raise this issue) stated:

> [t]he EIR must disclose the human health related effects of the Project's air pollution impacts. (CEQA Guidelines section 15126.2(a).) The EIR fails completely in this area. The EIR should be revised to disclose and determine the significance of TAC impacts, and of human health risks due to exposure to Project-related air emissions.

(AR 4602.)

In determining that the issue regarding the correlation between the Friant Ranch project's criteria air pollutants and adverse health impacts was adequately exhausted at the administrative level, the Court of Appeal improperly read the first two sentences of the City of Fresno's comment in isolation rather than in the context of the entire comment. *See Sierra Club v. County of Fresno* (2014) 172 Cal.Rptr.3d 271, 306. Although the comment first speaks generally in terms of "human health related effects" and "air pollution," it requests only that the EIR be revised to disclose "the significance of TACs" and the "human health risks due to exposure."

The language of this request in the third sentence of the comment is significant because, to an air pollution practitioner, the language would only have indicated only that a HRA for TACs was requested, and not a separate analysis of the health impacts associated with the project's criteria air pollutants. Fresno County clearly read the comment as a request to perform an HRA for TACs and limited its response accordingly. (AR 4602.)[17] The Air District submits that it would have read the City's comment in the same manner as the County because the City's use of the terms "human health risks" and "TACs" signal that an HRA for TACs is being requested. Indeed, the Air District was also concerned that an HRA be conducted, but understood that it was not possible to conduct such an analysis until the project entered the phase where detailed site specific information, such as the types of emission sources and the proximity of the sources to sensitive receptors became available. (AR 4553.)[18] The City of Fresno was apparently satisfied with the County's discussion of human health risks, as it did not raise the issue again when it commented on the final EIR. (AR 8944 – 8960.)

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[17] Appellants do not challenge the manner in which the County addressed TACs in the EIR. (Appellants' Answer Brief p. 28 fn. 7.)

[18] Appellants rely on the testimony of Air District employee, Dan Barber, as support for their position that the County should have conducted an analysis correlating the project's criteria air pollutant emissions with localized health impacts. (Appellants Answer Brief pp. 10-11; 28.) However, Mr. Barber's testimony simply reinforces the Air District's concern that a risk assessment (HRA) be conducted once the actual details of the project become available. (AR 8863.) As to criteria air pollutants, Mr. Barber's comments are aimed at the Air District's concern about the amount of emissions and the fact that the emissions will make it "more difficult for Fresno County and the Valley to reach attainment which means that the health of Valley residents maybe [sic] adversely impacted." Mr. Barber says nothing about conducting a separate analysis of the localized health impacts the project's emissions may have.

The Court of Appeal's holding, which incorrectly extrapolates a request for an HRA for TACs into a new analysis of the localized health impacts of the project's criteria air pollutants, highlights two additional errors in the Court's decision.

First, the Court of Appeal's holding illustrates why the Court should have applied the deferential substantial evidence standard of review to the issue of whether the EIR's air quality analysis was sufficient. The regulation of air pollution is a technical and complex field and the Court of Appeal lacked the expertise to fully appreciate the difference between TACs and criteria air pollutants and tools available for analyzing each type of pollutant.

Second, it illustrates that the Court likely got it wrong when it held that the issue regarding the criteria pollutant / localized health impact analysis was properly exhausted during the administrative process. In order to preserve an issue for the court, '[t]he "exact issue" must have been presented to the administrative agency....' [Citation.] *Citizens for Responsible Equitable Environmental Development v. City of San Diego*, (2011) 196 Cal.App.4th 515, 527 129 Cal.Rptr.3d 512, 521; *Sierra Club v. City of Orange* (2008) 163 Cal.App.4th 523, 535, 78 Cal.Rptr.3d 1, 13. "'[T]he objections must be sufficiently specific so that the agency has the

opportunity to evaluate and respond to them.' [Citation.]" *Sierra Club v. City of Orange*,163 Cal.App.4th at 536.[19]

As discussed above, the City's comment, while specific enough to request a commonly performed HRA for TACs, provided the County with no notice that it should perform a new type of analysis correlating criteria pollutant tonnages to specific human health effects. Although the parties have not directly addressed the issue of failure to exhaust administrative remedies in their briefs, the Air District submits that the Court should consider how it affects the issues briefed by the parties since "[e]xhaustion of administrative remedies is a jurisdictional prerequisite to maintenance of a CEQA action." *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1199, 22 Cal.Rptr.3d 203.

III. CONCLUSION

For all of the foregoing reasons, the Air District respectfully requests that the portion of the Court of Appeal's decision requiring an analysis correlating the localized human health impacts associated with an individual project's criteria air pollutant emissions be reversed.

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[19] *Sierra Club v. City of Orange*, is illustrative here. In that case, the plaintiffs challenged an EIR approved for a large planned community on the basis that the EIR improperly broke up the various environmental impacts by separate project components or "piecemealed" the analysis in violation of CEQA. In evaluating the defense that the plaintiffs had failed to adequately raise the issue at the administrative level, the Court held that comments such as *"the use of a single document for both a project-level and a program-level EIR [is] 'confusing',"* and *"[t]he lead agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project,"* were too vague to fairly raise the argument of piecemealing before the agency. *Sierra Club v. City of Orange*, 163 Cal.App.4th at 537.

correlating the localized human health impacts associated with an individual project's criteria air pollutant emissions be reversed.

Respectfully submitted,

Dated: April 2, 2015

Catherine T. Redmond
Attorney for Proposed Amicus Curiae

SAN JOAQUIN VALLEY
UNIFIED
AIR POLLUTION CONTROL
DISTRICT

CERTIFICATE OF WORD COUNT

Pursuant to Rule 8.204 of the California Rules of Court, I hereby certify that this document, based on the Word County feature of the Microsoft Word software program used to compose and print this document, contains, exclusive of caption, tables, certificate of word count, signature block and certificate of service, 3806 words.

Dated: April 2, 2015

Annette A. Ballatore-Williamson
District Counsel (SBN 192176)

Sierra Club et al, v. County of Fresno, et al
Supreme Court of California Case No.: S219783
Fifth District Court of Appeal Case No.: F066798
Fresno County Superior Court Case No.: 11CECG00726

PROOF OF SERVICE

I am over the age of 18 years and not a p[arty to the above-captioned action; that my business address is San Joaquin Valley Unified Air Pollution Control District located at 1990 E. Gettysburg Avenue, Fresno, California 93726.

On April 2, 2015, I served the document described below:

APPLICATION FOR LEAVE TO FILE AMICUS CURIAE BRIEF OF SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT IN SUPPORT OF DEFENDANT AND RESPONDENT, COUNTY OF FRESNO

On all parties to this action at the following addresses and in the following manner:

PLEASE SEE ATTACHED SERVICE LIST

(XX) **(BY MAIL)** I caused a true copy of each document(s) to be laced in a sealed envelope with first-class postage affixed and placed the envelope for collection. Mail is collected daily at my office and placed in a United State Postal Service collection box for pick-up and delivery that same day.

( ) **(BY ELECTRONIC MAIL)** I caused a true and correct scanned image (.PDF file) copy to be transmitted via electronic mail transfer system in place at the San Joaquin Valley Unified Air Pollution Control District ("District"), originating from the undersigned at 1990 E. Gettysburg Avenue, Fresno, CA, to the address(es) indicated below.

( ) **(BY OVERNIGHT MAIL)** I caused a true and correct copy to be delivered via Federal Express to the following person(s) or their representative at the address(es) listed below.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that I executed this document on April 2, 2015, at Fresno, California.

Esthela Soto

SERVICE LIST

Sierra Club et al, v. County of Fresno, et al
Supreme Court of California Case No.: S219783
Fifth District Court of Appeal Case No.: F066798
Fresno County Superior Court Case No.: 11CECG00726

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S219783

IN THE SUPREME COURT OF C ALIFORNIA

SIERRA CLUB, REVIVE THE SAN JOAQUIN, and
LEAGUE OF WOMEN VOTERS OF FRESNO,

Plaintiffs and Appellants,

v.

COUNTY OF FRESNO,

Defendant and Respondent,

and,

FRIANT RANCH, L.P.,

Real Party in Interest and Respondent.

SUPREME COURT
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Deputy

After a Published Decision by the Court of Appeal, filed May 27, 2014
Fifth Appellate District Case No. F066798

Appeal from the Superior Court of California, County of Fresno
Case No. 11CECG00726
Honorable Rosendo A. Pena, Jr.

APPLICATION OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT FOR LEAVE TO FILE BRIEF OF *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY AND *[PROPOSED]* BRIEF OF *AMICUS CURIAE*

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TO THE HONORABLE CHIEF JUSTICE AND JUSTICES OF THE SUPREME COURT:

APPLICATION FOR LEAVE TO FILE *AMICUS CURIAE* BRIEF

Pursuant to Rule 8.520(f) of the California Rules of Court, the South Coast Air Quality Management District (SCAQMD) respectfully requests leave to file the attached *amicus curiae* brief. Because SCAQMD's position differs from that of either party, we request leave to submit this amicus brief in support of neither party.

HOW THIS BRIEF WILL ASSIST THE COURT

SCAQMD's proposed amicus brief takes a position on two of the issues in this case. In both instances, its position differs from that of either party. The issues are:

1) Does the California Environmental Quality Act (CEQA) require an environmental impact report (EIR) to correlate a project's air pollution emissions with specific levels of health impacts?
2) What is the proper standard of review for determining whether an EIR provides sufficient information on the health impacts caused by a project's emission of air pollutants?

This brief will assist the Court by discussing the practical realities of correlating identified air quality impacts with specific health outcomes. In short, CEQA requires agencies to provide detailed information about a project's air quality impacts that is sufficient for the public and decisionmakers to adequately evaluate the project and meaningfully understand its impacts. However, the level of analysis is governed by a rule of reason; CEQA only requires agencies to conduct analysis if it is reasonably feasible to do so.

With regard to health-related air quality impacts, an analysis that correlates a project's air pollution emissions with specific levels of health impacts will be feasible in some cases but not others. Whether it is feasible depends on a variety of factors, including the nature of the project and the nature of the analysis under consideration. The feasibility of analysis may also change over time as air districts and others develop new tools for measuring projects' air quality related health impacts. Because SCAQMD has among the most sophisticated air quality modeling and health impact evaluation capability of any of the air districts in the State, it is uniquely situated to express an opinion on the extent to which the Court should hold that CEQA requires lead agencies to correlate air quality impacts with specific health outcomes.

SCAQMD can also offer a unique perspective on the question of the appropriate standard of review. SCAQMD submits that the proper standard of review for determining whether an EIR is sufficient as an informational document is more nuanced than argued by either party. In our view, this is a mixed question of fact and law. It includes determining whether additional analysis is feasible, which is primarily a factual question that should be reviewed under the substantial evidence standard. However, it also involves determining whether the omission of a particular analysis renders an EIR insufficient to serve CEQA's purpose as a meaningful, informational document. If a lead agency has not determined that a requested analysis is infeasible, it is the court's role to determine whether the EIR nevertheless meets CEQA's purposes, and courts should not defer to the lead agency's conclusions regarding the legal sufficiency of an EIR's analysis. The ultimate question of whether an EIR's analysis is "sufficient" to serve CEQA's informational purposes is predominately a question of law that courts should review de novo.

This brief will explain the rationale for these arguments and may assist the Court in reaching a conclusion that accords proper respect to a lead agency's factual conclusions while maintaining judicial authority over the ultimate question of what level of analysis CEQA requires.

STATEMENT OF INTEREST OF *AMICUS CURIAE*

The SCAQMD is the regional agency primarily responsible for air pollution control in the South Coast Air Basin, which consists of all of Orange County and the non-desert portions of the Los Angeles, Riverside, and San Bernardino Counties. (Health & Saf. Code § 40410; Cal. Code Regs., tit. 17, § 60104.) The SCAQMD participates in the CEQA process in several ways. Sometimes it acts as a lead agency that prepares CEQA documents for projects. Other times it acts as a responsible agency when it has permit authority over some part of a project that is undergoing CEQA review by a different lead agency. Finally, SCAQMD also acts as a commenting agency for CEQA documents that it receives because it is a public agency with jurisdiction by law over natural resources affected by the project.

In all of these capacities, SCAQMD will be affected by the decision in this case. SCAQMD sometimes submits comments requesting that a lead agency perform an additional type of air quality or health impacts analysis. On the other hand, SCAQMD sometimes determines that a particular type of health impact analysis is not feasible or would not produce reliable and informative results. Thus, SCAQMD will be affected by the Court's resolution of the extent to which CEQA requires EIRs to correlate emissions and health impacts, and its resolution of the proper standard of review.

CERTIFICATION REGARDING AUTHORSHIP AND FUNDING

No party or counsel in the pending case authored the proposed amicus curiae brief in whole or in part, or made any monetary contribution intended to fund the preparation or submission of the brief. No person or entity other than the proposed *Amicus Curiae* made any monetary contribution intended to fund the preparation or submission of the brief.

Respectfully submitted,

DATED: April 3, 2015

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BRIEF OF AMICUS CURIAE

SUMMARY OF ARGUMENT

The South Coast Air Quality Management District (SCAQMD) submits that this Court should not try to establish a hard-and-fast rule concerning whether lead agencies are required to correlate emissions of air pollutants with specific health consequences in their environmental impact reports (EIR). The level of detail required in EIRs is governed by a few, core CEQA (California Environmental Quality Act) principles. As this Court has stated, "[a]n EIR must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." (*Laurel Heights Improvement Assn. v. Regents of the Univ of Cal.* (1988) 47 Cal.3d 376, 405 ["*Laurel Heights I*"]) Accordingly, "an agency must use its best efforts to find out and disclose all that it reasonably can." (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 428 (quoting CEQA Guidelines § 15144)[1].). However, "[a]nalysis of environmental effects need not be exhaustive, but will be judged in light of what is reasonably feasible." (*Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1390; CEQA Guidelines §§ 15151, 15204(a).)

With regard to analysis of air quality related health impacts, EIRs must generally quantify a project's pollutant emissions, but in some cases it is not feasible to correlate these emissions to specific, quantifiable health impacts (e.g., premature mortality; hospital admissions). In such cases, a general description of the adverse health impacts resulting from the pollutants at issue may be sufficient. In other cases, due to the magnitude

[1] The CEQA Guidelines are found at Cal. Code Regs., tit. 14 §§ 15000, *et seq.*

or nature of the pollution emissions, as well as the specificity of the project involved, it may be feasible to quantify health impacts. Or there may be a less exacting, but still meaningful analysis of health impacts that can feasibly be performed. In these instances, agencies should disclose those impacts.

SCAQMD also submits that whether or not an EIR complies with CEQA's informational mandates by providing sufficient, feasible analysis is a mixed question of fact and law. Pertinent here, the question of whether an EIR's discussion of health impacts from air pollution is sufficient to allow the public to understand and consider meaningfully the issues involves two inquiries: (1) Is it feasible to provide the information or analysis that a commenter is requesting or a petitioner is arguing should be required?; and (2) Even if it is feasible, is the agency relying on other policy or legal considerations to justify not preparing the requested analysis? The first question of whether an analysis is feasible is primarily a question of fact that should be judged by the substantial evidence standard. The second inquiry involves evaluating CEQA's information disclosure purposes against the asserted reasons to not perform the requested analysis. For example, an agency might believe that its EIR meets CEQA's informational disclosure standards even without a particular analysis, and therefore choose not to conduct that analysis. SCAQMD submits that this is more of a legal question, which should be reviewed de novo as a question of law.

ARGUMENT

I. RELEVANT FACTUAL AND LEGAL FRAMEWORK.

A. Air Quality Regulatory Background

The South Coast Air Quality Management District (SCAQMD) is one of the local and regional air pollution control districts and air quality

management districts in California. The SCAQMD is the regional air pollution agency for the South Coast Air Basin, which consists of all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. (Health & Saf. Code § 40410, 17 Cal. Code Reg. § 60104.) The SCAQMD also includes the Coachella Valley in Riverside County (Palm Springs area to the Salton Sea). (SCAQMD, *Final 2012 AQMP (Feb. 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "chapter 7" hyperlink; pp 7-1, 7-3 (last visited Apr. 1, 2015).) The SCAQMD's jurisdiction includes over 16 million residents and has the worst or nearly the worst air pollution levels in the country for ozone and fine particulate matter. (SCAQMD, *Final 2012 AQMP (Feb. 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "Executive Summary" hyperlink p. ES-1 (last visited Apr. 1, 2015).)

Under California law, the local and regional districts are primarily responsible for controlling air pollution from all sources except motor vehicles. (Health & Saf. Code § 40000.) The California Air Resources Board (CARB), part of the California Environmental Protection Agency, is primarily responsible for controlling pollution from motor vehicles. (*Id.*) The air districts must adopt rules to achieve and maintain the state and federal ambient air quality standards within their jurisdictions. (Health & Saf. Code § 40001.)

The federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (EPA) to identify pollutants that are widely distributed and pose a threat to human health, developing a so-called "criteria" document. (42 U.S.C. § 7408; CAA § 108.) These pollutants are frequently called "criteria pollutants." EPA must then establish "national ambient air quality standards" at levels "requisite to protect public health",

allowing "an adequate margin of safety." (42 U.S.C. § 7409; CAA § 109.) EPA has set standards for six identified pollutants: ozone, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter (PM), and lead. (U.S. EPA, National Ambient Air Quality Standards (NAAQS), http://www.epa.gov/air/criteria.html (last updated Oct. 21, 2014).)[2]

Under the Clean Air Act, EPA sets emission standards for motor vehicles and "nonroad engines" (mobile farm and construction equipment, marine vessels, locomotives, aircraft, etc.). (42 U.S.C. §§ 7521, 7547; CAA §§ 202, 213.) California is the only state allowed to establish emission standards for motor vehicles and most nonroad sources; however, it may only do so with EPA's approval. (42 U.S.C. §§ 7543(b), 7543(e); CAA §§ 209(b), 209(c).) Sources such as manufacturing facilities, power plants and refineries that are not mobile are often referred to as "stationary sources." The Clean Air Act charges state and local agencies with the primary responsibility to attain the national ambient air quality standards. (42 U.S.C. § 7401(a)(3); CAA § 101(a)(3).) Each state must adopt and implement a plan including enforceable measures to achieve and maintain the national ambient air quality standards. (42 U.S.C. § 7410; CAA § 110.) The SCAQMD and CARB jointly prepare portion of the plan for the South Coast Air Basin and submit it for approval by EPA. (Health & Saf. Code §§ 40460, et seq.)

The Clean Air Act also requires state and local agencies to adopt a permit program requiring, among other things, that new or modified "major" stationary sources use technology to achieve the "lowest achievable emission rate," and to control minor stationary sources as

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[2] Particulate matter (PM) is further divided into two categories: fine particulate or $PM_{2.5}$ (particles with a diameter of less than or equal to 2.5 microns) and coarse particulate (PM_{10}) (particles with a diameter of 10 microns or less). (U.S. EPA, Particulate Matter (PM), http://www.epa.gov/airquality/particlepollution/ (last visited Apr. 1, 2015).)

needed to help attain the standards. (42 U.S.C. §§ 7502(c)(5), 7503(a)(2), 7410(a)(2)(C); CAA §§ 172(c)(5), 173(a)(2), 110(a)(2)(C).) The air districts implement these permit programs in California. (Health & Saf. Code §§ 42300, et seq.)

The Clean Air Act also sets out a regulatory structure for over 100 so-called "hazardous air pollutants" calling for EPA to establish "maximum achievable control technology" (MACT) for sources of these pollutants. (42 U.S.C. § 7412(d)(2); CAA § 112(d)(2).) California refers to these pollutants as "toxic air contaminants" (TACs) which are subject to two state-required programs. The first program requires "air toxics control measures" for specific categories of sources. (Health & Saf. Code § 39666.) The other program requires larger stationary sources and sources identified by air districts to prepare "health risk assessments" for impacts of toxic air contaminants. (Health & Saf. Code §§ 44320(b), 44322, 44360.) If the health risk exceeds levels identified by the district as "significant," the facility must implement a "risk reduction plan" to bring its risk levels below "significant" levels. Air districts may adopt additional more stringent requirements than those required by state law, including requirements for toxic air contaminants. (Health & Saf. Code § 41508; *Western Oil & Gas Assn. v. Monterey Bay Unified APCD* (1989) 49 Cal.3d 408, 414.) For example, SCAQMD has adopted a rule requiring new or modified sources to keep their risks below specified levels and use best available control technology (BACT) for toxics. (SCAQMD, *Rule 1401-New Source Review of Toxic Air Contaminants*, http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiv; then follow "Rule 1401" hyperlink (last visited Apr. 1, 2015).)

B. The SCAQMD's Role Under CEQA

The California Environmental Quality Act (CEQA) requires public agencies to perform an environmental review and appropriate analysis for projects that they implement or approve. (Pub. Resources Code § 21080(a).) The agency with primary approval authority for a particular project is generally the "lead agency" that prepares the appropriate CEQA document. (CEQA Guidelines §§ 15050, 15051.) Other agencies having a subsequent approval authority over all or part of a project are called "responsible" agencies that must determine whether the CEQA document is adequate for their use. (CEQA Guidelines §§ 15096(c), 15381.) Lead agencies must also consult with and circulate their environmental impact reports to "trustee agencies" and agencies "with jurisdiction by law" including "authority over resources which may be affected by the project." (Pub. Resources Code §§ 21104(a), 21153; CEQA Guidelines §§ 15086(a)(3), 15073(c).) The SCAQMD has a role in all these aspects of CEQA.

Fulfilling its responsibilities to implement its air quality plan and adopt rules to attain the national ambient air quality standards, SCAQMD adopts a dozen or more rules each year to require pollution reductions from a wide variety of sources. The SCAQMD staff evaluates each rule for any adverse environmental impact and prepares the appropriate CEQA document. Although most rules reduce air emissions, they may have secondary environmental impacts such as use of water or energy or disposal of waste—e.g., spent catalyst from control equipment.[3]

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[3] The SCAQMD's CEQA program for its rules is a "Certified Regulatory Program" under which it prepares a "functionally equivalent" document in lieu of a negative declaration or EIR. (Pub. Resources Code § 21080.5, CEQA Guidelines § 15251(l).)

The SCAQMD also approves a large number of permits every year to construct new, modified, or replacement facilities that emit regulated air pollutants. The majority of these air pollutant sources have already been included in an earlier CEQA evaluation for a larger project, are currently being evaluated by a local government as lead agency, or qualify for an exemption. However, the SCAQMD sometimes acts as lead agency for major projects where the local government does not have a discretionary approval. In such cases, SCAQMD prepares and certifies a negative declaration or environmental impact report (EIR) as appropriate.[4] SCAQMD evaluates perhaps a dozen such permit projects under CEQA each year. SCAQMD is often also a "responsible agency" for many projects since it must issue a permit for part of the projects (e.g., a boiler used to provide heat in a commercial building). For permit projects evaluated by another lead agency under CEQA, SCAQMD has the right to determine that the CEQA document is inadequate for its purposes as a responsible agency, but it may not do so because its permit program already requires all permitted sources to use the best available air pollution control technology. (SCAQMD, *Rule 1303(a)(1) – Requirements*, http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiii; then follow "Rule 1303" hyperlink (last visited Apr. 1, 2015).)

Finally, SCAQMD receives as many as 60 or more CEQA documents each month (around 500 per year) in its role as commenting agency or an agency with "jurisdiction by law" over air quality—a natural resource affected by the project. (Pub. Resources Code §§ 21104(a), 21153; CEQA Guidelines § 15366(a)(3).) The SCAQMD staff provides comments on as many as 25 or 30 such documents each month.

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[4] The SCAQMD's permit projects are not included in its Certified Regulatory Program, and are evaluated under the traditional local government CEQA analysis. (Pub. Resources Code §§ 21150-21154.)

(SCAQMD Governing Board Agenda, Apr. 3, 2015, Agenda Item 16, Attachment A, http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=governing-board-meeting-agenda-april-3-2015; then follow "16. Lead Agency Projects and Environmental Documents Received by SCAQMD" hyperlink (last visited Apr. 1, 2015).) Of course, SCAQMD focuses its commenting efforts on the more significant projects.

Typically, SCAQMD comments on the adequacy of air quality analysis, appropriateness of assumptions and methodology, and completeness of the recommended air quality mitigation measures. Staff may comment on the need to prepare a health risk assessment detailing the projected cancer and noncancer risks from toxic air contaminants resulting from the project, particularly the impacts of diesel particulate matter, which CARB has identified as a toxic air contaminant based on its carcinogenic effects. (California Air Resources Board, Resolution 98-35, Aug. 27, 1998, http://www.arb.ca.gov/regact/diesltac/diesltac.htm; then follow Resolution 98-35 hyperlink (last visited Apr. 1, 2015).) Because SCAQMD already requires new or modified stationary sources of toxic air contaminants to use the best available control technology for toxics and to keep their risks below specified levels, (SCAQMD Rule 1401, supra, note 15), the greatest opportunity to further mitigate toxic impacts through the CEQA process is by reducing emissions—particularly diesel emissions—from vehicles.

II. THIS COURT SHOULD NOT SET A HARD-AND-FAST RULE CONCERNING THE EXTENT TO WHICH AN EIR MUST CORRELATE A PROJECT'S EMISSION OF POLLUTANTS WITH RESULTING HEALTH IMPACTS.

Numerous cases hold that courts do not review the correctness of an EIR's conclusions but rather its sufficiency as an informative document. (*Laurel Heights 1, supra*, 47 Cal.3d at p. 392; *Citizens of Goleta Valley v.*

Bd. of Supervisors (1990) 52 Cal.3d 553, 569; *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1197.)

As stated by the Court of Appeal in this case, where an EIR has addressed a topic, but the petitioner claims that the information provided about that topic is insufficient, courts must "draw[] a line that divides *sufficient* discussions from those that are *insufficient*." (*Sierra Club v. County of Fresno* (2014) 226 Cal.App.4th 704 (superseded by grant of review) 172 Cal.Rptr.3d 271, 290.) The Court of Appeal readily admitted that "[t]he terms themselves – sufficient and insufficient – provide little, if any, guidance as to where the line should be drawn. They are simply labels applied once the court has completed its analysis." (*Id.*)

The CEQA Guidelines, however, provide guidance regarding what constitutes a sufficient discussion of impacts. Section 15151 states that "the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." Case law reflects this: "Analysis of environmental effects need not be exhaustive, but will be judged in light of what was reasonably feasible." (*Association of Irritated Residents v. County of Madera, supra,* 107 Cal.App.4th at p. 1390; see also CEQA Guidelines § 15204(a).)

Applying this test, this Court cannot realistically establish a hard-and-fast rule that an analysis correlating air pollution impacts of a project to quantified resulting health impacts is always required, or indeed that it is never required. Simply put, in some cases such an analysis will be "feasible"; in some cases it will not.

For example, air pollution control districts often require a proposed new source of toxic air contaminants to prepare a "health risk assessment" before issuing a permit to construct. District rules often limit the allowable cancer risk the new source may cause to the "maximally exposed individual" (worker and residence exposures). (*See, e.g.*, SCAQMD Rule 1401(c)(8); 1401(d)(1), *supra* note 15.) In order to perform this analysis, it

is necessary to have data regarding the sources and types of air toxic contaminants, location of emission points, velocity of emissions, the meteorology and topography of the area, and the location of receptors (worker and residence). (SCAQMD, *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB2588), pp. 11-16*; (last visited Apr. 1, 2015) http://www.aqmd.gov/home/library/documents-support-material; "Guidelines" hyperlink; AB2588; then follow AB2588 Risk Assessment Guidelines hyperlink.)

Thus, it is feasible to determine the health risk posed by a new gas station locating at an intersection in a mixed use area, where receptor locations are known. On the other hand, it may not be feasible to perform a health risk assessment for airborne toxics that will be emitted by a generic industrial building that was built on "speculation" (i.e., without knowing the future tenant(s)). Even where a health risk assessment can be prepared, however, the resulting maximum health risk value is only a calculation of risk—it does not necessarily mean anyone will contract cancer as a result of the project.

In order to find the "cancer burden" or expected additional cases of cancer resulting from the project, it is also necessary to know the numbers and location of individuals living within the "zone of impact" of the project: i.e., those living in areas where the projected cancer risk from the project exceeds one in a million. (SCAQMD, Health Risk Assessment Summary form, http://www.aqmd.gov/home/forms ; filter by "AB2588" category; then "Health Risk Assessment" hyperlink (last visited Apr. 1, 2015).) The affected population is divided into bands of those exposed to at least 1 in a million risk, those exposed to at least 10 in a million risk, etc. up to those exposed at the highest levels. (*Id.*) This data allows agencies to calculate an approximate number of additional cancer cases expected from

the project. However, it is not possible to predict which particular individuals will be affected.

For the so-called criteria pollutants[5], such as ozone, it may be more difficult to quantify health impacts. Ozone is formed in the atmosphere from the chemical reaction of the nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. (U.S. EPA, Ground Level Ozone, http://www.epa.gov/airquality/ozonepollution/ (last updated Mar. 25, 2015).) It takes time and the influence of meteorological conditions for these reactions to occur, so ozone may be formed at a distance downwind from the sources. (U.S. EPA, *Guideline on Ozone Monitoring Site Selection* (Aug. 1998) EPA-454/R-98-002 § 5.1.2, http://www.epa.gov/ttnamti1/archive/cpreldoc.html (last visited Apr. 1, 2015).) NO_x and VOC are known as "precursors" of ozone.

Scientifically, health effects from ozone are correlated with increases in the ambient level of ozone in the air a person breathes. (U.S. EPA, *Health Effects of Ozone in the General Population,* Figure 9, http://www.epa.gov/apti/ozonehealth/population.html#levels (last visited Apr. 1, 2015).) However, it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels over an entire region. For example, the SCAQMD's 2012 AQMP showed that reducing NO_x by 432 tons per day (157,680 tons/year) and reducing VOC by 187 tons per day (68,255 tons/year) would reduce ozone levels at the SCAQMD's monitor site with the highest levels by only 9 parts per billion. (South Coast Air Quality Management District, *Final 2012 AQMP (February 2013)*, http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan; then follow "Appendix V: Modeling & Attainment Demonstrations" hyperlink,

[5] See discussion of types of pollutants, supra, Part I.A.

pp. v-4-2, v-7-4, v-7-24.) SCAQMD staff does not currently know of a way to accurately quantify ozone-related health impacts caused by NO_x or VOC emissions from relatively small projects.

On the other hand, this type of analysis may be feasible for projects on a regional scale with very high emissions of NO_x and VOCs, where impacts are regional. For example, in 2011 the SCAQMD performed a health impact analysis in its CEQA document for proposed Rule 1315, which authorized various newly-permitted sources to use offsets from the districts "internal bank" of emission reductions. This CEQA analysis accounted for essentially *all* the increases in emissions due to new or modified sources in the District between 2010 and 2030.[6] The SCAQMD was able to correlate this very large emissions increase (e.g., 6,620 pounds per day NO_x (1,208 tons per year), 89,180 pounds per day VOC (16,275 tons per year)) to expected health outcomes from ozone and particulate matter (e.g., 20 premature deaths per year and 89,947 school absences in the year 2030 due to ozone).[7] (SCAQMD Governing Board Agenda, February 4, 2011, Agenda Item 26, *Assessment for: Re-adoption of Proposed Rule 1315 – Federal New Source Review Tracking System* (see hyperlink in fn 6*)* at p. 4.1-35, Table 4.1-29.)

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[6] (SCAQMD Governing Board Agenda, February 4, 2011, Agenda Item 26, Attachment G, *Assessment for: Re-adoption of Proposed Rule 1315 – Federal New Source Review Tracking System, Vol. 1, p.4.0-6,* http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=governing-board-meeting-agenda-february-4-2011; the follow "26. Adopt Proposed Rule 1315 – Federal New Source Review Tracking System" (last visited April 1, 2015).)

[7] The SCAQMD was able to establish the location of future NO_x and VOC emissions by assuming that new projects would be built in the same locations and proportions as existing stationary sources. This CEQA document was upheld by the Los Angeles County Superior Court in *Natural Res. Def. Council v SCAQMD*, Los Angeles Superior Court No. BS110792).

However, a project emitting only 10 tons per year of NO_x or VOC is small enough that its regional impact on ambient ozone levels may not be detected in the regional air quality models that are currently used to determine ozone levels. Thus, in this case it would not be feasible to directly correlate project emissions of VOC or NO_x with specific health impacts from ozone. This is in part because ozone formation is not linearly related to emissions. Ozone impacts vary depending on the location of the emissions, the location of other precursor emissions, meteorology and seasonal impacts, and because ozone is formed some time later and downwind from the actual emission. (EPA Guideline on Ozone Monitoring Site Selection (Aug. 1998) EPA-454/R-98-002, § 5.1.2; https://www.epa.gov/ttnamti1/archive/cpreldoc.html; then search "Guideline on Ozone Monitoring Site Selection" click on pdf) (last viewed Apr. 1, 2015).)

SCAQMD has set its CEQA "significance" threshold for NO_x and VOC at 10 tons per year (expressed as 55 lb/day). (SCAQMD, *Air Quality Analysis Handbook*, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook; then follow "SCAQMD Air Quality Significance Thresholds" hyperlink (last visited Apr. 1, 2015).) This is because the federal Clean Air Act defines a "major" stationary source for "extreme" ozone nonattainment areas such as SCAQMD as one emitting 10 tons/year. (42 U.S.C. §§ 7511a(e), 7511a(f); CAA §§ 182(e), 182(f).) Under the Clean Air Act, such sources are subject to enhanced control requirements (42 U.S.C. §§ 7502(c)(5), 7503; CAA §§ 172(c)(5), 173), so SCAQMD decided this was an appropriate threshold for making a CEQA "significance" finding and requiring feasible mitigation. Essentially, SCAQMD takes the position that a source that emits 10 tons/year of NO_x or VOC would contribute cumulatively to ozone formation. Therefore, lead agencies that use SCAQMD's thresholds of significance may determine

that many projects have "significant" air quality impacts and must apply all feasible mitigation measures, yet will not be able to precisely correlate the project to quantifiable health impacts, unless the emissions are sufficiently high to use a regional modeling program.

In the case of particulate matter ($PM_{2.5}$)[8], another "criteria" pollutant, SCAQMD staff is aware of two possible methods of analysis. SCAQMD used regional modeling to predict expected health impacts from its proposed Rule 1315, as mentioned above. Also, the California Air Resources Board (CARB) has developed a methodology that can predict expected mortality (premature deaths) from large amounts of $PM_{2.5}$. (California Air Resources Board, *Health Impacts Analysis: PM Premature Death Relationship*, http://www.arb.ca.gov/research/health/pm-mort/pm-mort_arch.htm (last reviewed Jan. 19, 2012).) SCAQMD used the CARB methodology to predict impacts from three very large power plants (e.g., 731-1837 lbs/day). (Final Environmental Assessment for Rule 1315, *supra*, pp 4.0-12, 4.1-13, 4.1-37 (e.g., 125 premature deaths in the entire SCAQMD in 2030), 4.1-39 (0.05 to 1.77 annual premature deaths from power plants.) Again, this project involved large amounts of additional $PM_{2.5}$ in the District, up to 2.82 tons/day (5,650 lbs/day of $PM_{2.5}$, or, or 1029 tons/year. (*Id.* at table 4.1-4, p. 4.1-10.)

However, the primary author of the CARB methodology has reported that this $PM_{2.5}$ health impact methodology is not suited for small projects and may yield unreliable results due to various uncertainties. [9] (SCAQMD, *Final Subsequent Mitigated Negative Declaration for: Warren*

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[8] SCAQMD has not attained the latest annual or 24-hour national ambient air quality standards for "$PM_{2.5}$" or particulate matter less than 2.5 microns in diameter.

[9] Among these uncertainties are the representativeness of the population used in the methodology, and the specific source of PM and the corresponding health impacts. (*Id.* at p. 2-24.)

E&P, Inc. WTU Central Facility, New Equipment Project (certified July 19, 2011), http://www.aqmd.gov/home/library/documents-support-material/lead-agency-permit-projects/permit-project-documents---year-2011; then follow "Final Subsequent Mitigated Negative Declaration for Warren E&P Inc. WTU Central Facility, New Equipment Project" hyperlink, pp. 2-22, 2-23 (last visited Apr. 1, 2015).) Therefore, when SCAQMD prepared a CEQA document for the expansion of an existing oil production facility, with very small $PM_{2.5}$ increases (3.8 lb/day) and a very small affected population, staff elected not to use the CARB methodology for using estimated $PM_{2.5}$ emissions to derive a projected premature mortality number and explained why it would be inappropriate to do so. (*Id.* at pp 2-22 to 2-24.) SCAQMD staff concluded that use of this methodology for such a small source could result in unreliable findings and would not provide meaningful information. (*Id.* at pp. 2-23, 2-25.) This CEQA document was not challenged in court.

In the above case, while it may have been technically possible to plug the data into the methodology, the results would not have been reliable or meaningful. SCAQMD believes that an agency should not be required to perform analyses that do not produce reliable or meaningful results. This Court has already held that an agency may decline to use even the "normal" "existing conditions" CEQA baseline where to do so would be misleading or without informational value. (*Neighbors for Smart Rail v. Exposition Metro Line* (2013) 57 Cal.4th 439, 448, 457.) The same should be true for a decision that a particular study or analysis would not provide reliable or meaningful results.[10]

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[10] Whether a particular study would result in "informational value" is a part of deciding whether it is "feasible." CEQA defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and

Therefore, it is not possible to set a hard-and-fast rule on whether a correlation of air quality impacts with specific quantifiable health impacts is required in all cases. Instead, the result turns on whether such an analysis is reasonably feasible in the particular case.[11] Moreover, what is reasonably feasible may change over time as scientists and regulatory agencies continually seek to improve their ability to predict health impacts. For example, CARB staff has been directed by its Governing Board to reassess and improve the methodology for estimating premature deaths. (California Air Resources Board, *Health Impacts Analysis: PM Mortality Relationship*, http://www.arb.ca.gov/research/health/pm-mort/pm-mort.htm (last reviewed Dec. 29, 2010).) This factor also counsels against setting any hard-and-fast rule in this case.

III. THE QUESTION OF WHETHER AN EIR CONTAINS SUFFICIENT ANALYSIS TO MEET CEQA'S REQUIREMENTS IS A MIXED QUESTION OF FACT AND LAW GOVERNED BY TWO DIFFERENT STANDARDS OF REVIEW.

A. Standard of Review for Feasibility Determination and Sufficiency as an Informative Document

A second issue in this case is whether courts should review an EIR's informational sufficiency under the "substantial evidence" test as argued by Friant Ranch or the "independent judgment" test as argued by Sierra Club.

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technological factors." (Pub. Resources Code § 21061.1.) A study cannot be "accomplished in a *successful* manner" if it produces unreliable or misleading results.

[11] In this case, the lead agency did not have an opportunity to determine whether the requested analysis was feasible because the comment was non-specific. Therefore, SCAQMD suggests that this Court, after resolving the legal issues in the case, direct the Court of Appeal to remand the case to the lead agency for a determination of whether the requested analysis is feasible. Because Fresno County, the lead agency, did not seek review in this Court, it seems likely that the County has concluded that at least some level of correlation of air pollution with health impacts is feasible.

As this Court has explained, "a reviewing court must adjust its scrutiny to the nature of the alleged defect, depending on whether the claim is predominantly one of improper procedure or a dispute over the facts." (*Vineyard Area Citizens v. City of Rancho Cordova, supra,* 40 Cal.4th at 435.) For questions regarding compliance with proper procedure or other legal questions, courts review an agency's action de novo under the "independent judgment" test. (*Id.*) On the other hand, courts review factual disputes only for substantial evidence, thereby "accord[ing] greater deference to the agency's substantive factual conclusions." (*Id.*)

Here, Friant Ranch and Sierra Club agree that the case involves the question of whether an EIR includes sufficient information regarding a project's impacts. However, they disagree on the proper standard of review for answering this question: Sierra Club contends that courts use the independent judgment standard to determine whether an EIR's analysis is sufficient to meet CEQA's informational purposes,[12] while Friant Ranch contends that the substantial evidence standard applies to this question.

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[12] Sierra Club acknowledges that courts use the substantial evidence standard when reviewing predicate factual issues, but argues that courts ultimately decide as a matter of law what CEQA requires. (Answering Brief, pp. 14, 23.)

SCAQMD submits that the issue is more nuanced than either party contends. We submit that, whether a CEQA document includes sufficient analysis to satisfy CEQA's informational mandates is a mixed question of fact and law,[13] containing two levels of inquiry that should be judged by different standards.[14]

The state CEQA Guidelines set forth standards for the adequacy of environmental analysis. Guidelines Section 15151 states:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection, but for adequacy, completeness, and a good-faith effort at full disclosure.

In this case, the basic question is whether the underlying analysis of air quality impacts made the EIR "sufficient" as an informative document. However, whether the EIR's analysis was sufficient is judged in light of what was reasonably feasible. This represents a mixed question of fact and law that is governed by two different standards of review.

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[13] Friant Ranch actually states that the claim that an EIR lacks sufficient relevant information is, "most properly thought of as raising mixed questions of fact and law." (Opening Brief, p. 27.) However, the remainder of its argument claims that the court should apply the substantial evidence standard of review to all aspects of the issue.

[14] Mixed questions of fact and law issues may implicate predominantly factual subordinate questions that are reviewed under the substantial evidence test even though the ultimate question may be reviewed by the independent judgment test. *Crocker National Bank v. City and County of San Francisco* (1989) 49 Cal.3d 881, 888-889.

SCAQMD submits that an EIR's sufficiency as an informational document is ultimately a legal question that courts should determine using their independent judgment. This Court's language in *Laurel Heights I* supports this position. As this Court explained: "The court does not pass upon the correctness of the EIR's environmental conclusions, but only upon its *sufficiency as an informative document.*" (*Laurel Heights I, supra,* 47 Cal.3d at 392-393) (emphasis added.) As described above, the Court in *Vineyard Area Citizens v. City of Rancho Cordova, supra,* 40 Cal.4th at 431, also used its independent judgment to determine what level of analysis CEQA requires for water supply impacts. The Court did not defer to the lead agency's opinion regarding the law's requirements; rather, it determined for itself what level of analysis was necessary to meet "[t]he law's informational demands." (*Id.* at p. 432.) Further, existing case law also holds that where an agency fails to comply with CEQA's information disclosure requirements, the agency has "failed to proceed in the manner required by law." (*Save Our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 118.)

However, whether an EIR satisfies CEQA's requirements depends in part on whether it was reasonably feasible for an agency to conduct additional or more thorough analysis. EIRs must contain "a detailed statement" of a project's impacts (Pub. Res. Code § 21061), and an agency must "use its best efforts to find out and disclose all that it reasonably can." (CEQA Guidelines § 15144.) Nevertheless, "the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." (CEQA Guidelines § 15151.)

SCAQMD submits that the question of whether additional analysis or a particular study suggested by a commenter is "feasible" is generally a question of fact. Courts have already held that whether a particular alternative is "feasible" is reviewed by the substantial evidence test.

(*Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587, 598-99; *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 883.) Thus, if a lead agency determines that a particular study or analysis is infeasible, that decision should generally be judged by the substantial evidence standard. However, SCAQMD urges this Court to hold that lead agencies must explain the basis of any determination that a particular analysis is infeasible in the EIR itself. An EIR must discuss information, including issues related to the feasibility of particular analyses "in sufficient detail to enable meaningful participation and criticism by the public. '[W]hatever is required to be considered in an EIR must be in that formal report; what any official might have known from other writings or oral presentations cannot supply what is lacking in the report.'" (*Laurel Heights I, supra*, 47 Cal.3d at p. 405 (quoting *Santiago County Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 831) (discussing analysis of alternatives).) The evidence on which the determination is based should also be summarized in the EIR itself, with appropriate citations to reference materials if necessary. Otherwise commenting agencies such as SCAQMD would be forced to guess where the lead agency's evidence might be located, thus thwarting effective public participation.

Moreover, if a lead agency determines that a particular study or analysis would not result in reliable or useful information and for that reason is not feasible, that determination should be judged by the substantial evidence test. (See *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority*, *supra*, 57 Cal.4th 439, 448, 457:

whether "existing conditions" baseline would be misleading or uninformative judged by substantial evidence standard.[15])

If the lead agency's determination that a particular analysis or study is not feasible is supported by substantial evidence, then the agency has not violated CEQA's information disclosure provisions, since it would be infeasible to provide additional information. This Court's decisions provide precedent for such a result. For example, this Court determined that the issue of whether the EIR should have included a more detailed discussion of future herbicide use was resolved because substantial evidence supported the agency's finding that "the precise parameters of future herbicide use could not be predicted." *Ebbetts Pass Forest Watch v. California Dept. of Forestry & Fire Protection* (2008) 43 Cal.4th 936, 955.

Of course, SCAQMD expects that courts will continue to hold lead agencies to their obligations to consult with, and not to ignore or misrepresent, the views of sister agencies having special expertise in the area of air quality. (*Berkeley Keep Jets Over the Bay v. Board of Port Commissioners* (2007) 91 Cal.App.4th 1344, 1364 n.11.) In some cases, information provided by such expert agencies may establish that the purported evidence relied on by the lead agency is not in fact "substantial". (*Id.* at pp. 1369-1371.)

In sum, courts retain ultimate responsibility to determine what CEQA requires. However, the law does not require exhaustive analysis, but only what is reasonably feasible. Agencies deserve deference for their factual determinations regarding what type of analysis is reasonably feasible. On the other hand, if a commenter requests more information, and the lead agency declines to provide it but does *not* determine that the

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[15] The substantial evidence standard recognizes that the courts "have neither the resources nor the scientific expertise" to weigh conflicting evidence on technical issues. (*Laurel Heights I, supra,* 47 Cal.3d 376, 393.)

requested study or analysis would be infeasible, misleading or uninformative, the question becomes whether the omission of that analysis renders the EIR inadequate to satisfy CEQA's informational purposes. (*Id.* at pp. 1370-71.) Again, this is predominantly a question of law and should be judged by the de novo or independent judgment standard of review. Of course, this Court has recognized that a "project opponent or reviewing court can always imagine some additional study or analysis that might provide helpful information. It is not for them to design the EIR. That further study...might be helpful does not make it necessary." (*Laurel Heights I, supra,* 47 Cal.3d 376, 415 – see also CEQA Guidelines § 15204(a) [CEQA "does not require a lead agency to conduct every test. . . recommended or demanded by commenters."].) Courts, then, must adjudicate whether an omission of particular information renders an EIR inadequate to serve CEQA's informational purposes.[16]

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[16] We recognize that there is case law stating that the substantial evidence standard applies to "challenges to the scope of an EIR's analysis of a topic" as well as the methodology used and the accuracy of the data relied on in the document "because these types of challenges involve factual questions." (*Bakersfield Citizens for Local Control v. City of Bakersfield, supra,* 124 Cal.App.4th 1184, 1198, and cases relied on therein.) However, we interpret this language to refer to situations where the question of the scope of the analysis really is factual—that is, where it involves whether further analysis is feasible, as discussed above. This interpretation is supported by the fact that the *Bakersfield* court expressly rejected an argument that a claimed "omission of information from the EIR should be treated as inquiries whether there is substantial evidence supporting the decision approving the project. " *Bakersfield, supra,* 124 Cal.App.4th at p. 1208. And the *Bakersfield* court ultimately decided that the lead agency must analyze the connection between the identified air pollution impacts and resulting health impacts, even though the EIR already included some discussion of air-pollution-related respiratory illnesses. *Bakersfield, supra,* 124 Cal.App.4th at p. 1220. Therefore, the court must not have interpreted this question as one of the "scope of the analysis" to be judged by the substantial evidence standard.

B. Friant Ranch's Rationale for Rejecting the Independent Judgment Standard of Review is Unsupported by Case Law.

In its brief, Friant Ranch makes a distinction between cases where a required CEQA topic is not discussed at all (to be reviewed by independent judgment as a failure to proceed in the manner required by law) and cases where a topic is discussed, but the commenter claims the information provided is insufficient (to be judged by the substantial evidence test). (Opening Brief, pp. 13-17.) The Court of Appeal recognized these two types of cases, but concluded that both raised questions of law. (*Sierra Club v. County of Fresno* (2014) 226 Cal.App.4th 704 (superseded by grant of review) 172 Cal.Rptr.3d 271, 290.) We believe the distinction drawn by Friant Ranch is unduly narrow, and inconsistent with cases which have concluded that CEQA documents are insufficient. In many instances, CEQA's requirements are stated broadly, and the courts must interpret the law to determine what level of analysis satisfies CEQA's mandate for providing meaningful information, even though the EIR discusses the issue to some extent.

For example, the CEQA Guidelines require discussion of the existing environmental baseline. In *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 954-955, the lead agency had discussed the environmental baseline by describing historic month-end water levels in the affected lakes. However, the court held that this was not an adequate baseline discussion because it failed to discuss the timing and amounts of past actual water releases, to allow comparison with the proposed project. The court evidently applied the independent judgment test to its decision, even though the agency discussed the issue to some extent.

Likewise, in *Vineyard Area Citizens* (2007) 40 Cal.4th 412, this Court addressed the question of whether an EIR's analysis of water supply impacts complied with CEQA. The parties agreed that the EIR was required to analyze the effects of providing water to the development project, "and that in order to do so the EIR had, in some manner, to identify the planned sources of that water." (*Vineyard Area Citizens, supra,* at p. 428.) However, the parties disagreed as to the level of detail required for this analysis and "what level of uncertainty regarding the availability of water supplies can be tolerated in an EIR . . . ." (*Id.*) In other words, the EIR had analyzed water supply impacts for the project, but the petitioner claimed that the analysis was insufficient.

This Court noted that neither CEQA's statutory language or the CEQA Guidelines specifically addressed the question of how precisely an EIR must discuss water supply impacts. (*Id.*) However, it explained that CEQA "states that '[w]hile foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can.'" (*Id.*, [Guidelines § 15144].) The Court used this general principle, along with prior precedent, to elucidate four "principles for analytical adequacy" that are necessary in order to satisfy "CEQA's informational purposes." (*Vineyard Area Citizens, supra,* at p. 430.) The Court did not defer to the agency's determination that the EIR's analysis of water supply impacts was sufficient. Rather, this Court used its independent judgment to determine for itself the level of analysis required to satisfy CEQA's fundamental purposes. (*Vineyard Area Citizens, supra*, at p. 441: an EIR does not serve its purposes where it neglects to explain likely sources of water and "... leaves long term water supply considerations to later stages of the project.")

Similarly, the CEQA Guidelines require an analysis of noise impacts of the project. (Appendix G, "Environmental Checklist Form."[17]) In *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1123, the court held that the lead agency's noise impact analysis was inadequate even though it had addressed the issue and concluded that the increase would not be noticeable. If the court had been using the substantial evidence standard, it likely would have upheld this discussion.

Therefore, we do not agree that the issue can be resolved on the basis suggested by Friant Ranch, which would apply the substantial evidence standard to *every* challenge to an analysis that addresses a required CEQA topic. This interpretation would subvert the courts' proper role in interpreting CEQA and determining what the law requires.

Nor do we agree that the Court of Appeal in this case violated CEQA's prohibition on courts interpreting its provisions "in a manner which imposes procedural or substantive requirements beyond those explicitly stated in this division or in the state guidelines." (Pub. Resources Code § 21083.1.) CEQA requires an EIR to describe *all* significant impacts of the project on the environment. (Pub. Resources Code § 21100(b)(2); *Vineyard Area Citizens, supra,* at p. 428.) Human beings are part of the environment, so CEQA requires EIRs to discuss a project's significant impacts on human health. However, except in certain particular circumstances,[18] neither the CEQA statute nor Guidelines specify the precise level of analysis that agencies must undertake to satisfy the law's requirements. (see, e.g., CEQA Guidelines § 15126.2(a) [EIRs must describe "health and safety problems caused by {a project's} physical changes"].) Accordingly, courts must interpret CEQA as a whole to

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[17] Association of Environmental Professionals, 2015 CEQA Statute and Guidelines (2015) p.287.

[18] E.g., Pub. Resources Code § 21151.8(C)(3)(B)(iii) (requiring specific type of health risk analysis for siting schools).

determine whether a particular EIR is sufficient as an informational document. A court determining whether an EIR's discussion of human health impacts is legally sufficient does not constitute imposing a new substantive requirement.[19] Under Friant Ranch's theory, the above-referenced cases holding a CEQA analysis inadequate would have violated the law. This is not a reasonable interpretation.

IV. COURTS MUST SCRUPULOUSLY ENFORCE THE REQUIREMENTS THAT LEAD AGENCIES CONSULT WITH AND OBTAIN COMMENTS FROM AIR DISTRICTS

Courts must "scrupulously enforce" CEQA's legislatively mandated requirements. (*Vineyard Area Citizens, supra*, 40 Cal.4th 412, 435.) Case law has firmly established that lead agencies must consult with the relevant air pollution control district before conducting an initial study, and must provide the districts with notice of the intention to adopt a negative declaration (or EIR). (*Schenck v. County of Sonoma* (2011) 198 Cal.App.4th 949, 958.) As *Schenck* held, neither publishing the notice nor providing it to the State Clearinghouse was a sufficient substitute for sending notice directly to the air district. (*Id.*) Rather, courts "must be satisfied that [administrative] agencies have fully complied with the procedural requirements of CEQA, since only in this way can the important public purposes of CEQA be protected from subversion." *Schenck,* 198 Cal.App.4th at p. 959 (citations omitted).[20]

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[19] We submit that Public Resources Code Section 21083.1 was intended to prevent courts from, for example, holding that an agency must analyze economic impacts of a project where there are no resulting environmental impacts (see CEQA Guidelines § 15131) , or imposing new procedural requirements, such as imposing additional public notice requirements not set forth in CEQA or the Guidelines.

[20] Lead agencies must consult air districts, as public agencies with jurisdiction by law over resources affected by the project, *before* releasing an EIR. (Pub. Resources Code §§ 21104(a); 21153.) Moreover, air

Lead agencies should be aware, therefore, that failure to properly seek and consider input from the relevant air district constitutes legal error which may jeopardize their project approvals. For example, the court in *Fall River Wild Trout Foundation v. County of Shasta,* (1999) 70 Cal.App.4th 482, 492 held that the failure to give notice to a trustee agency (Department of Fish and Game) was prejudicial error requiring reversal. The court explained that the lack of notice prevented the Department from providing any response to the CEQA document. (*Id.* at p. 492.) It therefore prevented relevant information from being presented to the lead agency, which was prejudicial error because it precluded informed decision-making. (*Id.*)[21]

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districts should be considered "state agencies" for purposes of the requirement to consult with "trustee agencies" as set forth in Public Resources Code § 20180.3(a). This Court has long ago held that the districts are not mere "local agencies" whose regulations are superseded by those of a state agency regarding matters of statewide concern, but rather have concurrent jurisdiction over such issues. (*Orange County Air Pollution Control District v. Public Util. Com.* (1971) 4 Cal.3d 945, 951, 954.) Since air pollution is a matter of statewide concern, *Id* at 952, air districts should be entitled to trustee agency status in order to ensure that this vital concern is adequately protected during the CEQA process.

[21] In *Schenck,* the court concluded that failure to give notice to the air district was not prejudicial, but this was partly because the trial court had already corrected the error before the case arrived at the Court of Appeal. The trial court issued a writ of mandate requiring the lead agency to give notice to the air district. The air district responded by concurring with the lead agency that air impacts were not significant. (*Schenck,* 198 Cal.App.4th 949, 960.) We disagree with the *Schenck* court that the failure to give notice to the air district would not have been prejudicial (even in the absence of the trial court writ) merely because the lead agency purported to follow the air district's published CEQA guidelines for significance. (*Id.*, 198 Cal.App.4th at p. 960.) In the first place, absent notice to the air district, it is uncertain whether the lead agency properly followed those guidelines. Moreover, it is not realistic to expect that an air district's published guidelines would necessarily fully address all possible air-quality related issues that can arise with a CEQA project, or that those

Similarly, lead agencies must obtain additional information requested by expert agencies, including those with jurisdiction by law, if that information is necessary to determine a project's impacts. (*Sierra Club v. State Bd. Of Forestry* (1994) 7 Cal.4th 1215, 1236-37.) Approving a project without obtaining that information constitutes a failure to proceed in the manner prescribed by CEQA. (*Id.* at p. 1236.)

Moreover, a lead agency can save significant time and money by consulting with the air district early in the process. For example, the lead agency can learn what the air district recommends as an appropriate analysis on the facts of its case, including what kinds of health impacts analysis may be available, and what models are appropriate for use. This saves the lead agency from the need to do its analysis all over again and possibly needing to recirculate the document after errors are corrected, if new significant impacts are identified. (CEQA Guidelines § 15088.5(a).) At the same time, the air district's expert input can help the lead agency properly determine whether another commenter's request for additional analysis or studies is reasonable or feasible. Finally, the air district can provide input on what mitigation measures would be feasible and effective.

Therefore, we suggest that this Court provide guidance to lead agencies reminding them of the importance of consulting with the relevant air districts regarding these issues. Otherwise, their feasibility decisions may be vulnerable to air district evidence that establishes that there is no substantial evidence to support the lead agency decision not to provide specific analysis. (*See Berkeley Keep Jets Over the Bay, supra,* 91 Cal.App.4th 1344, 1369-1371.)

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guidelines would necessarily be continually modified to reflect new developments. Therefore we believe that, had the trial court not already ordered the lead agency to obtain the air district's views, the failure to give notice would have been prejudicial, as in *Fall River, supra,* 70 Cal.App.4th 482, 492.

CONCLUSION

The SCAQMD respectfully requests this Court *not* to establish a hard-and-fast rule concerning whether CEQA requires a lead agency to correlate identified air quality impacts of a project with resulting health outcomes. Moreover, the question of whether an EIR is "sufficient as an informational document" is a mixed question of fact and law containing two levels of inquiry. Whether a particular proposed analysis is feasible is predominantly a question of fact to be judged by the substantial evidence standard of review. Where the requested analysis is feasible, but the lead agency relies on legal or policy reasons not to provide it, the question of whether the EIR is nevertheless sufficient as an informational document is predominantly a question of law to be judged by the independent judgment standard of review.

Respectfully submitted,

DATED: April 3, 2015

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
KURT R. WIESE, GENERAL COUNSEL
BARBARA BAIRD, CHIEF DEPUTY COUNSEL

By: Barbara Baird
Barbara Baird
Attorneys for Amicus Curiae
SOUTH COAST AIR QUALITY MANAGEMENT DISTICT

CERTIFICATE OF WORD COUNT

Pursuant to Rule 8.520(c)(1) of the California Rules of Court, I hereby certify that this brief contains 8,476 words, including footnotes, but excluding the Application, Table of Contents, Table of Authorities, Certificate of Service, this Certificate of Word Count, and signature blocks. I have relied on the word count of the Microsoft Word Vista program used to prepare this Certificate.

DATED: April 3, 2015 Respectfully submitted,

Barbara Baird

Barbara Baird

PROOF OF SERVICE

I am employed in the County of Los Angeles, California. I am over the age of 18 years and not a party to the within action. My business address is 21865 Copley Drive, Diamond Bar, California 91765.

On April 3, 2015 I served true copies of the following document(s) described as **APPLICATION OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT FOR LEAVE TO FILE BRIEF OF *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY AND *[PROPOSED]* BRIEF OF *AMICUS CURIAE*** by placing a true copy of the foregoing document(s) in a sealed envelope addressed as set forth on the attached service list as follows:

BY MAIL: I enclosed the document(s) in a sealed envelope or package addressed to the persons at the addresses listed in the Service List and placed the envelope for collection and mailing following our ordinary business practices. I am readily familiar with this District's practice for collection and processing of correspondence for mailing. Under that practice, the correspondence would be deposited with the United States Postal Service, with postage thereon fully prepaid at Diamond Bar, California, in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on April 3, 2015 at Diamond Bar, California.

Patricia Anderson

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Appendix C.5

AQIA Supplemental Memo #2

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WZI INC.

September 23, 2020

Mr. Randall Cates
Kern County Planning and Natural Resources
2700 M Street #100
Bakersfield, CA 93301

CUP 17, Map117

Re: Johe Ranch Project — AQIA Supplemental Memo

Dear Mr. Cates,

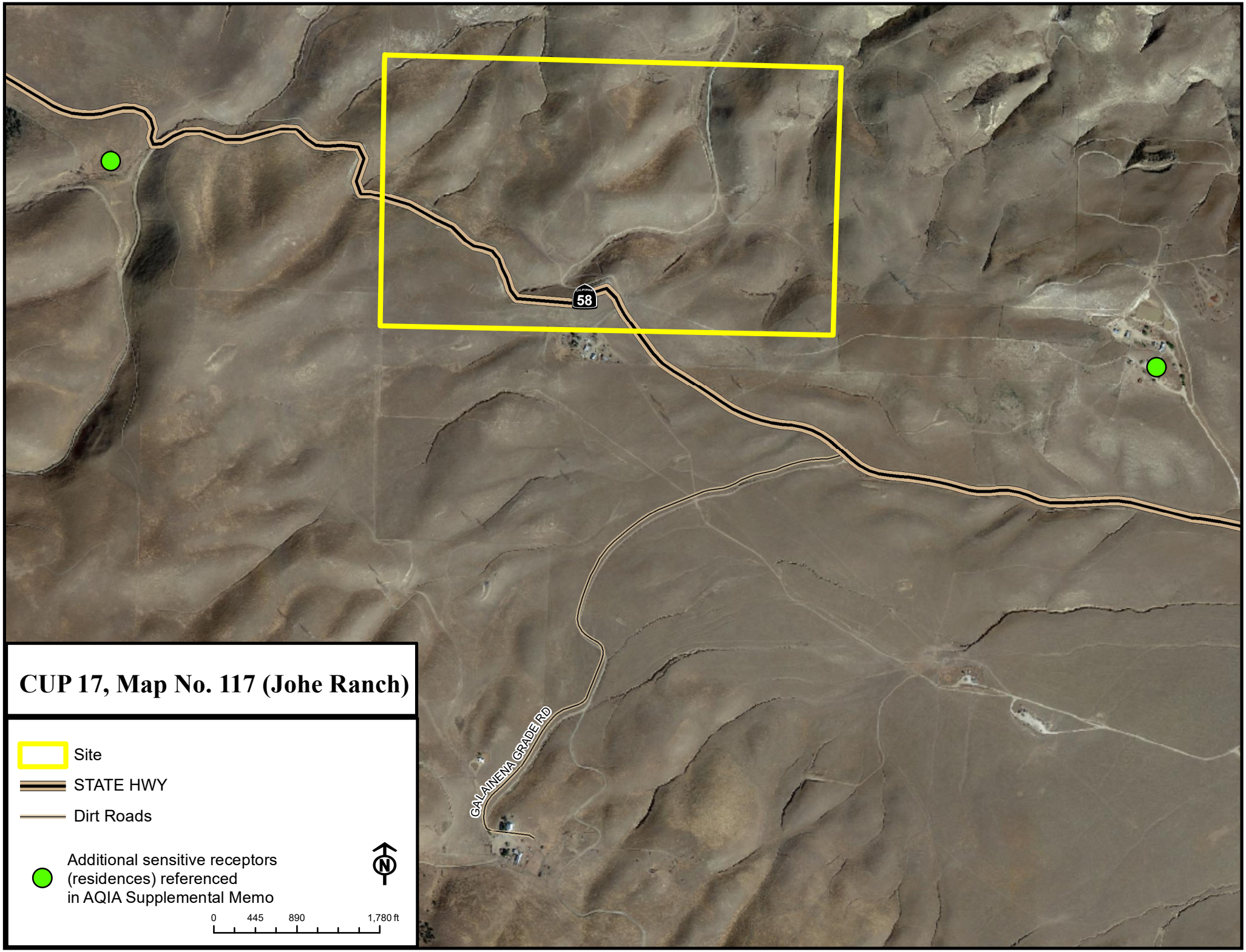
This memo is to serve as a supplement to the Air Quality Assessment (June 2015, updated June 2019) prepared by WZI Inc. for the Johe Ranch Project. This memo provides the following additional information:

Additional sensitive receptors were identified, approximately one-half mile east of the project site, and approximately one-half mile west of the project site. The receptors were confirmed to be residences (see attached map). The Air Quality Assessment concluded that the impact to sensitive receptors that were closer to the project site would be less than significant. Consequently, the impact from the project on the recently identified additional sensitive receptors is considered to be less than significant and does not impact the conclusions of the AQIA study.

Respectfully,

Richard B Wilson, PE
Vice President of Engineering

1717 28th Street Bakersfield, California 93301 (661) 326-1112 FAX: (661) 326-0191


58
GALAINENA GRADE RD
CUP 17, Map No. 117 (Johe Ranch)
Site
STATE HWY
Dirt Roads
Additional sensitive receptors
(residences) referenced
in AQIA Supplemental Memo
N
0
445
890
1,780 ft

Appendix D

Biological Resources Technical Studies

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Appendix D.1

Biological Resources Report

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padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

BIOLOGICAL RESOURCES REPORT: JOHE RANCH MINE PROJECT



Prepared for:

GF Industries
122 N. Harbor Blvd. #201
Fullerton, CA 92832
Contact: Mr. Steven Gentile

Prepared By:

Padre Associates, Inc.
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Bakersfield, California 93308

Updated June 2019

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- Appendix B. California Department of Fish and Wildlife Letter Dated 08-27-12

1.0 INTRODUCTION

Padre Associates, Inc. (Padre) has prepared this report for GF Industries (GFI) following baseline biological surveys that were completed for the Johe Ranch Mine Project near McKittrick, Kern County, California. The baseline biological surveys were conducted for a 93.67 acre surface mining operation of diatomaceous earth and development of a reclamation plan on approximately 331 acres in accordance with the Surface Mining and Reclamation Act of 1975 (Project), in order to identify any threatened, endangered, or otherwise sensitive (TES) plant and animal species that may be present within or surrounding the Project area. In addition, the surveys also focused on any other natural resources, such as the drainage features and the potential for any wetland and/or riparian features that could be impacted by Project activities. This report outlines the results of the biological surveys conducted by Padre and any recommendations for minimization and take avoidance measures for any TES species that could potentially be found within the Project Site.

1.1 BACKGROUND

The mining operation is located approximately 8.3 miles northwest of McKittrick, Kern County, California. The mining operations are planned to occur just north of Highway 58 (**Figure 1**). The Project Site is within the northwest quarter of Section 07, Township 30 South, Range 21 East, Mount Diablo Base and Meridian, within the United States Geological Survey (USGS) McKittrick Summit 7.5' Quadrangle Map. The current estimates of material to be removed include a maximum of 400,000 tons annually, for a maximum total of 8,000,000 tons of material over the estimated 20-year life of the operation. The mine will be composed of three mine areas and will consist of one single phase (**Figure 2**). Surface area to be disturbed at mining area 1 is approximately 58 acres, at mining area 2 is approximately 17 acres, and at mine area 3 is approximately 11 acres. The proposed maximum depth of operation is approximately 225-feet for mine area 1, 188-feet for mine area 2, and 137 feet for mine area 3. Operational and final reclaimed slopes would be at a maximum 2:1 slope. Access to the site is planned to occur via Highway 58.

In June 2008, Paul Pruett & Associates (Pruett) prepared a Biota Report for the Project (Pruett 2008) (**Appendix A**). Pruett conducted biological surveys for both plants and wildlife in April and May 2008. Additionally, vegetation baseline surveys utilizing square meter plot methods and pedestrian transects to estimate plant species richness and vegetation cover were conducted during this time period.

In a letter from the California Department of Fish and Wildlife (CDFW), dated August 27, 2012, which requested early consultation from CDFW for the Project and included a discussion on biological issues that could potentially be impacted by the Project (**Appendix B**). The CDFW letter also included recommendations for avoidance and minimization measures and expressed specific concerns regarding Project-related activities and on-going mining that could result in the impacts to TES species that could potentially occur within the general area. These TES will be discussed further in the following sections.

2.0 METHODS

2.1 LITERATURE REVIEW

Padre conducted a literature review of the Project site and surrounding area that included an updated California Natural Diversity Database (CNDDB) search for the Project site as well as a five-mile radius of the area (2014). Available aerial photographs and US Geological Survey (USGS) topographical maps were also reviewed prior to field surveys. Additionally, the CDFW letter (2012) and the Biota Report by Pruett (2008) were reviewed for any additional information. Padre's experience and knowledge in the general region was also used to determine what TES species could potentially occur within the Project or general vicinity. **Tables 1** and **2** present the TES wildlife and plant species, respectively, with potential to occur within or near the Project site. The table also denotes the current status of each species as a state and/or federally listed species, or any other designations, as well as the potential to occur within the Project site.

2.2 SURVEY METHODOLOGY

A reconnaissance-level biological survey was performed on November 20, 2014 by two qualified Padre biologists, Mr. Angel Correa and Ms. Diana Grosso, in order to determine the presence of TES species, as well as to document and update existing baseline biological conditions at the Project site and provide recommendations, if applicable. The coverage area of the survey included the three proposed mine sites as well as a buffer around each of these areas (**Figure 3**). The access roads throughout the Project Site were also surveyed. Surveys were conducted in an effort to identify suitable habitat for TES species and/or signs (e.g. nests, burrows, scat, tracks, prey remains, seeds, leaves, etc.) of their presence. All drainages, potential water ways, gullies, washes, etc. were surveyed as well. Padre conducted the survey by utilizing pedestrian belt transects spaced at approximately 60 feet in width. Steep locations were either accessed via existing dirt roads and/or two-tracked roads. Areas that were on a steep incline were surveyed using 8X10 binoculars from the ridge tops and bottoms of the hill to obtain a better perspective. Any burrow and/or dens could be easily observed as the vegetation on the site was primarily low-growing grasslands. All burrow/den complexes observed were accessed on foot and carefully examined for any signs of fossorial TES species. Logs, stones, and other debris observed within the drainages and other gullies within the Project Site were examined for the presence of any cryptic wildlife that may use these areas as refuge. Plant species that could not be readily identified in the field were collected for in-house identification using botanical keys and manuals.

Table 1. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
Amphibian			
Western spadefoot *Spea hammondii*	CSC	Cismontane woodland, valley and foothill grassland, vernal pool, wetland	Unlikely to occur within steep portions of site. No vernal pool breeding habitat identified within Project area. Nearest known location: 17.4 miles N of the Project (CNDDB, 1998).

Table 1. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
Reptile			
Blunt-nosed leopard lizard *Gambelia sila*	FE, SE, FP	Sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief (< 30° slopes) with small mammal burrows for cover.	Unlikely to occur within site as potential habitat is not present. Nearest known location: 6.6 miles NE of the Project (CNDDB, 2002).
Coast horned lizard *Phrynosoma blainvillii*	CSC	Lowlands along sandy washes with scattered low bushes with open areas for sunning, bushes for cover, and patches of loose soil.	Unlikely to occur as potential habitat is not present. Nearest known location: 6.7 miles W of the Project (CNDDB, 2010).
San Joaquin whipsnake *Masticophis flagellum ruddocki*	CSC	Open dry habitats with little or no tree cover. Requires mammal burrows for cover and oviposition sites.	Potential to occur as open and dry habitats found throughout the Project locations. Nearest known location: 5.2 miles W of the Project (CNDDB, 1993).
Silvery legless lizard *Anniella pulchra pulchra*	CSC, FS	Chaparral, coastal dunes, coastal scrub	Potential to occur within drainages in the lower elevations of the site, but unlikely to occur within areas where mining is to occur. Nearest known location: 8.8 miles SE of the Project (CNDDB, 1995).
Western pond turtle *Emys marmorata*	CSC, FS	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation and basking sites such as sandy banks or grassy open fields.	Unlikely to occur as aquatic habitat is not present within or near the Project site. Nearest known location: 14.5 miles NE of the Project (CNDDB, 1988).
Bird			
Burrowing owl *Athene cunicularia*	CSC, BCC, MBTA	Open dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation in areas where fossorial mammals are already present.	Likely to occur as burrows were observed and habitat was present throughout the Project site. Nearest known location: 5.4 miles SE of the Project (CNDDB, 2010).
California condor	FE, SE, MBTA	Open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude.	Unlikely to occur as nearest known observation is 26.4 miles se of the Project (CNDDB, 1989); however, foraging habitat is present.
Golden eagle *Aquila chrysaetos*	BE&GEPA, MBTA, FP, WL, BCC	Open grasslands	Potential to occur as foraging habitat present throughout Project area. Golden eagle observed by Padre biologist 4.4 miles west of the Project in 2012/2013.

Table 1. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
LeConte's thrasher *Toxostoma lecontei*	CSC (San Joaquin population), BCC, MBTA	Open desert, desert scrub, alkali desert scrub, and desert succulent scrub.	Unlikely to occur as no nesting or roosting habitat present. Nearest known location: 8.9 miles e of the Project (CNDDB, 1999).
Loggerhead shrike *Lanius ludovicianus*	CSC, BCC, MBTA	Broken woodlands, savannah, pinyon-juniper, Joshua tree, riparian woodlands, desert oases, scrub and washes	Potential to occur as foraging habitat is present; however, no nesting or roosting habitat present. Nearest known location: 11 miles SE of the Project (CNDDB, 1999).
Long-eared owl *Asio otus*	CSC, MBTA	Cismontane woodland, Great Basin scrub, riparian forest, riparian woodland, upper montane coniferous forest.	Unlikely to occur as no nesting or roosting habitat present. Nearest known location: 45 miles SE of the Project (CNDDB, 1999).
Mountain plover *Charadrius montanus*	CSC, BCC, MBTA	Open plains, short grass plains and fields, plowed fields, and sandy deserts.	Low potential to occur as foraging habitat is present; however, this species is not known to breed in California. Nearest known location: 21.8 miles N of the Project (CNDDB, 1994).
Prairie falcon *Falco mexicanus*	WL, BCC, MBTA	Inhabits dry, open terrain, whether level or hilly. Breeding sites located on cliffs, forages far afield, even to marshlands and ocean shores.	Likely to occur as open habitats for foraging present within the Project area; however, no cliffs or other potential habitat suitable for nesting is present. CNDDB locations for this species but prairie falcon have been observed in the Carrizo Plain/California Valley approximately 7 miles west of the Project site.
Short-eared owl *Asio flammeus*	CSC, MBTA	Swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields; tule patches/tall grass needed for nesting/daytime seclusion; valley and foothill grassland, wetland.	Potential to occur as nesting and foraging grassland habitat present within the Project area.
Swainson's hawk *Buteo swainsoni*	ST, BCC, MBTA	Riparian forest, riparian woodland, valley and foothill grasslands	Unlikely to occur as no nesting or roosting habitat present; however, foraging habitat is present. Nearest known location: 29.7 miles NE of the Project (CNDDB, 2004).
Tricolored blackbird *Agelaius tricolor*	CSC, BCC, MBTA	Colonial nester; nests in wetland and riparian vegetation near water. Forages in agricultural fields and grassland habitat.	Unlikely to occur as no nesting or roosting habitat present; however, foraging habitat is present. Nearest known location: 25 miles SE of the Project (CNDDB, 2005).
Mammal			

Table 1. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
American badger *Taxidea taxus*	CSC	Dry, open stages of most shrub, forest, and herbaceous habitats with friable soils.	Likely to occur as habitat present within Project site. Nearest known location: 6.1 miles s of the Project (CNDDB, 2010).
Giant kangaroo rat *Dipodomys ingens*	FE, SE	Annual grasslands with marginal habitat in alkali scrub with level terrain and sandy loams soils for burrowing.	Unlikely to occur as no preferred habitat is present within the site. Nearest known location: 8.6 miles ne of the Project (CNDDB, 2004).
Pallid bat *Antrozous pallidus*	CSC, FS, WBWG:M	Low elevation (< 1,830 m) rocky arid deserts and canyonlands, shrub-steppe grasslands, karst formations, and higher elevation coniferous forests (> 2,100 m); abundant in xeric ecosystems, including the Great Basin, Mojave, and Sonoran Deserts .	Potential to occur as foraging habitat is present; however, no roosting habitat/structures are present within the site. Nearest known location: 8.5 miles nw of the Project (CNDDB, 1948).
San Joaquin (Nelson's) antelope squirrel *Ammospermophilus nelsoni*	ST	Dry, sparsely vegetated loam soils with widely scattered shrubs, forbs, and grasses and broken terrain with gullies and washes.	Unlikely to occur as no potential habitat is present within the Project Site. Nearest known location: 4.3 miles ne of the Project (CNDDB, 1980) and 7.2 miles ne of the Project (CNDDB, 2007).
San Joaquin kit fox *Vulpes macrotis mutica*	FE, ST	Annual grasslands, habitat with grassy open stages and scattered shrubby vegetation in loose-textured sandy soils for burrowing and suitable prey base.	Potential to occur as open areas of grassland is present within or near the Project site where a fox could traverse, but site use of species is unknown. Nearest known location: 1.8 miles n of the Project (CNDDB, 1983).
Short-nosed kangaroo rat *Dipodomys nitratoides brevinasus*	CSC	Western side of San Joaquin Valley in grassland and desert shrub associations in highly alkaline soils on gently flat to gently sloping terrain.	Unlikely to occur as potential habitat is not present. Nearest known location: 7 miles ne of the Project (CNDDB, 2007).
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	FE, SE	Saltbush scrub and sink scrub in the Tulare Lake Basin with friable soils.	Does not occur as Project Site is outside of the known range of the species and west of the California Aqueduct. Nearest known location: 10.5 miles ne of the Project (CNDDB, 2003).

Table 1. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
Tulare grasshopper mouse *Onychomys torridus tularensis*	CSC	Hot, arid valleys and scrub deserts in the southern San Joaquin Valley. Chenopod scrub. Western margin of the Tulare Basin.	Potential to occur as habitat is present within the Project Site. Nearest known location: 4.5 miles w of the Project (CNDDB, 1943).
Western mastiff bat *Eumops perotis californicus*	CSC, WBWG:H	Chaparral, cismontane woodland, coastal scrub, valley and foothill grasslands	Potential to occur as foraging habitat is present; however, no roosting habitat/structures are present within the site. Nearest known location: 11.9 miles se of the Project (CNDDB, 1958).

BCC = Birds of Conservation Concern (USFWS)
BE&GEPA = Bald Eagle and Golden Eagle Protection Act
CSC=California Species of Special Concern (CDFW)
CNDDB = California Natural Diversity Database Info (CDFW)
MBTA = Migratory Bird Treaty Act (USFWS)
FE = Federally listed Endangered (USFWS)
FP = Fully protected under Fish and Game Code (CDFW)
FS = Federally listed Sensitive (USFWS)
SE = State listed Endangered (CDFW)
ST = State listed Threatened (CDFW)
WL = State Watch List (CDFW)
WBWG = Western Bat Working Group
H = Highest priority
M = Medium priority

Table 2. Threatened, endangered, and/or sensitive plant species with potential to occur within or near the Project Site.

Species	Status	Habitat	Blooming Period	Rationale
California Jewelflower *Caulanthus californicus*	FE, SE, CNPS-1B.1	Chenopod scrub,valley-foothill grassland, pinyon-junpier woodlands. Generally in non-alkaline grassland; 70–1000 m.	Feb-May	Unlikely to occur as known populations are not known to occur within or near Project site; however, grassland habitat is present within the Project site. Nearest known location: 9.5 miles SW of the Project (CNDDB, 1934).
Coulter's goldfields *Lasthenia glabrara* ssp. *coulteri*	CNPS-1B.1	Marshes and swamps (coastal salt); plays and vernal pools; saline places; <1000 m.	Feb-Jun	Unlikely to occur as no marshes and swamps within Project area. Nearest known location: 11.3 miles nw of the Project (CNDDB, 1950).
Diamond-petaled California poppy *Eschscholzia rhombipetala*	CNPS-1B.1	Valley and foothill grassland; fallow fields; alkaline, clay; <300 m.	Mar-Apr	Unlikely to occur as soils are moderately alkaline and mostly shaly loam. Nearest known location with a negative finding: 11.8 miles nw of the Project (CNDDB, 1986).

Table 2. Threatened, endangered, and/or sensitive plant species with potential to occur within or near the Project Site.

Species	Status	Habitat	Blooming Period	Rationale
Heartscale *Atriplex cordulata* var. *cordulata*	CNPS 1B.2	Saline or alkaline soils; chenopod scrub, meadows and seeps; valley and foothill grassland (sandy); <70m.	Apr-Oct	Unlikely to occur as soils are moderately alkaline and no meadows or seeps were observed within the Project Site. Nearest known location: 14.8 miles e of the Project (CNDDB, 2009).
Hoover's Eriastrum *Eriastrum hooveri*	CNPS-4.2	Chenopod scrub, valley-foothill grasslands, pinyon juniper woodlands on sparsely vegetated alkaline alluvial fans and sandy soils; < 900 m.	Mar-July	Unlikely to occur as sandy soils or alluvial fans not present to occur within the site. Nearest known location: 8.4 miles ne of the Project (CNDDB, 1983).
Jared's peppergrass *Lepidium jaredii* ssp. *jaredii*	CNPS 1B.2	Valley and foothill grassland (alkaline, adobe); slopes, washes, dry hillsides; 500-700m.	Mar-May	Unlikely to occur as suitable soils are not present. Nearest known location: 31 miles nw of the Project (CNDDB, 1989).
Kern mallow *Eremalche kernensis*	FE, CNPS-1B.1	Chenopod scrub, valley and foothill grassland; dry, open sandy to clay soils; often at edge of balds; alkali flats; 100-1000m.	Mar-May	Unlikely to occur as the site is outside the reported range for this species. Nearest known location: 5.2 miles sw of the Project (CNDDB, 2011).
Lemmon's jewelflower *Caulanthus lemmonii*	CNPS-1B.2	Pinyon and juniper woodlands, valley and foothill grassland; chaparral scrub; 80–1100 m.	Mar-May	Potential to occur as grassland habitat is present within the Project site. Nearest known location: 2.3 miles nw of the Project (CNDDB, 1990).
Lost Hills crownscale *Atriplex coronate* var. *vallicola*	CNPS 1B.2	Chenopod scrub; valley and foothill grassland; vernal pools; alkaline; <430 m.	Apr-Aug	Unlikely to occur as no vernal pools or alkaline soils are present within the site. Nearest known location: 5.3 miles se of the Project (CNDDB, 1998).
Munz's tidy tips *Layia munzii*	CNPS 1B.2	Chenopod scrub; valley and foothill grassland (alkaline clay); 50-800 m.	Mar-Apr	Unlikely to occur as preferred soils are not present within the site. Nearest known location: 7.5 miles sw of the Project (CNDDB, 1937).
Oil neststraw *Stylocline citroleum*	CNPS 1B.1	Chenopod scrub; coastal scrub; valley and foothill grassland; clay; 60-300 m.	Mar-Apr	Unlikely to occur as preferred soils are not present within the site. Nearest known location: 8.2 miles se of the Project (CNDDB, 1932).
Pale-yellow layia *Layia heterotricha*	CNPS-1B.1	Cismontane woodland, pinyon and juniper woodlands, valley and foothill grassland; Open clayey or sandy soil, sometimes ± alkaline; 200–1800 m.	Mar-Jun	Unlikely as preferred soils not present within the site. Nearest known location: 4.9 miles s of the Project (CNDDB, 2010).

Table 2. Threatened, endangered, and/or sensitive plant species with potential to occur within or near the Project Site.

Species	Status	Habitat	Blooming Period	Rationale
Recurved Larkspur *Delphinium recurvatum*	CNPS-1B.2	Chenopod scrub, valley-foothill grasslands, cismontane woodlands on alkaline soils; Poorly drained, fine, alkaline soils in grassland, *Atriplex* scrub; 30–600 m.	Mar-Jun	Unlikely as preferred soils not present within the site. Nearest known location: 8.2 miles e of the Project (CNDDB, 1957) and 10.7 miles e of the Project (CNDDB, 2011).
Round-leaved filaree *California macrophylla*	CNPS-1B.1	Cismontane woodland; valley and foothill grassland; clay; <1200 m.	Mar-May	Unlikely as preferred soils not present within the site. Nearest known location: 7 miles se of the Project (CNDDB, 2010).
San Joaquin woollythreads *Monolopia congdonii*	FE, CNPS-1B.2	Chenopod scrub and valley-foothill grasslands with alkaline or loamy plains with sandy soils; 90-700 m.	Feb-May	Unlikely as preferred soils not present within the site. Nearest known location: 7 miles ne of the Project (CNDDB, 1997).
Showy Golden Madia *Madia radiata*	CNPS-1B.1	Valley-foothill grasslands, cismontane woodlands, and chenopod scrub mostly on adobe clay; often clayey soils or shale; 20–1200 m.	Mar-May	Potential to occur as shaley soils are present within the site. Nearest known location: 11.1 miles ne of the Project (CNDDB, 1992).
Tejon poppy *Eschscholzia lemmonii*	CNPS-1B.1	Chenopod scrub, valley and foothill grassland; 200-1000 m.	Mar-May	Potential to occur as grassland is present within the Project site. Nearest known location: 9 miles se of the Project (CNDDB, 1999).
Temblor buckwheat *Eriogonum temblorense*	CNPS 1B.2	Valley and foothill grassland (clay or sandstone); 300-900 m.	Apr-Sep	Unlikely as preferred soils not present within the site. . Nearest known location: 6.9 miles nw of the Project (CNDDB, 1965).

CNNDB = California Natural Diversity Database Info (CDFW)
FE = Federally listed Endangered (USFWS)
SE = State listed Endangered (CDFW)

CNPS (California Native Plant Society) Codes:
1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
4 = Limited Distribution (watch list)
0.1 = Seriously Threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 = Fairly Threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

3.0 EXISTING CONDITIONS

3.1 TOPOGRAPHY

The Project Site occurs within the rolling foothills of the Temblor Mountains in the western portion of Kern County. Willow Springs Valley occurs directly south of the Project Site. The elevation on the site ranges between 2,000 to 2,600 feet. Areas planned for mining are composed of steep hillsides with gullies/depressions in between the hills (**See Photolog**). Flat terrain is mostly found to the south of the Project Site in areas that are not intended for mining activities.

3.2 WATER FEATURES

An unnamed ephemeral drainage traverses through the western portion of the areas planned for mining activities (**Figure 3)**. The drainage flows from higher elevations southwest of the Project Site and eventually converges at lower elevations with another unnamed ephemeral drainage within the Willow Springs Valley. Further review of the topographical maps for the Project Site and surrounding areas reveal that the drainages continue to flow through portions of the Temblor Range and terminate within the Temblor Valley, which presently contains the Cymric Oil Field. However, the drainage appears to be heavily disturbed by agricultural activities approximately one mile downstream from the Project boundary. No riparian and/or wetland habitat was observed within these drainages. During the biological survey, no flowing and/or standing water was observed within the drainage. The drainage had a v-shaped profile in the higher elevations of the Project Site and eventually widened into a sandy bottom drainage in the lower elevations of the site.

Based on previous survey notes and desktop information, additional drainage/channel features have been included in this report. **Figure 1A** includes additional drainages that were mapped using information obtained from the National Wetland Inventory Dataset (USFWS 2019). This information was cross referenced with the National Hydrography Dataset information (USGS 2019), surface water information from the Environmental Response Management Application (ERMA) Southwest (2019), and topographical mapping for the Project site. Additionally, **Figure 1A** also includes additional channels observed by Padre during the biological surveys in 2014 and 2018. These channels were observed within the Project site. Except for one channel within the western portion of the Project site, most of the channels observed did not connect to ephemeral drainages that occur nearby. Flow between these drainages was found to be interrupted by various topographical features and/or previous disturbances within the area.

3.3 CURRENT LAND USES

Recent signs of cattle grazing were observed on the Project Site as cow dung was present throughout most portions of the site. Pre-existing graded roads and two-tracked roads occur throughout the Project site. Farming equipment, corals, and other ranching/farming structures were present near the Project Site and land adjacent to the Project showed recent grading which appeared to be for agricultural use.

3.4 HABITAT

The habitat type and/or plant community that dominated the Project Site was California annual grassland series (Sawyer and Keeler-Wolf 2009). This community is dominated by herbaceous plants that are both non-native and native. Non-native species that typically dominate this community are red brome (*Bromus rubens*), ripgut (*B. diandrus*), soft chess (*B. hordeaceus*) and foxtail (*Bromus* sp. or *Hordeum* sp.). This vegetation type was observed through the majority of the areas planned for mining.

A relatively small portion of the site also contained alkali goldenbush (*Isocoma acradenia*) scrub (Diaz *et. al.* 2012). Alkali goldenbush is the dominant plant species in the shrub canopy of this vegetation type. The canopy is usually open to continuous with an open to continuous herbaceous layer. Stands are typically found in flat areas but can occur on gently sloping hills with saline to alkali soils. This vegetation type was observed on a lower slope on the north side of the Project Site.

3.5 SOILS

Soils occurring within or near the Project Site include: Reward shaly loam, Mendi-Hillbrick-Kilmer association, Reward channery loam, and Pottinger very shaly clay loam (USDA 2014). The Reward shaly loam comprises the majority of the soil types present on the Project site. This soil type is a loam type that occurs on hill slopes. These are well drained soils formed from weathered sandstone and shale.

4.0 RESULTS

4.1 WILDLIFE

Wildlife that was commonly observed during the field survey are included in **Table 3**. Several burrow complexes were observed throughout the Project Site. Each complex observed was thoroughly examined for any signs of TES species. No signs of TES were observed at the entrances of any of these burrows. The majority of the burrows observed were characteristic of California ground squirrel (*Otospermophilus beecheyi*) as the burrows had wide entrances that tapered into smaller more narrow holes. Several of the burrows observed had remnants of acorn shells that likely washed down the drainages on the site from oaks in higher elevations. No direct observations of TES species occurred during the field survey of the Project Site. The following sections discuss any further findings pertaining to TES that could potentially occur within or near the Project Site and that were specifically discussed in the CDFW letter.

Table 3. Common wildlife species observedwithin and/or near the Project

Common Name	Scientific Name
Reptiles	
Side-blotched lizard	*Uta stansburiana*
Birds	
Burrowing Owl (burrow)	*Athene cunicularia*
Mourning dove	*Zenaida macroura*
Rock wren	*Salpinctes obsoletus*
Savannah sparrow	*Passerculus sandwichensis*
Western kingbird	*Tyrannus verticalis*
Mammals	
California ground squirrel	*Otospermophilus beecheyi*
Coyote (scat)	*Canis latrans*

4.1.1 Listed Wildlife Species

4.1.1.1 San Joaquin Antelope Squirrel

The San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), which is a state Threatened species, is typically found in arid annual grasslands and shrubland communities, with the most numerous in areas with a sparse-to-moderate cover of shrubs, typically desert saltbush (*Atriplex polycarpa*) (ESRP 2006). Shrubless areas are only sparsely inhabited and steep slopes and broken, rocky, upland terrain are scarcely inhabited (ESRP 2014). In the southern and western San Joaquin Valley, these squirrels are associated with open, gently sloping land with shrubs. The Project Site was composed mostly of steep terrain with only a small patch of shrubs present. Flat areas to the north of the site have been cultivated for agriculture. The nearest CNDDB occurrence is from 1980 approximately 4.3 miles northeast of the Project Site. Therefore, it is unlikely that San Joaquin antelope squirrels would be present within or near the Project Site.

4.1.1.2 Giant Kangaroo Rat

The giant kangaroo rat (*Dipodomys ingens*), which is a state and federally listed as Endangered, is known to occur in the general region of the southern San Joaquin Valley. Giant kangaroo rats are typically known to inhabit annual grasslands and some shrubland communities with slopes less than 20 percent incline (ESRP 2014). However, GKR are found most often in grassland communities with gentle slopes less than 10 percent inclines with friable, sandy-loam soils. The Project Site contained slopes that were greater than a 20 percent incline. No burrow complexes that were characteristic of GKR were observed within any portion of the Project Site. Some small burrows were observed along the banks of drainages or berms in the lower, flat areas of the Project Site; however, these burrows were not characteristic of GKR. The nearest reported CNDDB occurrence is from 2007 in the Belridge area. It is unlikely that these that giant kangaroo rat occur within the Project Site.

4.1.1.3 San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*) was once known to occur throughout the San Joaquin Valley from southern Kern County north to eastern Contra Costa County; however, kit fox populations have declined and are most abundant in the southern San Joaquin Valley (ESRP 2014). Kit fox typically inhabit grasslands and scrublands and are known to adapt well to areas that have been extensively modified such as oilfields and agricultural areas. The Project Site contains suitable habitat for the San Joaquin kit fox and is also within the current range of the species. The nearest reported CNDDB occurrence is approximately 1.83 miles north of the Project Site north of Willow Springs Valley. No potential and/or known dens were observed within the Project Site as all burrow complexes observed were examined for any sign of scat, tracks, prey remains, fur, etc. It is probably that kit fox would be more inclined to travel through areas of flat terrain directly north of the Project within Willow Springs Valley. However, San Joaquin kit fox could potentially traverse through the site and forage in the general area at any time.

4.1.1.4 Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard (*Gambelia sila*) is endemic to the San Joaquin Valley and is currently thought to inhabit areas of the San Joaquin Valley floor and portions of the Coast Range foothills (ESRP 2006). Blunt-nosed leopard lizards (BNLL) inhabit sparsely vegetated areas of low relief. These lizards are typically not found in hills as they are only known to occur in areas with slopes less than a 30 degree incline (Germano 2007). Desert washes/drainages area also an important habitat feature in areas that contain poor habitat (Germano 2007). The majority of the site contained slopes that were steep and likely not suitable for BNLL to inhabit. The drainages present within the site were not typical of the sandy bottom drainages that are usually associated with BNLL as most of the washes were “V-shaped” and not likely to be conducive for BNLL to travel within. The nearest reported CNDDB occurrence is approximately 6.6 miles northeast of the Project Site in the Cymric Oilfield area. It is unlikely that the blunt-nosed leopard lizard would occur within the Project Site due to the lack of suitable habitat.

4.1.2 Other Sensitive Wildlife Species

4.1.2.1 Nesting Birds

Most bird species, their nests, and eggs are protected by the Migratory Bird Treaty Act. The site is completely void of trees and only a small patch of alkali goldenbush was observed, which limits the amount of nesting habitat available for most bird species. However, this does not preclude ground nesting birds from potentially utilizing the Project Site. Species such as western meadowlarks (*Sturnella neglecta*), which were observed during surveys, typically build their nests on the ground. Although not observed during the surveys, the short-eared owl (*Asio flammeus*) may also utilize open grasslands for nesting such as those present within the Project Site. Additionally, long-eared owl (*Asio otus*), prairie falcon (*Falco mexicanus*), Swainson's hawk (*Buteo swansoni*), tricolored blackbird (*Agelaius tricolor*), Le Conte's thrasher (*Toxostoma lecontei*), and golden eagle (*Aquila chrysaetos*) could potentially forage over the site; however, no nesting habitat for these bird species is present within the Project Site. The mountain plover (*Charadrius montanus*) does not breed in California, but could potentially forage through the site.

4.1.2.2 Burrowing Owl

The burrowing owl (*Athene cunicularia*) is a California Species of Special Concern and inhabits grassland habitats and utilizes the burrows of mammals such as squirrels, coyotes, foxes, and badgers (Zeiner *et al.* 1990). Two burrows that contained white wash and pellets at the entrances were observed during the field survey. Although burrowing owls were not directly observed, the presence of the whitewash and pellets likely indicates that burrowing owls utilize the Project Site for nesting, roosting, and foraging.

4.1.2.3 American Badger

The American badger (*Taxidea taxus*) is a California Species of Special Concern and inhabits drier open stages of a variety of habitats (Zeiner et al. 1990). Badgers are mostly found in areas with friable soils where they can dig burrows and hunt prey such as California ground squirrel and other small mammals. No potential badger dens were observed during the survey of the Project Site; however, suitable habitat for this species is present on the site.

4.1.2.4 Short-nosed kangaroo rat

The short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*) is a California Species of Special Concern. Short-nosed kangaroo rats typically occur in grassland habitats with scattered shrubs and desert-shrub associations on powdery soils with gently sloping and rolling hills (ESRP 2014). The nearest reported CNDDB occurrence is within the Cymric Oilfield approximately seven miles northeast of the Project Site. Therefore, since the Project Site is mostly void of habitat that is suitable for short-nosed kangaroo rat, they are unlikely to occur within the site.

4.1.2.5 Tulare Grasshopper Mouse

The Tulare grasshopper mouse (*Onychomys torridus tularensis*) is a California Species of Special Concern and inhabits arid grassland and shrubland associations and can be found within the sloping margins of the western San Joaquin Valley and Carrizo Plain (ESRP 2014). Potential habitat is present for this species within the Project Site and the species may occur within the area.

4.1.2.6 Bats

The pallid bat (*Antrozous pallidus*) and western mastiff bat (*Eumops perotis californicus*) are both bats that are California Species of Special Concern. Bats can forage over a variety of habitats; however, they typically utilize man-made structures such as attics, barns, roofs, bridges, and mines. Bats also roost in trees and rock outcrops/caves. Foraging habitat for bats is present within the Project Site; however, no roosting habitat is present.

4.1.2.7 Coast Horned Lizard

The coast horned lizard (*Phrynosoma blainvilli*), a California Species of Special Concern, can be found in a variety of habitats; however, they require loose, fine soils with a high sand fraction, an abundance of native ant populations, and open areas with limited overstory for basking (Jennings and Hayes 1994). The Project Site was mostly void of suitable habitat for the coast horned lizard and it is unlikely to occur within Project Site.

4.1.2.8 Silvery Legless Lizard

The silvery legless lizard (*Aniella pulchra*), a California Species of Special Concern, is known to occur within the Temblor Mountain Range and prefers areas with sandy soils (Papenfuss and Parham 2013). The Project Site is within the known range of this legless lizard; however, no sandy soils are known to occur within the areas planned for mining as they are mostly composed of shaly loam soils. Sandy soils may be present within lower portions of the drainages. Although silvery legless lizards could potentially be present within sandy soils at lower elevations of the site, it is unlikely that this species would occur within the areas planned for mining.

4.1.2.9 San Joaquin Whipsnake

The San Joaquin whipsnake (*Masticophis f ruddocki*), a California Species of Special Concern, occurs in grasslands and saltbush associations that are open and dry and contain little to no tree cover (Jennings and Hayes 1994). The Project Site is within the known range of this species and the species could potentially occur in the general area.

4.2 PLANTS

Plant species that were commonly observed during the field survey are presented in **Table 4**. No TES plant species were observed during the field survey. The field survey was not conducted during the optimal blooming period for most of the TES plant species that could potentially be on the site. However, many species can still be identified using vegetative

features of years past plant assemblages along with the dried remains of the previous year's standing crops. Many plants can still be identified to the genus level using their distinctive vegetative features.

Table 4. Plant species observed within and/or near the Project

Scientific Name	Common Name
Achyrachaena mollis	Blow wives
Ambrosia sp.	Ragweed
Amsinckia sp.	Fiddleneck
Astragalus sp.	Locoweed
Atriplex polycarpa	Desert saltbush
Avena barbata	Slender wild oats
Bromus diandrus	Rip-gut brome
Bromus hordeaceus	Soft chess
Bromus madritensis	Spanish brome
Croton setigerus	Doveweed; turkey mullein
Datura wrightii	Jimson weed
Erodium cicutarium	Redstem filaree
Eschscholzia californica	California poppy
Hordeum sp.	barley
Isocoma acradenia var. *bracteosa*	Alkali goldenbush
Lessingia gladulifera	Vinegar weed
Marah fabaceus	Manroot
Marrubium vulgare	Horehound
Nasella pulchra	Purple needlegrass
Poa secunda	Bluegrass
Phacelia tanacetifolia	Tansy leafed phacelia
Salsola kali	Russian thistle
Sisymbrium irio	London rocket

4.2.1 Listed Plant Species

4.2.1.1 California Jewelflower

The California jewelflower (*Caulanthus californicus*), is both state and federally listed as Endangered. Populations of California jewelflower is only known to be extant in three areas, which includes Santa Barbara Canyon near Cuyama Valley, the Carrizo Plain, and Kreyenhagen Hills near Coalinga, California (ESRP 2014). This species of jewelflower is reported to occur in grassland habitats but are thought to be threatened by cattle grazing. The nearest reported CNDDB occurrence for this species is within the Carrizo Plain approximately 9.5 miles southwest of the Project Site. The California jewelflower is unlikely to occur within the site as it is not within the vicinity of any known extant populations and grazing has occurred extensively throughout the immediate and general area.

4.2.1.2 San Joaquin Woollythreads

The San Joaquin woollythreads (*Monolopia congdonii*), is federally listed as Endangered. Woollythreads are known to occur in non-native grasslands and are most frequently found on neutral to subalkaline soils (ESRP 2014). This species of plant is frequently found on sand dunes and sandy ridges as well as along the high-water line of washes. Grazing has been reported as threat to the spring season survival of these plants (ESRP 2014). The nearest CNDDB occurrence is approximately seven miles northeast in the Belridge Oilfield. Although potential habitat may be present within the drainages of the Project Site, grazing and the lack of suitable soils in areas to be mined likely precludes San Joaquin woollythreads from the Project Site.

4.2.1.3 Kern Mallow

Kern mallow (*Eremalche kernensis*) is federally listed as Endangered and typically occurs on alkali flats and eroded hillsides of the southern San Joaquin Valley (USFWS 2013). Kern mallow is often found growing under and around saltbush shrubs (*Atriplex* sp.) and in areas with shrub cover less than 25 percent and herbaceous cover ranging 48 to 80 percent (USFWS 2013). The geographical distribution of Kern Mallow has been debated over the last few years as taxonomic problems and misidentifications have occurred with this species. In addition, Kern mallow is reported to only occur in the Lokern area (Cypher 2002). The Lokern area is approximately 10 miles northeast of the Project Site. As the Project Site is outside of the Lokern area, it is unlikely Kern mallow occurs in the area.

5.0 RECOMMENDATIONS, AVOIDANCE AND MINIMIZATION MEASURES

5.1 SAN JOAQUIN KIT FOX

Although no potential dens were observed within the Project site, additional surveys to determine the presence of San Joaquin kit fox (SJKF) within the site will be required to determine the extent of use of the Project Site and surrounding areas by the species. The SJKF protocol surveys would include the recording of any potential, known, or natal SJKF dens within or near the Project site. The SJKF survey protocols also require the use of spotlighting surveys and utilization of camera/scent stations for the Project, as described in the US Fish and Wildlife Service's *San Joaquin Kit Fox Survey Protocol for the Northern Range* (1999). The protocol for the northern and southern range is essentially similar but the latter has not been revised since 1990, and the use of the northern range protocol contains more up to date methods. The SJKF Survey Protocol requires 10 nights of spotlighting within a 15-day period (weather permitting) encompassing a two-mile radius (access permitting) of the Project site. In addition to spotlight surveys, scent/camera stations would need to be conducted concurrently over 10 consecutive days. At least one scent/camera station would be needed for an area encompassing almost 100 acres; however, more camera stations can be utilized to obtain more information. Scent/camera stations would require checking each station at least once a day. Surveys can be conducted between May 1 to November 1.

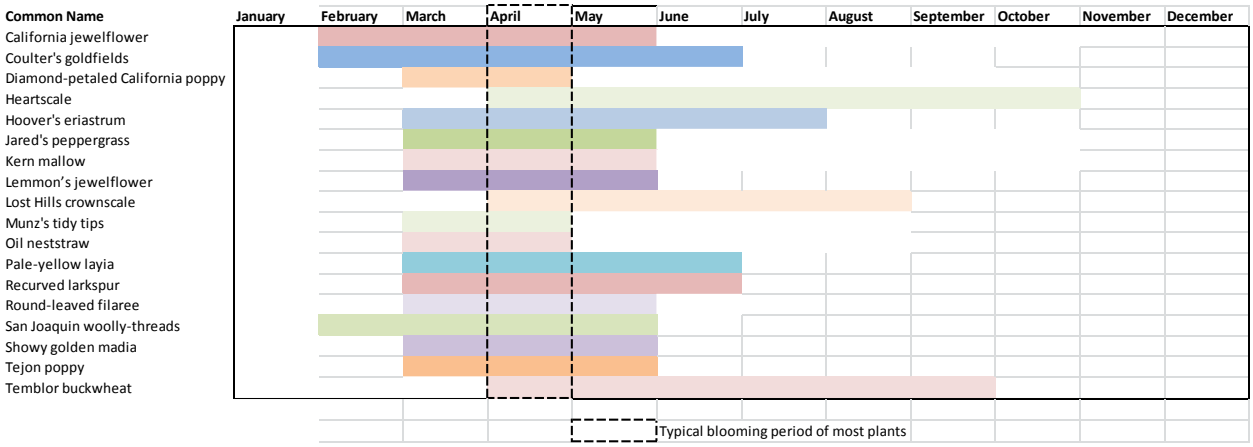
If kit fox dens are observed and can be avoided, then exclusion zones will be established for each kit fox den. Potential kit fox dens will be avoided by 50 feet, known kit fox dens will avoided by 100 feet and active pupping dens will be avoided by 200 feet. If a kit fox den cannot be avoided during the project activities, the den will be monitored for three nights to ensure it is not occupied. After establishing the den is unoccupied, it must be excavated and backfilled according to USFWS guidelines. However, if a kit fox is observed using a den, it will be monitored for five consecutive nights to confirm the fox leaves the den, and then the den will be excavated.

5.2 SENSITIVE PLANTS

Sensitive plant surveys would need to be included during the optimal blooming period for various plant species. The CDFW also recommended conducting sensitive plant surveys within the Project Site and although botanical surveys were conducted by Pruett (2008), these surveys did not identify reference populations for target plant species. These surveys would include conducting protocol-level rare plant surveys of the site, focusing on sensitive plant species and sensitive plant communities known to exist in the region. Methods outlined in Cypher's *General Rare Plant Survey Guidelines* (2002) will be employed for these surveys. All plant species identified during the survey will be noted and any sensitive plant species that occur within the site boundaries will be recorded using GPS and noted on map(s) to be included in a botanical survey report. Any sensitive plant species observed will also be noted on a CNDDB form and submitted to CDFW upon completion of the surveys. In addition, a visit to a nearby reference site(s) will be required prior to conducting rare plant surveys in order to determine if those species are identifiable at the time of the surveys. These surveys include conducting pedestrian transects that will cover the expanse of both sites during the optimal blooming periods for sensitive plants that may occur in the area. A minimum of two survey sessions may be required

depending on the varying blooming periods of the plant species that may occur; however, as most of the sensitive blooming periods for plants with potential to occur in the area all coincide within April, surveys may be able to be reduced to that particular time of the season. **Table 5** depicts the blooming periods of sensitive plants that have a potential to occur in the area. These surveys are also dependent on drought conditions during the survey period as some agencies are not accepting surveys conducted during severe drought conditions. These surveys can be incorporated into any pre-activity surveys that will be conducted for the mining activities; therefore, surveys can be conducted in phases as the mining activities occur.

Table 5. Blooming periods for sensitive plants that have potential to occur within the site.



5.3 BURROWING OWL

As burrowing owl burrows were observed at the site, which is within the known range of burrowing owls, surveys for this species should be conducted as well. Burrowing owl surveys typically require four site visits, systematically spread apart between February 15 through June 15, as recommended in the CDFW's *Staff Report on Burrowing Owl Mitigation* (2012). These surveys involve conducting pedestrian transects within the Project site and examining any and all shrubs, trees, and/or structures suitable for nesting. All potential burrowing owl burrows will also be recorded using GPS and motion sensor cameras may be utilized to determine if a burrow is currently occupied. These surveys can also be incorporated into any pre-activity surveys that will be conducted for the mining activities; therefore, surveys can be conducted in phases as the mining activities occur.

Avoidance and mitigation measures described in the 2012 CDFW Staff Report will be implemented for the Project. If occupied burrows are observed on site a Burrowing Owl Exclusion Plan should be developed for the Project as recommended by CDFW Staff Report. The plan would include but not be limited to methods for passive harassment, monitoring, mitigation, and installation of artificial burrows.

Burrowing owl burrows should not be disturbed during the nesting period, from 1 February to 31 August. If burrows will not be passively harassed, an exclusion zone of 500 meters (~1,640 feet) will be established around each burrow for avoidance. Passive harassment of the burrows may occur after 31 August, and typically involves the installation of one-way doors at the burrow entrances so as not to allow burrowing owls from entering back

into the burrow. The monitoring of the burrows must occur prior to the initiation of any passive harassment. The CDFW recommends that the burrows be monitored prior to the installation of one-way doors and Padre recommends the installation of an infrared motion-sensor camera at the entrance of each burrow for further determination of use of the burrows. If burrowing owls are determined to be utilizing the burrows, authorization from the CDFW may be required to use one-way doors and close the burrows. After monitoring of the burrows has been completed, installation of one-way doors at each burrow should occur for at least 48-hours with continuous monitoring of the one-way doors to exclude owls (or other wildlife) from entering the burrows. One-way doors should be inspected at least twice daily to ensure they are still properly installed and if any owls (or other wildlife) activity can be detected at the entrance of the door. After the burrows are determined to be empty, closure of the burrows may occur. The passive harassment of owls from their burrows will require the installation of artificial burrows in nearby areas that will not be disturbed by Project activities and that contains suitable habitat for owls.

No passive harassment will occur to burrows with owlets (owl chicks) and/or burrows that show signs of nesting/fledging activities. Any burrows that may show signs of nesting/fledging activities will have a 500-meter buffer zone established around the burrow until all owls have fledged from the burrow.

If owls and/or burrows can be avoided using buffer zones, then the appropriate buffer areas will be implemented. In the event that avoidance measures cannot be adhered to for burrowing owls located within the Project site, exclusion and burrow closures will be implemented. These activities will occur after consultation and CDFW approval has been obtained and in accordance with burrowing owl mitigation recommendations in the CDFW Staff Report (2012).

5.4 PRE-ACTIVITY SURVEYS

Pre-activity surveys should be conducted for the site at least within 30 days of any initial ground disturbance. As wildlife can be mobile and various mechanisms can spread plant seeds effectively over wide expanses, pre-activity surveys will help to determine if any sensitive species are utilizing the areas to be mined. Pre-activity surveys can incorporate searching for burrows, dens, nests, populations/occurrences of sensitive plants, and any other biological resources that may occur within the site.

Prior to construction, a qualified biologist will conduct avian nest surveys within the vicinity of the Project area. Surveys will be conducted during the appropriate time of the breeding season (February 1 through August 1). If any protected species are found nesting in these areas, the following mitigation measures will be implemented: consultation with CDFW will be initiated to decide on effects to active nests and how to avoid them as well as establishing an appropriate buffer zone around active nests during the breeding season.

Project activities shall avoid disturbance to active raptor nests within or near the Project. For ground disturbing activities, no pre-construction surveys for nesting raptors shall be required if work is to occur during the non-breeding season (September 1 through January 31). If, however, ground disturbing activities are scheduled to occur during the breeding season (February 1 through August 31), pre-construction surveys of all potentially active nest sites within 200 feet of the project site shall be conducted in areas that may potentially have nesting raptors, including ground nesting raptor species such as the short-eared owl. If surveys indicate

that nests are inactive or potential habitat is unoccupied during the life of the project, no further mitigation shall be required.

5.5 GENERAL MINIMIZATION AND AVOIDANCE MEASURES

The following minimization and avoidance measures are recommended to reduce the probability of incidental take of sensitive species that may traverse and/or occur on the Project Site:

- Project employees and contractors should receive a formal training prior to working on the Project including attending a sensitive species education program developed by trained biologists, focusing on protected and sensitive species that may occur in the Project Site. At a minimum, the program will cover species distribution, identification characteristics, sensitivity to human activities, legal protection, penalties for violation of state and federal laws, reporting requirements, and project mitigation measures;

- Remediation activities will be conducted during daylight hours to minimize encounters with listed animals that are typically most active during night time hours;
- Vehicles will use existing and/or designated roads and avoid any cross-country travel;
- Vehicles must observe a 20-mph speed limit in and around Project sites;
- To prevent attracting wildlife to the Project areas, trash and food items will be kept in closed containers and removed daily;
- Firearms and pets will be prohibited within the boundaries of the Project areas.
- To prevent entrapment of animals, any trenches or pits created during Project activities more than two feet deep must be either covered at night or earthen or wooden escape ramps must be provided. Before work continues in these areas, trenches and pits must be inspected by a biologist to ensure that no animals are present;
- Dust control (use of water trucks) should be implemented during project activities that create a substantial amount of dust;
- Spills of hazardous materials shall be immediately cleaned up to prevent exposure to wildlife;
- Topsoil that can potentially or is known to support sensitive plant species should be stockpiled and redistributed over portions of work areas that will be temporarily disturbed, when possible;
- On-site biological monitoring should be performed during initial ground disturbances so that sensitive species are not impacted.

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ATTACHMENTS

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JOHE RANCH MINE PROJECT PHOTOLOG
(NOVEMBER 20, 2014)

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Photolog for Johe Ranch Mine Project near McKittrick, Kern County, CA.
November 2014



Photo 1. Portion of pre-existing dirt road at eastern portion of the site to be used for Project access.



Photo 2. View of mining area 1 facing northwest.



Photo 3. View of mining area 2 with ephemeral drainage in middle of the photo.



Photo 4. Ephemeral drainage observed within Project Site.



Photo 5. Typical squirrel burrow observed in scattered areas throughout the Project Site.



Photo 6. Burrowing owl burrow with whitewash at entrance observed within Project Site.

Photolog for Johe Ranch Mine Project near McKittrick, Kern County, CA.
November 2014



Photo 7. View facing south of mining area 2.



Photo 8. Portion of the Project Site containing cattle dung where grazing has occurred.



Photo 8. View facing south of mining area 1 (left side) and mining area 2 (right side) with alkali goldenbush scrub.



Photo 9. View facing north from mine area 2 of Willow Springs Valley and plowed fields in the background.



Photo 9. View facing west of southern portions of the Project Site.



Photo 10. View facing northeast of Willow Springs Valley and plowed fields with Temblor Valley in the background.

Photolog for Johe Ranch Mine Project near McKittrick, Kern County, CA.
November 2014



Photo 11. Burrows observed along drainage in northernmost portions of the Project Site.



Photo 12. Plowed fields north of the Project Site.



Photo 13. View of mine area 1 facing south.



Photo 14. View of all three mine areas facing southwest.



Photo 15. View facing west of Project Site.



Photo 16. Second burrowing owl burrow observed within Project Site.

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FIGURES

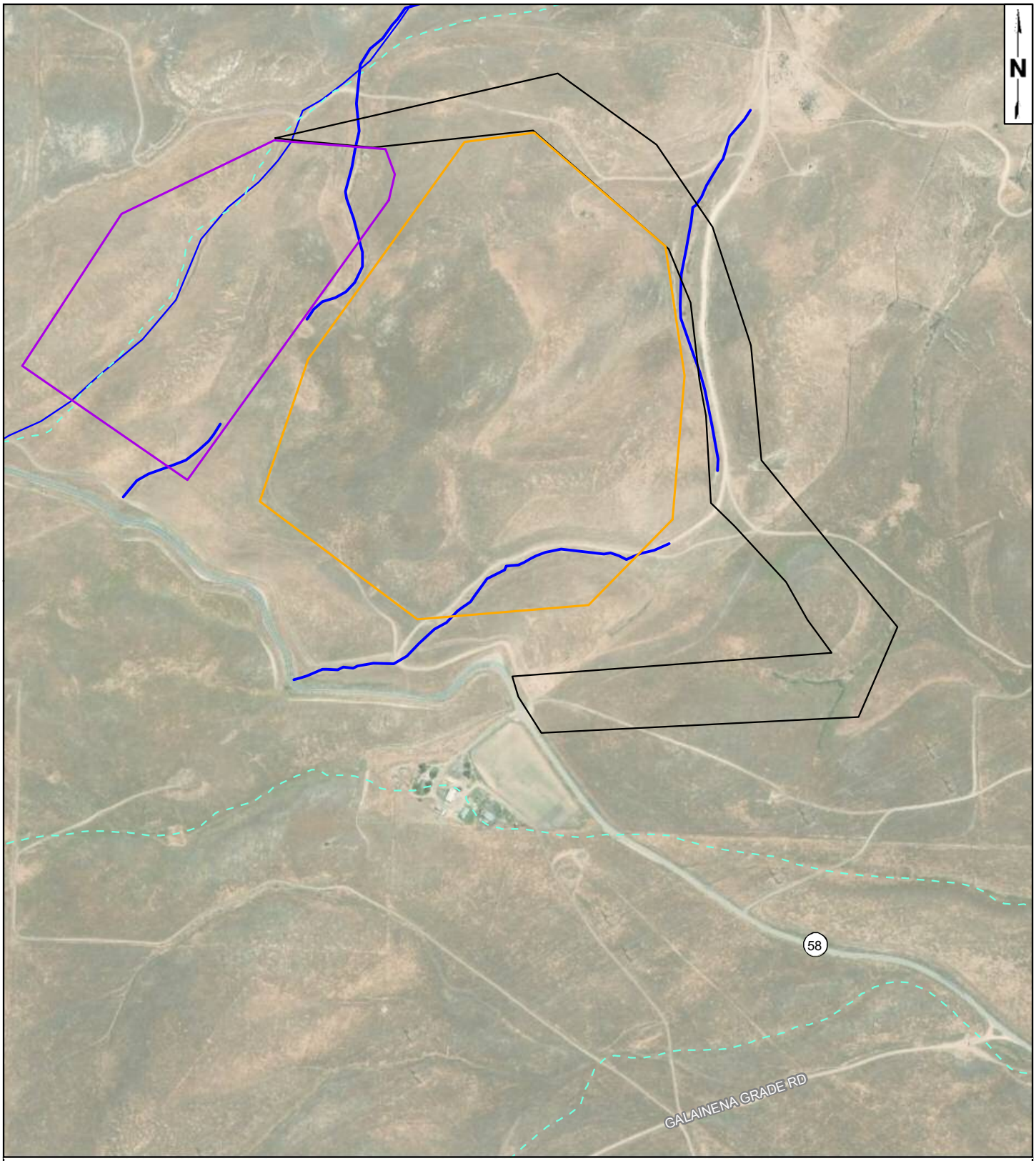
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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

GF Industries
Johe Ranch Mine Project
Biological Resources Survey
December 2014

Figure 1
General Location Site Map



LEGEND:

- Channel Observed by Padre During Survey
- National Wetland Inventory (NWI) Data
- Biological Survey Access Road
- Pits 1 and 2 Biological Survey Area
- Pit 3 Biological Survey Area

0 350 700
FEET

Source: Esri Online Imagery Basemap, County of Kern
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

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PROJECT NAME: JOHE RANCH MINE PROJECT; MCKITTRICK KERN COUNTY, CA

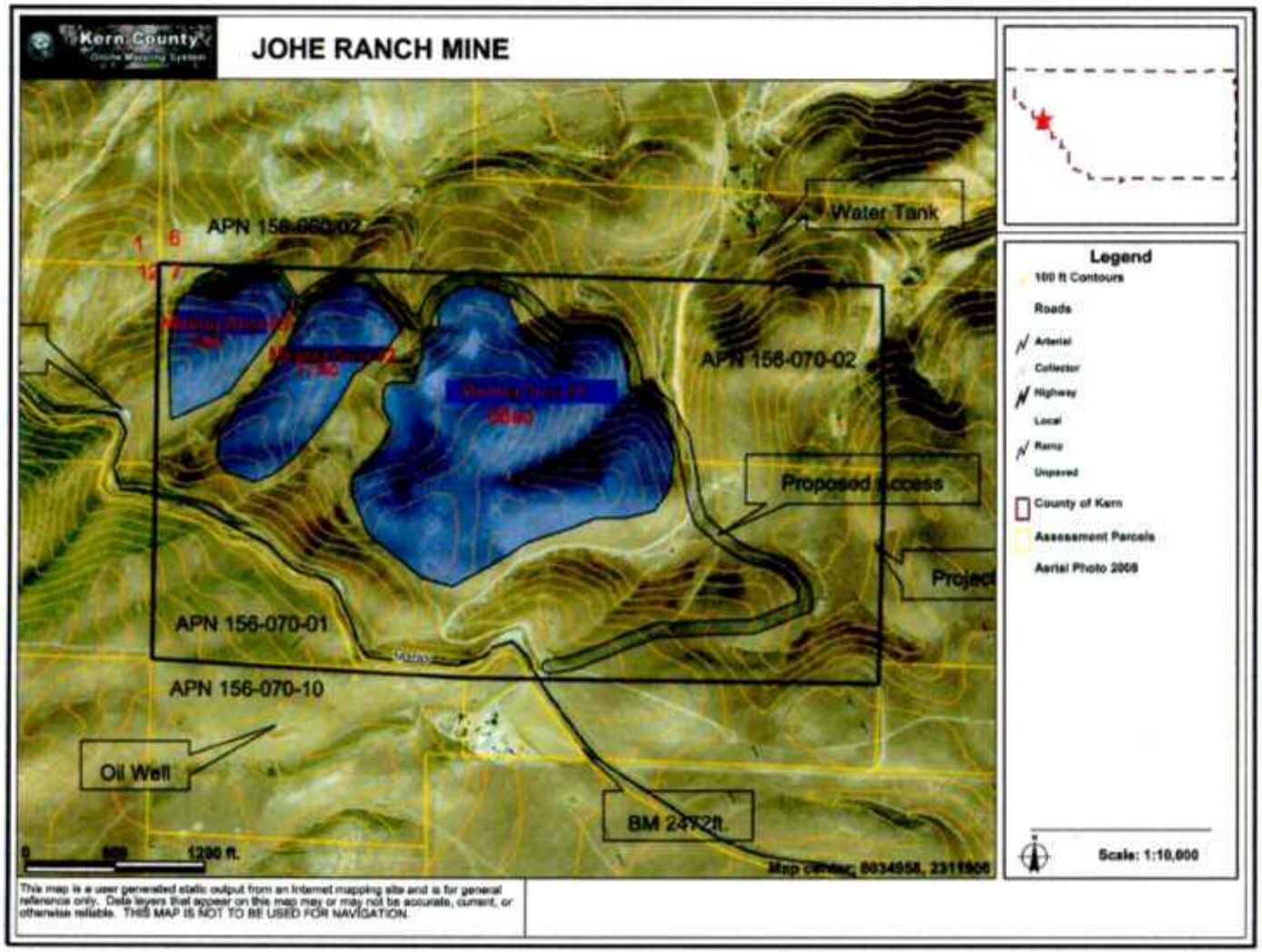
PROJECT NUMBER: 1402-2421

DATE: May 2019

PROJECT LAYOUT

FIGURE 2

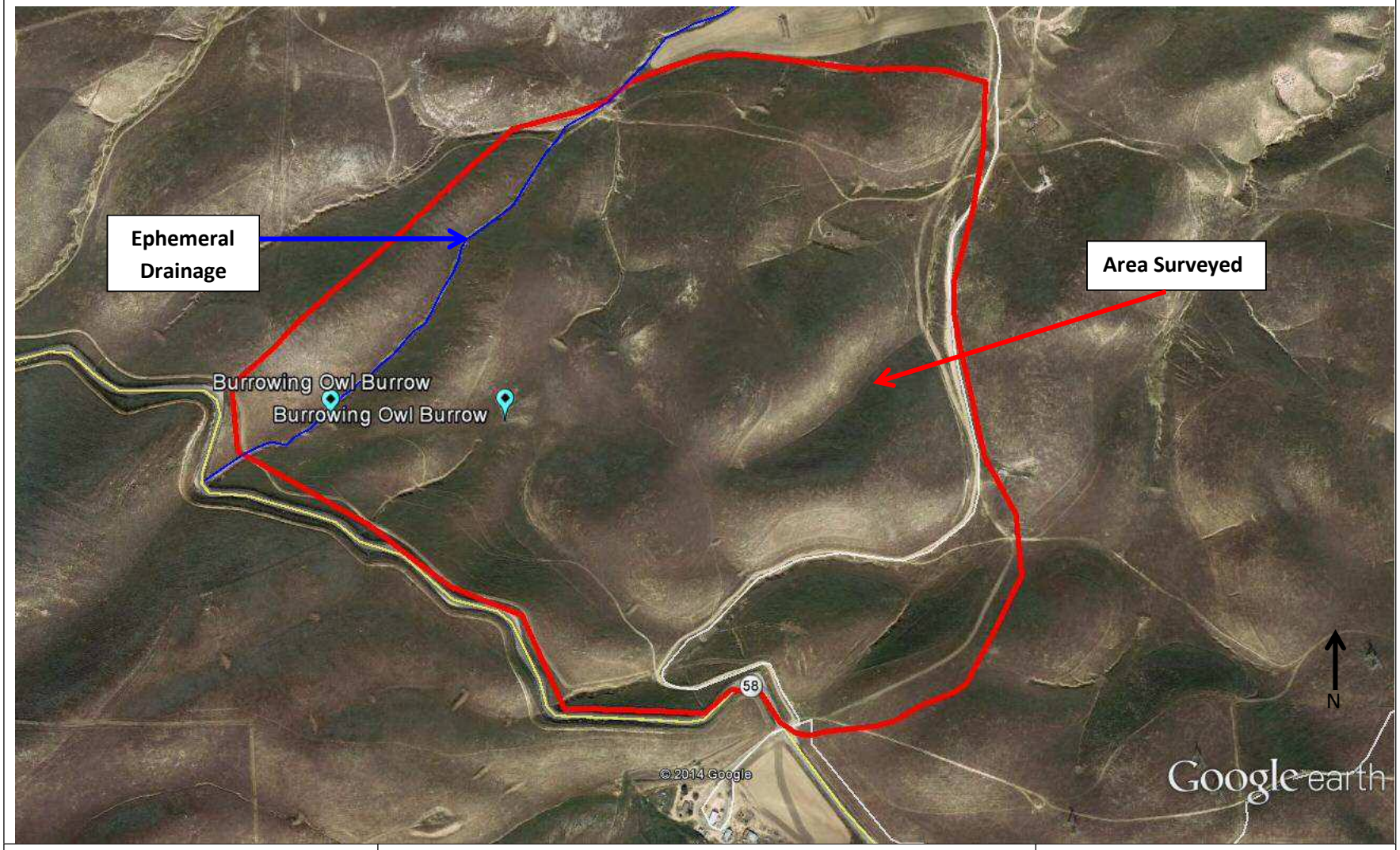
Johe Ranch Mine Project\Project Layout.mxd 5/22/2019



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GF Industries
Johe Ranch Mine Project
Biological Resources Survey
December 2014

Figure 2
Areas to be disturbed by mining activities (Figure provided by GF Industries)



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GF Industries
Johe Ranch Mine Project
Biological Resources Survey
December 2014

Figure 3
Survey Area and Significant Findings.

APPENDICES

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APPENDIX A.

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BIOTA REPORT
AND VEGETATION BASELINE SURVEY
240 ± ACRES, SECTION 07, T30S, R21E, MDB&M
MCKITTRICK, CA.

PAUL PRUETT & ASSOCIATES

A BIOLOGICAL ASSESSMENT OF VEGETATION AND WILDLIFE AND VEGETATION BASELINE SURVEY 240± ACRES, SECTION 07, T30S, R21E, MDB&M MCKITTRICK, KERN COUNTY, CALIFORNIA

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26 June 2008

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1. SUMMARY OF FINDINGS AND CONCLUSIONS: 240± ACRES, SECTION 07, T30S, R21E, MDB&M.

The proposed project is comprised of about 240± acres in the northwest quarter of Section 07, T30S, R21E, MDB&M. The project site is located west of the community of McKittrick, County of Kern, California (Figures 1 and 2). The project proposes to surface mine for diatomaceous earth on about eighty-eight (88) acres within the project boundaries. The anticipated disturbance areas are shown in Figure 3.

The site is relatively undisturbed Non-Native Grassland, Element Code 42200 (Holland 1986), historically used for grazing. No riparian or wetlands habitat exists on the proposed project site. No wetlands are shown by the U.S Fish and Wildlife Service as occurring in the vicinity of the proposed project. No trees suitable for raptor nesting exist on the project site. No wildlife corridors or wildlife nursery sites were identified on the site.

Forty-five (45) sensitive plant and animal species were listed in the California Natural Diversity Database (CNDDB) RareFind 3 printout for the USGS 7.5' McKittrick Summit Quadrangle and eight surrounding quadrangles, information dated 02 February 2008, or were known by Paul Pruett & Associates (PPA) staff to occur in the vicinity of the project site.

Nineteen (19) sensitive plant species were listed by the CNDDB or are known to exist in the vicinity: *Antirrhinum ovatum*, oval-leaved snapdragon; *Atriplex cordulata*, heartscale; *Atriplex vallicola*, Lost Hills crownscale; *Caulanthus californicus*, California jewel-flower; *Caulanthus coulteri* var. *lemmonii*, Lemmon's jewel-flower; *Delphinium recurvatum*, recurved larkspur; *Eremalche kernensis*, Kern mallow; *Eriastrum hooveri*, Hoover's eriastrum; *Eriogonum temblorense*, Temblor buckwheat; *Eschscholizia lemmonii* ssp. *kernensis*, Tejon poppy; *Eschscholzia rhombipetala*, diamond-petaled California poppy; *Lasthenia glabrata* ssp. *coulteri*, Coulter's goldfields; *Layia hetertricha*, pale-yellow layia; *Layia munzii*, Munz's tidy-tips; *Lepidium jaredii* ssp. *jaredii*, Jared's peppergrass; *Madia radiate*, showy madia; *Monolopia congdonii*, San Joaquin woolthreads; *Stylocline citroleum*, oil neststraw; and *Viola aurea*, golden violet.

No evidence of these nineteen, or any other sensitive plant species, was found on the project site during field reconnaissance. Forty (40) vascular plant species were identified on the project site during the survey period. Twenty-nine (29), or seventy-three (73) percent, are native species, and eleven (11), or twenty-seven (27) percent, are non-native species. Subsequent spring surveys would likely yield additional annual plant species.

Two (02) sensitive plant community types were listed as occurring in the vicinity of the proposed project: Northern Claypan Vernal Pool and Valley Sink Scrub. Neither of these sensitive plant communities was identified on the project.

Twenty-four (24) sensitive animal species were listed by the CNDDB or are known to occur in the vicinity of the project: *Actinemys marmorata pallida*, southwestern pond turtle; *Ammospermophilus nelsoni*, Nelson's antelope squirrel; *Antorzous pallidus*, pallid bat; *Asio otus*, long-eared owl; *Athene cunicularia*, burrowing owl; *Branchinecta campestris*, pocket pouch fairy shrimp; *Branchinecta longiantenna*, longhorn fairy shrimp; *Branchinecta lynchi*, vernal pool fairy shrimp; *Charadrius montanus*, mountain plover; *Dipodomys ingens*, giant

kangaroo rat; *Dipodomys nitratoides brevinasus*, short-nosed kangaroo rat; *Dipodomys nitratoides nitratoides*, Tipton kangaroo rat; *Eumops perotis californicus*, western mastiff bat; *Falco mexicanus*, prairie falcon; *Gambelia sila*, blunt-nosed leopard lizard; *Lasiurus cinereus*, hoary bat; *Masticophis flagellum ruddocki*, San Joaquin whipsnake; *Onychomys torridus tularensis*, San Joaquin pocket mouse; *Perognathus inornatus inornatus*, San Joaquin pocket mouse; *Protodufourea zavortinki*, Zavortink's protodufourea bee; *Spea hammondii*, western spadefoot; *Taxidea taxus*, American badger; *Toxostoma lecontei*, Le Conte's thrasher; and *Vulpes macrotis mutica*, San Joaquin kit fox.

No evidence of any of these sensitive animal species was noted during field reconnaissance. No evidence of any other, sensitive animal species was noted on the proposed project during the survey period.

San Joaquin kit fox and burrowing owls are highly vagile species' occurring throughout the San Joaquin Valley and bordering foothills. Although no evidence of either of these species was observed during field reconnaissance, the likelihood exists that either species may forage within the survey boundaries or den or utilize burrows on the site at times. No Nelson's antelope squirrels, kangaroo rat species', or mouse species' were observed during the daylight surveys conducted for this report. Small mammal burrows were noted on the site.

No focused animal surveys were requested for the preparation of this report. No live trapping was conducted. No night spotlighting was conducted or scent stations established. Sensitive bird species specifically listed by federal or state regulating agencies or otherwise protected under the Migratory Bird Treaty Act, may forage on or in the vicinity of the proposed project.

Vegetation baseline data was collected from nine survey plots representing the entire survey area in aspect, composition, density, and species richness. Vegetative Density is the number of individual plants rooted in a given reference area. Herb density is 429.33 herbs/square meter. Shrub density is 1.44 shrubs/square meter. No trees exist on the site. Vegetative Cover means the vertical projection of the crown shoot area of a species to the ground surface expressed as a percentage. The average Vegetative Cover Visual Percentage Estimates of the site is 0.0% trees, 0.3% shrubs, 87.0% herbs, and 13% bare. Vegetative species-richness is the number of different plant species in a given reference area. The average vegetative species-richness consists of 3.8 species within the 0.25 square meter plots, 4.3 species within one square meter plots.

We conclude that the development of this project will not result in the loss of any riparian or wetlands habitat.

We conclude that development of this site will result in the loss of some undisturbed native habitat.

We conclude that indirect impacts, in the form of loss of foraging habitat associated with a threatened, endangered, or otherwise protected species, may occur through the development of this project.

We conclude that direct impacts, in the form of "incidental take" of a threatened, endangered, or otherwise protected species, may occur through the development of this project.

2. THE PROJECT SITE:
240± ACRES, SECTION 07, T30S, R21E, MDB&M.

2.1 Legal Description: This biological assessment covers about two-hundred forty (240) acres in northwest quarter of Section 07, T30S, R21E, MDB&M within the U.S.G.S. McKittrick 7.5' Quadrangle Map.

2.2 Physical Description: This project is in the rolling foothills of the Temblor Mountains, west of the San Joaquin Valley in Kern County. Elevation on the site ranges from about 640 m to 780 m. The site is almost entirely comprised of Non-Native Grassland, Element Code 42200 (Holland 1986). The site has historically been used for grazing. Some roads, staging areas for equipment exist within the proposed project boundaries. State Route 55 cuts the southwest corner of the project area. A home and associated out-buildings exist just south of SR 55, in about the middle of the south edge of the survey area.

The project lies in the Lower Sonoran Life Zone of the San Joaquin Valley and is characterized by hot, dry summers, with daytime temperatures frequently above 100 degrees Fahrenheit, and cool, foggy winters with temperatures seldom below freezing. No riparian or wetlands habitat exists on the project. Rainfall averages about 5.70 inches per year with the heaviest rainfall between January and March (Munz and Keck 1973). Seasonal rainfall to date has been well below average as reported by the National Weather Service, San Joaquin Valley/Hanford office. Consequently, annual growth is well below average.

2.3 Land Use: Historically the site and vicinity have been used for farming, grazing, some oil production and diatomaceous earth mining.

2.4 Vegetation: The plant community of the site is Non-Native Grassland, Element Code 42200 (Holland 1986). The Non-Native Grassland is dominated by introduced species, such as *Avena barbata, Bromus sp.*, and *Erodium sp.*, which have replaced the native vegetation to a large extent. It is a sparse to dense cover of annual grasses and forbs with flowering culms to 1 meter high. In years of favorable rainfall there may be numerous species of showy, native annual forbs (wildflowers).

2.5 Soils: The soil types of the proposed project are covered by the United States Department of Agriculture (USDA), Soil Survey of Kern County, California, Northwestern Part, September, 1988. The site is almost entirely comprised of Mendi-Hillbrick-Kilmer association, 9 to 30 percent slopes, and Reward shaly loam, 30 to 50 percent slopes. A very small area of the southeast corner contains Aramburu very shaly clay loam, 15 to 30 percent slopes, and Pottinger very shaly clay loam, 2 to 9 percent slopes.

2.5.1 The Mendi-Hillbrick-Kilmer association is on hillsides, ridgetops, and mountains. The 9 to 30 percent slopes are 50 percent Mendi loam, 20 percent Hillbrick loam, and 15 percent Kilmer loam. It includes outcrops of Bluestone clay, Aido clay, Choice clay, and Rock outcrops. The Mendi soil is deep and well drained, formed from sandstone or shale. The surface layer is pale brown loam about 20 inches thick. The next 20 inches is a light yellowish brown loam and then a light yellow brown silt loam to 72 inches. Permeability is moderate, available water capacity is high, and runoff is medium with moderate hazard of water erosion. The Hillbrick soil is shallow and well drained, formed from sandstone or

shale. The surface layer is a pale brown loam to about 15 inches. Permeability is moderately rapid, water availability is very low, runoff is medium, and hazard of water erosion is high. The Kilmer soils are moderately deep and well drained and derived from shale or sandstone. The surface layer is a pale brown loam for about 14 inches and the underlying material is a pale brown loam over shale for about 18 inches. Permeability is moderately slow and water capacity is low or moderate. Runoff is rapid and hazard of water erosion is moderate.

2.5.2 Reward shaly loam, 30 to 50 percent slopes, is a deep, well-drained soil primarily derived from calcareous shale or sandstone. It is associated with hills and mountains of the area. The dominant vegetation type of this soil is annual grasses and forbs. The surface is grayish brown shaly loam to about 24 inches. About 15 inches of the underlying material is also a grayish brown shaly loam with pale brown loam below to a depth of about 60 inches. Permeability is moderate and runoff is rapid. The hazard of erosion is high with this soil.

2.5.3 Aramburu very shaly clay loam is also a deep, well-drained soil found on hills and mountains of the area. Vegetation of the site is dominated by annual grasses and forbs. Permeability is moderate and available water capacity is low. Most areas of this soil types are used for grazing.

2.5.4 Pottinger very shaly clay loam is derived from shale and found on alluvial fans and terraces. Vegetation of this soil type is also almost entirely comprised of annual grasses and forbs.

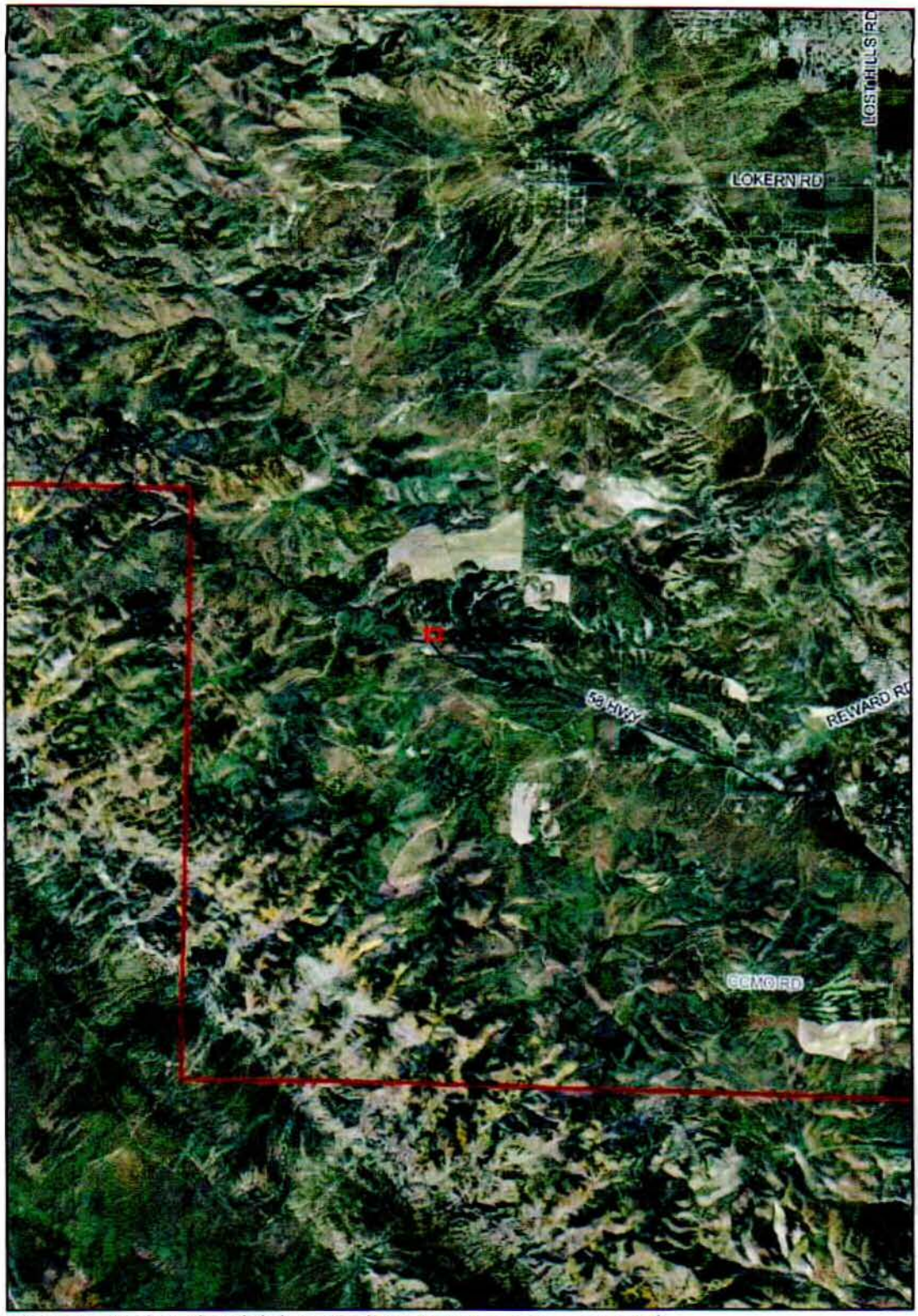


Figure 1. Project site vicinity map (http://www.co.kern.ca.us/gis/).

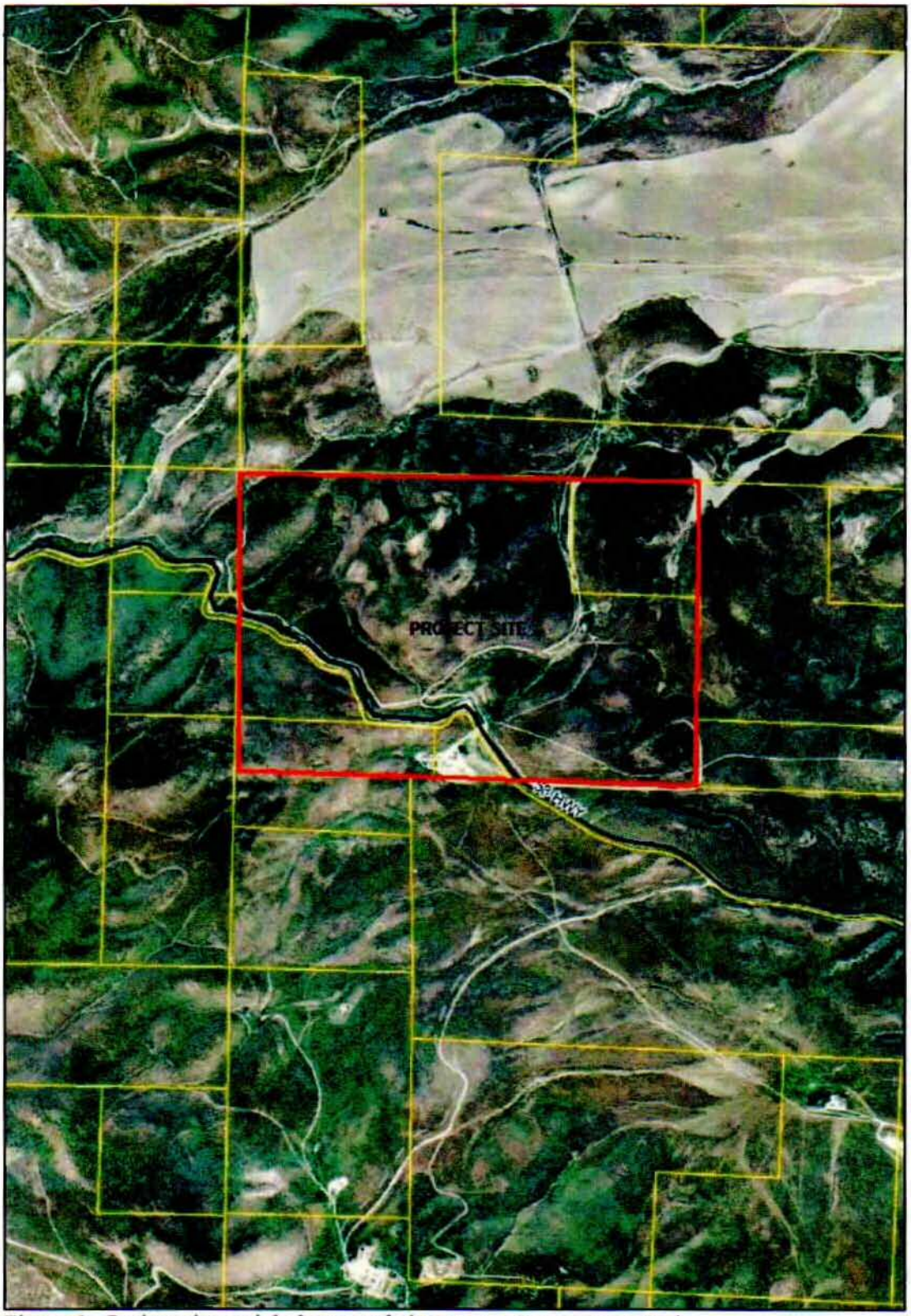


Figure 2. Project site aerial photograph (http://www.co.kern.ca.us/gis/).

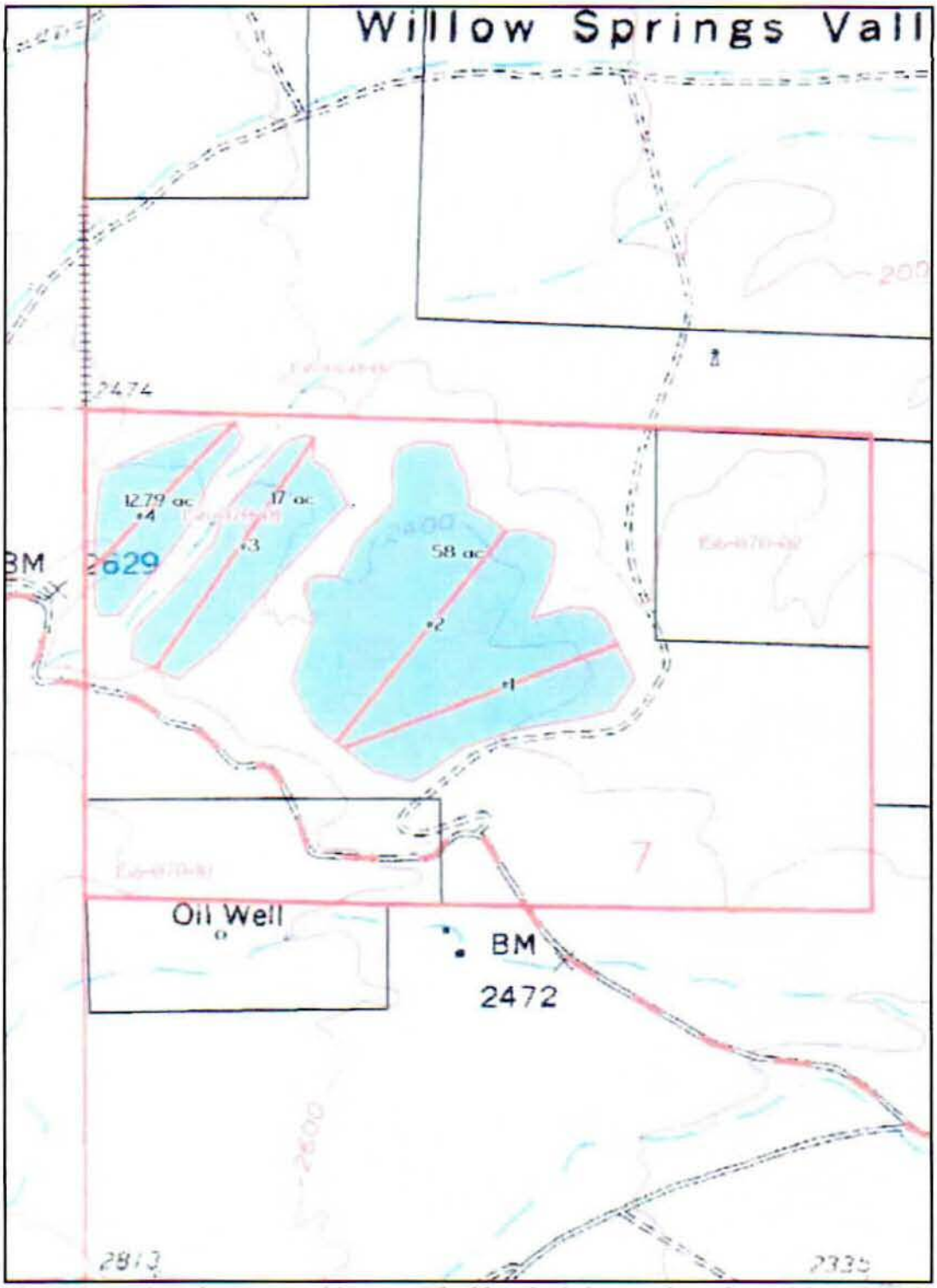


Figure 3. Project site topographic map. The blue shaded areas show the anticipated earth disturbance associated with mining activities (Provided by the applicant).



Figure 4. Photograph of the proposed project taken in the west half of the project site facing north/northeast and showing typical terrain and vegetation (19Apr08).



Figure 5. Photograph taken showing one of the 1 meter herb vegetation plots on an east facing slope (19Apr08).



Figure 6. Photograph taken in about the middle of the project near the north border facing south. A staging area for equipment and fencing for cattle pens shows in the photograph (19Apr08).



Figure 7. Photograph of the project taken in the northeast half of the project facing south/southwest showing a draw and one of the roads on the site (19Apr08).

3. BIOTIC INVENTORY METHODS:

3.1 Purpose: The primary purpose of this biota inventory was to determine if any plants or animals that are listed by state or federal agencies as endangered, rare, threatened, or depleted and of special concern occur on the proposed project. Another purpose of this study was to identify any critical habitat that may occur within the proposed project boundaries. The term sensitive will be used hereafter, throughout this report, to mean any species considered by state or federal agencies to be endangered, rare, threatened, or depleted and of special concern.

3.2 Studies Required to Satisfy Endangered Species Law and Assist in California Environmental Quality Act (CEQA) Analysis: This study is a biological assessment of the status of forty-five federally or state listed, proposed, or sensitive plant and animal species listed in Table 1. The study also sought to determine if any sensitive species not known to the CNDDB is presently using the property and if any critical habitat exists within the proposed project boundaries.

3.3 Literature Review: Both the scientific literature and the CNDDB were consulted to determine which sensitive species occur in this habitat and near this project site. Forty-five (45) sensitive species were reported in the CNDDB report for the Gosford and Lamont Quadrangles, information dated 02 February 2008. They are listed in Table 1, and their nearest locations are discussed in Section 5 of this report.

3.4 Consultations: Mr. Dan Williams, Department of Biological Sciences, California State University, Stanislaus, and Dr. David Germano, Department of Biological Sciences, California State University, Bakersfield, have been previously contacted concerning location and identification of *Dipodomys* sp.

3.5 Vegetation Survey Methods: Paul Pruett and Associates used three field methods to survey the plant community: habitat search, random search, and line transects. The entire site was surveyed by walking and/or slowly driving all perimeter and internal roads. Surveys were conducted on 19 April and 31 May 2008. Appendix B is a list of individuals who worked on the project and their responsibilities.

3.6 Animal Survey Methods: Paul Pruett and Associates surveyed the proposed project for animals on 19 April and 31 May 2008. All fieldwork followed the general guidelines established by the California Department of Fish and Game, Region 4, dated 08 May 90. Appendix B is a list of individuals who worked on the project and their responsibilities. Original field notes are available upon request from the office of Paul Pruett and Associates. Field notes were used to record habitat features and animal activity during the survey period. A photographic record was made of specific on-site features and wildlife.

3.7 Factors Limiting or Influencing Results: No focused animal surveys were requested for the preparation of this report. No live trapping was conducted. No night spotlighting was conducted or scent stations established.

TABLE 1: SENSITIVE SPECIES OCCURRING IN THE VICINITY OF THE PROPOSED PROJECT. The following are lists of sensitive plant and animal species known to occur in the vicinity of the proposed project site. The lists are drawn from the CNDDB, USGS 7.5' McKittrick Quadrangle and eight adjacent quadrangles, information dated 02 February 2008, scientific literature, and personal knowledge of Paul Pruett and Associates staff.

SENSITIVE PLANTS	COMMON NAME	FED/CA STATUS
Antirrhinum ovatum	oval-leaved snapdragon	None/None; CNPS 4.2
Atriplex cordulata	heartscale	None/None; CNPS 1B.2
Atriplex vallicola	Lost Hills crownscale	None/None; CNPS 1B.2
Caulanthus californicus	California jewel-flower	Endangered/Endangered; CNPS 1B.1
Caulanthus coulteri var. *lemmonii*	Lemmon's jewel-flower	None/None; CNPS 1B.2
Delphinium recurvatum	recurved larkspur	None/None; CNPS 1B.2
Eremalche kernensis	Kern mallow	Endangered/None; CNPS 1B.2
Eriastrum hooveri	Hoover's eriastrum	Delisted/None; CNPS 4.2
Eriogonum temblorense	Temblor buckwheat	None/None; CNPS 1B.2
Eschscholzia lemmonii ssp. *kernensis*	Tejon poppy	None/None; CNPS 1B.1
Eschscholzia rhombipetala	diamond-petaled California poppy	None/None; CNPS 1B.1
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None/None; CNPS 1B.1
Layia heterotricha	pale-yellow layia	None/None; CNPS 1B.1
Layia munzii	Munz's tidy-tips	None/None; CNPS 1B.2
Lepidium jaredii ssp. *jaredii*	Jared's peppergrass	None/None; CNPS 1B.2
Madia radiate	showy madia	None/None; CNPS 1B.1
Monlopia congdonii	San Joaquin woolythreads	None/None; CNPS 1B.2
Stylocline citroleum	oil neststraw	None/None; CNPS 1B.1
Viola aurea	golden violet	None/None; CNPS 2.2

SENSITIVE PLANT COMMUNITIES	FED/CA STATUS
Northern Claypan Vernal Pool	None/None
Valley Sink Scrub	None/None

SENSITIVE ANIMALS	COMMON NAME	FED/CA STATUS
Actinemys marmorata pallida	southwestern pond turtle	None/None; CDFG:SC
Ammospermophilus nelsonii	Nelson's antelope squirrel	None/Threatened
Antrozous pallidus	pallid bat	None/None; CDFG:SC
Asio otus	long-eared owl	None/None; CDFG:SC
Athene cunicularia	burrowing owl	None/None; CDFG:SC
Branchinecta campestris	pocket pouch fairy shrimp	None/None
Branchinecta longiantenna	longhorn fairy shrimp	Endangered/None
Branchinecta lynchi	vernal pool fairy shrimp	Threatened/None
Charadrius montanus	mountain plover	None/None; CDFG:SC
Dipodomys ingens	giant kangaroo rat	Endangered/Endangered
Dipodomys nitratoides brevinasus	shot-nosed kangaroo rat	None/None; CDFG:SC

TABLE 1: SENSITIVE SPECIES OCCURRING IN THE VICINITY OF THE PROPOSED PROJECT (CONT'D)

SENSITIVE ANIMALS	COMMON NAME	FED/CA STATUS
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	Endangered/Endangered
Eumops perotis californicus	western mastiff bat	None/None; CDFG:SC
Falco mexicanus	prairie falcon	None/None; CDFG:SC
Gambelia sila	blunt-nosed leopard lizard	Endangered/Endangered CDFG:Fully Protected
Lasiurus cinereus	hoary bat	None/None; CDFG:SC
Mastochophis flagellum ruddocki	San Joaquin whipsnake	None/None; CDFG:SC
Onychomys torridus tularensis	Tulare grasshopper mouse	None/None; CDFG:SC
Perognathus inornatus inornatus	San Joaquin pocket mouse	None/None; CDFG:SC
Protodufourea zavortinki	Zavortink's protodufourea bee	None/None
Spea hammondii	western spadefoot	None/None; CDFG:SC
Taxidea taxus	American badger	None/None; CDFG:SC
Toxstoma lecontei	Le Conte's thrasher	None/None; CDFG:SC
Vulpes macrotis mutica	San Joaquin kit fox	Endangered/Threatened

Listing Codes

CNPS: California Native Plant Society.
CDFG:SC California Department of Fish and Game Special Concern.

TABLE 2: SENSITIVE PLANT SPECIES HABITATS AND FLOWERING TIMES: (JEPSON 1993, MUNZ AND KECK 1973)

SCIENTIFIC NAME	FLOWERING	HABITAT
Antirrhinum ovatum	May-Jun	Heavy adobe clay soils, 1000 feet.
Atriplex cordulata	Apr-Oct	Chenopod scrub, valley and foothill grasslands below 1350 ft.
Atriplex vallicola	Jun-Aug	Valley Grasslands, dried rain pools and flats.
Caulanthus californicus	Mar-Apr	Valley grassland, dry slopes and plains below 3000 ft.
Caulanthus coulteri var. *lemmoii*	Mar-Apr	< 5000 ft, Dry slopes, Valley Grasslands, Chapparral, Foothills
Delphinium recurvatum	Mar-May	90-1800 ft, Subalkaline soil Valley Grasslands
Eremalche kernensis	Apr-May	600-900 ft, dry, clay flats
Eriastrum hooveri	Apr-Jun	Rolling plains<500 ft. Valley Grassland
Eriogonum temblorense	May-Sep	barren, shale slopes, sandstone, <1000 m.
Eschscholzia lemmonii ssp. *kernensis*	Mar-May	< 2500 ft, Dry grassy plains and slopes, Valley Grassland
Eschscholzia rhombipetala	Mar-May	Clay soils near annual grasslands, Open saltbush scrub.

TABLE 2: SENSITIVE PLANT SPECIES HABITATS AND FLOWERING TIMES: (JEPSON 1993, MUNZ AND KECK 1973)(CONT'D).

SCIENTIFIC NAME	FLOWERING	HABITAT
Lasthenia glabrata ssp. *coulteri*	Mar-May	Heavy soils, vernal pools, low alkaline fields, hillsides, <4500 ft.
Layia heterotricha	March-June	Grasslands, Foothill Woodland. < 5000 ft.
Layia munzii	Mar-Apr	500-2000 ft, Alkali flats of heavy clay
Lepidium jaredii ssp. *jaredii*	Mar-May	low-lying, alkaline areas, heavy clay or sandy soils, <1000 m.
Madia radiate	Mar-May	Grassy slopes, <900 m.
Monolopia congdonii	Mar-Apr	Alkali plains, < 1200 ft.
Stylocline citroleum	Mar-May	150-1200 ft, Clay flats in oil producing areas
Viola aurea	Apr-Jun	4500-6500 ft, Pinyon-Juniper Woodlands

4. BIOTIC SURVEY RESULTS:

4.1 Vegetation: The site is relatively undisturbed Non-Native Grassland, Element Code 42200 (Holland 1986), historically used for grazing. The Non-Native Grassland is dominated by introduced species such as *Bromus sp.*, and *Erodium sp.*, which, to a large extent, have replaced the native vegetation. No riparian or wetlands habitat exists on the proposed project site. No wetlands are shown by the U.S Fish and Wildlife Service as occurring in the vicinity of the proposed project. No trees suitable for raptor nesting exist on the project site. No wildlife corridors or wildlife nursery site were identified on the site.

The area is characterized by hot, dry summers with daytime temperatures frequently above 100 degrees Fahrenheit, and cool winters, infrequent snow, with temperatures seldom below freezing. Seasonal rainfall to date was well below average as reported by the National Weather Service, San Joaquin Valley/Hanford office. Consequently, annual growth is well below average.

Nineteen (19) sensitive plant species were listed by the California Natural Diversity Database (CNDDB) or are known to exist in the vicinity: *Antirrhinum ovatum*, oval-leaved snapdragon; *Atriplex cordulata*, heartscale; *Atriplex vallicola*, Lost Hills crownscale; *Caulanthus californicus*, California jewel-flower; *Caulanthus coulteri* var. *lemmonii*, Lemmon's jewel-flower; *Delphinium recurvatum*, recurved larkspur; *Eremalche kernensis*, Kern mallow; *Eriastrum hooveri*, Hoover's eriastrum; *Eriogonum temblorense*, Temblor buckwheat; *Eschscholizia lemmonii* ssp. *kernensis*, Tejon poppy; *Eschscholzia rhombipetala*, diamond-petaled California poppy; *Lasthenia glabrata* ssp. *coulteri*, Coulter's goldfields; *Layia hetertricha*, pale-yellow layia; *Layia munzii*, Munz's tidy-tips; *Lepidium jaredii* ssp. *jaredii*, Jared's peppergrass; *Madia radiate*, showy madia; *Monolopia congdonii*, San Joaquin woolthreads; *Stylocline citroleum*, oil neststraw; and *Viola aurea*, golden violet.

No additional sensitive plant species are known by Paul Pruett & Associates staff to occur in the vicinity of the area. No evidence of these nineteen sensitive plants, or any other sensitive plant species, was found on the project site.

Forty (40) vascular plant species were identified on the project site during the survey period. Of these, twenty-nine (29), or seventy-three (73) percent, were native species, and eleven (11), or twenty-seven (27) percent, were non-native species. A complete listing of all plants found on the project site is contained in Table 3. Subsequent spring surveys might yield additional annual plant species.

TABLE 3: VASCULAR PLANTS:
240± ACRES, SECTION 07, T30S, R21E, MDB&M.

SCIENTIFIC NAME	COMMON NAME	SOURCE
Achyrachaena mollis	Blow Wives	Nat.
Amsinckia menziesii	Fiddleneck	Nat.
Asclepias fascicularis	Mexican Whorled Milkweed	Nat.
Astragalus oxyphysus	Mt. Diablo Loco	Nat.
Atriplex polycarpa *	Common Saltbush; Allscale	Nat.
Avena barbata	Slender Wild Oat	Eur.
Brassica nigra	Black Mustard	Eur.
Bromus diandrus	Ripgut Grass	Eur.
Bromus hordeaceaus	Soft Chess	Eur.
Bromus madritensis ssp. *rubens*	Red Brome; Foxtail Chess	Eur.
Centaurea melitensis	Malta Starthistle	Eur.
Clarkia cylendrica	Speckled Fairyfan	Nat.
Claytonia perfoliata	Miner's Lettuce	Nat.
Datura wrightii	Jimson Weed	Nat.
Dichelostemma capitatum	Blue Dicks	Nat.
Eastwoodii elegans *	Yellow Mock Aster	Nat.
Elymus elymoides	Squirreltail Grass	Nat.
Eremocarpus setigerus	Dove Weed; Turkey Mullein	Nat.
Erodium cicutarium	Redstem Filaree	Eurasia
Eschscholzia californica	California Poppy	Nat.
Gnaphalium stramonium	Cotton-batting Plant	Nat.
Hordeum murinum	Farmer's Foxtail	Nat.
Isocoma acradenia var. *bracteosa*	Alkali Goldenbush	Nat.
Isomeris arborea *	Bladderpod	Nat.
Lomatium utriculatum	Common Lomatium	Nat.
*Linanthus*sp.	Linanthus	Nat.
Lupinus microcarpus	Chick Lupine	Nat.
Marah fabaceus	California Manroot	Nat.
Marrubium vulgare *	White Horehound	Nat.
Monolopia lanceolata	Common False Turtleback	Nat.
Nassella pulchra	Purple Needlegrass	Nat.
Phacelia crenulata	Notch-leaved Phacelia	Nat.
Plagiobothrys nothofulvus	Popcorn Plant	Nat.
Poa secunda	Pine Bluegrass	Nat.

TABLE 3: VASCULAR PLANTS (CONT'D):
240± ACRES, SECTION 07, T30S, R21E, MDB&M.

SCIENTIFIC NAME	COMMON NAME	SOURCE
Senecio breweri	Brewer's Groundsel	Nat.
Sisymbrium irio	London Rocket	Eur.
Sisymbrium oriental	Oriental Mustard	Eur
Stephanomeria exigua	Small Wirelettuce	Nat.
Tragopogon dubius	Yellow Salsify	Eur.
Vulpia myuros	Foxtail Fescue	Eur.

Source Codes:
Eur. - European
Nat. - Native
*Observed only on the extreme northeast edge of the survey area.

4.2 Animals: Twenty-four (24) sensitive animal species were listed by the CNDDB or are known to occur in the vicinity of the project: *Actinemys marmorata pallida*, southwestern pond turtle; *Ammospermophilus nelsoni*, Nelson's antelope squirrel; *Antorzous pallidus*, pallid bat; *Asio otus*, long-eared owl; *Athene cunicularia*, burrowing owl; *Branchinecta campestris*, pocket pouch fairy shrimp; *Branchinecta longiantenna*, longhorn fairy shrimp; *Branchinecta lynchi*, vernal pool fairy shrimp; *Charadrius montanus*, mountain plover; *Dipodomys ingens*, giant kangaroo rat; *Dipodomys nitratoides brevinasus*, short-nosed kangaroo rat; *Dipodomys nitratoides nitratoides*, Tipton kangaroo rat; *Eumops perotis californicus*, western mastiff bat; *Falco mexicanus*, prairie falcon; *Gambelia sila*, blunt-nosed leopard lizard; *Lasiurus cinereus*, hoary bat; *Masticophis flagellum ruddocki*, San Joaquin whipsnake; *Onychomys torridus tularensis*, San Joaquin pocket mouse; *Perognathus inornatus inornatus*, San Joaquin pocket mouse; *Protodufourea zavortinki*, Zavortink's protodufourea bee; *Spea hammondii*, western spadefoot; *Taxidea taxus*, American badger; *Toxostoma lecontei*, Le Conte's thrasher; and *Vulpes macrotis mutica*, San Joaquin kit fox.

No evidence of these sensitive animal species was noted during field reconnaissance. No evidence of any other, sensitive animal species was noted on the proposed project during the survey period.

San Joaquin kit fox and burrowing owls are highly vagile species' occurring throughout the San Joaquin Valley and bordering foothills. Although no evidence of either of these species was observed during field reconnaissance, the likelihood exists that either species may forage within the survey boundaries. Either species may also den or utilize burrows on the site at times. No Nelson's antelope squirrels, kangaroo rat species', or mouse species' were observed during the daylight surveys conducted for this report. Small mammal burrows were noted on the site.

No focused animal surveys were requested for the preparation of this report. No live trapping was conducted. No night spotlighting was conducted or scent stations established. Sensitive bird species specifically listed by federal or state regulating agencies or otherwise protected under the Migratory Bird Treaty Act, may forage on or in the vicinity of the proposed project.

A total of eleven (11) vertebrate species were observed on the project site. Four (04) mammals, six (06) birds, one (01) reptile, and zero (00) amphibians were identified on the project site. A complete listing of animals is found in Table 4.

TABLE 4: VERTEBRATE ANIMALS:
240± ACRES, SECTION 07, T30S, R21E, MDB&M.

SCIENTIFIC NAME	COMMON NAME	EVIDENCE
MAMMALS		
Canis familiaris	domestic dog	known
Canis latrans	coyote	scat
Lepus californicus	black-tailed jackrabbit	sighted
Spermophilus beecheyi	beechey ground squirrel	sighted
BIRDS		
Cathartes aura	turkey vulture	sighted
Corvus corax	common raven	sighted
Eremophila alpestris	horned lark	sighted
Sturnella neglecta	western meadowlark	sighted
Tyrannus verticalis	western kingbird	sighted
Zenaida macroura	mourning dove	sighted
REPTILES		
Uta stansburiana	side-blotched lizard	sighted
AMPHIBIANS		
None sighted		

5. DISCUSSION OF SENSITIVE SPECIES:

5.1 Sensitive Plants: Nineteen (19) sensitive plant species were listed by the California Natural Diversity Database (CNDDB) or are known to exist in the vicinity: *Antirrhinum ovatum*, oval-leaved snapdragon; *Atriplex cordulata*, heartscale; *Atriplex vallicola*, Lost Hills crownscale; *Caulanthus californicus*, California jewel-flower; *Caulanthus coulteri* var. *lemmonii*, Lemmon's jewel-flower; *Delphinium recurvatum*, recurved larkspur; *Eremalche kernensis*, Kern mallow; *Eriastrum hooveri*, Hoover's eriastrum; *Eriogonum temblorense*, Temblor buckwheat; *Eschscholizia lemmonii* ssp. *kernensis*, Tejon poppy; *Eschscholzia rhombipetala*, diamond-petaled California poppy; *Lasthenia glabrata* ssp. *coulteri*, Coulter's goldfields; *Layia hetertricha*, pale-yellow layia; *Layia munzii*, Munz's tidy-tips; *Lepidium jaredii* ssp. *jaredii*, Jared's peppergrass; *Madia radiate*, showy madia; *Monolopia congdonii*, San Joaquin woolthreads; *Stylocline citroleum*, oil neststraw; and *Viola aurea*, golden violet. Additional annual plant species probably would be identified during multiple spring surveys.

5.1.1 *Antirrhinum ovatum*, oval-leaved snapdragon, has no federal or state listing. It is a CNPS 4.2 plant. The oval-leaved snapdragon is a cream to pink, vine-like annual or perennial, ascending to erect, and generally clinging to other plants or debris by twining pedicels or branchlets. Leaves are generally opposite below and alternate above. It is found on heavy, adobe clay soils between 200 – 1000 m. The nearest reported occurrence is about seven (07) miles west of the project, six (06) miles SE of Simmler.

No evidence of the oval-leaved snapdragon was observed on site.

5.1.2 *Atriplex cordulata*, heartscale is not listed by federal or state authorities. It is identified by the CNPS as a 1B.2 plant. Heartscale, a saltbush relative (Chenopodiaceae: the goosefoot family) is an annual native growing between 4 and 20 inches tall. Stems can vary from one to many at the base, with gray-scaly tipped branches. Leaves of this plant are about 0.25 to 0.6 inches wide with lower bases cordate and rounded upper bases, and are gray and scaly. Seeds of this plant are very small and inflorescences are pistillate with bracts in fruit. This halophytic species occurs in low elevation sinks of the San Joaquin Valley. The nearest reported occurrence is about eleven and one-half (11.5) miles south/southwest of the site, 1.5 miles north of soda lake.

No evidence of heartscale was observed on site.

5.1.3 *Atriplex vallicola,* the Lost Hills crownscale, has no federal or state listing but is tracked by the CNDDB as a CNPS 1B.2 plant. It is a small (less than 2 dm) annual, gray-scaly, glabrous saltbush. The leaves are elliptical to ovate, green to gray, entire, and 8-11 mm. long. It has a pistillate inflorescence with fruit bracts 2.5-4 mm, flat to spheric, smooth to tubercled, toothed and greenish. It is differentiated from *A. coronata* by the smaller fruit bracts. The closest occurrence is about five miles southwest of the project. The nearest reported occurrence is about five (05) miles east of the site along Reward Road.

No evidence of Lost Hills crownscale was observed on site.

5.1.4 *Caulanthus californicus*, the California jewel-flower is listed as endangered by both the USFWS and the CDFG. The California jewel-flower is a decumbent to erect annual with leaves less than 11 cm that are wavy-dentate to shallowly cut with a winged petiole. The flowers are white with purple veins, wavy margins, and petals 6 to 11 mm. It is thought to exist originally in non-alkaline grasslands below 3000 feet. The nearest reported occurrence is about ten (10) miles northeast of the site.

No jewel-flower was observed on site.

5.1.5 *Caulanthus coulteri* var. *lemmonii*, Lemmon's jewel-flower, has no federal or state listing but is tracked by the CNDDB as a CNPS 1B.2 plant. This annual in the mustard family is generally found in habitats of the southwest San Joaquin Valley between 80 and 800m. The nearest reported location is in a road-cut on Highway 58 about six miles northwest of the project. The nearest reported occurrence is about two and one-half miles northwest of the proposed project along a road-cut on HWY 58, in Temblor Creek Drainage.

No jewel-flower was observed on the project.

5.1.6 *Delphinium recurvatum*, the recurved larkspur, is not listed by either federal or state agencies. It is tracked by the CNDDB as a CNPS 1B plant. This beautiful member of the Ranunculaceae with light blue sepals and white petals grows to 85 cm and is easily recognizable. It blooms during April and June. It grows on alkaline soils below about 2000 feet. The nearest reported occurrence is about eight and one-quarter (8.25) miles east of the site, about two (02) miles north of McKittrick.

No evidence of the recurved larkspur was found on the site.

5.1.7 *Eremalche kernensis*, Kern mallow, is listed as endangered by the federal agency but has no state standing.It is a CNPS 1B.2 plant. It is reported at many sites in the southwest area of the San Joaquin Valley. It was observed by the author along Lokern Road in 2001. The diagnostic key to separate this plant from *E. parryi-parryi* is the presence of pistillate flowers. The nearest reported occurrence is about four (04) miles north/northwest of the project site. The occurrence is listed as believed extirpated.

No Kern mallow was observed during field reconnaissance.

5.1.8 *Eriastrum hooveri*, Hoover's eriastrum, has been delisted by the FWS. It is not listed by the CDFG but is tracked as a CNPS 4.2 plant. The nearest reported occurrence is about eight and one-quarter (8.25) miles north of the site along Chino Martinez Creek, north of Seventh Standard Road.

No eriastrum was identified on the site.

5.1.9 *Eriogonum temblorense*, Temblor buckwheat, has no federal or state listing. It is a CNPS 1B.2 plant. This is an annual member of the buckwheat family blooming between May and September. Several tiny white flowers are clustered at the tips of spreading, elongated branches. Height of the plant varies with seasonal precipitation and plant appearance may vary from season to season. The closest reported location is about seven (07) miles northwest of the project.

No Temblor buckwheat was identified during field reconnaissance.

5.1.10 *Eschscholzia lemmonii* ssp. *kernensis*, the Tejon poppy, has no federal or state listing . It is tracked by the NDDB as a CNPS 1B.1 plant. It is found in habitats and elevations of the southwest Tehachapi Mountains and north Western Transverse Range. It is diagnostically different from *E. lemmonii* in seed structure having round to elliptical seeds. The nearest reported occurrence is about nine and one-quarter (9.25) miles southeast of the project site.

No evidence of the Tejon poppy was observed on site.

5.1.11 *Eschscholzia rhombipetala*, diamond-leaved California poppy, has no federal or state listing. It is tracked by the CNDDB as a CNPS 1B.1 plant. This poppy is similar to the Tejon and Lemmon's poppy. The buds may be erect or nodding and the flowers, small and yellow. The fruits are 4 to cm. potentially equaling the height of the entire plant. This poppy was once believed to be extinct for about forty years. It was rediscovered in 1992on the Carrizo

Plain in San Luis Obispo County. Three populations are currently known to exist outside of the Lawrence Livermore National Laboratory (LLNL). The nearest reported occurrence is about twelve (12) miles northwest of the project site.

No evidence of the diamond-leaved poppy was observed on site.

5.1.12 *Lasthenia glabrata* ssp. *coulteri*, Coulter's goldfields, has no federal or state listing. It is tracked by the CNDDB as a CNPS 1B.1 plant. This generally yellow, annual Asteraceae, is simple or branched, erect, and grows to <60 cm. Leaves are opposite, 4-15 cm., involucre 5-10 mm, with 10-14 phyllaries, fused and glabrous. Ray flowers are typically 7-15, disk flowers, many. The fruit is warty to hairy. Habitats of Coulter's Goldfields include the southern Outer South Coast Ranges (s SCoRO), the South Coast (SCo), and the northern Channel Islands (n ChI) (Santa Rosa Island) floristic provinces. The closest reported occurrence by the CNDDB is about eleven and one-half (11.5) miles south of the project.

No lasthenia was identified on the project site.

5.1.13 *Layia heterotricha*, the Pale-Yellow Layia, has no state or federal agency listing. It is a CNPS 1B.1 plant. It is typically found in alkaline or clay soil of the Pinyon-Juniper Woodland and in valley and foothill grasslands. The Pale-Yellow Layia is a typical annual layia plant, 13-90 cm tall with white to cream-colored ray flowers and yellow disk flowers. It is differentiated from other species by the apple or banana-scented odor and the 4-6.5 mm fruit with a disk pappus of 14-20 deciduous bristles. The closest known location is reported about nine (09) miles northwest of the site.

No pale-yellow layia-like plant was found on the project site.

5.1.14 *Layia munzii*, Munz's tidy-tips, has no federal or state listing but is listed as 1B.2 by CNPS. This aster plant is decumbent to erect, 1 to 50 cm. It has yellow, white tipped ray flowers and purple anthers in the disk flowers and blooms in March and April. It normally grows on alkaline clay soils below 2000 feet. Although populations still exist on the Carrizo Plain, the occurrences in Kern County have been listed by the Endangered Species Recovery Program (ESRP) as destroyed by agriculture. The closest reported location is about ten (10) miles southwest of the project site.

No layia was observed on the project.

5.1.15 *Lepidium jaredii* ssp. *jaredii*, Jared's peppergrass, has no federal or state listing. It is a CNPS 1B.2 plant. This 10 to 70 cm, yellow flowered peppergrass has narrow leaves occasionally with few teeth on the margins. Flowers are generally to 3 mm. with fruits 3 to 4 mm. It blooms between March and May in heavy clay or sandy soils. Multiple small flowers are distributed along near the ends of each branch. The soils of the site are not typical of the habitat of the species. The closest reported location is about nine (09) miles southwest of the project.

No evidence of Jared's peppergrass was observed on site.

5.1.16 *Madia radiate*, showy madia, has no federal or state listing. It is tracked by the CNDDB as a CNPS 1B.1 plant. This plant is an annual tarweed from 1 to 9 dm. occurring below 900 m. on grassy slopes. It is simple below and branched above. Typical of tarweeds, the stems are ascending and glandular. Glands are yellow to brown. Ray flowers are golden yellow. The closest reported location is about twelve and one-half (12.5) miles southwest of the site.

No evidence of showy madia was observed on site.

5.1.17 *Monolopia congdonii*, the San Joaquin woolythreads, is not listed by the state but is listed as endangered by the federal government and is a CNPS 1B.2 plant. This is a rather inconspicuous composite that grows to 30 cm and has yellow ray and disk flowers and is loosely woolly. The leaves are linear to oblanceolate with the lower leaves lobed. It is found on alkaline or loamy plains and blooms in March and April. The San Joaquin woollythreads were most recently observed Steven Pruett and botanist Randi McCormick in May 2008 in the foothills west of Kettleman City. The nearest reported location is about seven (07) miles northeast of the survey area.

No San Joaquin woollythreads were found on the project site.

5.1.18 *Stylocline citroleum*, oil neststraw, has no federal or state listing. It is a CNPS 1B.1 plant. It is found on clay soils in oil producing areas. The oil neststraw is a typical neststraw plant, an annual with generally grayish, cobwebby stems. The leaves are simple, alternate, and generally elliptical to oblanceolate and entire. It is differentiated from *S. gnaphaloides*, the everlasting neststraw, by a larger disk ovary and larger pappus bristles. The closest known location is about eight (08) miles east of the site near McKittrick.

No evidence of the oil neststraw was observed on site.

5.1.19 *Viola aurea*, golden violet, has no federal or state listing but is a CNPS 2.2 plant. The golden violet is a grayish loose perennial with a deep vertical root and stems to 6 centimeters high. The leaves are rounded to lance-ovate. The flowers are typical violet flowers with yellow petals 8-13 mm long. The three lower petals have brown veins, the two lateral petals have thick hair, and the upper two are brown or purple outside. It is differentiated from the *V. purpurea* by the much smaller peduncle on the golden violet. The closest reported location is about five (05) miles northwest of the project area at the summit of the Temblor Mountains.

The golden violet is normally found in the pinyon-juniper woodland. No such habitat exists on the project site. The closest known occurrence is near the summit of the Temblor Mountains, collected by Twisslemann in 1955 at an elevation of 3200 feet. No typical golden Violet habitat exists on the project site.

No golden violets were found on the project site.

5.2 Sensitive Animals: Twenty-four (24) sensitive animal species were listed by the CNDDB or are known to occur in the vicinity of the project: *Actinemys marmorata pallida*, southwestern pond turtle; *Ammospermophilus nelsoni*, Nelson's antelope squirrel; *Antorzous pallidus*, pallid bat; *Asio otus*, long-eared owl; *Athene cunicularia*, burrowing owl; *Branchinecta campestris*, pocket pouch fairy shrimp; *Branchinecta longiantenna*, longhorn fairy shrimp; *Branchinecta lynchi*, vernal pool fairy shrimp; *Charadrius montanus*, mountain plover; *Dipodomys ingens*, giant kangaroo rat; *Dipodomys nitratoides brevinasus*, short-nosed kangaroo rat; *Dipodomys nitratoides nitratoides*, Tipton kangaroo rat; *Eumops perotis californicus*, western mastiff bat; *Falco mexicanus*, prairie falcon; *Gambelia sila*, blunt-nosed leopard lizard; *Lasiurus cinereus*, hoary bat; *Masticophis flagellum ruddocki*, San Joaquin whipsnake; *Onychomys torridus tularensis*, San Joaquin pocket mouse; *Perognathus inornatus inornatus*, San Joaquin pocket mouse; *Protodufourea zavortinki*, Zavortink's protodufourea bee; *Spea hammondii*, western spadefoot; *Taxidea taxus*, American badger; *Toxostoma lecontei*, Le Conte's thrasher; and *Vulpes macrotis mutica*, San Joaquin kit fox.

No evidence of these sensitive animal species was noted during field reconnaissance. No evidence of any other, sensitive animal species was noted on the proposed project during the survey period.

San Joaquin kit fox and burrowing owls are highly vagile species' occurring throughout the San Joaquin Valley and bordering foothills. Although no evidence of either of these species was observed during field reconnaissance, the likelihood exists that either species may forage within the survey boundaries or den or utilize burrows on the site at times. No Nelson's antelope squirrels, kangaroo rat species', or mouse species' were observed during the daylight surveys conducted for this report. Small mammal burrows were noted on the site.

No focused animal surveys were requested for the preparation of this report. No live trapping was conducted. No night spotlighting was conducted or scent stations established. Sensitive bird species specifically listed by federal or state regulating agencies or otherwise protected under the Migratory Bird Treaty Act, may forage on or in the vicinity of the proposed project.

5.2.1 *Actinemys marmorata pallida*, southwestern pond turtle, has no federal or state listing but is considered a Species of Concern by the CDFG. This small turtle inhabits permanent or nearly permanent bodies of water below 6000 ft. Location of the southwestern pond turtle is typically suppressed by the CDFG. One occurrence is listed on the database about sixteen (16) miles southwest of the site and is shown as "tule pond, within Barrett Creek drainage, in the Chimineas Unit of Carrizo Plain Ecological Reserve."

Since this turtle is thoroughly aquatic, no suitable habitat for the southwestern pond turtle exists on the project

5.2.2 *Ammospermophilus nelsonii*, Nelson's antelope squirrel, San Joaquin antelope squirrel, has no federal listing. It is listed by the state has threatened. This small squirrel of the western and southern areas in the Tulare Basin and San Joaquin Valley is easily distinguished from the California ground squirrel by it's much smaller size, about 220 to 240 mm., smaller, flatter tail, and light colored stripes along the sides of the body. When running, this small squirrel will also carry its tail over its back showing a white to grayish underside. Its current range and distribution are considered greatly reduced as a result of agricultural development

of the San Joaquin Valley (Williams, 1997). The closest reported occurrence is about seven and one-quarter (7.25) miles east of the site.

Nelson's antelope squirrels have been observed by the author about miles five miles east of the project.

5.2.3 *Antrozous pallidus*, pallid bat, has no federal or state listing, but is designated as a species of concern by the California Department of Fish and Game. In comparison to other North American bat species, the pallid bat has comparatively larger eyes with wide, pale colored, ears. Pelage varies from pale to light brown dorsally with white on the venter. This species may range in size up to 5.3 inches long with a wingspan up to 15 inches. This species inhabits a broad range of habitats including grasslands and woodlands of low elevations up to coniferous forests at higher elevations. Flight patterns are generally lower, less than 8ft, during feeding and foraging, with many prey species' taken at ground level. Roosts are generally located in dry rocky areas and the members of populations are normally colonizing. The closest reported occurrence is about nine (09) miles northwest of the proposed project.

No pallid bat was observed within the project boundaries during the survey period. No dawn or dusk surveys were conducted as a part of this report.

5.2.4 *Asio otus*, long-eared owl, has no federal or state listing, but is designated as a species of concern by the California Department of Fish and Game. Long-eared owls are medium sized owls with females larger than males on average. Sizes can range up to 15.7 inches with mass around 15.3 ounces. Coloration is brownish gray with vertical streaks, a white patch below the bill, and pale patches appearing to be eyebrows. Legs and feet are feathered and females can be somewhat darker and more distinct in coloration. This species is mostly nocturnal with hunting taking place mostly in open areas with prey consisting of mostly smaller vertebrates including voles and similar rodents. Long-eared owls inhabit areas of dense canopies and may be in decline due to habitat alteration in riparian areas and oak woodlands resulting from agriculture and urban development. The closest reported location is about seventeen (17) miles southwest of the survey area.

No long eared owl was observed during field reconnaissance of the project site.

5.2.5 *Athene cunicularia*, the burrowing owl, is an easily identifiable, small owl, active both night and day, which lives in the ground in abandoned holes of other animals such as the California ground squirrel. Burrowing owls are neither endangered nor threatened by either state or federal agencies but have CDFG Special Concern status (SC) and are protected by the Migratory Bird Treaty Act. The closest known location is about nine (09) miles northeast of the site.

No burrowing owls or potential owl burrows were observed within the project boundaries.

5.2.6 *Branchinecta campestris*, pocket pouch fairy shrimp, has no federal or state listing. It is a typical fairy shrimp of ephemeral water bodies. Adults are about 16 to 30 mm in length. The closest reported location is about ten (10) miles southwest in Soda Lake, Carrizo Plain. No suitable vernal pools exist on the site to support the fairy shrimp.

5.2.7 *Branchinecta longiantenna*, longhorn fairy shrimp, is federally listed as endangered but has no state standing. This is also a typical fairy shrimp of ephemeral water bodies. Adults are about 12.1 to 20.8 mm in length. The two nearest known populations exist on Soda Lake and the Carrizo Plain. The closest reported location is about ten (10) miles southwest in Soda Lake, Carrizo Plain. The location information is typically suppressed by CDFG. One location is shown about eleven (11) miles south/southwest of the site.

No suitable ephemeral pools exist on the site to support the fairy shrimp.

5.2.8 *Branchinecta lynchi*, vernal pool fairy shrimp, is federally listed as threatened but has no state listing status. Another typical fairy shrimp about 1 to 1.5 inches in length. The closest reported location is about eleven (11) miles south/southwest of the site along Cambria Road, 0.1 miles south of Belmont Trail Road.

No suitable ephemeral pools exist on the site to support the fairy shrimp.

5.2.9 *Charadrius montanus*, mountain plover, has no federal or state listing, but is a CDFG species of concern. The mountain plover is an 8-9.5 in., small killdeer-type bird with no breast rings, and similar to the American golden plover. Habitat types of the mountain plover include semiarid grasslands, plains, and plateaus. The nearest reported occurrence is about five miles west of the project. The closest reported location is about nine (09) miles south of the site NE of the intersection of Elkhorn Road and Simler Soda Lane on the Carrizo Plain Ecological Reserve.

No mountain plover were observed during field reconnaissance.

5.2.10 *Dipodomys ingens*, giant kangaroo rat, is both federally and state listed as endangered. *D. ingens* is by far the largest species of the genus *Dipodomys*, with a mean mass of about 151 grams for females and 157 rams for males. Originally described by Merriam (1904), the giant kangaroo rat is adapted for bipedal locomotion with hind feet in excess of 47 mm. The head is large and flattened, forelimbs short, and tail longer than the combined head and body length. Current distribution in Kern County is recognized as western Kern in the areas of Lokern, Elk Hills, McKittrick, and Taft. The nearest reported CNDDB occurrence is about five and one-quarter (5.25) miles southwest of the project.

No giant kangaroo rats or burrows typical of the species were observed during field reconnaissance. No trapping was conducted as a part of this report.

5.2.11 *Dipodomys nitratoides brevinasus*, short-nosed kangaroo rat, short-nosed kangaroo rat, has no federal or state listing. It is a CDFG species of concern. Currently *D. n. nitratoides* cannot be differentiated from *D. n. brevinasus* either physically, or by DNA comparison. Personal communication with Dr. Dan Williams, California State University, Stanislaus, and Dr. David Germano, California State University, Bakersfield, further concludes that individuals found east of the California Aqueduct in Valley Sink Scrub conditions are generally accepted to be *D. n. nitratoides* while populations west of the Aqueduct along the foothills are generally accepted to be *D. n. brevinasus*. Positive identification is impossible without close, in-hand inspection. The closest reported occurrence is about eight miles

northeast of the site.

No short-nosed kangaroo rats were observed during field reconnaissance. No trapping was conducted as a part of this report.

5.2.12 *Dipodomys nitratoides nitratoides*, the Tipton kangaroo rat, is listed as endangered by both the state and federal government. The *D. n. nitratoides* is diagnostically differentiated from other Dipodomys by the absence of a fifth hind toe. Currently *D. n. nitratoides* cannot be differentiated from *D. n. brevinasus* either physically, or by DNA comparison. Personal communication with Dr. Dan Williams, California State University, Stanislaus, and Dr. David Germano, California State University, Bakersfield, further concludes that individuals found east of the California Aqueduct in Valley Sink Scrub conditions are generally accepted to be *D. n. nitratoides* while populations west of the Aqueduct along the foothills are generally accepted to be *D. n. brevinasus*. Positive identification is impossible without close, in-hand inspection. The closest reported occurrence is about nine (09) miles southwest of the survey area.

No Tipton kangaroo rats were observed during field reconnaissance. No trapping was conducted as a part of this report.

5.2.13 *Eumops perotis californicus*, western mastiff bat, has no federal or state listing but is considered a species of concern by the CDFG. It is North America's largest bat and is easily distinguished from other free tail bat species given its forearm, reaching 73-83 mm. Because this species is primarily cliff dwelling no focused surveys for the western mastiff bat were conducted for the preparation of this report. No suitable nesting sites for the western mastiff bat were indentified on the subject property. The nearest reported location is about eleven and one-half (11.5) miles north of the site, about ten miles north of McKittrick.

No bats were observed within the project boundaries during the survey period. No dawn or dusk surveys were conducted as a part of this report.

5.2.14 *Falco mexicanus*, prairie falcon, has no federal or state listing but is considered a Species of Concern by the CDFG. The prairie falcon is raptor of dry grasslands, sagebrush flats, and deserts and usually nesting on cliff edges. Similarly shaped to the peregrine falcon, it is brown overall with a narrow, dark whisker mark. Location information on the prairie falcon is suppressed by CDFG.

No prairie falcons were observed during field reconnaissance. No suitable nesting habitat for the prairie falcon was noted on the project.

5.2.15 *Gambelia sila,* the blunt-nosed leopard lizard, is listed as endangered by both the state and federal agencies. The blunt-nosed leopard lizard is a large, easily identifiable reptile found throughout the southern San Joaquin Valley and the surrounding foothills. Urbanization and agriculture development have greatly reduced the best habitat for the species. This large lizard, 12-15 inches long including the tail, has prominent leopard-like spots and lighter colored cross bands or bars on its back and tail. It is often observed running bipedal. The closest reported occurrence is about seven (07) miles NE of the project site.

No blunt-nose leopard lizards were observed during surveys conducted for this report. Protocol level searches for the blunt-nose leopard lizard were not conducted as a part of this biological assessment. The site does not contain good habitat for the species.

5.2.16 *Lasiurus cinereus*, hoary bat, has no federal or state listing. It is considered a Species of Concern by the CDFG. It is the most widespread of North American bats. Hoary bats are solitary. They primarily roost in the foliage of coniferous and deciduous trees. No suitable roosting habitat exists on the proposed project. The closest reported occurrence is about nine (09) miles northwest of the site.

No bats were observed within the project boundaries during the survey period. No dawn or dusk surveys were conducted as a part of this report.

5.2.17 *Mastochophis flagellum ruddocki*, San Joaquin whipsnake, has no federal or state listing. It is a CDFG species of concern. It is a smoothed-scaled, slender snake, with large eyes. Generally a tan-yellow to olive dorsal without lengthwise stripes, and a straw yellow ventral with pinkish to orange under the tail, this snake ranges in size from 90-155 cm. Habitat of the San Joaquin whipsnake includes valley grassland and saltbush scrubs and other open, dry vegetative areas with little or no tree cover. The closest report location is about 5 miles south of the project. The closest reported occurrence is about five (05) miles west of the project area.

No whipsnakes were observed during field reconnaissance.

5.2.18 *Onychomys torridus tularensis*, Tulare grasshopper mouse, has no state or federal listing. It is tracked by the CNDDB as a CDFG species of concern. This mouse is described as stout bodied, with a body length of about 119 to 163 mm. Typically the coat is pale-brown to gray or pinkish cinnamon with white underparts characteristically different. The Tulare grasshopper mouse can be distinguished from coexisting white-footed mice by its shorter, club-like tail, 33 -62 mm, and larger forefeet. The nearest reported occurrence is about five miles south of the project, east of Enos Lane, about 0.8 miles northwest of where Highway 119 crosses Interstate 5. The closest reported occurrence is about five (05) miles west of the site.

No mice were observed during the survey period. No live trapping was conducted as a part of this biota report.

5.2.19 *Perognathus inornatus inornatus*, San Joaquin pocket mouse, the San Joaquin pocket mouse, has no state or federal listing. It is a CDFG species of concern. This member of the pocket mouse family is a small, 15-18 gram, buff-orange mouse with an indistinct lateral line. It occurs in grasslands and scrub between about 350 and 600m. The nearest recorded listing by the CNDDB is a 2003 occurrence reported by Dr. David Germano, about two miles east of the project. The closest reported occurrence is about five and one-half (5.5) miles west of the site.

No mice were observed during the survey period. No live trapping was conducted as a part of this biota report.

5.2.20 *Protodufourea zavortinki*, Zavortink's protodofourea bee, has no federal or state listing. The closest reported occurrence is about three (03) miles northwest of the site at Temblor Creek.

No focused surveys for insect species were requested or conducted for the preparation of this report.

5.2.21 *Spea hammondii*, western spadefoot, has no federal or state listing, but is a CDFG species of concern. Members of the genus *Scaphiopus* are found only in the Western Hemisphere and are distinguished from true toads by their catlike eyes (vertical pupils), and a single black, sharp-edged "spade" on each hind foot, teeth in the upper jaw and a relatively smooth skin. This species normally requires vernal-like pools for breeding and egg laying.

The Western Spadefoot is a 1 ½ to 2 ½ inch animal, dusky gray or green above with four irregular light stripes down the back and no cranial boss between the eyes. It ranges throughout the Central Valley and adjacent foothills, below 4500 feet. It occurs primarily in grasslands but has been known to persist for a few years in orchards. They are active at night during rains or high humidity. Adults stay in underground burrows during most of the year. Breeding occurs in March. Tadpoles transform in late spring and disperse after spending a few hours or days near the pond margins. The closest reported occurrence is about five and a half miles east of the project site. The closest reported occurrence is about ten miles west of the survey area, about three miles north of the junction of Seven-Mile Road and Soda Lake Road.

No western spadefoot were observed during field reconnaissance. The potential for occurrence of the western spadefoot is unlikely given the lack of suitable ponds, necessary for breeding.

5.2.22 *Taxidea taxus*, the American badger, has no state or federal listing but is tracked by the CNDDB as a CDFG species of concern. The American badger is a heavy-bodied (13 to 25 lb.), short-legged mammal, yellowish-gray with a median white stripe from the nose over the top of its head. With a body length of about 18 to 22 inches, it has white cheeks with a black spot in front of each ear. The closest reported occurrence is about nine and one-half (9.5) miles northeast of the site.

No evidence of badger was identified on the project site.

5.2.23 *Toxostoma lecontei*, Le Conte's thrasher, has no threatened or endangered status by either federal or state agencies but is listed as an animal of special concern by the CDFG. It is a large, very pale thrasher of the desert with a dark tail and dark eyes. The California thrasher is much darker and the curve-billed thrasher has a slightly spotted breast. The Le Conte's thrasher often nests in thorny bushes. The closest known occurrence is about five miles southwest of the project site. The closest reported occurrence is about four (04) miles east of the project area in the Temblor Valley area.

No thrasher like bird was observed on the project site.

5.2.24 *Vulpes macrotis mutica*, the San Joaquin kit fox, is listed as endangered by the federal

agencies and as threatened by the state. This small dog relative is known to inhabit the general area and is easily identified by its small size (cat size), bushy black tipped tail, and extremely large ears. It is a nocturnal predator and can be identified by the typical green eye shine at night. Scat from the kit fox is typically 10-15 mm in diameter, of varying lengths, and almost always contains hair, and usually small fragments of prey bones and insect parts. The closest reported occurrence is about three and one-half (3.5) miles east of the site.

No kit fox were observed on the site. No potential kit fox dens were noted within the project boundaries during field reconnaissance. San Joaquin kit fox are highly vagile species occurring throughout the San Joaquin Valley and bordering foothills. Although no evidence of this species was observed during field reconnaissance, the likelihood exists that this species may forage within the survey boundaries or den on the site at times.

6. PROJECT POTENTIAL IMPACTS: 240± ACRES, SECTION 07, T30S, R21E, MDB&M.

6.1 Because no evidence of any sensitive plant species listed by state and/or federal regulatory agencies was found on the project site during field reconnaissance, no direct or indirect impacts to any sensitive plant species are expected to occur as a result of the development of this project.

6.2 Because no riparian or wetlands habitat exists within the proposed project boundaries, development of this project will not result in the loss of any riparian or wetlands habitat.

6.3 Because no large trees suitable for raptor nesting exist on the project site, development of this site will not result in direct impacts to raptor nesting sites.

6.4 Because no wildlife corridors or nursery sites were identified on the project site, no direct or indirect impacts to wildlife corridors or wildlife nursery sites are expected to occur as a result of the development of this project.

6.5 Because the site is comprised of relatively undisturbed habitat, development of this project will result in the loss of relatively undisturbed habitat.

6.6 Because sensitive animal species' listed by state and/or federal regulatory agencies are known to occur in the vicinity of the project site, indirect and impacts in the form of loss of foraging habitat associated with an endangered, threatened, sensitive, or otherwise protected animal species, may occur as a result of the development of this project.

6.7 Because sensitive animal species' listed by state and/or federal regulatory agencies are known to occur in the vicinity of the project site, direct impacts in the form of "incidental take" an endangered, threatened, sensitive, or otherwise protected animal species, may occur as a result of the development of this project.

7. RECOMMENDED MITIGATION MEASURES: 240± ACRES, SECTION 07, T30S, R21E, MDB&M.

Mitigation measures are used when it is impossible or unfeasible to avoid adverse impact to the biological resources. Mitigation measures should reduce, offset, or compensate for adverse impacts. The authors believe that the following measures will avoid, or reduce to less than significant, adverse impact to the biological resources found on the project site. These recommendations are not binding but represent the best biological judgment of the authors. The final decisions on avoidance and mitigation measures rest with the permitting and reviewing agencies: City of Bakersfield, County of Kern, California Department of Fish and Game, and the United States Fish and Wildlife Service.

7.1 It is recommended that a preconstruction clearance survey be conducted within 30 days of initial ground disturbance. It is recommended that any potential, inactive, or active kit fox dens or burrowing owl sites identified as unavoidable, be monitored, excavated, and backfilled in accordance with all guidelines, protocols, and other provisions of the CDFG, the USFWS, the Migratory Bird Treaty Act, Endangered Species Act, and California Endangered Species Act.

7.2 It is recommended that a "tailgate" session for all construction personnel be conducted by a qualified biologist, prior to initial ground disturbance, relative to all environmental federal, state, and local law. It is recommended that all construction personnel be trained in sensitive species identification and avoidance techniques and be instructed to be on the lookout for sensitive species sign during earth disturbance phases of construction. Any evidence, such as activity, dens, or burrows, observed at any time during construction, shall be promptly reported to the reviewing agencies for resolution.

7.3 It is recommended that all pipes, culverts, or similar structures with a diameter of four inches or greater shall be kept capped to prevent entry of kit fox. All structures not capped or otherwise covered, shall be inspected prior to burial or closure to ensure no kit fox, or other protected species become entrapped.

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APPENDIX A. VEGETATION BASELINE SURVEY DATA
240± ACRES, SECTION 07, T30S, R21E, MDB&M.

On 19 April and 31 May 2008, nine Vegetation Baseline Survey Plots were established on the project site in Section 07, T30S, R21E, MDM, west of McKittrick, County of Kern, California. The Vegetation Base Line Survey Plots consisted of a one (1) meter square plot nested inside a sixteen (16) meter square plot nested inside a 100 meter square (one hectare plot).

The vegetation density, cover, and species richness of naturally occurring habitats was documented in these baseline studies as required by paragraph 3705 (a) of the Surface and Mining and Reclamation Act of 1975, Public Resources Code, Division 2, Chapter 9, Section 2710 et seq. Herb species and number were counted within the 1 meter square nested plots. Shrub species and number were counted within the 16 meter square plots. Tree species and number were counted within the 1 hectare plots. Shrub species were noted within the 16 meter square plots. No trees exist on the project site; therefore, none were measured or plotted. Visual Percentage Estimations of Vegetation Cover Transects were conducted by walking ten 100 foot transects in typical vegetation within the survey areas and visually estimating the percent of cover.

The Vegetation Baseline Survey Plots and the Vegetation Cover Transect locations were chosen at random in what appeared to be typical vegetation of the project. An average of 4.3 herbaceous plants was found within the 1 square meter plots. Two shrub species were identified within the 16 meter square plots.

Table 5 lists the herbaceous species and the number of individual plants per 1 square meter plot. Vegetative Density is the number of individual plants rooted within a given reference area. Herb density is 429.33 herbs/square meter. Table 6 shows the shrub species and number per 16 meter square plot. Shrub density is 1.44 shrubs/square meter. Tree density is 0.00 trees/hectare.

Vegetative Cover means the vertical projection of the crown of shoot area of a species to the ground surface area expressed as a percentage. Table 7 contains the data of the Visual Percentage Estimation for Vegetative Cover. The average Vegetative Cover Visual Percentage Estimations of the sites consist of 0.0 % trees, 0.3 % shrubs, 87.0 % herbs, and 13.0 % bare. Ten vegetation cover transects were conducted. Each transect was 100 feet long and the vegetation cover was visually estimated.

Vegetative species-richness is the number of different plant species in a given reference area. The average vegetative species-richness consists of 3.8 species within the 0.25 one square meter plots, 4.3 species within one square meter plots.

TABLE 5. HERB VEGETATION DENSITY.

Herbs (1m x 1m plot) Plot A
N35^0 19.888' W119^0 45.893'

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Aveena barbata	40	68	37	43	188
Bromus madritensis ssp. *rubens*	18	12	23	09	62
Erodium cicutarium	00	01	02	00	03

Total **253 herbs/square meter**

Herbs (1m x 1m plot) Plot B
N35^0 19.997' W119^0 45.814'

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Amsinckia menziesii	03	06	05	04	18
Bromus diandrus	34	58	46	26	164
Bromus hordeaceaus	04	01	01	00	06
Erodium cicutarium	08	13	06	08	35
Hordeum murinum	03	08	04	08	23

Total **246 herbs/square meter**

Herbs (1m x 1m plot) Plot C
N35^0 20.113' W119^0 45.695'

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Aveena barbata	01	01	01	00	03
Amsinckia menziesii	07	07	06	06	26
Bromus madritensis ssp. *rubens*	37	54	43	46	180
Erodium cicutarium	12	09	19	36	76

Total **285 herbs/square meter**

Herbs (1m x 1m plot) Plot D
N35^0 20' 01.1" W119^0 46' 08.6"

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Bromus madritensis ssp. *rubens*	47	74	70	33	224
Erodium cicutarium	02	06	06	04	18
Eremocarpus setigerus	11	06	06	00	23
Vulpia myuros	06	07	04	05	22

Total **287 herbs/square meter**

Herbs (1m x 1m plot) Plot E
N35^0 19' 59.5" W119^0 46' 08.1"

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Bromus hordeaceaus	10	45	03	03	61
Bromus madritensis ssp. *rubens*	04	02	03	03	12
Hordeum murinum	250	250	180	185	865
Sisymbrium irio	00	00	00	01	01

Total **939 herbs/square meter**

Herbs (1m x 1m plot) Plot F
N35^0 20' 03.5" W119^0 46' 12.1"

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Bromus madritensis ssp. *rubens*	22	87	43	20	172
Erodium cicutarium	56	65	82	73	276

Total **448 herbs/square meter**

Herbs (1m x 1m plot) Plot G
N35^0 20' 04.0" W119^0 46' 14.5"

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Aveena barbata	00	01	01	02	04
Amsinckia menziesii	41	15	30	48	134
Bromus hordeaceaus	04	03	10	09	26
Erodium cicutarium	60	66	83	78	287
Linanthus sp.	04	22	04	07	37
Lupinus microcarpus	00	00	00	01	01

Total **489 herbs/square meter**

Herbs (1m x 1m plot) Plot H
N35^0 19' 43.2" W119^0 45' 42.2"

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Aveena barbata	00	01	00	00	01
Amsinckia menziesii	02	07	01	00	10
Brassica nigra	00	00	01	00	01
Bromus madritensis ssp. *rubens*	83	138	130	55	406
Erodium cicutarium	86	105	57	58	306

Total **724 herbs/square meter**

Herbs (1m x 1m plot) Plot I
N35^0 20' 01.1" W119^0 46' 08.6"

Scientific Name	Quarter				
	NW	NE	SW	SE	Total
Amsinckia menziesii	08	02	04	12	26
Brassica nigra	01	00	00	01	02
Bromus diandrus	11	11	14	08	44
Bromus hordeaceaus	04	11	19	09	43
Erodium cicutarium	08	39	07	18	72
Lupinus microcarpus	03	01	01	01	06

Total **193 herbs/square meter**

AVERAGE HERB DENSITY = 429.33 herbs/square meter

TABLE 6. SHRUB VEGETATION DENSITY.

Shrubs (16m x 16m plot) Plot C

Scientific Name	Total
Astragalus oxyphysus	01
Total Shrubs	**01/16m x 16m**

Shrubs (16m x 16m plot) Plot H

Scientific Name	Total
Isocoma acradenia var. *bracteosa*	12
Total Shrubs	**12/16m x 16m**

AVERAGE SHRUB DENSITY = 0.10 Shrubs/Square Meter

TABLE 7. VEGETATION COVER TRANSECT VISUAL PERCENTAGE ESTIMATIONS.

TRANSECT	%TREES	%SHRUBS	%HERBS	%BARE
1	0	0	90	10
2	0	0	95	05
3	0	<1	80	20
4	0	0	85	15
5	0	0	70	30
6	0	<1	95	05
7	0	0	80	20
8	0	0	95	05
9	0	<1	90	10
10	0	0	90	10
AVERAGE	**0.0%**	**0.3%**	**87.0%**	**13.0%**

Note: Total may exceed 100%. Shrubs, herbs, and bare ground may be under the vertical projection of a tree crown cover, etc.

TABLE 8. AVERAGE NUMBER OF SPECIES PER AREA WITHIN VEGETATION BASELINE SURVEY PLOTS

AREA	NUMBER OF SPECIES
1/4 sq m	3.8
1 sq m	4.3

APPENDIX B. PARTICIPANTS
240± ACRES, SECTION 07, T30S, R21E, MDB&M.

BIOLOGIST	EDUCATION	PROJECT RESPONSIBILITY
Arnold, Ken	BS, Biology CSU Bakersfield	Field Biologist
Chapman, William J.	BS, Gen Sci Adams State College M.Ed. University of LaVerne	Field Biologist
Cluff, Greg	BS, Botany, UNLV MS, Crop Science UN Reno PhD, NM St. University, Agronomy	Plant Taxonomy Field Biologist
Gletne, Jeff	BS, UC Berkeley Registered Professional Forester	Field Biologist
Gletne, John	Senior, Surveying/GIS CSU Fresno	Field Biologist
Pruett, Paul E.	BA, UC Berkeley MS, NC State LLB, LaSalle Univ. CWB, TWS	Project Manager Wildlife Biologist
Pruett, Steven P.	BA, Business CSU Bakersfield MEd, University of La Verne	Field Biologist Office Manager

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APPENDIX B.

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DEPARTMENT OF FISH AND GAME
Central Region
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CHARLTON H. BONHAM, Director

August 27, 2012

Randall Cates
Kern County Planning and
Community Development Department
2700 "M" Street, Suite 100
Bakersfield, California 93301

Subject: Early Consultation
G.F. Industries Pacific Industrial Minerals, LLC
Cooper (Stanley) Thiess (Robert) CUP No. 17 Map No. 117
PP 12316 (156-070-01, 02, and 10)

Dear Mr. Cates:

The California Department of Fish and Game (Department) has reviewed the early consultation request for the above Project. Approval of the Project would allow for a 93.67-acre surface mining operation of diatomaceous earth and development of a reclamation plan on approximately 331 acres in accordance with the Surface Mining and Reclamation Act (SMARA) of 1975. Current estimates of material to be removed include a maximum of 400,000 tons annually, for a maximum total of 8,000,000 tons of material over the estimated 20-year life of the operation. Three mine areas are proposed to consist of one single phase. The proposed maximum depth of operation is approximately 225-feet for mine area 1, 188-feet for mine area 2, and 137-feet for mine area 3. Operational and final reclaimed slopes would be at a maximum 2:1 slope. Water would be obtained from a nearby well owned by the Project proponent and conveyed to the Project site via truck. Access to the site is obtained via Highway 58. The Project site is located 8.5 miles west of McKittrick on the north and south sides of Highway 58 in Kern County.

The Department is aware that the recommended date for submittal of written comments has passed; however, the Department has identified areas where biological resources could potentially be impacted by the implementation of the Project and would like to offer recommendations on avoidance and minimization measures. We hope that you will consider our comments in light of the late response.

Specifically, the Department is concerned that Project-related activities and on-going mining such as described above could result in impacts to special-status species known to occur in the Project area including, but not limited to, nesting birds; the State and

federally endangered giant kangaroo rat (*Dipodomys ingens*), California jewel-flower (*Caulanthus californicus*), and blunt-nosed leopard lizard (*Gambelia sila*) which is also a State fully protected species; the State threatened and federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*); the State threatened San Joaquin antelope squirrel (*Ammospermophilus nelsoni*); the federally endangered (*Eremalche kernensis*), and San Joaquin woollythreads (*Monolopia congdonii*); the federally proposed threatened and State Species of Special Concern mountain plover (*Charadrius montanus*); the State Species of Special Concern silvery legless lizard (*Anniella pulchra pulchra*), pallid bat (*Antrozous pallidus*), burrowing owl (*Athene cunicularia*), long-eared owl (*Asio otus*), short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*), western mastiff bat (*Eumops perotis californicus*), loggerhead shrike (*Lanius ludovicianus*), San Joaquin whipsnake (*Masticophis flagellum ruddocki*), San Joaquin pocket mouse (*Perognathus inornatus*), Tulare grasshopper mouse (*Onychomys torridus tularensis*), coast horned lizard (*Phrynosoma blainvillii*), American badger (*Taxidea taxus*), Le Conte's thrasher (*Thamnophis gigas*), the California Rare Plant Rank 1B.1 listed round-leaved filaree (*California macrophylla*), Tejon poppy (*Eschscholzia lemmonii* spp. *kernensis*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), Coulter's goldfields (*Lasthenia glabrara* ssp. *coulteri*), pale-yellow layia (*Layia heterotricha*), showy golden madia (*Madia radiata*), and oil neststraw (*Stylocline citroleum*); the California Rare Plant Rank 1B.2 listed heartscale (*Atriplex cordulata*), Lost Hills crownscale (*Atriplex coronata* var. *vallicola*), Lemmon's jewelflower (*Caulanthus lemmonii*), recurved larkspur (*Delphinium recurvatum*), Temblor buckwheat (*Eriogonum temblorense*), Munz's tidy tips (*Layia munzii*), and Jared's peppergrass (*Lepidium jaredii* ssp. *jaredii*); and the California Rare Plant Rank 4.2 which was also federally delisted Hoover's eriastrum (*Eriastrum hooveri*). All these species are known to occur on or in close proximity to the subject site.

The Department recognizes that biological reconnaissance surveys where conducted on the Project site by Paul Pruett and Associates on April 19 and May 31 of 2008 (Pruett, 2008). Even though special-status species were not seen during these two survey days, the survey report does state that no focused animal surveys were requested for the preparation of the report and accordingly, none were conducted. It was noted by the consulting biologists that small mammal burrows are present within the Project site. The resulting Biota Report (Pruett, 2008) does include a few recommended mitigation measures, but does not include measures that would guide the Project proponent to implement avoidance of special-status species. If full avoidance of State-listed species is not feasible and "take" could occur as a result of Project implementation, acquisition of a State Incidental Take Permit (ITP) would be warranted.

Therefore, in addition to the mitigation measures provided in the Biota Report for the Project (Pruett, 2008), the Department is recommending additional mitigation measures to be included in the CEQA document prepared for the Project. Our recommendations on measures to avoid, minimize, and mitigate project related impacts to special-status biological resources should be included as enforceable mitigation measures in the CEQA document for this Project. Our comments follow.

Department Jurisdiction

Trustee Agency Authority: The Department is a Trustee Agency with responsibility under the California Environmental Quality Act (CEQA) for commenting on projects that could impact plant and wildlife resources. Pursuant to Fish and Game Code Section 1802, the Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, the Department is responsible for providing, as available, biological expertise to review and comment upon environmental documents and impacts arising from project activities, as those terms are used under CEQA (Division 13 [commencing with Section 21000] of the Public Resources Code).

Responsible Agency Authority: The Department has regulatory authority over projects that could result in the "take" of any species listed by the State as threatened or endangered, pursuant to Fish and Game Code Section 2081. If the Project could result in the "take" of any species listed as threatened or endangered under the California Endangered Species Act (CESA), the Department may need to issue an ITP for the Project. CEQA requires a Mandatory Finding of Significance if a project is likely to substantially impact threatened or endangered species (sections 21001(c), 21083, Guidelines sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less than significant levels unless the CEQA Lead Agency makes and supports a Statement of Overriding Consideration (SOC). The CEQA Lead Agency's SOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code Section 2080. The Project has the potential to reduce the number or restrict the range of endangered, rare, or threatened species (as defined in Section 15380 of CEQA).

Unlisted Species: Species of plants and animals need not be officially listed as Endangered, Rare, or Threatened (E, R, or T) on any State or Federal list to be considered E, R, or T under CEQA. If a species can be shown to meet the criteria for E, R, or T, as specified in the CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Section 15380), it should be fully considered in the environmental analysis for the Project.

Fully Protected Species: The Department has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code sections 3511, 4700, 5050, and 5515. "Take" of any fully protected species is prohibited and the Department cannot authorize their "take".

Bird Protection: The Department has jurisdiction over actions which may result in the disturbance or destruction of active nest sites or the unauthorized "take" of birds. Fish and Game Code sections that protect birds, their eggs, and nests include sections 3503 (regarding unlawful "take," possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the "take," possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful "take" of any migratory nongame bird).

Stream Alteration Agreement (SAA): The Department also has regulatory authority with regard to activities occurring in streams and/or lakes that could adversely affect any fish or wildlife resource, pursuant to Fish and Game Code sections 1600 *et seq.* It appears that there could be up to two or more ephemeral drainages within the Project area. The Project proponent should consult with the Department before ground-breaking activities or submit a Stream Alteration Notification to determine if the features are within the Department's jurisdiction and an SAA is required for the proposed activities. The Department is required to comply with CEQA in the issuance or the renewal of an SAA. For additional information on notification requirements, please contact our staff in the Stream Alteration Program at (559) 243-4593.

Potential Project Impacts and Recommendations

Nesting Birds: Nesting birds have the potential to exist on the Project site. If Project-related activities must occur during the breeding season (February through mid-September), surveys for active nests should be conducted by a qualified biologist no more than 30 days prior to commencing Project-related activities. A minimum no-disturbance buffer of 250 feet should be delineated around active nests until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. Avoidance and minimization measures for nesting birds should be fully addressed in the CEQA document prepared for the Project.

Burrowing Owl: Known occurrence records document burrowing owl within 6 miles of the Project site. To avoid impacts to the species, focused surveys should be conducted following the survey methodology developed by the California Burrowing Owl Consortium (CBOC, 1993) well in advance of any ground disturbance associated with Project construction as well as a pre-construction survey effort. If any ground-disturbing

activities will occur during the burrowing owl nesting season (approximately February 1 though August 31), and potential burrowing owl burrows are present within the Project footprint, implementation of avoidance measures are warranted. In the event that burrowing owls are found, the Department's Staff Report on Burrowing Owl Mitigation (CDFG 2012) (Staff Report) recommends that impacts to occupied burrows be avoided by implementation of no-disturbance buffer zones, unless a qualified biologist approved by the Department verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival. Failure to implement the recommended buffer zones could cause adult burrowing owls to abandon the nest, cause eggs or young to be directly impacted (crushed), and/or result in reproductive failure, in violation of Fish and Game Code and the Migratory Bird Treaty Act.

If the Project proposes to evict burrowing owls that may be present, the Department recommends passive relocation during the non-breeding season. The CEQA document should describe all avoidance measures that would be employed in the event that owls are found on the Project site, as well as methods that would be used to evict owls from burrows. The CEQA document should specify how the impact of evicting owls would be mitigated to a less than significant level. The Department's Staff Report on Burrowing Owl Mitigation (CDFG 2012) recommends that foraging habitat be acquired and permanently protected to offset the loss of foraging and burrow habitat. The Department also recommends replacement of occupied burrows with artificial burrows at a ratio of 1 burrow collapsed to 1 artificial burrow constructed (1:1) as mitigation for the potentially significant impact of evicting a burrowing owl.

Blunt-nosed Leopard Lizard (BNLL): Known occurrence records document BNLL within 6.5 miles of the Project site. Because BNLL is fully protected and, therefore, no "take" incidental or otherwise can be authorized by the Department, protocol-level surveys should be conducted prior to any ground-disturbing activities in all areas of suitable habitat following the Department's protocol-level survey methods described in the "Approved Survey Methodology for the Blunt-nosed Leopard Lizard" (DFG, 2004). Suitable habitat includes all areas of grassland and shrub scrub habitat that contains required habitat elements, such as small mammal burrows. These surveys, the parameters of which were designed to optimize detectability, should be conducted to reasonably assure the Department that "take" of this fully protected species will not occur as a result of Project implementation. In the event that this species is detected during protocol-level surveys, consultation with the Department is warranted to discuss how to implement the Project and avoid "take." It is important to note that protocol-level surveys must be conducted on multiple dates during late spring, summer, and fall and that within these time periods there are specific date, temperature, and time parameters which must be adhered to; as a result, protocol-level surveys for this species are not

synonymous with 30-day "pre-construction" surveys often recommended for other wildlife species. The CEQA document prepared for this Project should evaluate and address potential Project-related impacts to BNLL, and should include appropriate avoidance measures.

San Joaquin Antelope Squirrel (SJAS): Known occurrence records document SJAS within 5 miles of the Project site. In order to determine if SJAS occupy the Project site, focused protocol-level surveys would need to be conducted by a qualified wildlife biologist well in advance of any ground disturbance associated with Project construction as well as a pre-construction survey effort. In order to implement full avoidance for SJAS, the Department recommends a minimum 50-foot no-disturbance buffer be employed around all burrows that could potentially be used by SJAS. If the no-disturbance buffer is not feasible or "take" could occur as a result of Project implementation, acquisition of a State ITP would be warranted prior to initiating ground-disturbing activities. Alternatively, the applicant has the option of assuming presence of these species and securing a State ITP. Avoidance, minimization, and mitigation measures for SJAS should be fully addressed in the CEQA document prepared for the Project.

Special-Status Kangaroo Rats: Known occurrence records document giant kangaroo rat (GKR) within 5 miles of the Project site and short-nosed kangaroo rat (SNKR) within 9 miles. In order to determine if GKR or SNKR occupy the Project site, focused protocol-level trapping surveys would need to be conducted by a qualified wildlife biologist that is permitted to do so by both the Department and United States Fish and Wildlife Service (USFWS) well in advance of any ground disturbance associated with Project construction. These surveys must be conducted well in advance of ground-disturbing activities in order to determine if impacts to GKR and SNKR could occur. It is important to note that GKR have been recorded in many new locations this past year demonstrating this species may be undergoing a potential expansion into currently unpopulated habitat patches within its historic known range. In order to implement full avoidance for GKR and SNKR, the Department recommends a minimum 50-foot no-disturbance buffer be employed around all burrows that could be used by these species. If full avoidance is not feasible and "take" could occur as a result of Project implementation, acquisition of a State ITP for GKR would be warranted prior to initiating ground-disturbing activities. Alternatively, the applicant has the option of assuming presence of GKR and securing a State ITP. Mitigation measures for GKR and SNKR should be fully addressed in the MND prepared for the Project.

San Joaquin Kit Fox (SJKF): Known occurrence records document SJKF within 1.5 miles of the Project site. SJKF populations are known to den in right-of-ways, vacant lots, parks, landscaped areas, golf courses, etc., and population numbers

fluctuate over years. It is important to note that presence/absence in any one year is not indicative of the potential for kit fox to occur on a site. This is true for many other listed species in the San Joaquin Valley. SJKF are also attracted to construction and disposal areas due to the type and level of activity (grading, excavation, staged pipeline, etc.) and the loose, friable soils that are created as a result of intensive ground disturbance. The Department recommends having a qualified biologist conduct focused surveys for potential, known, atypical, and active kit fox dens on the entire Project site well in advance of any ground disturbance following the United States Fish and Wildlife Service (USFWS) "Standardized recommendations for protection of the San Joaquin kit fox prior to or during ground disturbance" (2011). A pre-construction survey is also recommended and a biological monitor should be present during any ground-disturbing activities. In the event that this species is detected during surveys, consultation with the Department is warranted to discuss how to implement the Project and avoid "take," or if avoidance is not feasible, to acquire a State ITP prior to any ground-disturbing activities. Avoidance, minimization, and mitigation measures for SJKF should be fully addressed in the CEQA document prepared for the Project, guidance can be found in the document referenced above.

Special-Status Plant Species: There is the potential for multiple special-status plant species to occur on or adjacent to the Project site. Two biological reconnaissance surveys where conducted on April 19 and May 31 of 2008 that included general botanical surveys. These surveys were completed during the known blooming periods of 'several target species', but did not include the identification of reference populations. Plants that have overlapping blooming periods may not necessarily be blooming and be identifiable at the same time within that period. The completion of two survey days during joint blooming periods does not constitute a complete rare plant survey demonstrating absence. In addition, the 2008 rain fall was particularly low and some annual plant species may not have even emerged that year. The Department recommends following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (November 24, 2009). This protocol, which is intended to maximize detectability, includes the identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period. This survey effort should be led by a qualified botanist well in advance of any ground disturbance associated with Project construction. In the absence of protocol-level surveys being performed, additional surveys may be necessary. Further, special-status plant species should be avoided whenever possible by delineation and observing a no-disturbance buffer of at least 50 feet from the outer edge of the plant population(s) or specific habitat type(s) required by special-status plant species. If buffers cannot be maintained, then consultation with the Department should occur to determine appropriate minimization and mitigation measures for impacts to special-status plant species. Should a State- or federally listed plant species

be identified during botanical surveys then consultation with the Department and/or the USFWS should be conducted to determine the need for an ITP (issued by the Department) or a Biological Opinion (issued by the USFWS). The CEQA document should describe all avoidance, minimization, and mitigation measures that would be employed in the event that special-status plant species are found on the Project site.

Federally Listed Species: The Department also recommends consulting with the USFWS on potential impacts to federally listed BNLL, SJKF, GKR, mountain plover, California jewel-flower, San Joaquin woollythreads, and Kern mallow. "Take" under the Federal Endangered Species Act (FESA) is more broadly defined than CESA; "take" under FESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding, foraging, or nesting. Consultation with the USFWS in order to comply with FESA is advised well in advance of Project implementation.

State Species of Special Concern: Silvery legless lizard, pallid bat, long-eared owl, short-nosed kangaroo rat, western mastiff bat, loggerhead shrike, San Joaquin whipsnake, Tulare grasshopper mouse, San Joaquin pocket mouse, coast horned lizard, American badger, and Le Conte's thrasher could occur in the Project area. Focused surveys should be conducted for these species well in advance of any ground disturbance associated with Project construction. The surveys should be done by qualified biologists familiar with the species during the appropriate survey period(s) and prior to Project implementation to determine if these species are present and if they could be impacted by the proposed Project. Survey results can then be used to identify any mitigation, minimization, and avoidance measures to minimize significant impacts to State Species of Special Concern. Such measures should be included in the CEQA document prepared for this Project.

More information on survey and monitoring protocols for sensitive species can be found at the Department's website (www.dfg.ca.gov/wildlife/nongame/survey_monitor.html). If you have any questions on these issues, please contact Reagen O'Leary, Environmental Scientist, at the address provided on this letterhead, by telephone at (559) 243-4014, extension 244, or by electronic mail at roleary@dfg.ca.gov.

Sincerely,

for Jeffrey R. Single, Ph.D.
Regional Manager

cc: See Page Nine

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United States Army Corps of Engineers
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CBOC, 1993. Burrowing Owl Survey Protocol and Mitigation Guidelines. California Burrowing Owl Consortium, April 1993.

CDFG, 2012. Staff Report on Burrowing Owl Mitigation. California Department of Fish and Game.

CDFG, 2004. Approved Survey Methodology for the Blunt-nosed Leopard Lizard. Department of Fish and Game, May 2004.

CDFG, 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. California Deptartment of Fish and Game, November 2009.

USFWS, 2011. Standard Recommendations for the Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance. United States Fish and Wildlife Service.

Appendix D.2

Supplemental Update of Biological Resources

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SUPPLEMENTAL UPDATE OF BIOLOGICAL RESOURCES

JOHE RANCH MINE PROJECT
KERN COUNTY, CALIFORNIA



Prepared for:

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UPDATED JUNE 2019

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

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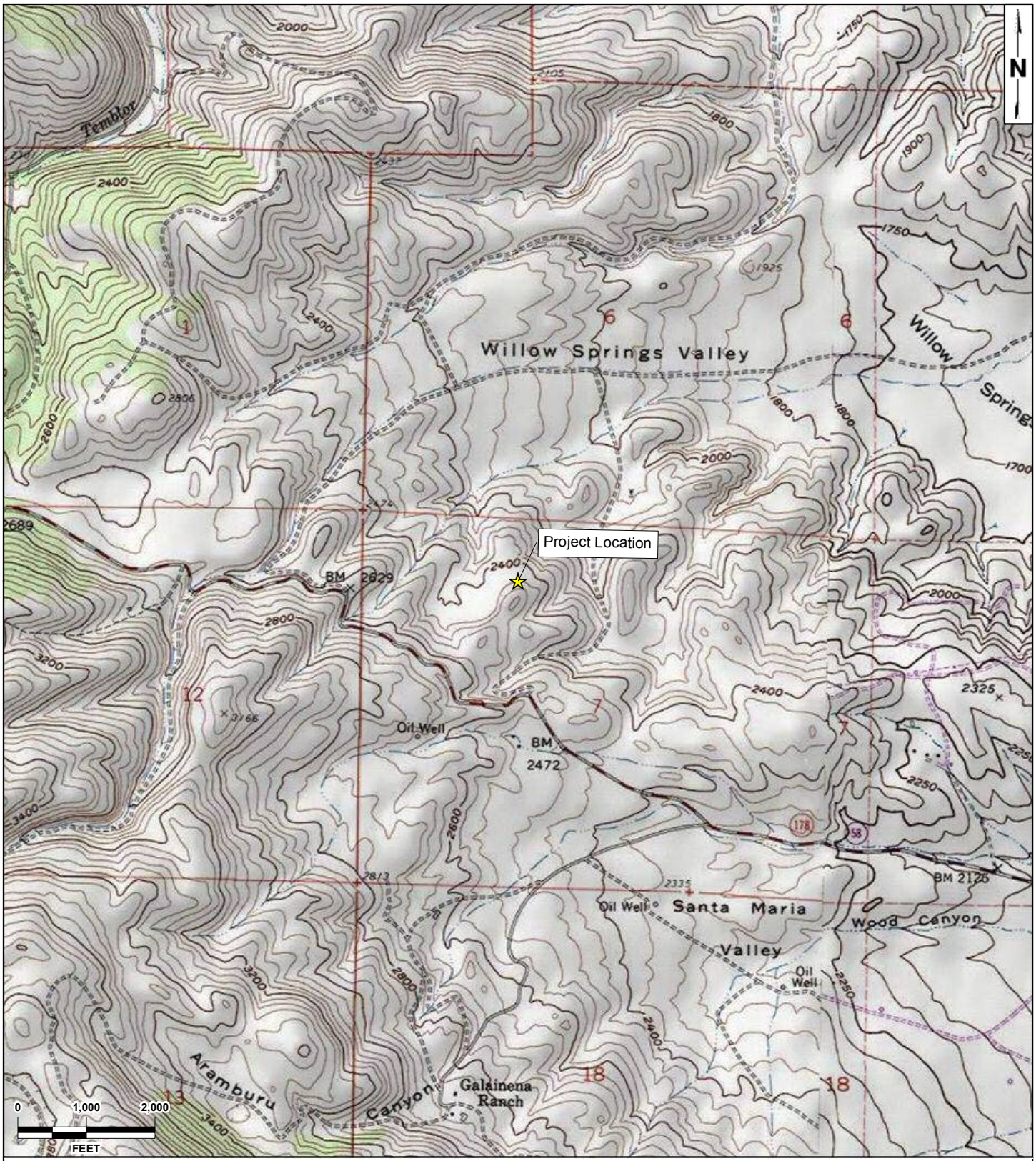
1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

In 2014 and 2015, Padre Associates, Inc. (Padre) was contracted by GF Industries (GFI) to conducted biological surveys for the Johe Ranch Mine Project near McKittrick, Kern County, California (Project). The Project is planned for a 93.67-acre surface mining operation of diatomaceous earth and development of a reclamation plan on approximately 331 acres in accordance with the Surface Mining and Reclamation Act of 1975. In 2014, Padre conducted baseline biological surveys in order to identify any threatened, endangered, or otherwise sensitive (TES) plant and animal species that may be present within or surrounding the Project area. Additionally, Padre conducted botanical surveys in April 2015 in order to identify TES plant species that may not have been germinating or in full-bloom during the initial 2014 biological surveys. Padre also conducted San Joaquin Kit Fox Surveys, utilizing both spotlighting and infrared camera tracking/scent stations, throughout the Project site in June 2015. In June 2008, Paul Pruett & Associates (Pruett) prepared a Biota Report for the Project (Pruett 2008). Pruett conducted biological surveys for both plants and wildlife in April and May 2008. Additionally, vegetation baseline surveys utilizing square meter plot methods and pedestrian transects to estimate plant species richness and vegetation cover were conducted during this time period.

The proposed mining operation is located approximately 8.3 miles northwest of McKittrick, Kern County, California. The mining operations are planned to occur just north of Highway 58 (**Figure 1**). The Project Site is within the northwest quarter of Section 07, Township 30 South, Range 21 East, Mount Diablo Base and Meridian, within the United States Geological Survey (USGS) McKittrick Summit 7.5 Minute Quadrangle Map. The current estimates of material to be removed include a maximum of 400,000 tons annually, for a maximum total of 8,000,000 tons of material over the estimated 20-year life of the operation. The mine will be composed of three mine areas with one access road to each area (**Figure 2**). Surface area to be disturbed at mining area 1 (Pit #1) is approximately 58 acres, at mining area 2 (Pit #2) is approximately 17 acres, and at mine area 3 (Pit #3) is approximately 11 acres. The proposed maximum depth of operation is approximately 225-feet for mine area 1, 188-feet for mine area 2, and 137 feet for mine area 3. Operational and final reclaimed slopes would be at a maximum 2:1 slope. Access to the site is planned to occur via Highway 58.

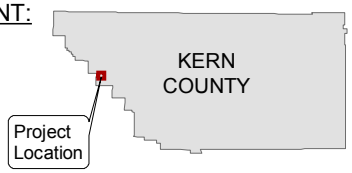
This report is a supplemental update for the 2014 and 2015 biological studies and will provide updated information regarding the current site conditions, any new habitats and/or features that have developed since those surveys, and any additional information pertinent to the biological resources that occur or may occur at or near the Project site.



LEGEND:

☆ Project Location

MAP EXTENT:

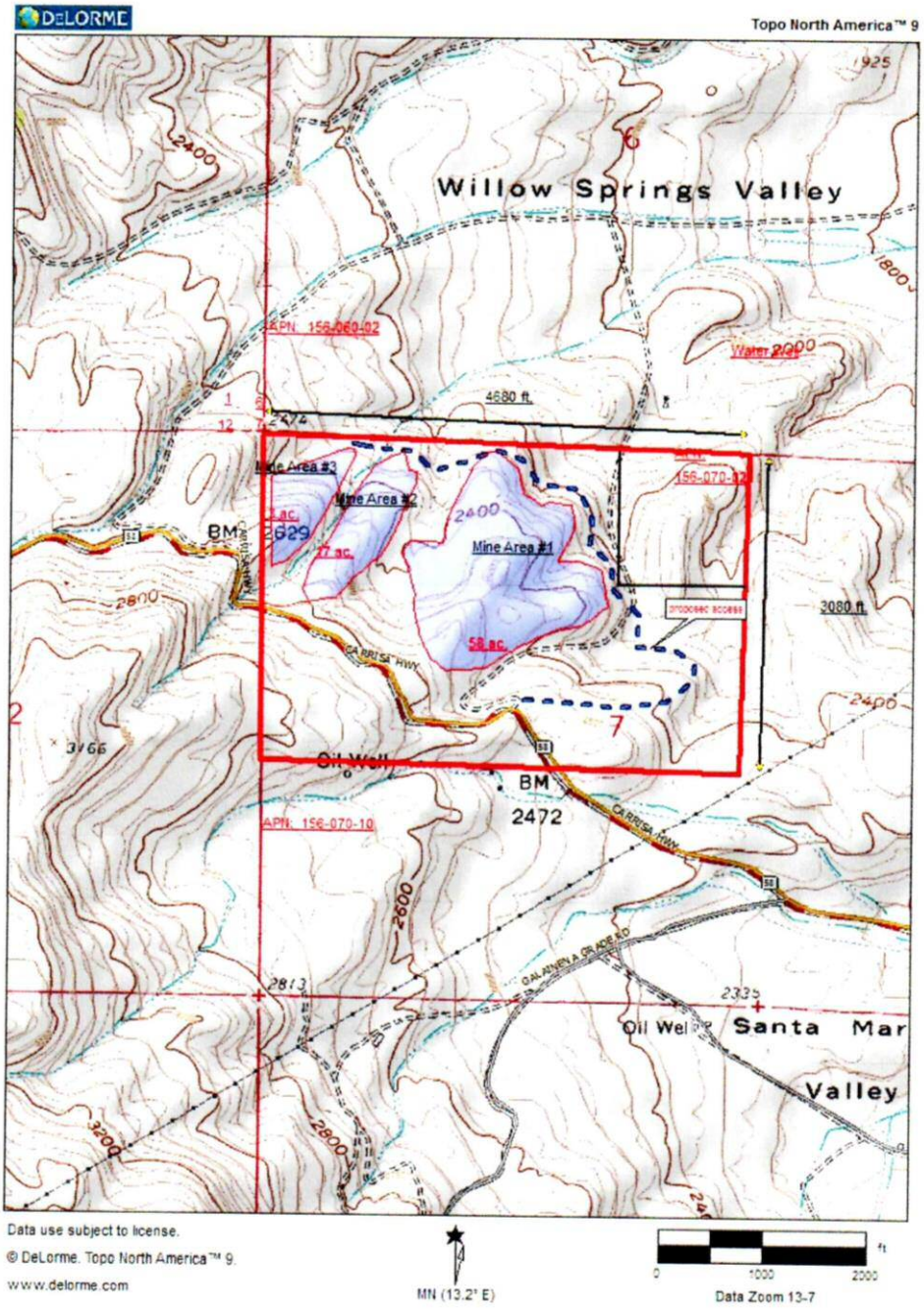


Source: USGS Topo, County of Kern
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: JOHE RANCH MINE PROJECT; MCKITTRICK KERN COUNTY, CA		PROJECT LOCATION MAP	FIGURE 1
PROJECT NUMBER: 1402-2421	DATE: May 2018		

Johe Ranch Mine Project\Project Location Map.mxd 5/21/2018



padre associates, inc. ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS	**GF Industries** **Johe Ranch Mine Project** Supplemental Update of Biological Resources May 2018	**Figure 2** Proposed Project Layout (Figure provided by GF Industries).

2.0 EXISTING ENVIRONMENTAL SETTING

2.1 PHYSICAL SETTING

An unnamed ephemeral drainage traverses between Pit #1 and Pit #2 within the western edge of the Project site. The drainage flows from higher elevations southwest of the Project Site and eventually converges at lower elevations with another unnamed ephemeral drainage within Willow Springs Valley. Further review of the topographical maps for the Project Site and surrounding areas reveal that the drainages continue to flow through portions of the Temblor Range and terminate within the Temblor Valley, which presently contains the Cymric Oil Field. The drainage continues to be heavily disturbed by agricultural activities approximately one mile downstream from the Project boundary as was observed in 2014. No riparian and/or wetland habitat was observed within the drainage. During the biological survey, no flowing and/or standing water was observed within the drainage. The drainage had a v-shaped profile in the higher elevations of the Project Site and eventually widened into a sandy bottom drainage in the lower elevations outside of the Project site.

Based on previous survey notes and desktop information, additional drainage/channel features have been included in this addendum. **Figure 1A** includes additional drainages that were mapped using information obtained from the National Wetland Inventory Dataset (USFWS 2019). This information was cross referenced with the National Hydrography Dataset information (USGS 2019), surface water information from the Environmental Response Management Application (ERMA) Southwest (2019), and topographical mapping for the Project site. Additionally, **Figure 1A** also includes additional channels observed by Padre during the biological surveys in 2014 and 2018. These channels were observed within the Project site. Except for one channel within the western portion of the Project site, most of the channels observed did not connect to ephemeral drainages that occur nearby. Flow between these drainages was found to be interrupted by various topographical features and/or previous disturbances within the area.

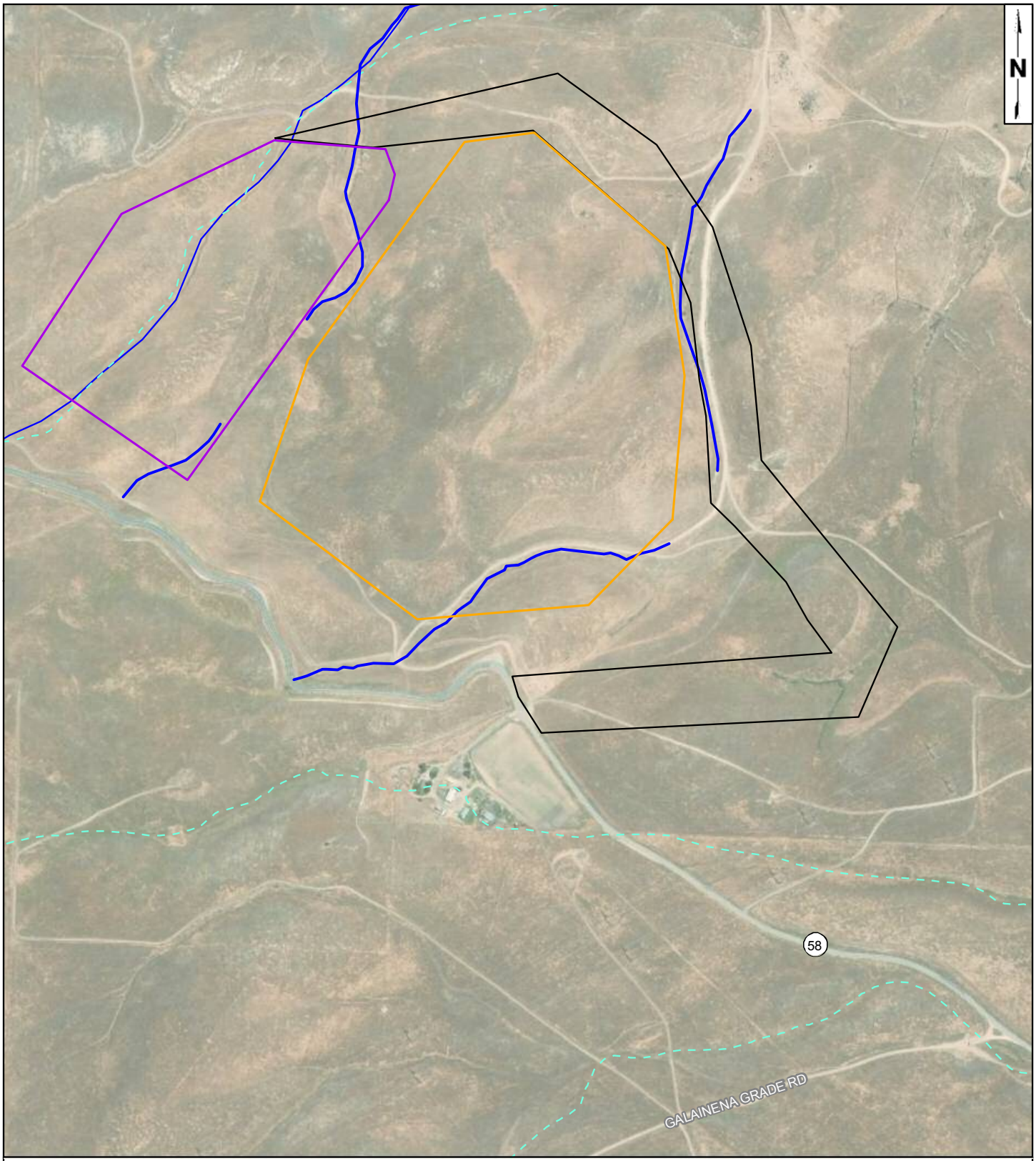
Cattle grazing was observed at the Project site. Pre-existing graded roads and two-tracked roads occur throughout the Project site. Farming equipment, corals, and other ranching/farming structures were present within or near the Project site.

2.2 GEOLOGY

Soils occurring within or near the Project Site include: Reward shaly loam, Mendi-Hillbrick-Kilmer association, Reward channery loam, and Pottinger very shaly clay loam (USDA 2014). The Reward shaly loam comprises the majority of the soil types present on the Project site. This soil type is a loam type that occurs on hill slopes (USDA 2018). These are well drained soils formed from weathered sandstone and shale.

2.3 VEGETATION/HABITAT TYPES

The vegetative association found within or near the Project site consisted primarily of California Annual (non-native) Grassland series (Sawyer and Keeler-Wolfe 2009). Other vegetation or habitat types observed included disturbed or “ruderal” communities, and Alkali



LEGEND:

- Channel Observed by Padre During Survey
- National Wetland Inventory (NWI) Data
- Biological Survey Access Road
- Pits 1 and 2 Biological Survey Area
- Pit 3 Biological Survey Area

0 350 700
FEET

Source: Esri Online Imagery Basemap, County of Kern
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

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ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME: JOHE RANCH MINE PROJECT; MCKITTRICK KERN COUNTY, CA

PROJECT NUMBER: 1402-2421

DATE: May 2019

PROJECT LAYOUT

FIGURE 2

Johe Ranch Mine Project\Project Layout.mxd 5/22/2019

Goldenbush Scrub (Diaz *et. al* 2012) adjacent to a portion of the proposed access road. Greater descriptions of these vegetation types are included below.

2.3.1 California Annual Grassland Series

An Annual Grassland community is characterized by a sparse to dense cover of low (< 3.3 feet; <1 meter) annual grasses and native and non-native herbaceous species (Holland 1986; Sawyer and Keeler-Wolf 1995). Shrubs and sub-shrubs are sometimes scattered in grasslands but do not dominate the vegetation. Annual Grasslands were present throughout the majority of the Project site. Dominant species in this vegetation type included *Bromus* madritensis ssp. *rubens* (red brome), *B. diandrus* (Ripgut grass), *Hordeum* spp. (wild barley), *Schismus* spp. (Mediterranean grass, and a variety of other annuals such as *Amsinckia* spp. (fiddleneck) *Erodium cicutarium* (redstem filaree), and *Lepidium* spp. (peppergrass).

2.3.2 Disturbed (Ruderal) Community

Disturbed areas are characterized as areas that have been physically disturbed or invaded by non-native species, such that few or no native plant species remain. Although a disturbed modifier can be applied to any native habitat, the actual designation of disturbed area refers to areas that are no longer recognizable as a native or naturalized vegetation association. Often these areas are associated with human-related activities such as clearing or grazing. Staging areas and dirt roads within the Project site contained mostly disturbed community habitats with several ruderal species dominating the vegetation, such as red brome, redstem filaree, *Sisymbrium irio* (London rocket), and other non-native species.

2.3.3 Alkali Goldenbush Scrub

A relatively small portion of the site also contained alkali goldenbush (*Isocoma acradenia*) scrub (Buck-Diaz *et. al.,* 2012). Alkali goldenbush is the dominant plant species in the shrub canopy of this vegetation type. The canopy is usually open to continuous with an open to continuous herbaceous layer. Stands are typically found in flat areas but can occur on gently sloping hills with saline to alkali soils. This vegetation type was observed on a lower slope on the north side of the Project site and adjacent to the proposed access road.

3.0 SURVEY METHODOLOGIES

3.1 DESKTOP ANALYSIS

Padre conducted an updated literature review of the Project site and surrounding area that included a California Natural Diversity Database (CNDDB) search, California Native Plant Society (CNPS) search, and an Information for Planning and Conservation (IPaC) data search through U.S. Fish and Wildlife Service (USFWS). The search was conducted within a five-mile radius of the Project site and encompassed US Geological Survey Topographical Quadrangles McKittrick Summit and Simmler. The results of the search and Padre's personal experience of the area indicate that several species of plants and animals could potentially be present in the area of the Project site (**Table 1** and **Table 2**). In 2014, Padre conducted a species search of the Project site and surrounding area; however, the database search and literature review has been updated to include any new species that may have been reportd since then.

Table 1. Plant species with potential to occur on the Project site.

Species	Status	Habitat	Blooming Period	Rationale
Antirrhinum ovatum Oval-leaved snapdragon	CRPR 4.2	Chaparral, cismontane woodland, pinon and juniper woodlands, valley and foothill grasslands; from open hillsides to small vernal pools in clay or gypsum soils within grassland or woodland; sites often alkaline 200-1000 m.	May-Nov	Unlikely to occur as suitable habitat not present.
Astragalus macrodon Salinas milk-vetch	CRPR 4.3	Chaparral openings, cismontane woodland, and valley and foothill grassland; within sandstone, shale, or serpentinite substrate 250-950 m.	April-July	Unlikely to occur as serpentine soils not present.
Atriplex coronata var. vallicola Lost Hills crownscale	CRPR 1B.2	Chenopod scrub, valley and foothill grassland, vernal pool, wetland; in powdery, alkaline soils that are vernally moist with *Frankenia*, *Atriplex* spp. and *Distichlis*; 50-635 m.	Apr-Sep	Unlikely to occur as suitable habitat is absent within the Project site.
Caultanthus californicus California jewelflower	FE, SE, CRPR 1B.1	Chenopod scrub,valley-foothill grassland, pinyon-junpier woodlands. Generally in non-alkaline grassland; 70–1000 m.	Feb-May	Unlikely to occur as known/extant populations are not known to occur within or near Project site; however, grassland habitat is present.
Caulanthus lemmonii Lemmon's jewelflower	CRPR 1B.2, USFWS: S	Pinyon and juniper woodland, valley and foothill grassland; chaparral scrub; 80–1580 m.	Feb-May	Potential to occur, Padre biologists have observed this plant less than three miles from the Project site along Highway 58 in Juniper woodlands.
Delphinium recurvatum Recurved larkspur	CRPR 1B.2	Chenopod scrub, valley and foothill grassland, cismontane woodland, poorly drained, fine, alkaline soils in grassland, *Atriplex* scrub; 3-790 m.	March-June	Unlikely to occur as suitable habitat and/or soils not present within the Project site.
Eryngium spinosepalum	1B.2	Valley and foothill grassland and vernal pools; 80-975 m.	April-June	Unlikely to occur, no vernal pools have been observed on the Project site.

Table 1. Plant species with potential to occur on the Project site.

Species	Status	Habitat	Blooming Period	Rationale
Spiny-sepaled button celery				
Eremalche parryi ssp. *kernensis* Kern mallow	FE, CRPR-1B.2	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; dry, open sandy to clay soils; often at edge of balds; alkali flats; 70-1290 m.	Jan-May	Potential to occur as the Project site is within foothill grassland.
Eriogonum temblorense Temblor buckwheat	CRPR 1B.2	Valley and foothill grassland; barren clay or sandstone substrate; 300-1000 m.	Apr-Sep	Unlikely to occur as preferred soils not found within Project site.
Eschscholzia rhombipetala Diamond-petaled California poppy	CRPR 1B.1	Valley and foothill grassland within alkaline or clay substrate; 0-975 m.	March-April	Potential to occur due to the substrate on the Project site being shaley-loam.
Layia heterotricha Pale-yellow layia	CRPR 1B.1, USFWS: S	Cismontane woodland, coastal scrub, pinyon and juniper woodlands, valley and foothill grassland, alkaline or clay soil; in open areas; 300-1705 m.	March-June	Potential to occur with foothill grassland present on the Project site.
Layia munzii Munz's tidy-tips	BLM: S, CRPR 1B.2	Chenopod scrub; valley and foothill grassland; on hillsides, in white-grey alkaline clay soils, with grasses; 150-700 m.	March-April	Potential to occur with foothill grassland present on the Project site.
Lepidium jaredii ssp. *jaredii* Jared's pepper-grass	CRPR 1B.2	Valley and foothill grassland in alkali flats and sinks, within alkaline or adobe substrate; 335-1005 m.	March-May	Unlikely to occur on the Project site due lack of suitable substrate.
Monolopia congdonii San Joaquin woollythreads	FE, CRPR 1B.2	Chenopod scrub, valley and foothill grassland, within sandy substrate.	Feb-May	Unlikely to occur on the Project site as suitable substrate has not present.
Viola purpurea ssp. *aurea* Golden violet	CRPR 2B.2	Great Basin scrub and pinyon and juniper woodland; 1000-2500 m.	April-June	Unlikely to occur as due to lack of suitable habitat within Project site.

CCH = Consortium of California Herbaria.
CNNDB = California Natural Diversity Database Info (CDFW)
FE = Federally listed Endangered (USFWS)
CRPR (California Rare Plant Ranks) Codes:
1B = Rare or Endangered in California and elsewhere
2B = Rare or Endangered in California, but more common elsewhere
4 = Plants of limited distribution (watch list)
0.1 = Seriously Threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 = Fairly Threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 = Not very threatened in California (<20% of occurrences threatened/ low degree and immediacy of threat or no current threats known)

Table 2. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
Invertebrates			
Branchinecta longiantenna longhorn fairy shrimp	FE	Valley & foothill grassland, vernal pool, wetland; endemic to the eastern margin of the Central Coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow wales.	Unlikely to occur due to no breeding habitat nearby.
Branchinecta lynchi Vernal pool fairy shrimp	FT	Valley & foothill grassland, vernal pool, wetland; endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools; inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Unlikely to occur due to no breeding habitat nearby.
Amphibians			
Spea hammondii Western spadefoot	SSC	Occurs primarily in grassland habitats but can be found in valley and foothill hardwood woodlands; vernal pools are essential for breeding and egg laying.	Unlikely to occur within hill portions of site. No vernal pool breeding habitat identified within Project area.
Rana draytonii California red-legged frog	FT, SSC	Breeding habitat including pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds, and lagoons, artificial stock pounds; and dispersal habitat upland and riparian.	Unlikely to occur due to no breeding habitat nearby.
Reptiles			
Anniella grinnelli Bakersfield legless lizard	SSC	Southern San Joaquin Valley. Microhabitat poorly known, other legless lizard species occur in sparely vegetated areas with moist, loose soil. Often found underneath leaf litter, rocks, and logs.	Potential to occur in the lower elevations of the site, but unlikely where Project activities will be taking place. Occurs on the east side of the Carrizo Plain and portions of the city limits of Bakersfield.
Anniella pulchra northern California legless lizard	SSC, USFWS	Chaparral, coastal dunes, coastal scrub in sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. They prefer soils with a high moisture content.	Potential to occur in the lower elevations of the site, but unlikely where Project activities will be taking place. Occurs on the east side of the Carrizo Plain and portions of the city limits of Bakersfield.
Gambelia sila Blunt-nosed leopard lizard	FE, SE, FP	Sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief (< 30° slopes) with small mammal burrows for cover.	Unlikely to occur within the Project site.
Masticophis flagellum ruddocki San Joaquin whipsnake	SSC	Open dry habitats with little or no tree cover. Found in valley grassland and saltbush scrub in the San Joaquin Valley. Requires mammal burrows for refuge and oviposition sites.	Potential to occur since open and dry habitats are found throughout the Project site.
Phrynosoma blainvillii Coast horned lizard	SSC	Uses a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes; they require open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Unlikely to occur due to lack of sandy substrate for cover.
Thamnophis gigas giant garter snake	FT, ST	Valley floor wetlands of the Sacramento and San Joaquin Valleys, inhabits marshes, sloughs, ponds, small lakes, low gradient streams and other water ways, and agricultural wetlands.	Unlikely to occur due to no wetland habitat.
Birds			
Agelaius tricolor Tricolored blackbird	CE, SSC, BCC, MBTA	Colonial nester; nests in wetland and riparian vegetation near water. Forages in agricultural fields and grassland habitat.	Unlikely to occur as no nesting or roosting habitat present on the Project site.

Table 2. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
Aquila chrysaetos Golden eagle	FP, WL, BCC, BE&GEPA, MBTA	Rolling foothills, mountain areas, sage-juniper flats, and desert. Nests in large trees in open areas or canyons.	Golden eagles observed foraging in 2015, and again in April 2018. No suitable nesting habitat present.
Athene cunicularia Burrowing owl	SSC, BCC, MBTA	Open dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation in areas where burrowing mammals are already present.	Potential to occur as potential habitat was present throughout the Project site. Ground squirrels were present on the Project site. The owl depends on burrowing mammals for nest/refuge sites.
Buteo swainsoni Swainson's hawk	ST, BCC, MBTA	Riparian forest, riparian woodland, valley and foothill grasslands	Potential to be flying through the general area. No nesting habitat is present on the Project site.
Falco mexicanus Prairie falcon	WL, BCC, MBTA	Inhabits dry, open terrain, whether level or hilly. Breeding sites located on cliffs, forages far afield, even to marshlands and ocean shores.	Potential to occur as open habitats for foraging present within the Project area; however, no cliffs or other potential habitat suitable for nesting is present.
Gymnogyps californianus California condor	FE, SE, FP, MBTA	Requires large areas of remote country for foraging, roosting, and nesting. Roosts on large trees or snags, or on isolated rocky outcrops and cliffs. Forages in open grasslands and oak savanna foothills.	Potential to occur as open habitat for foraging. Critical habitat has been designated for this species to the south; however, the site is outside the critical habitat.
Lanius ludovicianus Loggerhead shrike	SSC, BCC, MBTA	Broken woodlands, savannah, pinyon-juniper, Joshua tree, riparian woodlands, desert oases, scrub and washes	Potential to occur due to habitat being present. Padre biologists have observed this species throughout the general area.
Toxostoma lecontei Le Conte's thrasher	SSC, BCC, MBTA	Open desert, desert scrub, alkali desert scrub, and desert succulent scrub.	Unlikely to occur, no nesting or roosting habitat is present within the Project site.
Mammals			
Ammospermophilus nelsoni San Joaquin (Nelson's) antelope squirrel	ST	Dry, sparsely vegetated loam soils with widely scattered shrubs, forbs, and grasses and broken terrain with gullies and washes.	Unlikely to occur on Project site.
Antrozous pallidus Pallid bat	SSC, USFWS, WBWG:H	Many habitat types: deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Unlikely, no rocky outcrops for this species to roost in and be protected from high temperatures.
Dipodomys ingens Giant kangaroo rat	FE, SE	Annual grasslands with marginal habitat in alkali scrub with level terrain and sandy loams soils for burrowing.	Unlikely to occur no evidence of burrow precincts observed within the Project site.
Dipodomys nitratoides brevinasus Short-nosed kangaroo rat	SSC	Western side of San Joaquin Valley in grassland and desert shrub associations in highly alkaline soils on gently flat to gently sloping terrain.	Potential to occur as habitat is present.
Dipodomys nitratoides nitratoides Tipton kangaroo rat	FE, SE	Saltbush scrub and sink scrub in the Tulare Lake Basin in the southern San Joaquin Valley.	Unlikely; Project site is outside known range of the species.
Onychomys torridus tularensis Tulare grasshopper mouse	SSC	Hot, arid valleys and scrub deserts in the southern San Joaquin Valley. Chenopod scrub. Western margin of the Tulare Basin.	Potential to occur as habitat is present within the Project Site.
Taxidea taxus American badger	SSC	Dry, open stages of most shrub, forest, and herbaceous habitats with friable soils.	Potential to occur since there is habitat present within Project site.
Vulpes macrotis mutica San Joaquin kit fox	FE, ST	Annual grasslands, habitat with grassy open stages and scattered shrubby vegetation in loose-textured sandy soils for burrowing and suitable prey base.	Known to occur as Padre biologists conducted spot light surveys and observed kit fox in 2015 adjacent to Project site.

Table 2. Threatened, endangered, and/or sensitive wildlife species with potential to occur within or near the Project Site.

Species	Status	Habitat	Rationale
Listing Codes: BCC = Birds of Conservation Concern (USFWS) BE&GEPA = Bald Eagle and Golden Eagle Protection Act (USFWS) CE = Candidate Endangered (CDFW) FE = Federally listed Endangered (USFWS) FP = Fully protected under Fish and Game Code (CDFW) FT = Federally listed Threatened (USFWS) MBTA = Migratory Bird Treaty Act (USFWS) SSC= Species of Special Concern (CDFW) SE = State listed Endangered (CDFW) ST = State listed Threatened (CDFW) USFWS = Sensitive WL = State Watch List (CDFW) WBWG = Western Bat Working Group H = Highest priority			

3.2 BOTANICAL REFERENCE SITE VISITS

Prior to or shortly after botanical surveys were conducted, Padre biologists visited several special-status plant reference sites to determine if listed plant species were in bloom for proper species identification. **Table 3** below includes a list of the federally and/or state Endangered plant species visited as well as their locations and dates. These included the Maricopa/Taft area, California, and west of the Belridge oil field, California. For those plants not observed, plants in the same genus were checked to ensure that blooming was present and/or other local botanist/biologists were contacted for reference site observations and information. Reference sites for California jewelflower (*Caulanthus californicus*) were inspected in February within the Carrizo Plain National Monument; however, none were in bloom or germinating likely due to the low precipitation in the area. However, another species in the *Caulanthus* genus (*C. lasiophyllus*) was observed blooming within western Kern County in March 2018. Lemmon's jewelflower (*C. lemmonii*) was also observed blooming on May 1, 2018 approximately three-miles west of the Project site on rocky hillside adjacent to Highway 58.

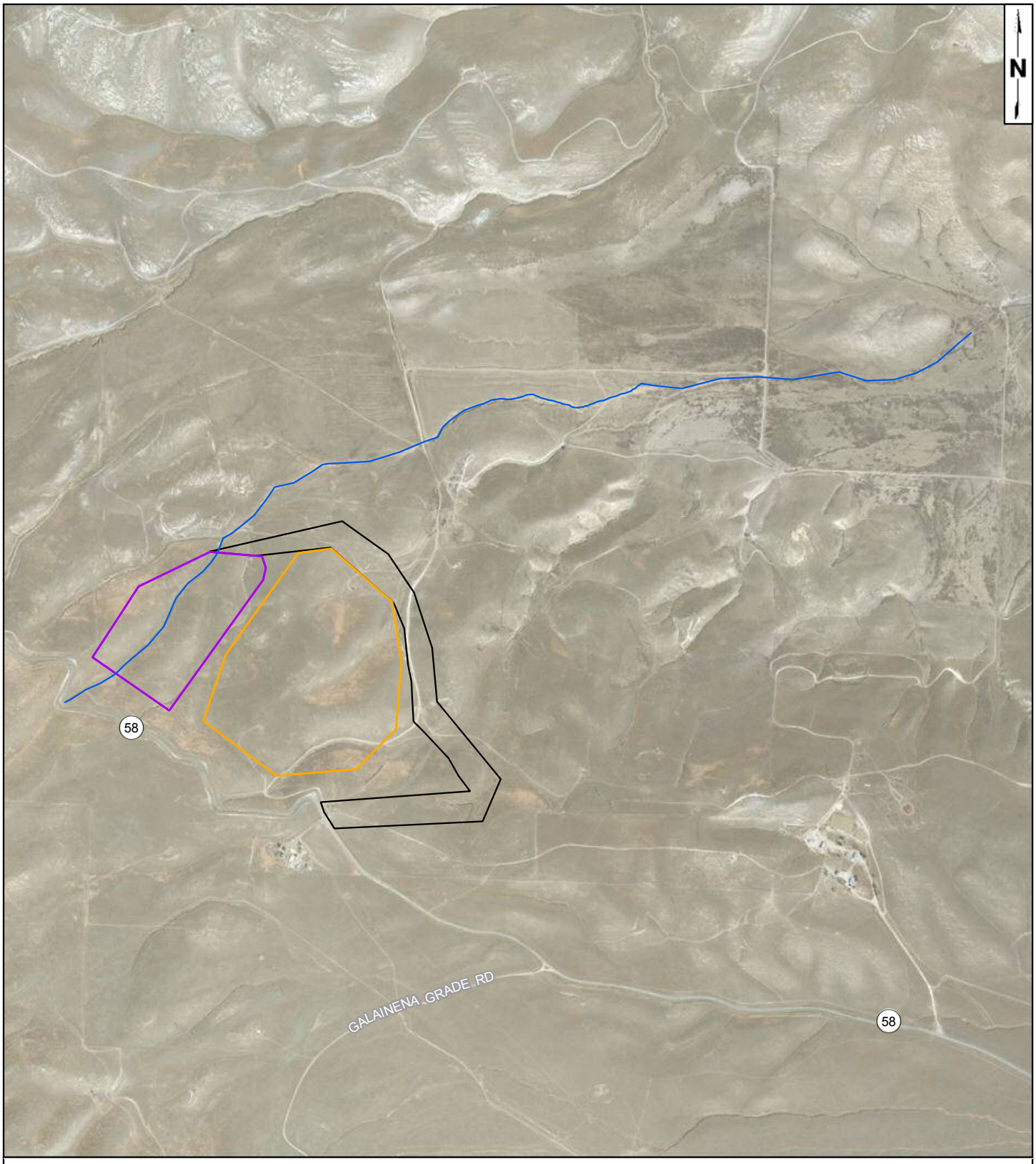
Table 3. Reference Sites visited for State and/or Federally Listed Plants.

Common Name	Scientific Name	Date	GPS Locations
Kern mallow	*Eremalche kernensis*	04-14-2018	N35.097275° W-119.383614°
San Joaquin woollythreads	*Monolopia congdonii*	02-14-2018	N35.502584° W-119.814856°

3.3 SURVEY METHODOLOGIES

3.3.1 Reconnaissance-level Biological Surveys

A reconnaissance-level biological survey was conducted on April 12, 2018, in order to determine the presence of TES species, as well as to document and update existing baseline biological conditions at the Project site and provide recommendations, if applicable. The coverage area of the survey included the three proposed mine sites as well as a buffer, when feasible, around each of these areas (**Figure 3**). The access roads throughout the Project Site were also surveyed. Surveys were conducted in an effort to identify suitable habitat for TES species and/or signs (e.g. nests, burrows, scat, tracks, prey remains, seeds, leaves, etc.) of their



LEGEND:

- Ephemeral Drainage
- Biological Survey Access Road
- Pits 1 and 2 Biological Survey Area
- Pit 3 Biological Survey Area

0 750 1,500
FEET

Source: Esri Online Imagery Basemap, County of Kern
Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Notes: This map was created for informational and display purposes only.

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

PROJECT NAME:		
JOHE RANCH MINE PROJECT; MCKITTRICK KERN COUNTY, CA		
PROJECT NUMBER: 1402-2421	DATE: May 2018	

BIOLOGICAL SURVEY AREAS

FIGURE 3

Johe Ranch Mine Project\Biological Survey Findings 2017.mxd 5/21/2018

presence. Padre conducted the survey by utilizing pedestrian belt transects spaced at approximately ten-meters in width. Steep locations were either accessed via existing dirt roads and/or two-tracked roads. Areas that were on a steep incline were surveyed using 8X10 binoculars from the ridge tops and bottoms of the hill to obtain a better perspective. Any burrow/den complexes observed were examined for any signs of fossorial TES species. Logs, stones, and other debris observed within the drainages and other gullies within the Project Site were examined for the presence of any cryptic wildlife that may use these areas as refuge.

3.3.2 Botanical Surveys

Padre biologists conducted botanical surveys at the Johe Ranch Mine Project site on April 12, 2018. Pedestrian transects, spaced approximately ten meters apart, were completed throughout the project footprint, in order to ensure thorough coverage of potential impact areas. Transects were modified as needed depending on topography, shrub coverage, property boundaries, etc. Padre biologists also returned on May 1, 2018; however, the vegetative state of most plants had already desiccated and only a few new plant species were observed.

Surveys were scheduled for the proper time of year when most plants were both evident (i.e. flowering) and identifiable. Every plant species observed during the survey was recorded and identified to species, subspecies, and/or variety as applicable. The Jepson Manual, Second Edition (Baldwin *et al*. 2012) and Kern County Flora key (Moe 2016) were consulted and used for the identification of species observed in the field. Hand-held Global Positioning System (GPS) units were used to record the locations of any special-status plant species observed during the surveys. Photographs were also taken at various locations within the Project site (**Appendix A**). Plant species that could not be readily identified in the field were collected for in-house identification using botanical keys and manuals.

3.3.2.1 State and Federal Agency Survey Guidelines

The USFWS, CDFW, and CNPS each have protocols for surveying rare and/or special-status plant species on public and private lands as noted below. These include the following:

- California Department of Fish and Wildlife. 2018. Protocols for surveying and evaluating impacts to special-status native plant populations and sensitive natural communities.
- California Native Plant Society. 2001. CNPS botanical survey guidelines.
- United States Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate species.

4.0 RESULTS

4.1 PLANTS

Padre biologists identified 27 plant species throughout the survey area within the Project site in 2018. The species observed were common native or non-native species typically found in similar habitats in western Kern County and surrounding areas. A complete list of plant species observed during the 2018 botanical surveys can be found in **Appendix B**. No special-status plant species were observed during the Botanical Survey. The timing of the surveys occurred when the majority of the species were both evident and identifiable at reference locations or at least plants within the same genus were observed to be blooming in the general region. Surveys can confirm the presence of sensitive plant species, but negative results do not necessarily mean sensitive plants are absent from a survey area. The McKittrick areas typically receives over six inches of rain annually; however, at the time of the survey, the rainfall in the McKittrick area was approximately 3.8 inches of rainfall for the year (National Weather Service 2018). Reduced precipitation can affect the number of plant species germinating and flowering in certain areas.

4.1.1 Sensitive Plant Species

Although no listed and/or sensitive plant species were observed during the botanical survey, Kern mallow (*Eremalche kernensis*), which is federally listed, may have potential to occur within the Project site during years of sufficient precipitation. However, no Kern mallow or other mallow species were observed within the Project site or surrounding areas. The Project site has been continually grazed by cattle, which may reduce the likelihood of sensitive plant species in the area. Additionally, non-native grasses are prevalent throughout the Project site and likely outcompete native plant species.

4.2 WILDLIFE

Wildlife that was commonly observed during the field survey are included in **Appendix C**. Several burrow complexes were still present throughout the Project Site. The majority of the burrows observed were characteristic of California ground squirrel (*Otospermophilus beecheyi*) as the burrows had wide entrances that tapered into smaller more narrow holes, which is similar to the findings in 2014. No direct observations of threatened or endangered species occurred during the field survey of the Project Site. Species analysis were presented in the previous report by Padre (2014) and site conditions at the Project site have not changed drastically enough to change the likelihood of occurrence for the species discussed in 2014.

The updated database search and literature review for the Project site and surrounding areas resulted in 26 wildlife species with potential to occur in the general area. However, based on the known range, habitat preferences, and existing data, Padre was able to reduce the number of wildlife species with potential to occur at the Project site to 13 species. A brief analysis of these wildlife species with potential to occur is presented below.

4.2.1 Birds

Golden eagles were observed both in 2015 and 2018 within the Project site. Although the site provides suitable foraging habitat for eagles, no roosting or nesting habitat is present.

California condor could potentially fly over foraging for carrion; however, the Project site does not contain any suitable cliffs or trees suitable for roosting or perching. The Project site is outside the critical habitat for condors as well. No burrowing owl or their burrows were directly observed in 2018, however, potential burrows with white-wash and pellets were observed within the Project site in 2014. The Project site does provide suitable habitat for burrowing owl. Swainson's hawk and prairie falcon could potentially forage through the site as well; however, no nesting habitat is present for either species. Loggerhead shrikes have been observed in areas east of the Project site within saltbush (*Atriplex* species) scrub habitat and could potentially forage or traverse through the Project site. Ground nesting bird species, such as western meadowlark (*Sturnella neglecta*) and horned lark (*Eremophila alpestris*), were observed throughout the Project site and ground nests may be present throughout the Project site have a potential to occur during the nesting season.

4.2.2 Mammals

No giant kangaroo rat precincts were observed within portions of the Project that contained suitable habitat. However, the Project site occurs within the range of short-nosed kangaroo rat or Tulare grasshopper mouse and have potential to occur within the Project site. No San Joaquin antelope squirrel were observed during the survey and no suitable habitat was observed. No suitable habitat was present for the Buena Vista Lake ornate shrew. The Project location is outside the critical habitat for the shrew. No larger mammal dens were observed during the survey; however, American badger are known to dig multiple dens throughout the year and change dens nightly. The Project site is also within the known range of the San Joaquin kit fox and a kit fox was observed in 2015 during spot-light surveys. Although San Joaquin kit fox may be present in the general area, the areas planned for mining are within steep topography which are not typically preferred by the species as they may be more vulnerable to predation by larger predators (Warrick and Cypher 1998; Koopman *et al*., 2001). However, both the American badger and the San Joaquin kit fox could utilize and/or traverse through the Project site at any time.

4.2.3 Reptiles

Blunt-nosed leopard lizard (BNLL) are unlikely to occur within the Project site or surrounding areas as suitable habitat was not observed. The topography within the Project site is predominantly steep which typically precludes BNLL from an area. Flat open areas are found south of the Project site; however, the Project is not anticipated to impact these areas and steep hills separate the Project site and these flat areas. Silvery legless lizards are may occur within the Project site; however, due to their elusive behavior the species is sometimes difficult to determine their presence but could potentially be present within loose and/or sandy soils within drainages. San Joaquin whipsnake is likely to occur, as Padre biologists have observed these snakes throughout the southern San Joaquin Valley and surrounding foothills. Giant garter snake is unlikely to occur within the Project site as they require waterways for moving and foraging, which is not present within any Portion of the Project site.

5.0 RECOMMENDATIONS

The following section outlines various recommendations that have been updated from the 2014 biological report for the Project to minimize the take of any listed or sensitive plant species

that may occur where Project activities are planned. These recommendations are relatively standard for various Project activities within western Kern County. Implementation of these measures is designed to avoid and/or minimize effects to sensitive species and their habitats.

- All Project employees and contractors will receive Environmental Awareness Training prior to working on the Project including attending a sensitive species education program developed by trained biologists, focusing on the protected and sensitive plant species that may occur in the Project areas. At a minimum, the program will cover species distribution, identification characteristics, and sensitivity to human activities, legal protection, penalties for violation of state and federal laws, reporting requirements, and project mitigation measures. In addition, the training will emphasize to avoid contact with onsite wildlife and avoid biologically sensitive areas, if any.
- Within 30 days before ground disturbance activities within special-status species habitat, a pre-disturbance survey by a qualified biologist shall be conducted to record existing conditions of the site, determine if conditions have changed since the reconnaissance or botanical surveys were conducted, and to determine where sensitive species avoidance buffers will be established. This survey will include San Joaquin kit fox den evaluation. If ground disturbance activities do not commence within 30 days of the initial survey date, surveys should be repeated to refresh results.
- If any sensitive species are observed, the following buffers shall be established by the qualified biologist to prevent incidental take of any observed sensitive species.

Buffers for Sensitive Biological Resources	
Biological Resource	**Buffer Zone from Disturbance (feet)**
American badger: maternity den (pup rearing season: February 15 through July 1)	200
American badger: Non-maternity den	50
Burrowing owl burrow	Dependent on non-breeding or breeding, time of year, and project level impact
Active bird nests	50
San Joaquin coachwhip, silvery legless lizard, coast horned lizard	30
San Joaquin kit fox atypical den	50
San Joaquin kit fox potential den	50
San Joaquin kit fox known den	100
San Joaquin kit fox natal den	Contact California Department of Fish & Wildlife, United States Fish & Wildlife Service
Special-status plants	50

- No more than 10 days prior to ground disturbing activities, a pre-disturbance survey for active bird nests must be conducted, if work occurs between February and September when nesting activity is most prevalent. If any active nests are observed appropriate buffer areas (at least 50 feet) will be established around each nest for avoidance as appropriate.

- A biological monitor is recommended to be on site for any initial vegetation removal/grubbing activities that may occur. A biological monitor is not a substitute for an incidental take permit. If any TES species are uncovered during Project activities, work will be halted to determine the best course of action.
- Keep all trash and food items picked up and removed from the site daily including microtrash (i.e. wrappers, bottle tops, and food scraps.)
- No pets (dogs) on site.
- Vehicle traffic should use established roadways. Cross country travel is prohibited.
- Dust control should be implemented for excavations, spoils piles, access roads, and parking and staging areas.
- Conduct a 360-degree vehicle check before moving vehicle from site.
- Maintain a speed limit of 20 mph or less on dirt roads.
- To the extent practicable, previously disturbed areas are to be used to stockpile excavated materials, storage of equipment, locations of trailers, parking of vehicles, and other surface-disturbing actions.
- Open excavations or trenches shall be covered at the end of each workday to prevent wildlife entrapment. If an excavations or trench is too large to cover, then a 45-degree escape ramp should be installed. All excavations and trenches shall be inspected for wildlife prior to the commencement of work.
- If perimeter fencing is used, then the fencing shall include a 4-8 inch (0.1-0.2 m) opening between the fence mesh and the ground or the fence shall be raised 4 inches above the ground to enable San Joaquin kit fox and other wildlife to pass through the Project site.
- All vertical tubes and chain link fencing piles, shall be temporarily or permanently capped to avoid the entrapment and death of special-status wildlife and birds. All pipes 1.5 inches (.038 m) or greater in diameter stored overnight on a project location must have end caps or other physical barriers that prevent wildlife from entering the pipe.
- All dead or injured special status wildlife shall be left in place and reported to the USFWS and the CDFW within 48 hours of the discovery for rescue or salvage. Discovery of state or federal listed species that are injured or dead shall also be managed consistent with regulatory requirements, including being reported immediately via telephone and with 24 hours in writing, and a copy to Kern County Planning and Community Development.
- All washing of trucks, paint, equipment, or similar activities should occur in areas where runoff is fully contained for collection and offsite disposal. Wash water may not be discharged from the site and shall be located at least 100 feet (30.48 m) from any water body, or sensitive Biological Resources. If ground disturbance is intended to be temporary and does not occur on cultivated land, perform topsoil segregation during construction activities to preserve the seed bank for restoration efforts. Store the segregated topsoil separate from the subsoil and restore segregated topsoil to its original location. This will decrease unwanted invasive plant species (i.e. tumble weed and invasive grasses) from invading the area.

- Contact a qualified biologist if any dens suitable for San Joaquin kit fox, burrowing owl, and/or American badger (four inches or greater in diameter) are observed during Project activities.
- If any TES species are encountered during Project activities, all work that may harm that species should stop immediately and a qualified biologist should be contacted to determine the best course of action. TES wildlife species should be allowed to leave the site of their own accord.

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Appendix A

Photolog for Johe Ranch Mine Project 2018 Biological Surveys

Photolog for Johe Ranch Mine Project near McKittrick, Kern County, CA.
April 12 and May 1, 2018



Photo 1. View facing southwest of Pit #1 during April 12, 2018 surveys.



Photo 2. View facing west of Pit #1 and surrounding areas during April 12, 2018 surveys.



Photo 3. View facing west Pits #2 and #3 during April 12, 2018 site visit.



Photo 4. View facing north from Pit #1 during April 12, 2018 surveys.



Photo 5. View facing west of area planned for access road during April 12, 2018 surveys.



Photo 6. View facing southwest of southernmost portions of Pit #1 and planned access road during April 12, 2018 surveys.

Photolog for Johe Ranch Mine Project near McKittrick, Kern County, CA.
April 12 and May 1, 2018



Photo 7. View facing east of planned access road during April 12, 2018 surveys.



Photo 8. View facing north of planned access road during April 12, 2018 surveys.



Photo 9. View facing south of Pits #2 and #3 from planned access road during April 12, 2018 surveys.



Photo 10. View of areas north of the Project site during April 12, 2018 surveys.



Photo 11. View facing west of Pit #1 during May 1, 2018 surveys.



Photo 12. View facing northwest of Pit #1 during May 1, 2018 surveys.

Photolog for Johe Ranch Mine Project near McKittrick, Kern County, CA.
April 12 and May 1, 2018



Photo 13. Cattle observed within Project site during May 1, 2018 surveys.



Photo 14. View facing west of Pits #2 and #3 during May 1, 2018 surveys.



Photo 15. Cattle observed at Pit #1 during May 1, 2018 surveys.



Photo 16. View facing north of Pits #2 and #3 during May 1, 2018 surveys.

Appendix B

Plant Species Observed during Botanical Surveys

Appendix C. List of plant species observed during 2018 Botanical Surveys for the Johe Ranch Mine Project.

Scientific Name	Common Name	Habit	Family
Acmispon brachycarpus	foothill deervetch	AH, PH	Fabaceae
Astragalus lentiginosus var. *nigricalycis*	freckled milkvetch	PH	Fabaceae
Astragalus oxyphysus	Stanislaus milkvetch	PH	Fabaceae
*Bromus hordeaceus**	soft chess	AG	Poaceae
Bromus madritensis ssp. *madritensis**	foxtail chess	AG	Poaceae
Bromus madritensis ssp. *rubens**	red brome	AG	Poaceae
Caulanthus lasiophyllus	California mustard	AH	Brassicaceae
Clarkia affinis	Chaparral clarkia	AH	Onagraceae
Clarkia purpurea ssp. *quadrivulnera*	four-spot	AH	Onagraceae
Claytonia parviflora ssp. *parviflora*	Utah Miner's lettuce	AH	Montiaceae
Croton setiger	turkey-mullein	AH	Euphorbiaceae
Datura wrightii	Jimsonweed	PH	Solanaceae
*Erodium cicutarium**	redstem filaree	AH	Geraniaceae
Eschscholzia californica	California poppy	AH	Papaveraceae
Isocoma acradenia	alkali goldenbush	S	Asteraceae
Lepidium nitidum	shining peppergrass	AH	Brassicaceae
Lupinus bicolor	miniature lupine	AH	Fabaceae
Lupinus microcarpus var. *microcarpus*	valley lupine	AH	Fabaceae
Phacelia tanacetifolia	lacy phacelia	AH	Boraginaceae
Plagiobothrys canescens	Valley popcornflower	AH	Boraginaceae
*Salsola tragus**	Russian thistle	AH	Chenopodiaceae
Stephanomeria pauciflora	wire-lettuce	PH	Asteraceae
Thysanocarpus curvipes	Hairy lacepod	AH	Brassicaceae
Trichostema lanceolatum	vinegar weed	AH	Lamiaceae
Trifolium willdenovii	tomcat clover	AH	Fabaceae
Uritica dioica	stinging nettle	AH	Urticaceae
Uropappus lindleyi	silverpuffs	AH	Asteraceae

Notes:
Scientific nomenclature follows The Jepson Manual Second Edition (Baldwin et al., 2012).
An "*" indicates non-native species which have become naturalized or persist without cultivation.

Habit Definitions:
AG = annual grass.
AH = annual herb.
BH = biennial herb.
PG = perennial grass.
PH = perennial herb.
PH = perennial herb.
S = shrub.
SS = Subshrub
SU = Succulent
T = tree
V = Vine

Appendix C

Wildlife Species Observed during Biological Surveys

Appendix C. Wildlife species observed during a biological survey on April 12, 2018.

Common Name	Scientific Name
Reptiles	
Gopher snake	*Pituphis catenifer*
Side-blotched lizard	*Uta stansburiana*
Whiptail	*Cnemidophorus tigris*
Birds	
Bewick's wren	*Thryomanes bewickii*
Black phoebe	*Sayornis nigricans*
Brewer's blackbird	*Euphagus cyanocephalus*
Common raven	*Corvus corax*
European starling	*Sturnus vulgaris*
Golden eagle	*Aquila chrysaetos*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Spinus psaltria*
Mourning dove	*Zenaida macroura*
Northern harrier	*Circus cyaneus*
Rock wren	*Salpinctes obsoletus*
Say's phoebe	*Sayornis saya*
Western meadowlark	*Sturnella neglecta*
White-crowned sparrow	*Zonotrichia leucophrys*
Mammals	
Black-tailed jackrabbit	*Lepus californicus*
Botta's pocket gopher	*Thomomys bottae*
California ground squirrel	*Otospermophilus beecheyi*
Desert cottontail	*Sylvilagus audubonii*
Domestic cattle	*Bos taurus*

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Appendix D.3

2015 Botanical Survey Peer Review Memo

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padre
associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

May 16, 2019
Project Number 1402-2421

WZI Inc.
1717 28th Street
Bakersfield, CA 93301

Attention: Mr. Allen Waggoner
Senior Professional Geologist

SWCA MEMO: PEER REVIEW OF 2015 BOTANICAL SURVEY (PADRE ASSOCIATES) – JOHE RANCH MINING PROJECT

Dear Mr. Waggoner:

Padre Associates, Inc. (Padre) has prepared this second response to the comments submitted by Ms. Jacqueline Markley with SWCA Environmental Consultants (SWCA) to Mr. Randall Cates with the Kern County Planning & Natural Resources Department regarding the Botanical Survey Report prepared by Padre for the Johe Ranch Mine Project (Project). The responses to the comments are presented below:

Section 4.1 and 4.2 / Pg. 10 & 11 Comment Response:

Padre has revised the 2015 Botanical Survey Report to remove *Clarkia jolonensis* from the plant species list as this species was not identified and/or found within the Project site and was included as a likely error attributed to a typo and/or a misidentification. The revised report has been included as Attachment 1.

CONCLUSION

If you have any questions regarding this information, please contact Angel Correa at (661) 829-2686 ext. 301 or <acorrea@padreinc.com>.

PADRE ASSOCIATES, INC.

Angel Correa
Sr. Project Manager/Biologist

Enclosures: Attachment 1

ATTACHMENT 1

2015 BOTANICAL SURVEY

GF INDUSTRIES JOHE RANCH MINE PROJECT
MCKITTRICK, KERN COUNTY, CALIFORNIA



Prepared for:

GF Industries
122 N. Harbor Blvd. #201
Fullerton, California 92832

Prepared by:

Padre Associates, Inc.
3500 Coffee Road, Suite B
Bakersfield, California 93308

APRIL 2015 (REVISED MAY 2019)

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

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Figure 1. General location site map.
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Appendix A. Photolog
Appendix B. State and federal agency botanical survey guidelines.

1.0 INTRODUCTION

Padre Associates, Inc. (Padre) has prepared this report for GF Industries (GFI) following botanical surveys that were completed for the Johe Ranch Mine Project near McKittrick, Kern County, California. The baseline biological surveys were conducted for a 93.67 acre surface mining operation of diatomaceous earth and development of a reclamation plan on approximately 331 acres in accordance with the Surface Mining and Reclamation Act of 1975 (Project), in order to identify any threatened, endangered, or otherwise sensitive (TES) plant species that may be present within or surrounding the Project area. This report outlines the results of the botanical surveys conducted by Padre.

1.1 BACKGROUND INFORMATION

The mining operation is located approximately 8.3 miles northwest of McKittrick, Kern County, California. The mining operations are planned to occur just north of Highway 58 (**Figure 1**). The Project Site is within the northwest quarter of Section 07, Township 30 South, Range 21 East, Mount Diablo Base and Meridian, within the United States Geological Survey (USGS) McKittrick Summit 7.5 Minute Quadrangle Map. The current estimates of material to be removed include a maximum of 400,000 tons annually, for a maximum total of 8,000,000 tons of material over the estimated 20-year life of the operation. The mine will be composed of three mine areas and will consist of one single phase (**Figure 2**). Surface area to be disturbed at mining area 1 is approximately 58 acres, at mining area 2 is approximately 17 acres, and at mine area 3 is approximately 11 acres. The proposed maximum depth of operation is approximately 225-feet for mine area 1, 188-feet for mine area 2, and 137 feet for mine area 3. Operational and final reclaimed slopes would be at a maximum 2:1 slope. Access to the site is planned to occur via Highway 58.

In June 2008, Paul Pruett & Associates (Pruett) prepared a Biota Report for the Project (Pruett 2008). Pruett conducted biological surveys for both plants and wildlife in April and May 2008. Additionally, vegetation baseline surveys utilizing square meter plot methods and pedestrian transects to estimate plant species richness and vegetation cover were conducted during this time period. However, no reference population sites for sensitive plant species were visited to determine if various plant species were in bloom during the time of the surveys.

A letter from the California Department of Fish and Wildlife (CDFW), dated August 27, 2012, requested early consultation from CDFW for the Project and included a discussion on special-status plant species that could potentially be impacted by the Project. The CDFW letter stressed the importance of identifying reference population sites to facilitate the likelihood of detecting sensitive plant species.

2.0 EXISTING ENVIRONMENTAL SETTING

2.1 PHYSICAL SETTING

An unnamed ephemeral drainage traverses through the western portion of the areas planned for mining activities. The drainage flows from higher elevations southwest of the Project Site and eventually converges at lower elevations with another unnamed ephemeral drainage within the Willow Springs Valley. Further review of the topographical maps for the Project Site and surrounding areas reveal that the drainages continue to flow through portions of the Temblor Range and terminate within the Temblor Valley, which presently contains the Cymric Oil Field. However, the drainage appears to be heavily disturbed by agricultural activities approximately one mile downstream from the Project boundary. No riparian and/or wetland habitat was observed within these drainages. During the biological survey, no flowing and/or standing water was observed within the drainage. The drainage had a v-shaped profile in the higher elevations of the Project Site and eventually widened into a sandy bottom drainage in the lower elevations of the site.

2.2 GEOLOGY

The Project Site occurs within the rolling foothills of the Temblor Mountains in the western portion of Kern County. Willow Springs Valley occurs directly south of the Project Site. The elevation on the site ranges between 2,000 to 2,600 feet. Areas planned for mining are composed of steep hillsides with gullies/depressions in between the hills (See Photolog). Flat terrain is mostly found to the south of the Project Site in areas that are not intended for mining activities.

Soils occurring within or near the Project Site include: Reward shaly loam, Mendi-Hillbrick-Kilmer association, Reward channery loam, and Pottinger very shaly clay loam (USDA 2014). The Reward shaly loam comprises the majority of the soil types present on the Project site. This soil type is a loam type that occurs on hill slopes. These are well drained soils formed from weathered sandstone and shale.

2.3 VEGETATION TYPES

The vegetative association at Johe Ranch Mine consists primarily of Annual (non-native) Grassland. Greater descriptions of these vegetation types are included below and site photos are included in the attached Photolog (**Appendix A**).

2.3.1 Annual (Non-native Grassland)

An Annual Grassland community is characterized by a sparse to dense cover of low (< 3.3 feet; <1 meter) annual grasses and native and non-native herbaceous species (Holland, 1986; Sawyer and Keeler-Wolf, 1995). Shrubs and sub-shrubs are sometimes scattered in grasslands but do not dominate the vegetation. Annual Grasslands were present throughout the majority of the mining areas. Dominant species in this vegetation type included *Bromus* spp. (ripgut and red brome), wild barley (*Hordeum* spp.), Mediterranean grass (*Schismus* spp.), and a variety of other annuals such as fiddleneck (*Amsinckia* spp.) redstem filaree (*Erodium cicutarium*) and peppergrass (*Lepidium* spp.).

3.0 BOTANICAL SURVEY METHODOLOGIES

3.1 DESKTOP ANALYSIS

Prior to the start of the 2015 botanical surveys at the Johe Ranch Mine, a desktop analysis was conducted to identify any special-status plant species that may be present within or surrounding the Project site. The desktop analysis included a query for the Reward and eight surrounding USGS 7.5-minute quadrangles using the United States Fish and Wildlife Service (USFWS) Critical Habitat Portal, a California Department of Fish and Wildlife (CDFW) California Natural Diversity Database search (CDFW, 2015), and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants list (CNPS, 2015). From these searches, it 34 plants have been reported within the nine-quad search of the Project site (see **Table 3.1** below).

Nine species of plants that were identified in the above query were not included in the table as special-status plant species that may be present at the Project site due to lack of suitable habitat within the Project site or the site being out of the known range for the species. These included: California androsace (*Androsace elongate* ssp*. acuta*), white pygmy-poppy (*Canbya candida*), peninsular spineflower (*Chorizanthe leptotheca*), marsh claytonia (claytonia palustris), Ferris' goldfields (*Lasthenia ferrisiae*), Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), Jared's peppergrass (*Lepidium jaredii* ssp*. jaredii*), chaparral ragwort (*Senecio aphanactis*), and golden violet (*Viola purpurea* ssp*. aurea*). Therefore, these plants will not be discussed further in the report.

Table 3.1. Special-status Plant Species Potentially Occurring at Johe Ranch Mine.

Species	Status	Habitat	Blooming Period	Survey Requirements
Amsinckia vernicosa ssp. furcata Forked fiddleneck	CRPR 4.2	Cismontane woodland, and valley and foothill grassland. 50 – 1000m.	February-May	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Antirrhinum ovatum Oval-leaved snapdragon	CRPR 4.2	Chaparral, cismontane woodland, pinyon and juniper woodland and valley and foothill grassland. 200 – 1000m.	May-November	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Astragalus hornii var. *hornii* Horn's Milkvetch	CRPR-1B.1	Meadows and seeps, playas, lake margins, at alkaline sites. 60 – 850m.	May-October	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Astragalus macrodon Salinas milk-vetch	CRPR 4.3	Chaparral, cismontane woodland and valley and foothill grassland. 250 – 950m.	April - July	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Atriplex cordulata var. *cordulata* Heartscale	CRPR 1B.2	Chenopod scrub, valley and foothill grassland and meadows and seeps in saline or alkaline soils. 0 – 560m.	April-October	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Atriplex coronata var. coronata Crownscale	CRPR 4.2	Chenopod scrub, valley and foothill grassland, and vernal pools. 1 – 590m.	March-October	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Atriplex coronata ssp. *vallicola*	CRPR 1B.2, BLM S	Chenopod scrub, valley and foothill grasslands, and vernal pools in powdery, alkaline soils that is vernally	April-August	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to

Species	Status	Habitat	Blooming Period	Survey Requirements
Lost Hills Crownscale		moist. 50 – 635m.		determine if plants are identifiable.
California macrophylla Round-leaved filaree	CRPR 1B.1, BLM S	Cismontane woodland and valley and foothill grassland. 15 – 1200m.	March-May	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Caulanthus californicus California Jewelflower	FE/ SE/CRPR 1B.1	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodlands. 61 – 1000m.	February-May	State and Federal Guidelines: transects between 5 and 10 meters apart throughout all habitats, prior to survey, should visit known locations to verify precipitation has been adequate for germination with one person who has seen the species.
Caulanthus lemmonii Lemmon's jewelflower	CRPR 1B.2	Pinyon and juniper woodland and valley and foothill grassland. 80 – 1220m.	March-May	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Clarkia xantiana ssp. *parviflora* Kern Canyon clarkia	CRPR 4.2	Chaparral, cismontane woodland, great basin scrub and valley and foothill grassland often in sandy, sometimes rocky slopes. 700 – 3620m.	May-June	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Delphinium recurvatum Recurved Larkspur	CRPR-1B.2	Chenopod scrub, valley and foothill grasslands, cismontane woodlands on alkaline soils. 3 – 790m.	March-June	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Eremalche kernensis Kern Mallow	FE/CRPR 1B.1	Chenopod scrub, valley and foothills grassland with dry, open sandy clayey soils. 70 – 1290m.	March-May	Federal Guidelines: transects between 5 and 10 meters apart throughout all habitats, prior to survey, should visit known locations to verify precipitation has been adequate for germination with one person who has seen the species.

Species	Status	Habitat	Blooming Period	Survey Requirements
Eriastrum hooveri Hoover's Eriastrum	CRPR 4.2	Chenopod scrub, valley and foothill grasslands, pinyon juniper woodlands on sparsely vegetated alkaline alluvial fans and sandy soils in the Temblor range. 50 – 915m.	March-June	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Eriogonum gossypinum Cottony buckwheat	CRPR 4.2	Valley and foothill grasslands and chenopod scrub, possibly on clay soils. 100 – 550m.	March-September	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Eriogonum temblorense Temblor buckwheat	CRPR 1B.2,	Valley and foothill grasslands, barren clay or sandstone substrate. 300 - 1000m.	April-September	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Eschscholzia lemmonii ssp. *kernensis* Tejon Poppy	CRPR 1B.1	Valley-foothill grasslands and chenopod scrub with sandy soils. 160 – 1000m.	March-May	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Eschscholzia hypecoides San Benito poppy	CRPR 4.3	Chaparral, cismontane woodland and valley and foothill grassland. 200 – 1500m.	March-June	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Eschscholzia rhombipetala Diamond-petaled California poppy	CRPR 1B.1	Valley and foothill grassland; fallow fields; alkaline, clay; <300 m.	March-April	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Layia heterotricha Pale-yellow layia	CRPR 1B.1	Cismontane woodland, coastal scrub, pinyon and juniper woodland and valley and foothill grassland on alkaline or clay soil. 300 – 1705m.	March-June	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.

Species	Status	Habitat	Blooming Period	Survey Requirements
Layia munzii Munz tidy tips	CRPR 1B.2	Chenopod scrub and valley and foothill grassland. 150 – 700m.	March-April	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Madia radiata Showy Golden Madia	CRPR 1B.1	Valley and foothill grasslands, cismontane woodlands, and chenopod scrub mostly on adobe clay. 25 – 1215m.	March-May	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Monolopia congdonii San Joaquin Woolly-threads	FE/CRPR 1B.2	Chenopod scrub and valley-foothill grasslands with alkaline or loamy plains with sandy soils. 60 – 800m.	February-May	Federal Guidelines: transects between 5 and 10 meters apart throughout all habitats, prior to survey, should visit known locations to verify precipitation has been adequate for germination with one person who has seen the species.
Stylocline citroleum Oil Neststraw	CRPR 1B.1	Chenopod scrub, valley and foothill grassland, and possibly coastal scrub on flats with sandy soils in oil-producing areas. 50 – 400m.	March-April	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.
Trichostema ovatum San Joaquin bluecurls	CRPR 4.2	Chenopod scrub and valley and foothill grasslands. 65 – 320m.	July-October.	CNPS Guidelines: proper times of the year when plants are both evident and identifiable. Reference sites should be visited first to determine if plants are identifiable.

FE = Federally listed Endangered
SE = State listed Endangered
CRPR = California Rare Plant Rank
1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
4 = Limited Distribution (watch list)
0.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 = Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 = Not very threatened in California (less than 20% occurrences threatened / low degree and immediacy of threat or no current threats known)

3.2 BOTANICAL REFERENCE SITE VISITS

Prior to the start of botanical surveys, Padre biologists visited several special-status plant reference sites to determine if listed plant species were in bloom for proper species identification. Table 3.2 below includes a list of the federally and/or state Endangered plant species visited as well as their locations and dates. Plants listed on the CNPS Inventory of Rare and Endangered Plants that were included in Table 3.1 were also visited at several locations. These included the Carrizo Plains National Monument, the Lokern area west of Buttonwillow, California, and Elk Hills near Taft, California. Many of the plants listed in Table 3.1 were observed at reference sites prior to beginning botanical surveys at Johe Ranch Mine. For those plants not observed, plants in the same genus were checked to ensure that blooming was present.

Table 3.2. Reference Sites Visited for State and/or Federally Listed Plants.

Common Name	Scientific Name	Date	Location
Kern mallow	*Eremalche parryi* ssp. *kernensis*	2/17/2015	35.422874°, -119.606105°
California jewel flower	*Caulanthus californicus*	2/17/2015	34.850411°, -119.497388°
San Joaquin woolly threads	*Monolopia congdonii*	2/18/2015	35.502261°, -119.816160°

3.3 SURVEY METHODOLOGIES

Padre biologists conducted botanical surveys at the Johe Ranch Mine on February 24, 2015 and March 31, 2015. **Figure 3** depicts the areas where botanical surveys were conducted. Meandering pedestrian belt transects spaced approximately five to ten meters apart were completed within the areas planned for mining and proposed access roads, where accessible. A 200-foot buffer around these locations was included and surveyed as well. Transects were modified as needed depending on topography, shrub coverage, safely accessible, and property access, etc.

Surveys were scheduled for the proper time of year when most plants were both evident (i.e. flowering) and identifiable. The region experienced what seemed to be an early “spring” and many plant species were already in full bloom during the first botanical survey. Every plant observed during the surveys was recorded and identified to species, subspecies, and/or variety as applicable. The Jepson Manual, Second Edition (Baldwin *et al*., 2012) was consulted and used for the identification of species observed in the field. Hand-held Global Positioning System (GPS) units were on-hand to record the locations of any special-status plant species observed during the surveys. Photographs were also taken at various locations within the Project site (**Appendix A**).

3.3.1 State and Federal Agency Survey Guidelines

The USFWS, CDFW, and CNPS each have protocols for surveying rare and/or special-status plant species on public and private lands as noted below. These guidelines above are provided in full in **Appendix B** and were reviewed by Padre biologists prior to the start of the 2015 botanical surveys. These include the following:

- United States Fish and Wildlife Service. 2000. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate species.
- California Department of Fish and Wildlife. 2009. Protocols for surveying and evaluation impacts to special-status native plant populations and natural communities.
- California Native Plant Society. 2001. CNPS botanical survey guidelines.

4.0 RESULTS

4.1 SUMMARY OF PLANT SPECIES OBSERVED

Padre biologists identified 62 plant species throughout the survey area within the Project site. The species observed were common native or non-native species typically found in similar habitats in western Kern County and surrounding areas. A complete list of plant species observed during the 2015 botanical surveys can be found below in Table 4.1.

Table 4.1. List of Plant Species Observed During 2015 Johe Ranch Mine Botanical surveys.

Scientific Name	Common Name
Achyracheana mollis	Blow wives
Acmisopon brachycarpus	Short podded lotus
Ambrosia sp.	Ragweed
Amsinckia menziesii	Menzie's fiddleneck
Amsinckia tessellata var. *gloriosa*	Bristly fiddleneck
Astragalus lentiginosus var*. nigricalycis*	Bakersfield freckled milkvetch
Avena barbata	Slender oats
Avena sativa	Wild oats
Bromus diandrus	Rip-gut brome
Brassica nigra	Black mustard
Bromus hordeaceus	Soft brome
Bromus madritensis ssp*. madritensis*	Foxtail chess
Bromus madritensis ssp*. rubens*	Red brome
Calandrinia ciliata	Redmaids
Capsella bursa-pastoris	Shepherd's-purse
Castilleja exserta ssp. *exserta*	Purple owl's clover
Caulanthus lasiophyllus	California mustard
Clarkia affinis	Chaparral clarkia
Clarkia bottae	Botta's clarkia
Claytonia perfoliata	Miner's lettuce
Collinsia heterophylla	Purple Chinese houses
Croton setigerus	Doveweed; turkey mullein
Datura wrightii	Jimson weed
Delphinium gypsophilum sp*. gypsophilum*	Gypsum-loving larkspur
Dichelostemma capitatum	Blue dicks
Eriogonum gracillimum	Rose and white buckwheat
Erodium cicutarium	Redstem filaree
Eschscholzia californica	California poppy
Erysimum capitatum var. capitatum	Western wallflower
Galium aparine	Goosegrass
Herniaria hirsuta var. cinerea	Hairy rupturewort

Hordeum murinum	Farmer's foxtail
Isocarma acradenia var. *bracteosa*	Alkali goldenbush
Lepidium nitidum var. *nitidum*	Shining pepperweed
Lessingia gladulifera	Vinegar weed
Lomatium utriculatum	Common lomatium
Lupinus bicolor	Miniature lupine
Lupinus microcarpus	Chick lupine
Melica californica	California melic
Marah fabaceus	Manroot
Malva sp.	Cheeseweed
Marrubium vulgare	Horehound
Nasella pulchra	Purple needlegrass
Nemophila menziesii var. *menziesii*	Baby blue eyes
Peritoma arborea	Bladderpod
Phacelia tanacetifolia	Tansy leafed phacelia
Plagiobothrys canescens	Valley popcornflower
Poa secunda	One sided blue grass
Salsola sp.	Russian thistle
Schismus sp.	Mediterrean grass
Senecio sp.	Groundsel
Sisymbrium irio	London rocket
Sisymbrium orientale	Oriental hedge mustard
Stephanomeria pauciflora	wirelettuce
Thysanocarpus curvipes	Sand fringepod
Thysanocarpus laciniatus	Cut-leaf fringepod
Tragopogon pratensis	Meadow salsify
Trifolium albopurpureum	Rancheria clover
Trifolium willdenovii	Tomcat clover
Tropidocarpum gracile	Dobie pod
Urtica dioica	Stinging nettle

4.2 SPECIAL-STATUS PLANT SPECIES

No special-status plant species were observed within or near the survey area during the 2015 botanical surveys. Gypsum-loving larkspur (*Delphinium gyposphilum* ssp*. gypsophilum*) was observed to occur on many of the north-facing slopes throughout the Project site; however, this plant species was from the 4.2 CRPR list species for being "too common" (CNPS 2015). Lemmon's jewelflower (*Caulanthus lemmonii*) was observed in full bloom during the February botanical survey approximately 2.6 miles west of the Project site; but was not observed within or in any other areas near the Project site. Lemmon's jewelflower is currently listed as a CRPR 1B.2 by the CNPS.

5.0 RECOMMENDATIONS

Although no special-status plant species were observed during the botanical surveys, the following recommendations have been included in the event that any special-status plant species are observed during pre-activity surveys or throughout the life of the Project. The following section outlines various recommendations to minimize the take of any listed or sensitive plant species that may occur where Project activities are planned. Implementation of these measures is designed to avoid and/or minimize effects to listed plant species and their habitats if they are found within the Project mining areas or access roads.

- All Project employees and contractors should receive formal training prior to working on the Project including attending a sensitive species education program developed by trained biologists, focusing on the protected and sensitive plant species that may occur in the Project areas. At a minimum, the program will cover species distribution, identification characteristics, and sensitivity to human activities, legal protection, penalties for violation of state and federal laws, reporting requirements, and project mitigation measures.
- Vehicles should use existing and/or designated roads and avoid any cross-country travel.
- Dust control (use of water trucks) should be implemented during all project activities that create a substantial amount of dust. Fugitive dust can accumulate on the surfaces of plants and effect photosynthetic processes, which may result in the death of certain plants.
- All spills of hazardous materials shall be immediately cleaned up to prevent exposure to plant species.
- Topsoil that can potentially or is known to support sensitive plant species should be stockpiled and redistributed over portions of work areas that will be temporarily disturbed.
- In any locations where work has to be conducted near sensitive biological areas, on-site biological monitoring will be performed during work activities to ensure that sensitive plant species are not impacted. The biological monitor shall flag-off or mark-off all areas clearly within the mining areas if sensitive plant species are present. Project personnel shall avoid all flagged areas and Project activities shall avoid disturbance activities.

6.0 REFERENCES

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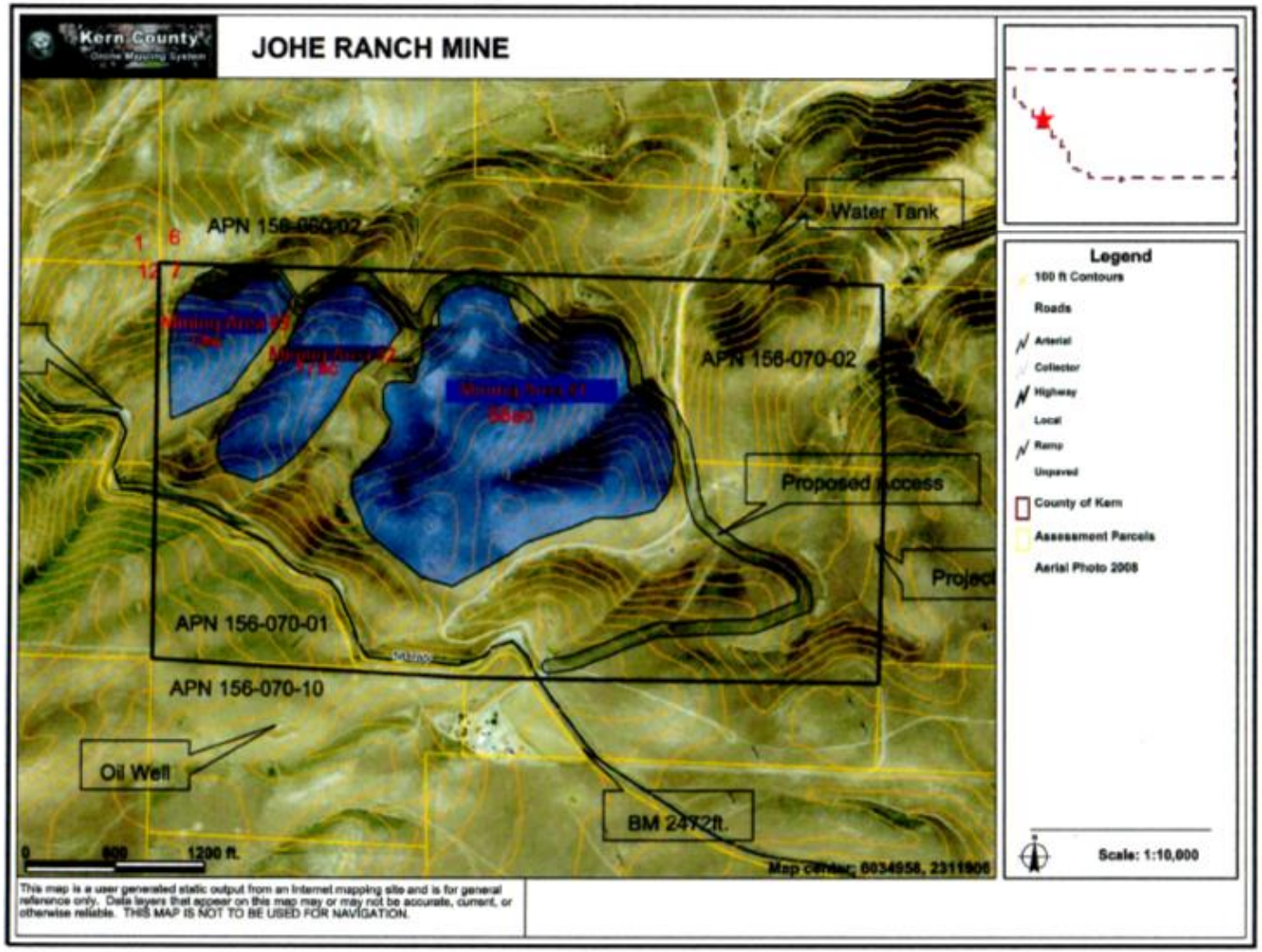
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GF Industries
Johe Ranch Mine Project
April 2015

Figure 1
General Location Site Map



padre associates, inc. ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS	**GF Industries** **Johe Ranch Mine Project** April 2015	**Figure 2** Areas to be disturbed by mining activities (Figure provided by GF Industries).



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Johe Ranch Mine Project
April 2015

Figure 3
Areas (green) where botanical surveys were conducted.

Appendix A.

Photolog

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Photolog of the 2015 Botanical Survey at Johe Ranch Mine Project, McKittrick, Kern County, California. February/March 2015



Photo 1. View facing south of Mining Area 1 during February 2015 botanical survey.



Photo 2. View facing southeast of Mining Area 1 during February 2015 botanical survey.



Photo 3. View of Mining Area 2 facing northwest during February 2015 botanical survey..



Photo 4. Annual grassland with *Amsinckia* sp.



Photo 5. Baby blue eyes (*Nemophila menziesii*) and Amsinckia sp..



Photo 6. California poppy (*Eschscholzia californica*) observed throughout Project site.

Photolog of the 2015 Botanical Survey at Johe Ranch Mine Project, McKittrick, Kern County, California. February/March 2015



Photo 7. View facing west of Mining Areas 2 and 3 during February 24, 2015 botanical survey.



Photo 8. View facing west of Mining Area 1 during March 31, 2015 botanical survey.



Photo 8. View of pre-existing access roads throughout Project site during March 31, 2015 botanical survey..



Photo 9. View facing north of Mining Area 1 during March 31, 2015 botanical survey.



Photo 10. View facing northwest of Mining Areas 2 and 3 during March 31, 2015 botanical survey.

Appendix B.

State and Federal Agency Botanical Survey Guidelines

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Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed, or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

    a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

    b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

    c. survey dates and survey methodology(ies)

    d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

    e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

f. current and historic land uses of the habitat(s) and degree of site alteration

g. presence of target species off-site on adjacent parcels, if known

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

CNPS Botanical Survey Guidelines

CALIFORNIA NATIVE PLANT SOCIETY
December 9, 1983
Revised June 2, 2001

The following recommendations are intended to help those who prepare and review environmental documents determine when a botanical survey is needed, who should be considered qualified to conduct such surveys, how surveys should be conducted, and what information should be contained in the survey report. The California Native Plant Society recommends that lead agencies not accept the results of surveys unless they are conducted and reported according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all botanical resources, including special status plants (rare, threatened, and endangered plants) and plant (vegetation) communities. Special status plants are not limited to those that have been listed by state and federal agencies but include any plants that, based on all available data, can be shown to be rare, threatened, or endangered under the following definitions:

   > A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.[1]

   Rare plant (vegetation) communities are those communities that are of highly limited distribution. These communities may or may not contain special status plants. The most current version of the California Natural Diversity Database's *List of California Terrestrial Natural Communities*[2] should be used as a guide to the names and status of communities.

   Consistent with the California Native Plant Society's goal of preserving plant biodiversity on a regional and local scale, and with California Environmental Quality Act environmental impact assessment criteria[3], surveys should also assess impacts to locally significant plants. Both plants and plant communities can be considered significant if their local occurrence is on the outer limits of known distribution, a range extension, a rediscovery, or rare or uncommon in a local context (such as within a county or region). Lead agencies should address impacts to these locally unique botanical resources regardless of their status elsewhere in the state.

2. Botanical surveys must be conducted to determine if, or to the extent that, special status or locally significant plants and plant communities will be affected by a proposed project when any natural vegetation occurs on the site and the project has the potential for direct or indirect effects on vegetation.

3. Those conducting botanical surveys must possess the following qualifications:
   a. Experience conducting floristic field surveys;
   b. Knowledge of plant taxonomy and plant community ecology and classification;
   c. Familiarity with the plants of the area, including special status and locally significant plants;

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[1] California Environmental Quality Act Guidelines, §15065 and §15380.
[2] List of California Terrestrial Natural Communities. California Department of Fish and Game Natural Diversity Database. Sacramento, CA.
[3] California Environmental Quality Act Guidelines, Appendix G (Initial Study Environmental Checklist).

d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
e. Experience with analyzing impacts of a project on native plants and communities.

4. Botanical surveys should be conducted in a manner that will locate any special status or locally significant plants or plant communities that may be present. Specifically, botanical surveys should be:

    a. Conducted in the field at the proper times of year when special status and locally significant plants are both evident and identifiable. When special status plants are known to occur in the type(s) of habitat present in the project area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the plants are identifiable at the time of survey.

    b. Floristic in nature. A floristic survey requires that every plant observed be identified to species, subspecies, or variety as applicable. In order to properly characterize the site, a complete list of plants observed on the site shall be included in every botanical survey report. In addition, a sufficient number of visits spaced throughout the growing season is necessary to prepare an accurate inventory of all plants that exist on the site. The number of visits and the timing between visits must be determined by geographic location, the plant communities present, and the weather patterns of the year(s) in which the surveys are conducted.

    c. Conducted in a manner that is consistent with conservation ethics and accepted plant collection and documentation techniques[4,5]. Collections (voucher specimens) of special status and locally significant plants should be made, unless such actions would jeopardize the continued existence of the population. A single sheet should be collected and deposited at a recognized public herbarium for future reference. All collections shall be made in accordance with applicable state and federal permit requirements. Photography may be used to document plant identification only when the population cannot withstand collection of voucher specimens.

    d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas. All habitats within the project site must be surveyed thoroughly in order to properly inventory and document the plants present. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity.

    e. Well documented. When a special status plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5-minute topographic map with the occurrence mapped, shall be completed, included within the survey report, and separately submitted to the California Natural Diversity Database. Population boundaries should be mapped as accurately as possible. The number of individuals in each population should be counted or estimated, as appropriate.

5. Complete reports of botanical surveys shall be included with all environmental assessment documents, including Negative Declarations and Mitigated Negative Declarations, Timber Harvesting Plans, Environmental Impact Reports, and Environmental Impact Statements. Survey reports shall contain the following information:

    a. Project location and description**,** including:

[4] Collecting Guidelines and Documentation Techniques. California Native Plant Society Policy (adopted March 4, 1995).
[5] Ferren, W.R., Jr., D.L. Magney, and T.A. Sholars. 1995. The Future of California Floristics and Systematics: Collecting Guidelines and Documentation Techniques. *Madroño* 42(2):197-210.

1) A detailed map of the location and footprint of the proposed project.
2) A detailed description of the proposed project, including one-time activities and ongoing activities that may affect botanical resources.
3) A description of the general biological setting of the project area.

b. Methods, including:
   1) Survey methods for each of the habitats present, and rationale for the methods used.
   2) Description of reference site(s) visited and phenological development of the target special status plants, with an assessment of any conditions differing from the project site that may affect their identification.
   3) Dates of surveys and rationale for timing and intervals; names of personnel conducting the surveys; and total hours spent in the field for each surveyor on each date.
   4) Location of deposited voucher specimens and herbaria visited.

c. Results, including:
   1) A description and map of the vegetation communities on the project site. The current standard for vegetation classification, *A Manual of California Vegetation*[6], should be used as a basis for the habitat descriptions and the vegetation map. If another vegetation classification system is used, the report must reference the system and provide the reason for its use.
   2) A description of the phenology of each of the plant communities at the time of each survey date.
   3) A list of all plants observed on the project site using accepted scientific nomenclature, along with any special status designation. The reference(s) used for scientific nomenclature shall be cited.
   4) Written description and detailed map(s) showing the location of each special status or locally significant plant found, the size of each population, and method used to estimate or census the population.
   5) Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms and accompanying maps.

d. Discussion, including:
   1) Any factors that may have affected the results of the surveys (*e.g.*, drought, human disturbance, recent fire).
   2) Discussion of any special local or range-wide significance of any plant population or community on the site.
   3) An assessment of potential impacts. This shall include a map showing the distribution of special status and locally significant plants and communities on the site in relation to the proposed activities. Direct, indirect, and cumulative impacts to the plants and communities shall be discussed.
   4) Recommended measures to avoid and/or minimize direct, indirect, and cumulative impacts.

e. References cited and persons contacted.

f. Qualifications of field personnel including any special experience with the habitats and special status plants present on the site.

[6] Sawyer, J.O. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society. Sacramento, CA. 471 pp.

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities

State of California
CALIFORNIA NATURAL RESOURCES AGENCY
Department of Fish and Game
November 24, 2009[1]

INTRODUCTION AND PURPOSE

The conservation of special status native plants and their habitats, as well as natural communities, is integral to maintaining biological diversity. The purpose of these protocols is to facilitate a consistent and systematic approach to the survey and assessment of special status native plants and natural communities so that reliable information is produced and the potential of locating a special status plant species or natural community is maximized. They may also help those who prepare and review environmental documents determine when a botanical survey is needed, how field surveys may be conducted, what information to include in a survey report, and what qualifications to consider for surveyors. The protocols may help avoid delays caused when inadequate biological information is provided during the environmental review process; assist lead, trustee and responsible reviewing agencies to make an informed decision regarding the direct, indirect, and cumulative effects of a proposed development, activity, or action on special status native plants and natural communities; meet California Environmental Quality Act (CEQA)[2] requirements for adequate disclosure of potential impacts; and conserve public trust resources.

DEPARTMENT OF FISH AND GAME TRUSTEE AND RESPONSIBLE AGENCY MISSION

The mission of the Department of Fish and Game (DFG) is to manage California's diverse wildlife and native plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations (Fish and Game Code §1802). DFG, as trustee agency under CEQA §15386, provides expertise in reviewing and commenting on environmental documents and makes protocols regarding potential negative impacts to those resources held in trust for the people of California.

Certain species are in danger of extinction because their habitats have been severely reduced in acreage, are threatened with destruction or adverse modification, or because of a combination of these and other factors. The California Endangered Species Act (CESA) provides additional protections for such species, including take prohibitions (Fish and Game Code §2050 *et seq.*). As a responsible agency, DFG has the authority to issue permits for the take of species listed under CESA if the take is incidental to an otherwise lawful activity; DFG has determined that the impacts of the take have been minimized and fully mitigated; and, the take would not jeopardize the continued existence of the species (Fish and Game Code §2081). Surveys are one of the preliminary steps to detect a listed or special status plant species or natural community that may be impacted significantly by a project.

DEFINITIONS

Botanical surveys provide information used to determine the potential environmental effects of proposed projects on all special status plants and natural communities as required by law (i.e., CEQA, CESA, and Federal Endangered Species Act (ESA)). Some key terms in this document appear in **bold font** for assistance in use of the document.

For the purposes of this document, **special status plants** include all plant species that meet one or more of the following criteria[3]:

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1 This document replaces the DFG document entitled "Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened and Endangered Plants and Natural Communities."

2 http://ceres.ca.gov/ceqa/

3 Adapted from the East Alameda County Conservation Strategy available at http://www.fws.gov/sacramento/EACCS/Documents/080228_Species_Evaluation_EACCS.pdf

- Listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12).

- Listed[4] or candidates for listing by the State of California as threatened or endangered under CESA (Fish and Game Code §2050 *et seq.*). A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors (Fish and Game Code §2062). A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures (Fish and Game Code §2067).

- Listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 *et seq*.). A plant is **rare** when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901).

- Meet the definition of rare or endangered under CEQA §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:

  - Species considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (Lists 1A, 1B and 2);

  - Species that may warrant consideration on the basis of local significance or recent biological information[5];

  - Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List* (California Department of Fish and Game 2008)[6].

- Considered a **locally significant species,** that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of the Department's *List of California Terrestrial Natural Communities*[7] indicates which natural communities are of special status given the current state of the California classification.

Most types of wetlands and riparian communities are considered special status natural communities due to their limited distribution in California. These natural communities often contain special status plants such as those described above. These protocols may be used in conjunction with protocols formulated by other agencies, for example, those developed by the U.S. Army Corps of Engineers to delineate jurisdictional wetlands[8] or by the U.S. Fish and Wildlife Service to survey for the presence of special status plants[9].

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4 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

5 In general, CNPS List 3 plants (plants about which more information is needed) and List 4 plants (plants of limited distribution) may not warrant consideration under CEQA §15380. These plants may be included on special status plant lists such as those developed by counties where they would be addressed under CEQA §15380. List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. List 3 and 4 plants are also included in the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List.* [Refer to the current online published list available at: http://www.dfg.ca.gov/biogeodata.] Data on Lists 3 and 4 plants should be submitted to CNDDB. Such data aids in determining or revising priority ranking.

6 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

7 http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf. The rare natural communities are asterisked on this list.

8 http://www.wetlands.com/regs/tlpge02e.htm

9 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

BOTANICAL SURVEYS

Conduct botanical surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site.

SURVEY OBJECTIVES

Conduct field surveys in a manner which maximizes the likelihood of locating special status plant species or special status natural communities that may be present. Surveys should be **floristic in nature**, meaning that every plant taxon that occurs on site is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status species or are restricted to lists of likely potential species are not considered floristic in nature and are not adequate to identify all plant taxa on site to the level necessary to determine rarity and listing status. Include a list of plants and natural communities detected on the site for each botanical survey conducted. More than one field visit may be necessary to adequately capture the floristic diversity of a site. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the species and communities on the site is also useful to assess the significance of a particular population.

SURVEY PREPARATION

Before field surveys are conducted, compile relevant botanical information in the general project area to provide a regional context for the investigators. Consult the CNDDB[10] and BIOS[11] for known occurrences of special status plants and natural communities in the project area prior to field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties of the site and surrounding ecoregion[12], unless a larger assessment area is appropriate. Then, develop a list of special status plants with the potential to occur within these vegetation types. This list can serve as a tool for the investigators and facilitate the use of reference sites; however, special status plants on site might not be limited to those on the list. Field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on this list. Include in the survey report the list of potential special status species and natural communities, and the list of references used to compile the background botanical information for the site.

SURVEY EXTENT

Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects, such as those from fuel modification or herbicide application, could potentially extend offsite. Pre-project surveys restricted to known CNDDB rare plant locations may not identify all special status plants and communities present and do not provide a sufficient level of information to determine potential impacts.

FIELD SURVEY METHOD

Conduct surveys using **systematic field techniques** in all habitats of the site to ensure thorough coverage of potential impact areas. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct surveys by walking over the entire site to ensure thorough coverage, noting all plant taxa

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10 Available at http://www.dfg.ca.gov/biogeodata/cnddb

11 http://www.bios.dfg.ca.gov/

12 Ecological Subregions of California, available at http://www.fs.fed.us/r5/projects/ecoregions/toc.htm

observed. The level of effort should be sufficient to provide comprehensive reporting. For example, one person-hour per eight acres per survey date is needed for a comprehensive field survey in grassland with medium diversity and moderate terrain[13], with additional time allocated for species identification.

TIMING AND NUMBER OF VISITS

Conduct surveys in the field at the time of year when species are both evident and identifiable. Usually this is during flowering or fruiting. Space visits throughout the growing season to accurately determine what plants exist on site. Many times this may involve multiple visits to the same site (e.g. in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special status plants are present[14]. The timing and number of visits are determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which the surveys are conducted.

REFERENCE SITES

When special status plants are known to occur in the type(s) of habitat present in the project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those species are identifiable at the time of the survey and to obtain a visual image of the target species, associated habitat, and associated natural community.

USE OF EXISTING SURVEYS

For some sites, floristic inventories or special status plant surveys may already exist. Additional surveys may be necessary for the following reasons:

- Surveys are not current[15]; or
- Surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems); or
- Surveys are not comprehensive in nature; or fire history, land use, physical conditions of the site, or climatic conditions have changed since the last survey was conducted[16]; or
- Surveys were conducted in natural systems where special status plants may not be observed if an annual above ground phase is not visible (e.g. flowers from a bulb); or
- Changes in vegetation or species distribution may have occurred since the last survey was conducted, due to habitat alteration, fluctuations in species abundance and/or seed bank dynamics.

NEGATIVE SURVEYS

Adverse conditions may prevent investigators from determining the presence of, or accurately identifying, some species in potential habitat of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any given year. Discuss such conditions in the report.

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that this plant occurrence no longer exists at this location, particularly if adverse conditions are present. For example, surveys over a number of years may be necessary if the species is an annual plant having a persistent, long-lived seed bank and is known not to germinate every year. Visits to the site in more

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13 Adapted from U.S. Fish and Wildlife Service kit fox survey guidelines available at www.fws.gov/sacramento/es/documents/kitfox_no_protocol.pdf

14 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

15 Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

16 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/botanicalinventories.pdf

than one year increase the likelihood of detection of a special status plant especially if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may ensure that the timing of the survey was appropriate.

REPORTING AND DATA COLLECTION

Adequate information about special status plants and natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants or natural communities[17] and will guide the development of minimization and mitigation measures. The next section describes necessary information to assess impacts. For comprehensive, systematic surveys where no special status species or natural communities were found, reporting and data collection responsibilities for investigators remain as described below, excluding specific occurrence information.

SPECIAL STATUS PLANT OR NATURAL COMMUNITY OBSERVATIONS

Record the following information for locations of each special status plant or natural community detected during a field survey of a project site.

- A detailed map (1:24,000 or larger) showing locations and boundaries of each special status species occurrence or natural community found as related to the proposed project. Mark occurrences and boundaries as accurately as possible. Locations documented by use of global positioning system (GPS) coordinates must include the datum[18] in which they were collected;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If the species is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of individuals in each life stage such as seedlings vs. reproductive individuals;
- The number of individuals of the species per unit area, identifying areas of relatively high, medium and low density of the species over the project site; and
- Digital images of the target species and representative habitats to support information and descriptions.

FIELD SURVEY FORMS

When a special status plant or natural community is located, complete and submit to the CNDDB a California Native Species (or Community) Field Survey Form[19] or equivalent written report, accompanied by a copy of the relevant portion of a 7.5 minute topographic map with the occurrence mapped. Present locations documented by use of GPS coordinates in map and digital form. Data submitted in digital form must include the datum[20] in which it was collected. If a potentially undescribed special status natural community is found on the site, document it with a Rapid Assessment or Relevé form[21] and submit it with the CNDDB form.

VOUCHER COLLECTION

Voucher specimens provide verifiable documentation of species presence and identification as well as a public record of conditions. This information is vital to all conservation efforts. Collection of voucher specimens should

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17 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata. For Timber Harvest Plans (THPs) please refer to the "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

18 NAD83, NAD27 or WGS84

19 http://www.dfg.ca.gov/biogeodata

20 NAD83, NAD27 or WGS84

21 http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp

be conducted in a manner that is consistent with conservation ethics, and is in accordance with applicable state and federal permit requirements (e.g. incidental take permit, scientific collection permit). Voucher collections of special status species (or suspected special status species) should be made only when such actions would not jeopardize the continued existence of the population or species.

Deposit voucher specimens with an indexed regional herbarium[22] no later than 60 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant permittee names and permit numbers on specimen labels. A collecting permit is required prior to the collection of State-listed plant species[23].

BOTANICAL SURVEY REPORTS

Include reports of botanical field surveys containing the following information with project environmental documents:

- **Project and site description**
  - A description of the proposed project;
  - A detailed map of the project location and study area that identifies topographic and landscape features and includes a north arrow and bar scale; and,
  - A written description of the biological setting, including vegetation[24] and structure of the vegetation; geological and hydrological characteristics; and land use or management history.
- **Detailed description of survey methodology and results**
  - Dates of field surveys (indicating which areas were surveyed on which dates), name of field investigator(s), and total person-hours spent on field surveys;
  - A discussion of how the timing of the surveys affects the comprehensiveness of the survey;
  - A list of potential special status species or natural communities;
  - A description of the area surveyed relative to the project area;
  - References cited, persons contacted, and herbaria visited;
  - Description of reference site(s), if visited, and phenological development of special status plant(s);
  - A list of all taxa occurring on the project site. Identify plants to the taxonomic level necessary to determine whether or not they are a special status species;
  - Any use of existing surveys and a discussion of applicability to this project;
  - A discussion of the potential for a false negative survey;
  - Provide detailed data and maps for all special plants detected. Information specified above under the headings “Special Status Plant or Natural Community Observations,” and “Field Survey Forms,” should be provided for locations of each special status plant detected;
  - Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms should be sent to the CNDDB and included in the environmental document as an Appendix. It is not necessary to submit entire environmental documents to the CNDDB; and,
  - The location of voucher specimens, if collected.

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22 For a complete list of indexed herbaria, see: Holmgren, P., N. Holmgren and L. Barnett. 1990. Index Herbariorum, Part 1: Herbaria of the World. New York Botanic Garden, Bronx, New York. 693 pp. Or: http://www.nybg.org/bsci/ih/ih.html

23 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

24 A vegetation map that uses the National Vegetation Classification System (http://biology.usgs.gov/npsveg/nvcs.html), for example *A Manual of California Vegetation*, and highlights any special status natural communities. If another vegetation classification system is used, the report should reference the system, provide the reason for its use, and provide a crosswalk to the National Vegetation Classification System.

- **Assessment of potential impacts**
  - A discussion of the significance of special status plant populations in the project area considering nearby populations and total species distribution;
  - A discussion of the significance of special status natural communities in the project area considering nearby occurrences and natural community distribution;
  - A discussion of direct, indirect, and cumulative impacts to the plants and natural communities;
  - A discussion of threats, including those from invasive species, to the plants and natural communities;
  - A discussion of the degree of impact, if any, of the proposed project on unoccupied, potential habitat of the species;
  - A discussion of the immediacy of potential impacts; and,
  - Recommended measures to avoid, minimize, or mitigate impacts.

QUALIFICATIONS

Botanical consultants should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with the plants of the area, including special status species;
- Familiarity with natural communities of the area, including special status natural communities;
- Experience conducting floristic field surveys or experience with floristic surveys conducted under the direction of an experienced surveyor;
- Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
- Experience with analyzing impacts of development on native plant species and natural communities.

SUGGESTED REFERENCES

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Appendix D.4

San Joaquin Kit Fox Survey Report Peer Review

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padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

February 20, 2019
Project Number 1402-2421

WZI Inc.
1717 28th Street
Bakersfield, CA 93301

Attention: Mr. Allen Waggoner
Senior Professional Geologist

SWCA MEMO: PEER REVIEW OF SAN JOAQUIN KIT FOX SURVEY REPORT– JOHE RANCH MINING PROJECT

Dear Mr. Waggoner:

Padre Associates, Inc. (Padre) has prepared the following response letter to the comments submitted by Ms. Jacqueline Markley with SWCA Environmental Consultants (SWCA) to Mr. Randall Cates with the Kern County Planning & Natural Resources Department regarding the San Joaquin Kit Fox Survey Report that Padre prepared for the Johe Ranch Mine Project (Project). The responses to the comments are presented below:

General Comment Response:

Please refer to **Attachment 1** as previously referenced, which provides an analysis of the potential impacts/effects to SJKF from the Johe Ranch Mine Project.

CONCLUSION

If you have any questions regarding this information, please contact Angel Correa at (661) 829-2686 ext. 301 or <acorrea@padreinc.com>.

PADRE ASSOCIATES, INC.

Angel Correa
Sr. Project Manager/Biologist

Enclosed:
Attachments 1

ATTACHMENT 1

ATTACHMENT 1: SAN JOAQUIN KIT FOX POTENTIAL EFFECTS FROM THE JOHE RANCH MINE PROJECT

The San Joaquin kit fox has the potential to be directly affected by vehicle strikes, entrapment in trenches and/or entombment in burrows during ground disturbing activities. Kit foxes may be injured or killed by predators attracted to food trash associated with activities generated from the Johe Ranch Mine Project (Project). Below is an analysis of potential impacts/effects on San Joaquin kit fox (SJKF).

Historically, SJKF have inhabited the majority of the San Joaquin valley and interior basins of the Coast Ranges in addition to other scattered populations. Current distributions suggest that San Joaquin kit foxes inhabit the majority of the larger, scattered pieces of natural communities that remain over most of their original range. Two of the three largest extant populations of SJKF exist in the southern range of the kit fox. The Western Kern County Core Area and in the Carrizo Plain Area in San Luis Obispo County (USFWS, 2010). The largest threat to the SJKF populations is habitat loss due to agricultural conversion, infrastructure construction, and urban development. (USFWS, 2010). Additional potential threats to kit fox habitat is habitat alterations due to oil extraction and mining activities. These threats contribute to the decline of kit foxes through direct and indirect effects by mortalities, displacement, reduction of prey populations and suitable denning sites, changes in the population dynamics of larger canids that compete with kit fox for resources and reduces their carrying capacity (Jensen, 1972 and Morrell, 1975, as cited by USFWS, 2010). During land conversion activities, kit fox may be buried in their dens or permanently displaced. The mining activities that are planned for the Project could potentially create barriers or disruption to the movement of San Joaquin kit fox in the habitat corridor between two the Carrizo Plains and Western Kern County. The southwestern San Joaquin Valley contains the highest number of San Joaquin kit fox occurrences (Cypher *et al.,* 2000, as cited by USFWS, 2010). The San Joaquin kit fox has adapted too many highly disturbed habitats including the fringes of suburban development, oil exploration and production areas, cultivated fields, pastures, orchards and other similar fragmented and ruderal communities (Cypher *et al*., 2000, as cited by USFWS 2010). Because of their ability to adapt to these fragmented and highly disturbed habitats, the Project area is considered to be appropriate for inhabitation by San Joaquin kit foxes.

Direct impacts from mining activities include foraging habitat loss, loss of natural prey items, destruction of earthen and man-made dens, and entombment in dens. The direct impacts of greatest concern are those resulting from earth movement as a result of heavy equipment used to remove vegetation and to conduct mining activities. The loss of a den in itself may not be a significant impact because SJKF typically have multiple dens within their home ranges. However, significant impacts can occur if a SJKF den is destroyed while occupied by one or more kit foxes, particularly if it is a natal den harboring young that are not able to escape entombment. (Cypher and Van Horn Job, in press, as cited by USFWS, 2010). The development of potential habitat areas may reduce the abundance and distribution of SJKF by lowering the carrying capacity of populations of both SJKF and their prey species (such as kangaroo rats) due to habitat loss and fragmentation (Warrick and Cypher, 1998; Cypher *et al*., 2000, as cited by USFWS 2010). The studies for the SJKF and developed areas were mostly conducted within the rugged terrain (steep slopes) of Elk Hills, which is habitat not preferred by SJKF as they may be more vulnerable to predation by larger predators (Warrick and Cypher, 1998; Koopman et al., 2001, as cited by USFWS 2010); however, the terrain within this setting could be likened to the terrain found at the Johe Ranch Mine Project site.

Indirect impacts to SJKF may occur from Project activities from: vehicle strikes on roads and highways, predation from larger canines i.e. coyote, bobcat, etc.; and creation of barriers to SJKF movements from roads, canals, fences and walls (USFWS, 2010). Further development such as from oil and mining activities in the region could have impacts on San Joaquin kit fox populations, most likely through continued habitat fragmentation and conversion. Studies on populations of SJKF on oilfield areas have stemmed in mixed results, with the most apparent effects occurring from indirect effects of "long-term habitat change" (USFWS, 2010).

As the Project is anticipated to result in altering the current conditions of the area for the purpose of a mining facility, impacts and/or effects, both direct or indirect could have significant impacts to SJKF. However, the implementation of take avoidance and minimization measures will greatly reduce potential impacts to San Joaquin kit fox as a result of the Project. Therefore, development of this Project with the implementation of Minimization Measures is not anticipated to jeopardize the continued existence of the San Joaquin kit fox. Take in the form of mortality or injury of SJKF due to the development of the of this mining project can be greatly reduced and/or avoided with the implementation of the Avoidance and Minimization Measures described in the sections below:

SAN JOAQUIN KIT FOX SPECIFIC TAKE AVOIDNACE AND MINIMIZATION MEASURES

As SJKF have been observed within the Project, specific measures for SJKF have been developed for the Project for the minimization and take avoidance of the species. All measures listed below should be implemented in order to reduce the risk of take to SJKF. Approval from the USFWS and CDFW must be obtained prior to the destruction/excavation of any known or natal SJKF dens. Measures presented below are taken from the USFWS *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (2011). If SJKF dens are observed and can be avoided, then exclusion zones will be established for each kit fox den. Potential SJKF dens will be avoided by 50 feet, known SJKF dens will avoided by 100 feet, and occupied and unoccupied natal/pupping dens will require consultation with CDFW and USFWS. If a den cannot be avoided during the Project activities, the USFWS and CDFW will be consulted for the best course of action.

1. Any potential, known, and/or atypical dens are observed within the Project site during preconstruction surveys, tracking of the den(s) will be required. The dens occurring within the Project will be monitored for three days using tracking medium and coupled with an infra-red beam (motion-sensor) camera to determine the current use. If no SJKF activity is observed during this period, the potential or atypical den will be destroyed immediately to preclude subsequent use, and only a known den will be destroyed with a take authorization/permit from the Service. However, if any SJKF activity is detected, additional consultation with the USFWS and CDFW will be required to determine the best course of action.

2. Project-related vehicles should observe a daytime speed limit of 20 mile per hour (mph) or less throughout the site in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. Night-time construction should be minimized to the extent possible. However, if night-time

activities do occur, then the speed limit should be reduced to 10-mph. Off-road traffic outside of designated Project areas should be prohibited.

3. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of the Project, all excavated, steep-walled holes or trenches more than 2-feet deep should be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks with a climbable surface shall be installed. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, a qualified biologist as well as the US Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) shall be contacted immediately.

4. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes or tubular structures and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored on-site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe or other structure, that section of pipe should not be moved until the USFWS and CDFW has been consulted.

5. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from a construction or project site.

6. No firearms shall be allowed on the project site.

7. No pets, such as dogs or cats, should be permitted on the project site to prevent harassment, mortality of kit foxes, or destruction of dens.

8. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the USFWS and CDFW. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.

9. An employee education program shall be developed for the Project, which will discuss impacts to SJKF and other sensitive species that may occur in the area. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and/or agency personnel involved in the project. The program should include the following: A description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the

species and its protection under the Endangered Species Act and California Endangered Species Act as well as include a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the previously referenced people and anyone else who may enter the project site.

10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with USFWS, CDFW, and revegetation experts.

11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for guidance.

12. Any contractor, employee, or military or agency personnel who are responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact USFWS and CDFW immediately in the case of a dead, injured or entrapped kit fox.

13. The Sacramento Fish and Wildlife Office and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information.

14. New sightings of kit fox shall be reported to the California Natural Diversity Database (CNDDB). A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed should also be provided to the Service at the address below.

LITERATURE CITED

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Appendix D.5

Giant Kangaroo Rat and Blunt-Nosed Leopard Lizard Biological Studies Letter

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padre
associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS

October 24, 2018
Project Number 1402-2421

WZI Inc.
1717 28th Street
Bakersfield, CA 93301

Attention: Mr. Allen Waggoner
Senior Professional Geologist

Subject: Johe Ranch Mine Project Biological Studies

Dear Mr. Waggoner:

On behalf of WZI Inc., Padre Associates, Inc. (Padre) is submitting a statement regarding biological surveys by the Kern County Planning and Natural Resources Department for the Johe Ranch Mine Environmental Impact Report (EIR). It is our assessment that the following are not necessary for inclusion in the EIR for Johe Ranch:

(a) Protocol-level surveys for giant kangaroo rats.
(b) Protocol-level surveys for blunt-nosed leopard lizard.

This assessment is based on the following of all applicable reports pertaining to biological (i.e. animal) species which are currently on file with Kern County:

- Biological Resources Report: Johe Ranch Mine Project, prepared by Padre Associates Inc., December 2014

- Supplemental Update of Biological Resources: Johe Ranch Mine Project Kern County, California, prepared by Padre Associates Inc., May 2018

The aforementioned studies stipulate that no giant kangaroo rats, short-nosed kangaroo rats or blunt-nosed leopard izards were observed during the study. Additionally, Padre has included the following information for reasons as to why protocol-level surveys for these species should not be required:

Biological surveys were conducted by Padre in 2016 and 2018 in order to determine the presence of TES species. Giant kangaroo rat (*Dipodomys ingens*) and blunt-nosed leopard lizard (*Gambelia sila*) were ruled as unlikely to occur due to the topography and habitat within the Project site. Short-nosed kangaroo rats (*Dipodmys nitratoides brevinasus*); as previously stated by Padre have a potential to occur within the Project site. Although short-nosed kangaroo rats (SKR) are designated as California Species of Special Concern, they are not federally and/or state listed and no incidental take permits can be obtained for this species. SKR typically occur in areas of low topographical relief and with sparse desert shrub associations but may occur in hilly terrain (ESRP 1998).

Giant kangaroo rats (GKR) are known to occur in annual grassland habitats with slopes ranging up to 22 percent (USFWS 2010a). The majority of the proposed Johe Ranch Mine occurs on slopes over 22 percent, which is typically suboptimal terrain for GKR. Additionally, GKR burrows can typically be identified such as those observed in the Lokern and Carrizo Plain areas and Padre did not observe any burrows characteristic of GKR on any portion of the Project site. Although studies such as the Lokern Grazing Study have resulted in more GKR being captured in grazed lands versus in ungrazed lands, GKR only accounted for 3% of species captured on grazed lands; likely indicating grazed grasslands are suboptimal for GKR as well (USFWS 2010a). The Johe Ranch Mine is actively grazed. In addition, Padre Biologist, Andrew Krause, who holds both a California Memorandum of Understanding and Federal Recovery Permit for the live-trapping of GKR, also surveyed the Project site and did not think it supported suitable habitat for GKR. The nearest occurrence of GKR is reported approximately six miles west of the Project site within the Carrizo Plain and approximately eight miles east of the Project site in the Lokern Area (CNDDB 2018). GKR are also known to occur within the McKittrick Valley and Buena Vista Valley, and Johe Ranch Mine is not within any of these geographical locations. Therefore, it is unlikely that GKR occur within the Johe Ranch Mine project site and protocol surveys should not be required for the EIR.

Blunt-nosed leopard lizards (BNLL) are also known to occur in areas that are relatively flat (USFWS 2010; Bailey and Germano 2015) and are not known in areas with slopes greater than 30 to 40 degrees (Germano and Williams 1992). As previously stated, the terrain within Johe Ranch Mine is composed mostly of steep terrain that is typically not suitable for BNLL. Drainages/ephemeral creeks observed within or near the mine were v-shaped and narrow and congested with vegetation (Russian thistle), which typically are not suitable for BNLL as they prefer drainages that are flat, broad, and sandy bottomed (Zeiner *et al.* 1990). The nearest occurrences of BNLL are within the Carrizo Plain approximately seven miles away west of the Project site and Lokern area approximately four-miles west of the Project site, all reported in relatively flat areas unlike the Johe Ranch Mine property. Additionally, the mine occurs at the elevation limit (2,400 feet) for BNLL (Zeiner *et al.* 1990); therefore, it is unlikely that BNLL would occur at Johe Ranch. For these reasons, protocol-level surveys should not be required for the Project site.

CONCLUSION

If you have any questions regarding this information, please contact Angel Correa at (661) 829-2686 ext. 301 or <acorrea@padreinc.com>.

PADRE ASSOCIATES, INC.



Angel Correa
Biologist/Project Manager

Literature Cited:

Bailey, C. and Germano, D. 2015. Probability of occupancy of blunt-nosed leopard lizards on habitat patches of various sizes in the San Joaquin desert of California. Western Wildlife 2:9-28.

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Appendix D.6

AUM Calculations Correspondence (2016 and 2017)

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Randall Cates

From: Allen Waggoner <awaggoner@wziinc.com>
Sent: Monday, January 8, 2018 9:44 AM
To: Randall Cates
Subject: FW: AUM calculations

Hi Randall,

Here is the email from Julie. For the percent cover, Julie indicated 60-75% would be reasonable so we took the average at 67.5%. Please let me know if you need anything else.

Thanks,

Allen

Allen Waggoner PG, CEG, CHG
Senior Professional Geologist
WZI Inc.
1717 28th St.
Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
Cell: (661) 808-0095
E-mail: awaggoner@wziinc.com

From: Julie A Finzel [mailto:jafinzel@ucanr.edu]
Sent: Thursday, November 30, 2017 2:05 PM
To: Allen Waggoner
Subject: RE: AUM calculations

Hi Allen,

I did a cursory review of available resources. As such, I can provide input on your question below, however, I would like to point out that I have in no way considered all potential resources or references. It is very likely that I have missed something that could impact your client; I wouldn't refer to my opinion below as anything more than an informed guess.

First, considering percent cover. If average annual rainfall is assumed, a range of 60-75% cover is reasonable to expect given the species seeded. If rainfall this year is below average (a La Nina is predicted), percent plant cover may easily fall short of this mark.

Second, in regards to species richness, I think it's important to consider planting rates as well as the potential for species success. I reviewed the planting rates you provided me in September 2016, which were:

Blando Brome – 12 lbs/acre
Rose Clover – 16 lbs/acre
Big Squirrel Tail – 3 lbs/acre

Nodding Needle Grass – 3 lbs/acre
Lupine – 2 lbs/acre

A total of 36 lbs of seed was applied per acre according to these seeding rates. Species represented by percent are:
Blando Brome – 33%
Rose Clover – 50%
Big Squirrel Tail – 8.3%
Nodding Needle Grass – 8.3%
Lupine – 5.5%

Considering species representation as well as potential for success, I would expect to see more than 50% blando brome, with the potential for much higher rates depending on precipitation timing and amounts. Some rainfall patterns favor forbs, while other favor grasses. Given my research today I wouldn't expect to see big squirrel tail or nodding needle grass, each, make up more than 5% of species present. Lupine success could be as much as 10% in a good rainfall year. As with blando brome, rose clover will depend on rainfall timing and amounts. I have read trials from 30-50 years ago where clover was seeded and established fairly well initially, but after five years couldn't be found on site. Considering the other species present, clover will probably be about 30% of the species on the site.

I would like to reiterate that these numbers represent an informed guess and also that they are highly dependent on rainfall patterns this year. Actual species richness could be radically different from the numbers I have suggested above.

Respectfully,

Julie

Julie Finzel
Livestock and Natural Resources Advisor
UCCE – Kern, Tulare and Kings Counties
1031 S. Mount Vernon Ave.
Bakersfield, CA 93307
661-868-6219
jafinzel@ucanr.edu
http://cekern.ucanr.edu/Livestock/

From: Allen Waggoner [mailto:awaggoner@wziinc.com]
Sent: Thursday, November 30, 2017 11:23 AM
To: Julie A Finzel
Subject: FW: AUM calculations

Hi Julie,

Below is the email with the species of interest for reclamation and the application rate. Randall has asked that we include a cover percentage and species richness (species/square meter) number for the success criteria of the revegetation. The numbers he had proposed from a previously approved mine operation are 74.4% cover and species richness of 5, meaning all 5 reclamation species would be present.

Please let me know if these numbers would be sufficient for the success criteria or if some other numbers would be more appropriate.

Thanks so much for your help,

Allen

Allen Waggoner PG, CEG, CHG
Senior Professional Geologist
WZI Inc.
1717 28th St.
Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
Cell: (661) 808-0095
E-mail: awaggoner@wziinc.com

From: Julie A Finzel [mailto:jafinzel@ucanr.edu]
Sent: Thursday, September 15, 2016 2:13 PM
To: Allen Waggoner
Subject: RE: AUM calculations

Hi Allen,

I have included some USDA Plant webpage references that have recommended seeding rates by species. USDA NRCS is a really good resource for seeding projects. Also, the company that produces the seed will be the most familiar with seeding rates per acre based on the purity of the seed as well as germination rates under test conditions.

Let me know if you have any questions.

Julie

Blando Brome
http://plants.usda.gov/plantguide/pdf/pg_brhoh.pdf

Rose Clover
http://plants.usda.gov/plantguide/pdf/pg_trhi4.pdf
Based on the plant guide, the seeding rate of rose clover seems high. There's also the possibility that rose clover won't perform well in the planting area due to low rainfall

Big Squirreltail
http://plants.usda.gov/plantguide/pdf/pg_elel5.pdf

Nodding Needlegrass
http://plants.usda.gov/plantguide/pdf/pg_nace.pdf

In regards to the lupine, there are many species of lupine. I would need a scientific name before I can pull any more information on it. I do have an estimate for Arroyo Lupine (Lupinus succulentus) that says there are about 15,000 seeds/lb which equals about 0.3 seeds per square foot when one lb/acre is planted. At 2 lbs/acre, that equals about 0.6 seeds/square foot.

Based on the references I have provided above, my assessment is that the seeding rates should be sufficient to provide 0.25 AUM/acre, assuming normal rainfall and good grazing management.

Julie Finzel

Livestock and Natural Resources Advisor
UCCE – Kern, Tulare and Kings Counties
1031 S. Mount Vernon Ave.
Bakersfield, CA 93307
661-868-6219
jafinzel@ucanr.edu
http://cekern.ucanr.edu/Livestock/

From: Allen Waggoner [mailto:awaggoner@wziinc.com]
Sent: Wednesday, September 14, 2016 3:49 PM
To: Julie A Finzel
Subject: RE: AUM calculations

Hi Julie,

Attached is the quote from J&M Land Restoration and recommended application rate for the recommended seed mix from the Office of Mine Reclamation for revegetation at the proposed Johe Ranch diatomite mine project. Pursuant to Randall Cates request, we are trying to establish that the recommended mix and application rate will be adequate to restore the project area to grazing land which will support 0.25 AUM per acre.

Thanks for your help,

Allen

Allen Waggoner PG, CEG, CHG
Senior Professional Geologist
WZI Inc.
1717 28th St.
Bakersfield, CA 93301
Office: (661) 326-1112 ext. 231
Cell: (661) 808-0095
E-mail: awaggoner@wziinc.com

From: Julie A Finzel [mailto:jafinzel@ucanr.edu]
Sent: Thursday, September 08, 2016 11:16 AM
To: Allen Waggoner
Subject: AUM calculations

Hi Allen,

It was nice speaking with you this morning. Below are my calculations for an AUM. In thinking about the paragraph you read me, my concern would be what type of monitoring was expected and what are the expected results. As I stated during our conversation, it is important for both parties to agree to a standard and how it will be measured so there's no confusion or misinterpretation later.

1,200 lb cow eats 3% of her body weight daily (1200 * 0.03) = 36 lbs of forage consumed daily
36 * 30 days = 1,080 lbs of forage consumed monthly.
I tend to round down to 1,000 to keep things simple.

So, if one AUM is 1,000 lbs of forage, 1000 * 0.25 = 250 lbs of forage.
Therefore, 0.25 AUM = 250 lbs of forage per acre minimum forage production

Please let me know if you have any questions.

Julie

Julie Finzel
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Appendix D.7

AUM Calculation Correspondence (2020)

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Randall Cates

From: Allen Waggoner <awaggoner@wziinc.com>
Sent: Friday, January 3, 2020 10:27 AM
To: Randall Cates
Subject: FW: Johe Ranch AUM estimate

CAUTION: This email originated from outside of the organization. Do not click links, open attachments, or provide information unless you recognize the sender and know the content is safe.

Randall,

Here is Julie's response to your request. She actually added a little more information.

Please let me know if you need anything else.

Allen

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Office: (661) 326-1112 ext. 231
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E-mail: awaggoner@wziinc.com

From: Julie A Finzel <jafinzel@ucanr.edu>
Sent: Thursday, January 02, 2020 11:41 AM
To: Allen Waggoner <awaggoner@wziinc.com>
Subject: Johe Ranch AUM estimate

Hi Allen,

As a follow-up and clarification to my September 8, 2016 email regarding the Johe Ranch Mining Project:

0.25 AUM = 250 lbs of *available* forage per acre per year minimum forage production. Using the assumption that half of the forage produced is typically lost due to trampling, fecal contamination, or wildlife, a minimum of 500 lbs of forage per acre must be produced annually to support 0.25 AUM.

I went to google maps and studied the area carefully. I have a forage production plot northwest of the proposed mine location that I visit annually to measure forage production. I am familiar with the area and the species that grow there. In my opinion it is reasonable to expect the mine site to produce 500 lbs/acre or more post-successful reclamation treatments and seeding. Please see reference chart below for actual production data from the nearby plot since 2013.

Therefore, based on my informed guess, it may be assumed it would require 48 acres of reclaimed land to sustain one head of cattle on a year-round basis (12,000 pounds needed for each head of cattle per year divided by 250 pounds of available forage produced per acre per year). Further, with appropriate soil treatments and reclamation techniques I believe the seeding rate estimate provided by J & M land restoration from June 9, 2016 should be sufficient to provide this level of forage production.

Please let me know if you need anything further from me.

Best,

Julie

Year	Lbs/acre
2013	1038
2014	0
2015	2894
2016	4708
2017	1982
2018	1957
2019	3209.5

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Appendix E

Cultural Resources Assessment

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A CULTURAL RESOURCES ASSESSMENT OF APPROXIMATELY 240 ACRES WEST OF McKITTRICK, KERN COUNTY, CALIFORNIA

Prepared by:

Catherine Lewis Pruett

Three Girls and A Shovel, LLC
Catherine Lewis Pruett
Dorothy Fleagle
Peggy Murphy

2820 Alta Vista
Bakersfield, CA 93305
Telephone: 661-861-8711
Fax: 661-324-9656

Project #: 040803

Prepared for:

Robert Theiss
GF Industries
1100 East Valencia Drive
Fullerton, CA 92831

Key Words: T. 30S, R. 21E, McKittrick Summit 7.5', 249 acres, pedestrian survey, Kern County, three gas wells, no cultural resources

May 2008

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EXECUTIVE SUMMARY

At the request of Robert Theiss, with GF Industries, and on behalf of Stan and Wanda Cooper, a cultural resources assessment was conducted on 240 acres of land located west of the community of McKittrick. The project area is proposed for mining of diatomaceous earth. The purpose of the cultural resources assessment was to satisfy requirements of the California Environmental Quality Act (CEQA) regarding identification and protection of cultural resources.

No prehistoric or historic archaeological sites were located as a result of the survey. It is therefore recommended that:

1) **No further archaeological work is necessary, unless cultural resources are unearthed during development. Should cultural resources, either historic or prehistoric, be discovered during development, work must halt in the area of the finds until they can be assessed by a qualified archaeologist.**

2) **Should human remains be discovered at any time, work must halt and the Kern County Coroner be notified immediately (Section 7050.5 of the Health and Safety Code).**

INTRODUCTION

At the request of Robert Theiss, with GF Industries, and on behalf of Stan and Wanda Cooper, *Three Girls and A Shovel, LLC (TG&S),* 2820 Alta Vista Drive, Bakersfield, California, conducted a cultural resources assessment on 240 acres of land located west of the community of McKittrick. The project area is proposed for mining of diatomaceous earth. The purpose of this study was to satisfy the California Environmental Quality Act (CEQA) regarding the identification and protection of cultural resources on lands proposed for development.

PROJECT LOCATION

The project area is located in the foothills west of the community of McKittrick. The project consists of the NW 1/4 and the W ½ of the NE 1/4 of Section 7, T. 30S, R. 21E, MDBM as shown on the McKittrick Summit 7.5' series USGS topographic quadrangle, 1954, 1968, 1973 (Figure 1).

RECORDS SEARCH

A Records Search of the project area, and the area immediately surrounding it, was conducted at the Southern San Joaquin Valley Archaeological Information Center (SSJVIC) at California State University, Bakersfield (Appendix I). The records search indicated that a previous survey for cultural resources had been conducted along Highway 58 (Scott 1999). The remainder of the project area has not been inventoried for cultural resources and no cultural resources are recorded within the project area. There has been one other survey conducted within one mile of the property (Uli 1984). No archeological sites are recorded within one mile of the project area.

There are no cultural resources within the project area that are listed in the National Register of Historic Places, California Inventory of Historic Places, California State Historic Landmarks or the California Point of Historic Interest. There were potential historical locations identified on the 1912 McKittrick 15' topographic map.

The maps and files at the Department of Oil, Gas, and Geothermal were reviewed for oil and gas wells. Three gas wells are located within the project boundary.

A request was sent to the Native American Heritage Commission for review of their Sacred Lands files. No such sites were identified within the project area (Appendix II). A request was also sent to Gene Albitre of the Native American Heritage Preservation Council of Bakersfield. No response was received.

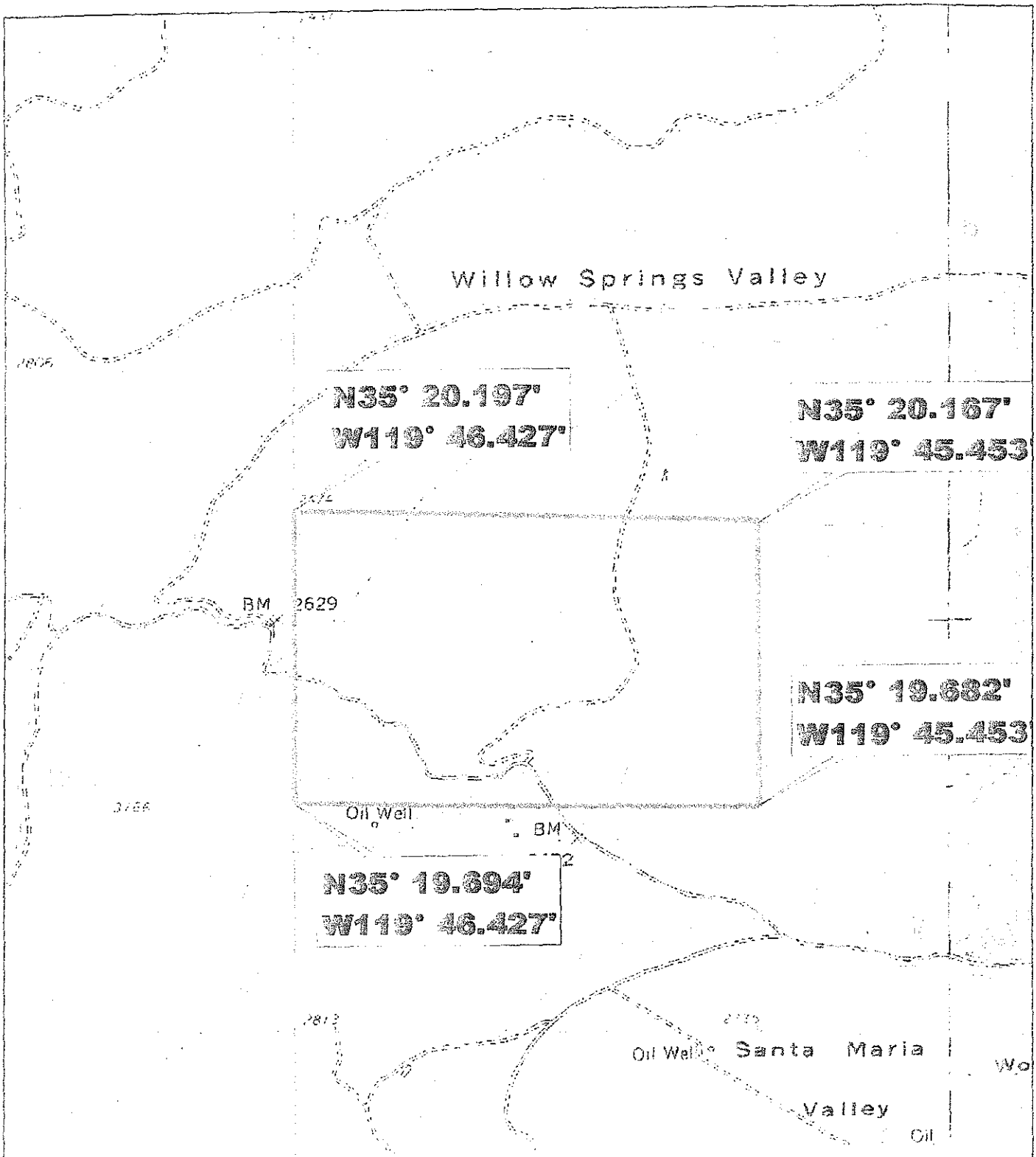


Fig. 1 Project area as shown on the McKittrick Summit 7.5' series USGS topographic quadrangle, 1954, 1968, 1973.

ENVIRONMENTAL BACKGROUND

The project area is located in Kern County in the foothills of the Temblor Range west of the community of McKittrick. Typical climate includes hot and arid summers and contrasting mild and slightly wet winters. Elevation of the project area ranges from approximately 2,200 feet to approximately 2,800 feet above mean sea level. The parcel is open and slopes downward from the southwest corner to the northeast corner. Squirrels, cottontails, and lizards were observed. Vegetation included wild flowers and dried annuals. There are no streams or springs within the project area, however, a flowing spring is located just north of the property.

PREHISTORIC ENVIRONMENTAL SETTING

A recounting of the prehistoric environment of California and the San Joaquin Valley is presented in Michael J. Moratto's "California Archaeology " (1984). The following is excerpted and paraphrased from that source.

The pre-contact native Americans were completely reliant upon their natural resources. They had extensive knowledge about habitats and animals, plants, climate, rocks, and minerals. They knew how to place villages to maximize the environmental surroundings. Their cultures were strongly influenced by natural conditions and it is necessary to understand California's environmental setting to understand it's pre-historic inhabitants and interpret the later archaeological record.

California covers approximately 157,207 square miles and includes many geomorphic provinces. With such a large area, including a long coast line, mountains, and deserts, there is great variety and contrast in the state's physiography, geology, climate, flora, and fauna. Of special concern here is the Great Central Valley, consisting of the Sacramento Valley, the Delta, and the San Joaquin Valley.

The floor of the valley is 750 km long and 30-80 km wide and is enclosed by the Siskiyou, Sierra Nevada, Tehachapi, and Coast Mountain ranges. It is underlain, mainly, by Sierran stream sediments up to 17 km deep. Elevation ranges from sear level to 100 m, broken only by the 600 m high Sutter Buttes. The Sacramento and San Joaquin River systems drain the valley and merge into the channels and marshes of the Sacramento-San Joaquin Delta. The waters later pass through a gap in the Coast Range and empty into San Pablo Bay.

Over the centuries the valley experienced many dramatic environmental changes, including: faunal extinctions and replacement at the end of the Pleistocene, the emergence of wetlands, flooding, massive siltation, cyclical appearance and evaporation of shallow lakes, and biogeographic shifts in response to climatic fluctuations.

In ancient times lakes, marshes, and sloughs covered more than 5,000 square km in the San Joaquin Valley alone. The largest lake, Tulare, occupied a structural basin created by

downwarping. Additionally, Tulare and Buena Vista Lakes were partially contained by alluvial fans reaching into the valley from the King's River and Los Gatos Creek. These coalesced into a ridge and lands to the south were so arid that runoff was often not able to maintain a discharge through the alluvium. This natural dam thus contributed to the impoundment of Tulare Lake and its swampy basin. A similar projection from the Kern River fan westward to the McKittrick Hills formed a second dam behind which lie Kern and Buena Vista Lakes. At flood levels the Buena Vista and Tulare Lakes spilled into a single basin and with the waters of the Kern Kaweah, and King's Rivers, flowed into the San Joaquin River system. The lakes are now mostly dry due to historic drainage projects.

The Central Valley was attractive to the early inhabitants. The climate was locally varied, but generally pleasant. Precipitation was also variable and in the southern San Joaquin Valley, where it was scant, the water was supplemented by the snow melt from the mountains. The Central Valley's plains and wetlands had abundant game and vegetal foods. The bottomlands produced lush swamp vegetation valued for food, fiber, and building materials. Riparian woodlands grew along the watercourses. The waterways also provided the habitats for river mussels and many species of fish. Steatite and asphaltum occurred in the southern part of the valley and salt deposits were found in the north. With so many abundances, resources that were lacking, such as obsidian, were easily obtainable through trade with outside areas. With such an abundance of resources and comfortable living conditions, the eighteenth century aboriginal population was 105,000, with 53,000 people in the Sacramento Valley and 52,000 in the San Joaquin.

During the long prehistory of the Central Valley there have been diverse and changing environments, along with many population movements, waves of cultural influences from neighboring groups, and a complex interplay between local and regional cultural forces. The oldest evidence for occupation of the valley comes from Tracy, Tulare, and Buena Vista Lakes and dates to about 11,500-7,500 years ago. Since the floor of the valley is covered with a thick layer of alluvium, it is likely that most of the earliest habitation evidence lies buried beneath it. This would account for the modest antiquity of artifacts, especially in the valley lowlands of the San Joaquin and Sacramento River drainages.

ETHNOGRAPHY - SOUTHERN VALLEY YOKUTS

The Yokuts have been broken into three geographical divisions, the Northern, Foothill, and Southern Valley Yokuts. The project area lies within the territory of the Southern Valley Yokuts. The following information is excerpted from "Southern Valley Yokuts" by William J. Wallace (1978).

The territory of the Southern Valley Yokuts included Tulare, Buena Vista, and Kern Lakes, their connecting sloughs, and the lower portion of the Kings, Kaweah, Tule, and Kern Rivers. The area consisted of extensive swamps and marshlands which provided an enormous variety and abundance of wildlife and aquatic flora. The southern San Joaquin Valley received

only 5-10 inches of rain annually and was dependent upon the additional water being brought in from the melting snows of the Sierra Nevadas. As the Yokuts adapted to this abundance of subsistence resources they developed a culture of comparatively greater material wealth and tended to live in large, more permanent settlements. It is estimated that this way of life lasted approximately 2,000 years. At the beginning of the historic period 15 different Yokuts groups were identified in the area.

Adapting to their environment, the southern Valley Yokuts developed a mixed economy subsistence pattern. It emphasized fishing, hunting waterfowl, and collecting shellfish, roots, and seeds. Most of their region was treeless except for the cottonwoods, sycamores, and willows that lined the river channels and sloughs. Oaks did not extend very far onto the valley floor and, therefore, acorns were not readily available. They were generally obtained by trade with neighboring groups.

Small land mammals and birds were only a small portion of the native diet and the Southern Valley Yokuts rarely ventured into the open country to capture antelope and elk. They did, however, capture many of the larger mammals when they came to the lakes and sloughs for water.

Various cooking methods were employed. Tule roots and seeds were ground into meal, mixed with water, and stone-boiled in baskets. Fish and meat were broiled and roasted on coals and ashes. Small earth ovens were used to bake both vegetable and animal foods. Salt grass was used for seasoning. Firewood was at a premium and dried tules were usually substituted.

Single family residences were constructed by using long poles, limbs, or sticks with one end set on the ground in an oval pattern, and the other ends brought together at the top to form a frame that was then covered with mats made from tule reeds. Some groups, using the same materials, built a distinctive long, steep-roofed communal house. This structure would shelter ten or more families. Each family would have a fireplace and outside door. Along the front of the house a long open shade porch was constructed and many of the domestic activities, such as cooking, were performed there. Additionally, each village had a communally-owned sweathouse. The men did their daily sweating and occasionally slept there.

Clothing worn by the Southern Valley Yokuts was minimal. Males were either naked or used a breechcloth. Females wore a narrow fringed apron in front and a larger back piece. In cold weather both sexes wrapped themselves in skin cloaks. Generally feet were bare, though simple skin moccasins were used when traveling over rocky, brushy terrain. The hair was worn long by men and women and held in place by a string tied around the forehead. Women, who bore the heaviest burdens, wore basketry caps to protect the forehead from the tumpline band when carrying heavy burdens. Men carried loads in net backpacks held by a chest strap. Simple design tattooing was worn mainly by women. The design consisted of lines, zigzags, and rows of dots down the chin and across from the corners of the mouth. Children had their earlobes and nasal septa pierced for insertion of an ornament.

The Yokuts technology was also shaped by the source of raw materials available. The very important tule provided the basis for their highest technological skill - basket weaving. The baskets varied in shape and use and included bowl-shaped cooking containers, conical burden baskets, flat winnowing trays, seed beaters, and a unique necked water bottle. Wood and stone crafts were quite undistinguished. Wood and many lithic materials were imported. Even stone mortars and pestles were obtained by trade. Marine shells were secured from trade with coastal peoples and used for currency and personal adornment.

Canoe-shaped rafts were constructed of dried tules and constituted the Yokuts favored mode of travel. The rafts could hold six people and their belongings.

The basic domestic and economic unit in southern Valley Yokuts society was the nuclear family. The families were grouped into patrilineal totemic lineages. A totem, an animal or bird, was a symbol representing the father's line. The totem was dreamed about, prayed to, and forbidden to kill or eat by that lineage. The lineage was a mechanism for transmitting offices, performing certain ceremonial duties, and creating mutual loyalties. These lineages were further organized into two moieties, or groups. The moieties had little to do with day-to-day like, but did serve certain functions. They would serve as opposing teams for games and as reciprocal groups in mourning rites and first-fruits ceremonies. Moiety exogamy was customary but not absolute.

There was no overall political unity among the tribes. They were split into self-governing local groups. Each group had a name, spoke a different dialect, and had a territory that was collectively owned. Some official positions were filled through patrilineal inheritance. In the Tachi tribe each settlement had a chief for each moiety and the pair shared equal authority.

Generally Yokuts groups were peaceful, but occasional warfare did break out. Fighting was on a small scale and very little ritual was attached to warfare.

There were four occasions regarded as significant and crucial in the like of each Yokuts: birth, a girl's puberty, marriage, and death. Each of these periods required special care, attention, and ceremony.

One of the most important ceremonies was the ritual honoring the tribal dead. This usually took place annually, lasted six days, and included outside local groups. Guests came by the hundreds for the festival. The shamans were the only religious specialists of the Yokuts. They also served as "doctors".

Many rituals were accompanied by songs and instrumental music. Musical instruments included the cocoon rattle, bone and wood whistle, flute, musical bow, and a cleft-stick rattle. The major artistic accomplishment of the Southern Valley Yokuts was the decorative patterns woven into their baskets.

No significant number of Southern Valley Yokuts came under the control of the coastal Franciscan missionaries, however, significant impact to their culture resulted from infiltration of escaped natives from the missions. The runaways introduced foreign practices from their cultures which had suffered greatly from non-practice and practices acquired from the missions.

Complete cultural breakdown and near-total disappearance of native peoples from the San Joaquin Valley came with the annexation of California by the United States. The land passed quickly into the hands of the settlers. The process was relatively easy since the native peoples offered little effective resistance.

Because of the early and rapid decimation of the Southern Valley Yokuts and the rapid collapse of their culture, there is relatively little published literature regarding them, and ethnographic descriptions obtained from aged informants are certainly incomplete.

HISTORIC USE OF THE GENERAL AREA

Historically, the general area has been used for cattle ranching, farming, oil exploration, and mining of diatomaceous earth. The project area is currently used for cattle grazing, though flat hilltops and valleys have been farmed in the past. Three gas wells are within the project boundary (Division of Oil, Gas, and Geothermal Resources).

The project area is part of a larger tract of land known as the Johe Ranch. The Coopers bought the ranch from Carl Johe. A small house just south of the project area was built by Stan Cooper in 1952. A small homestead site with a water well, designated by a windmill symbol on the topographic map, is just north of the project area.

FIELD PROCEDURE

The project property lies in an area of open rangeland that is crisscrossed by dirt roads and fence lines. There are no definitive boundary markers except for some corner posts. On May 14, Catherine Lewis Pruett and Peggy Murphy were driven around the project area by David Cooper, son of Stan and Wanda Cooper. Mr. Cooper pointed out corner markers, project boundaries, one oil well, the homestead, and a spring just north of the project area.

A pedestrian survey of the project area was conducted by Catherine Lewis Pruett, Peggy Murphy, and Stuart Ahlf on May 16 and 17, 2008 (See Appendix III for qualifications). On flat hilltops and in valleys, transects were walked spaced at 25 meters apart. Ridges and drainages were walked according to the terrain. There were no boulder outcrops or springs on the project. The small portion of the property south of Highway 58 was covered in oat grass and visibility was less than 10%. Throughout the remainder of the property, there was some weed growth and visibility ranged from 50% to 90%. Vegetation consisted of blooming mustard, poppies, larkspur, Datura, and owls clover, as well as dried annuals.

DISCUSSION

No evidence of prehistoric usage was observed on the project property. The property is some distance from water and other natural resources that would have attracted Native Americans, and any use of the project area would likely have been of a transitory nature.

Historically, the foothills of the Temblor Range have been rangeland with some farming in flat areas. The project area is part of a larger ranch known as the Johe Ranch. The Coopers purchased the Johe Ranch from Carl Johe years ago and it is now part of their 8,000 acre land holdings. The Coopers lease other portions of their property for mining of diatomaceous earth and this project area is now proposed for the same.

Some oil and gas exploration has taken place in the general area. Three gas wells are located within the project boundaries (Department of Oil, Gas, and Geothermal):

Baker 1, spud date July 12, 1960, CalResources LLC

Seaboard-Honolulu 14-7, spud date June 1954, abandoned July 31, 1954 Union Oil Company of California

Lizbet Gilbert 1, spud date April 25, 1966, abandoned May 1969, Stanley Johnson

A pipe extending about one foot out of the ground marks the location of Lizbet Gilbert 1. No evidence was observed of either of the other two wells.

RESULTS

No prehistoric or historic archaeological sites were located as a result of the cultural resources survey. Specific information on the gas wells can be obtained from the Department of Oil, Gas and Geothermal. They do not need to be recorded.

RECOMMENDATIONS

As no prehistoric or historic archaeological sites were located as a result of the survey, it is therefore recommended that:

1) **No further archaeological work is necessary, unless cultural resources are unearthed during development. Should cultural resources, either historic or prehistoric, be discovered during development, work must halt in the area of the finds until they can be assessed by a qualified archaeologist.**

2) **Should human remains be discovered at any time, work must halt and the Kern County Coroner be notified immediately (Section 7050.5 of the Health and Safety Code).**

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Scott, B.

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Uli, Jim

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APPENDIX I: RECORDS SEARCH

Center for Archaeological Research
California State University, Bakersfield
9001 Stockdale Highway, 24 DDH
Bakersfield, CA 93311

661/654-6161 office
661/654-2143 fax

May 5, 2008

Catherine Pruett
Three Girls and a Shovel
Bakersfield, CA 93305

Re: Cultural Resources Records Search for GF Industries Quarry

Dear Ms. Pruett:

Per your request, a cultural resources records search (RS#08-133, Project No. 08-42) conducted for the above-referenced project on May 2, 2008, at the Southern San Joaquin Valley Historical Resources Information Center at California State University, Bakersfield by Matt DeCarlo. The Project Area (PA) consists of approximately 320 acres located northwest of Santa Maria Valley, Kern County, California (see Figure 1).

The results of the records search showed that one survey has been performed on the Project Area but results were negative for cultural resources during that survey (Scott 1999). No archaeological or historical sites have been recorded in the Project Area. One survey has been performed within one mile of the Project Area, but again, results were negative for cultural resources (Uli 1984); no archaeological or historical sites have been recorded within one mile of the Project Area.

The records search included an examination of the *National Register of Historic Places, the California Register of Historical Resources, California Points of Historical Interest, California Inventory of Historic Resources, California State Historic Landmarks Registry,* and the HRIC files of pertinent historical and archaeological data. The 1912 McKittrick 1:125,000 USGS topographic quadrangle was also reviewed for identifying potential historical locations.

While a small portion of the Project Area was surveyed along Highway 178/58 in 1999, the possibility remains that resources do exist in the majority of the Project Area and may be identifiable at this time. Structures are identified on the USGS topographic quadrangle on the southern edge of the Project Area boundary lines; please refer to the McKittrick Summit, CA 7.5' USGS topographic quadrangle. We recommend that the Project Area be surveyed by a qualified archaeologist.

The invoice for this records search will follow. If you have any further questions or concerns, please feel free to contact me at 661-654-6161 or by email at rorfila@csub.edu.

Sincerely,

Rebecca S. Orfila, M.A., RPA
Assistant Director

REFERENCES

Scott, B.
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Uli, Jim
1984 Archaeological Investigation of Twisselman's Proposed 40 acres Shale Mining Claim, McKittrick, Kern County, California. Report on file at the Southern San Joaquin Valley Historical Information Center, California State University, Bakersfield.

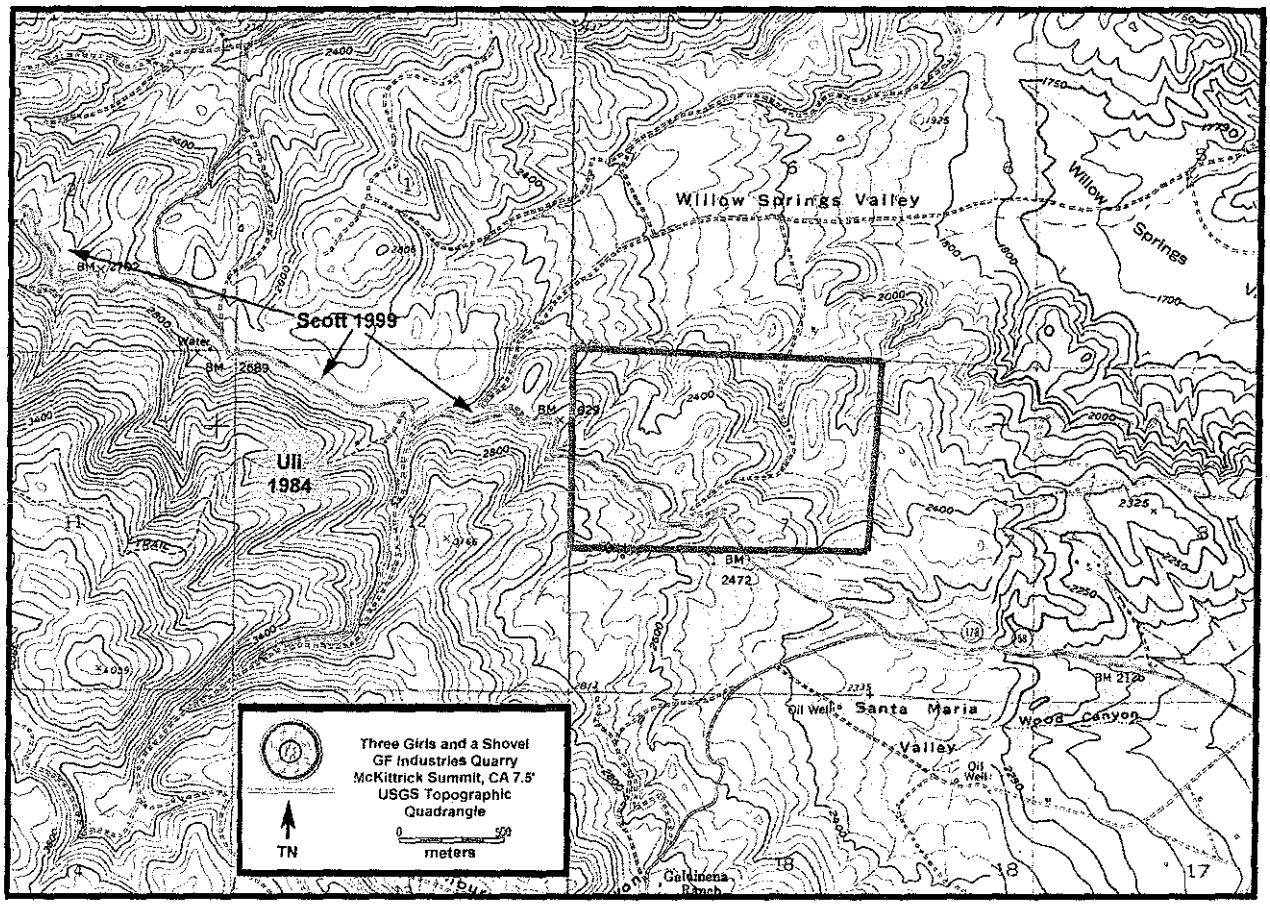


Figure 1. The Project Area is outlined in blue while previous surveys are identified in color on the map. Map adapted from the McKittrick Summit, CA 7.5' USGS Topographic Quadrangles.

APPENDIX II: NATIVE AMERICAN CORRESPONDENCE

STATE OF CALIFORNIA — Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

May 21, 2008

Ms. Catherine Lewis Pruett, RPA
THREE GIRLS AND A SHOVEL, LLC
2820 Alta Vista
Bakersfield, CA 93305

Sent by FAX to: (661) 324-9656
Number of Pages: 2

Re: Request for a Sacred Lands File records search/Cultural Resources Survey for the proposed 240-acres McKittrick Project; Located in western Kern County, California

Dear Ms. Pruett:

The Native American Heritage Commission was able to perform a record search of its Sacred Lands File (SLF) for the affected project area. The SLF failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any project area. This project site is in close proximity to previously discovered prehistoric burial sites and is believed to hold numerous cultural resources.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed is the name of the nearest tribes that may have knowledge of cultural resources in the project area. A list of Native American contacts is attached to assist you. It is advisable to contact the persons listed; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 15064.5(f) and Section 15097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Discussion of these should be included in your environmental documents, as appropriate.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton, Program Analyst

Attachment: Native American Contact List

Three Girls and a Shovel, LLC

2820 Alta Vista, Bakersfield, CA 93305

Fax 661-325-0307 or 661-324-9656

Specializing in archaeological assessments and excavations in the San Joaquin Valley, Mojave Desert, Central and Southern Sierra Nevada/Tehachapi Mts.

Peggy B. Murphy 661-325-0307

Catherine Pruett 661-861-8711

Dorothy Fleagle 661-323-5728

May 19, 2008

Rob Wood
Native American Heritage Commission
915 Capital Mall, Room 364
Sacramento, CA 95814

RE: 240 acres west of McKittrick

Dear Mr. Wood,

We have been contracted to conduct an archaeological survey on approximately 240 acres in the foothills west of McKittrick. We would like to know if you have a record of any sacred lands for the property in Section 7, T. 30S, R. 21E, on the McKittrick Summit 7.5' topographic map (see enclosed map).

Our time frame is two weeks. Please respond by May 31, 2008 for your response to be included in the report. My fax number is 661-324-9656. Thank you.

Sincerely,

Catherine Lewis Pruett
Three Girls and A Shovel, LLC

APPENDIX III: QUALIFICATIONS OF PROJECT PERSONNEL

Catherine Lewis Pruett
2820 Alta Vista Drive
Bakersfield, California 93305

EDUCATION

1987	MA Behavioral Science, CSU Bakersfield
1984	BA Anthropology, CSU Bakersfield
1977	AA Anthropology, Bakersfield College

SPECIALTY: Archaeology of southern California, in particular the southern Sierra Nevada/Tehachapi Mountains, the southern San Joaquin Valley, and the western Mojave Desert.

AREAS OF FIELDWORK: Active in archaeological investigations since 1978. Experience in the central and southern San Joaquin Valley, the southern Sierra Nevada/Tehachapi Mountains, the Temblor and Coast Ranges, and the Mojave Desert.

SUMMARY OF EXPERIENCE: Over thirty years of field experience in central and southern California, participation in more than 550 surveys and excavations, 14 years as Assistant Coordinator and three years as Coordinator of the Southern San Joaquin Valley Archaeological Information Center. Two years as Assistant Director of the Cultural Resource Facility, California State University, Bakersfield. Eight years as a private consultant.

A complete vita is available upon request.

Peggy Brooks Murphy
205 Hagin Street
Bakersfield, California 93309

EDUCATION

1989	BA Anthropology, California State University, Bakersfield

SPECIALTY: Archaeology of southern California, in particular the southern Sierra Nevada, Tehachapi Mountains, the southern San Joaquin Valley, and the western Mojave Desert.

AREAS OF FIELDWORK: Active in field investigations since 1985. Experience in the southern Sierra Nevada Mountains, the Tehachapi Mountains, the southern San Joaquin Valley, and the Mojave Desert.

SUMMARY OF EXPERIENCE: Over twenty years of field experience in southern and central California, participation in more than 400 surveys and excavations. Seven years as staff archaeologist with the Cultural Resource Facility, California State University, Bakersfield, nine years as a private consultant.

A complete vita is available upon request.

Dorothy Fleagle
822 Niles St.
Bakersfield, California 93305

EDUCATION

1996	MA Behavioral Science, California State University, Bakersfield (ABT)
1990	BA Anthropology, California State University, Bakersfield
1988	AA Anthropology, Bakersfield College

SPECIALTY: Archaeology of the southern Sierra Nevada Mountains, Great Basin pertaining to Tubatulabal, and California pertaining to Tubatulabal, and contemporary Tubatulabal specifically.

AREAS OF FIELDWORK Experience in the southern Sierra Nevada/Tehachapi Mountains, the southern San Joaquin Valley, the San Bernardino Mountains, and the western and Mojave Desert.

SUMMARY OF EXPERIENCE: Twenty years of field experience in southern and central California, participation in over 400 surveys and excavations. Six years as staff archaeologist with the Cultural Resource Facility, California State University, Bakersfield. Eight years as a private consultant.

A complete vita is available upon request.

Stuart Ahlf
3014 San Emidio Street
Bakersfield, CA 93301
661-323-1717

EDUCATION

1990-92	Undergraduate studies in Anthropology and Archaeology, California State University, Bakersfield

SPECIALTY: Archaeology of southern California, including the southern Sierra Nevada/Tehachapi Mountains, the southern San Joaquin Valley, and the western Mojave Desert.

AREAS OF FIELDWORK: Active in field investigations since 1989. Experience in the southern Sierra Nevada Mountains, the Tehachapi Mountains, the southern San Joaquin Valley, the Mojave Desert, and the San Bernardino Mountains.

SUMMARY OF EXPERIENCE: Eighteen years of field experience in southern and central California, participation in more than 100 surveys and excavations. Two years as archaeologist field crew with the Cultural Resource Facility, California State University, Bakersfield. Six years as field crew with TG&S..

A complete vita is available upon request.

Appendix F

Energy Study

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Johe Ranch Mine
Section 7, Township 30 South, Range 21 East
Kern County, CA

Energy Study

Revised – June 2019

Submitted to:
GF Industries
122 North Harbor Blvd., #201
Fullerton, CA 92832

Prepared by:
WZI Inc.
1717 28th Street
Bakersfield, California 93301

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EXHIBITS

Exhibit 1 Location Map
Exhibit 2 Site Plan Map
Exhibit 3 California Average Daily Consumption of Transportation Fuels

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1.0 INTRODUCTION

The proposed Johe Ranch Mine site is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The property is identified by portions of Kern County Assessor's Parcel Number 156-070-0, 156-070-02 and 156-070-10 and contains approximately 331 acres. The 331- acre site is primarily occupied by undeveloped land which is proposed for mining of diatomaceous earth and overburden material. A location map is included as **Exhibit 1**.

2.0 PROJECT DESCRIPTION

GF Industries, as operator, proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres within the 331acre project site. Mining will be conducted within three mine areas at the site (**Exhibit 2**). As proposed, no more than twenty (20) acres are planned to be disturbed at any given time. Maximum annual production is anticipated to be 330,000 tons of diatomaceous earth and 20,000 tons of overburden material. It is anticipated that a total of 6,600,000 tons of diatomaceous earth and 400,000 tons of overburden material will be removed. The proposed life of the mining operation is for the life of the reserve. Surface mining operations will be conducted from 6:00 am to 7:30 pm, Monday through Friday. There will be a maximum of 10 employees on site at any given time.

3.0 EQUIPMENT

Equipment utilized for the mining operation will include the following:

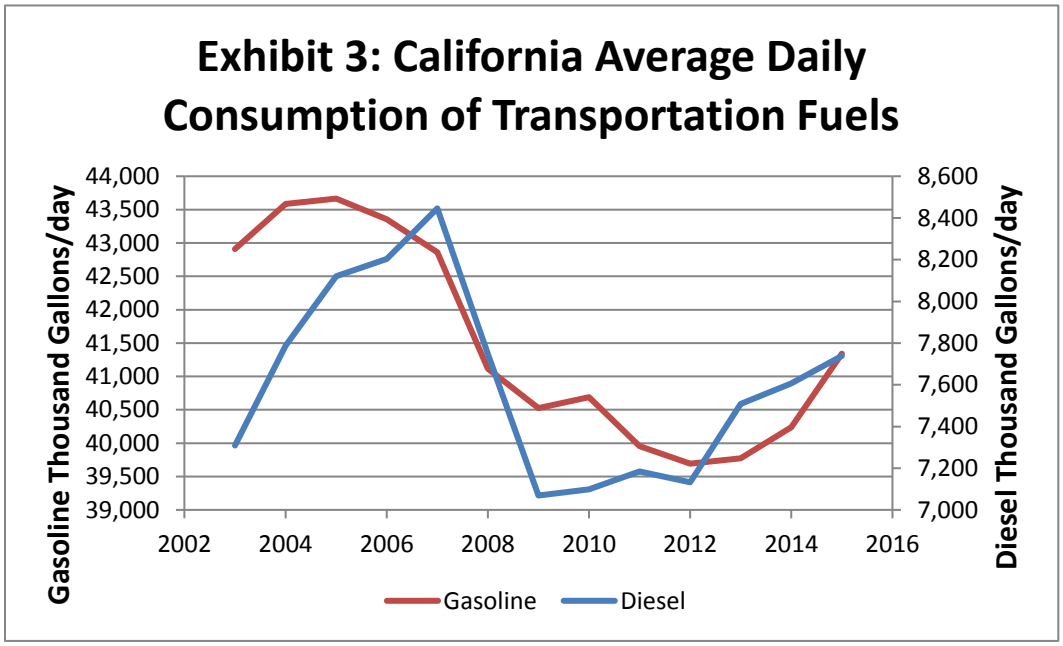
- 2 rubber tired loaders, however, only 1 would be operating at any given time,
- haul trucks,
- a water truck,
- a tire truck,
- portable screening unit,
- radial stacker,
- employee vehicles,
- contractor vehicles servicing portable toilet,
- grader.

4.0 ENERGY UTILIZATION – CONSTRUCTION, OPERATION, AND RECLAMATION

Use of transportation fuels, primarily diesel fuel, will be a consequence of the proposed project. **Table 1** shows the historic use of gasoline and diesel in California (California Board of Equalization).

Table 1: California Average Daily Consumption of Transportation Fuels (Thousand Gallons/day)													
Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Diesel	7,309	7,787	8,120	8,203	8,446	7,747	7,069	7,098	7,185	7,133	7,508	7,606	7,739
Gasoline *	42,909	43,584	43,665	43,357	42,862	41,115	40,525	40,689	39,955	39,693	39,771	40,238	41,339

*Gasoline number does not include aviation gasoline.



As shown in the **Exhibit 3**, the daily consumption of gasoline and diesel in the State of California was in a decreasing trend until 2012. The California Energy Commission (CEC) and other experts expect the overall decline in gasoline consumption to continue for another decade due to national vehicle economy standards and major fuel reduction projects (California Energy Commission, 2015). Diesel fuel consumption historically has grown as a result of fuel consumption for the transport of freight in trucks. According to the CEC, by 2022 this trend will flatten due to diesel fuel substitutes such as ethanol and natural gas (California Energy Commission, 2015).

4.1 Construction Energy Utilization

Construction activities for the project primarily include grading of haul roads and a pad for the blending and screening area. No structures will be constructed on the property for the project. It is estimated that grading for the construction phase will require approximately 10 days of work utilizing a Caterpillar Model 140M grader. According to Caterpillar Corporation, the estimated diesel fuel utilization by the Caterpillar 140M grader during medium use applications, which includes road construction, is 3.3 to 5.3 gallons per hour (Caterpillar, 2014). The following

Table 2 is an estimate of diesel and gasoline fuel usage for the construction phase of the project:

Table 2: Construction Phase Fuel Usage				
	Construction Days	Hours/Day	Gallons Diesel/Hour	Total Gallons
Equipment (Diesel)	10	10	5	500
Worker trips (Gasoline) (1 worker)	10	-	-	30

Based on the above projections, the annual diesel and gasoline fuel utilization for the project during the construction phase is estimated to be approximately 530 gallons (on-site equipment and worker trip fuel usage).

4.2 Operational Energy Utilization

During the operational phase of the project, energy utilization will primarily be diesel fuel which will be used by the loaders, water truck, tire truck, and portable screening unit as well as a small quantity of unleaded gasoline. The estimated fuel usage for the on-site operational phase of the project is summarized in **Table 3** based on data from GF Industries for similar equipment at a project located to the east of the site. For the Johe Ranch project, an increase in fuel use of 20% was estimated based on anticipation of potential new customers. Estimated gasoline fuel usage for worker commutes is also included in **Table 3**.

Table 3: Operational Phase Fuel Usage					
	Gal/month high usage	Gal/month low usage	Gal/month average	Estimated Gal/month with 20% increase	Estimated annual gallons
Off-road Vehicles and screening unit (Diesel)	3,447	1,068	2,195	2,634	31,608
On-road Vehicles (Diesel and gasoline)	-	-	174	209	2,508
Worker trips (Gasoline) (avg. 4 workers/day)	-	-	240	-	2,880

In addition to fuel utilized for the on-site mining operations, the project will require diesel fuel for haul trucks that will be transporting the mined diatomite to end use customers. According to the Traffic Impact Report prepared for the project (LAV/Pinnacle Engineering, 2018) the project will generate 100 Average Daily Trips (ADTs) for the haul trucks. Average mileage per ADT of 186 miles was utilized based on the ADT mileage used in the Air Quality Impact Assessment prepared for the project by WZI (WZI, 2015). Based on an estimated average of 6 miles per

gallon for the haul trucks (GEOTAB), diesel fuel use for the haul trucks associated with the project is estimated as follows based on 250 days per year of operation:

Table 4:
Operational Phase Fuel Usage (Off-site Haul Trucks)

	Average Daily Trips (ADTs)	Average miles per ADT	Miles per day	Estimated daily gallons diesel	Estimated annual gallons diesel
On-road haul trucks (Diesel)	100	186	18,600	3,100	775,000

Based on the above projections, the annual diesel and gasoline fuel utilization for the project during the operational phase is estimated to be approximately 811,996 gallons (on-site, off-site, and worker trip fuel usage).

4.3 Reclamation Energy Utilization

The mining operation will involve excavation within three pit areas. Reclamation activities will be minimal as slopes and pit floors will be maintained within design criteria during operational periods and the project will not include any onsite structures or facilities that would require demolition. A contingency for 20 working days (1 month) of equipment work has been included for reclamation activities based on the fuel utilization provided by GF industries.

Table 5:
Reclamation Phase Fuel Usage

	Gal/month high usage	Gal/month low usage	Gal/month average	Estimated Gal/month with 20% increase	Estimated reclamation gallons
Off-road Vehicles and screening unit (Diesel)	3,447	1,068	2,195	2,634	2,634
On-road Vehicles (Diesel and gasoline)	-	-	174	209	209
Worker trips (Gasoline) (avg. 4 workers/day)	-	-	240	-	240

Based on the above projections, the annual diesel and gasoline fuel utilization for the project during the reclamation phase is estimated to be approximately 3,083 gallons.

4.4 Electricity and Natural Gas Energy Utilization

As proposed, the project will not require connection to electrical or natural gas utilities and no electrical or natural gas-powered equipment/vehicles will be used.

5.0 ENERGY STANDARDS

There are numerous Federal and State regulations and standards that have been adopted to increase energy conservation, require renewable energy resources and reduce greenhouse gas emissions.

Federal Regulations

Federal Vehicle Standards

In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order 13432 in 2007 directing the U.S. EPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the U.S. EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the DOT, DOE, U.S. EPA and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the U.S. EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the U.S. EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the U.S. EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baselines.

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;

- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and,
- While superseded by the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

California Regulations

California regulations address energy consumption, fuel standards, land use standards to reduce vehicle miles traveled, building standards to conserve energy, and water use.

Energy-Related Sources

California's Renewable Portfolio Standard requires retail sellers of electric services to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020. As interim measures, this standard requires 20 percent of retail sales to be sourced from renewable energy by 2013, and 25 percent by 2016.

Mobile Sources

AB 1493 (the Pavley Standard) required CARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016. CARB obtained a waiver from the USEPA that allows for implementation of these regulations notwithstanding possible federal preemption concerns.

CARB's regulations for passenger vehicles (cars and light trucks) combine the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. This new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California. These standards would apply to all passenger and light duty trucks used by customers, employees of and deliveries to the Project site.

Executive Order S-1-07 requires a ten percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020. In 2009, CARB approved the Low Carbon Fuel Standard (LCFS) regulations, which became fully effective in April 2010. In 2013, an ethanol company obtained a court order compelling CARB to remedy substantive and procedural defects under CEQA of the LCFS adoption process (POET, LLC v. CARB). However, the court allowed implementation of the LCFS to continue pending correction of the identified defects. Consequently, this analysis assumes that the LCFS will remain in effect during construction and operation of the Project.

In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for model years 2017–2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

The Sustainable Communities and Climate Protection Act of 2008, or SB 375, coordinates land use planning, regional transportation plans, and funding priorities to help California meet the GHG reduction mandates established in AB 32. As specifically codified in Government Code section 65080, SB 375 requires the Metropolitan Planning Organization (MPO) relevant to the Project area (here, the Tulare County Association of Governments [TCAG]) to include a Sustainable Communities Strategy in its Regional Transportation Plan (RTP) that will achieve GHG emission reduction targets set by CARB by reducing vehicle miles traveled (VMT) from light-duty vehicles (i.e., passenger vehicles and light-duty trucks) through the development of more compact, complete, and efficient communities. For the area under TCAG's jurisdiction, including the Project Site, CARB adopted regional targets for reduction of mobile source-related GHG emissions by 5 percent for 2020 and by 10 percent for 2035.

Building Standards

The California Energy Commission's (CEC) 2007 Integrated Energy Policy Report (IEPR) established the goal that new building standards achieve "net zero energy" levels by 2020 for residences and by 2030 for commercial buildings. A net zero energy building consumes only as much energy on an annual basis as can be generated with an on-site renewable energy system. The Energy Commission has begun a path toward a tiered approach to achieve zero net energy in future building standards. The base tier will be the traditional mandatory standard that increases in stringency with every code cycle. Additional tiers will be voluntary and represent a "reach" standard for advanced levels of energy efficiency. The intent of the advanced, voluntary tiers is to provide the industry and marketplace with a framework for differentiating highly energy-efficient buildings from standard buildings and to pilot these enhanced features in the field to see how well they work before determining which of the measures should be included in future mandatory standards.

Title 24 of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically, generally every three years, to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

The CEC has adopted the 2013 Building Energy Efficiency Standards (2013 Building Standards) contained in Title 24. The 2013 Building Standards (effective July 1, 2014) are 25 percent more efficient than previous standards for residential construction and 30 percent more efficient for nonresidential construction, and require better windows, insulation, lighting, ventilation systems and other features that further reduce energy consumption in homes and businesses.

Homes built to the 2016 standards, which became effective on January 1, 2017 and are the currently operative building standards, will use 28 percent less energy than those built to the

2013 standards (California Energy Commission, 2013). Residential is 46% more efficient than the 2008 Standard.

The CEC also has adopted the 2012 Appliance Efficiency Regulations (2012 Appliance Standards), which are contained in Title 20 of the California Code of Regulations and include standards for both federally-regulated appliances and non-federally regulated appliances.
In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The 2016 CalGreen standards became effective in January 1, 2017. These standards are updated every three years and apply throughout the state, however cities and counties may adopt more restrictive standards or voluntary measures presented in the standard.

Solid Waste Diversion
The California Integrated Waste Management Act of 1989, as modified by AB 341, requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: (1) diversion of 25 percent of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; (2) diversion of 50 percent of all solid waste on and after January 1, 2000; and (3) diversion of 75 percent of all solid waste on or after 2020, and annually thereafter. The California Department of Resources Recycling and Recovery (CalRecycle) is required to develop strategies, including source reduction, recycling, and composting activities, to achieve the 2020 goal.

CalRecycle published a discussion document, entitled *California's New Goal: 75 Percent Recycling,* which identified concepts that would assist the state in reaching the 75 percent goal by 2020. Subsequently, in October 2013, CalRecycle released a revised concept list, entitled *Update on AB 341 Legislative Report: Statewide Strategies to Achieve the 75 Percent Goal by 2020*.

6.0 PROJECT IMPACTS

The primary energy related impact of the project will be the use of diesel and small amounts of gasoline motor fuels during the construction, operational, and reclamation phases of the project. In accordance with the Air Quality Impact Assessment conducted for the project (WZI, 2015) both on-road and off-road equipment and vehicles utilized by the project will meet California and federal standards for efficiency and emissions.

Other potential energy impacts are addressed as follows:

- Other than the use of motor fuels, the project will have no effect on local or regional energy supplies and requirements for additional capacity as the project will not require connection to electrical or natural gas utilities and no electrical or natural gas-powered equipment/vehicles will be used.

- The project will have no impact on peak and base period demands for electricity and other forms of energy as it will not require connection to electrical or natural gas utilities.
- Project energy use will be limited to diesel and small amounts of gasoline motor fuels. All on-road and off-road equipment and vehicles utilized by the project will meet California and federal standards for efficiency and emissions.
- Due to the remote location of the project, the use of alternative transportation to the site by onsite employees (public transportation, bicycles, etc.) is not feasible. Due to the low number of workers at the site on a daily basis (average 3-4), energy utilization for workers commuting to the project site will be minimized.
- No potential energy efficiency impacts associated with the construction and maintenance of onsite structures will occur as the project will not involve the construction of any structures.
- The project will not generate solid waste. Consequently, no energy use due to solid waste diversion or disposal will occur.

7.0 MITIGATION MEASURES AND ENERGY USE CONCLUSIONS

Energy for the proposed project will primarily be from the use of diesel fuel associated with the mining operation and transportation of the mined material to end user customers. The greatest energy utilization for the project will be diesel fuel used by the haul trucks for product delivery. Due to the nature of the project, open pit mining, alternative sites for the project are not feasible as the project must be located where the ore body occurs.

The following mitigation measures are proposed to reduce wasteful, inefficient, and unnecessary consumption of energy by the project:

- Keep the number of on-site employees and associated vehicle trips to a minimum,
- Have haul trucks take the most efficient routes to end user customers in order to minimize trip lengths,
- Not utilize electrical or natural gas utility demand during construction, operational, or reclamation phases of the project,
- Not impact peak and base period demands for electricity and other forms of energy for the project by not requiring connection to electrical or natural gas utilities.
- Have all on-road and off-road equipment and vehicles utilized by the project meet California and federal standards for efficiency and emissions.
- Keep construction phase energy utilization to a minimum by not incorporating the need for construction of structures or other facilities,
- Eliminate energy consumption for solid waste diversion or disposal by not generating solid waste at the project site.

Based on the review of energy use and by incorporating the proposed mitigation measures, it is concluded that the proposed project would not result in impacts associated with wasteful, inefficient, or unnecessary use of energy.

8.0 REFERENCES

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California Energy Commission, 2015. *2015 Integrated Energy Policy Report. Publication Number: CEC-100-2015-001-CMF*. http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-01/TN212017_20160629T154354_2015_Integrated_Energy_Policy_Report_Small_File_Size.pdf

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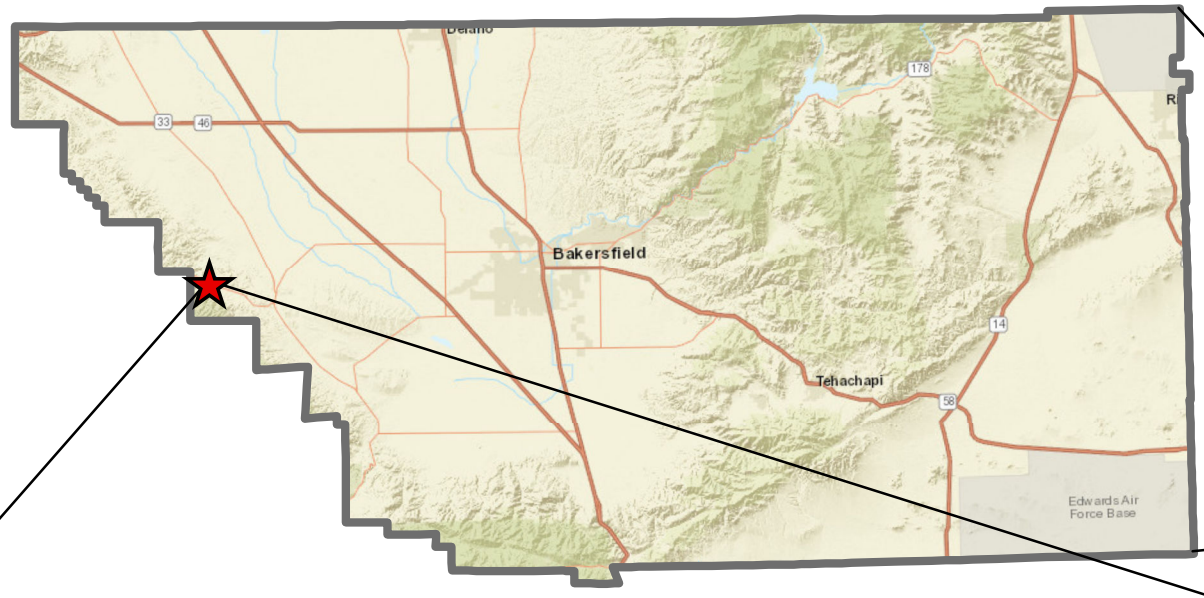
LAV/Pinnacle Engineering, 2018, *Traffic Impact Study for Johe Ranch Mine at 68501 Highway 58, Kern County, California*, Consulting report, Project No. 15-654.

POET, LLC v. CARB, 2013, 217 Cal.App.4th 1214.

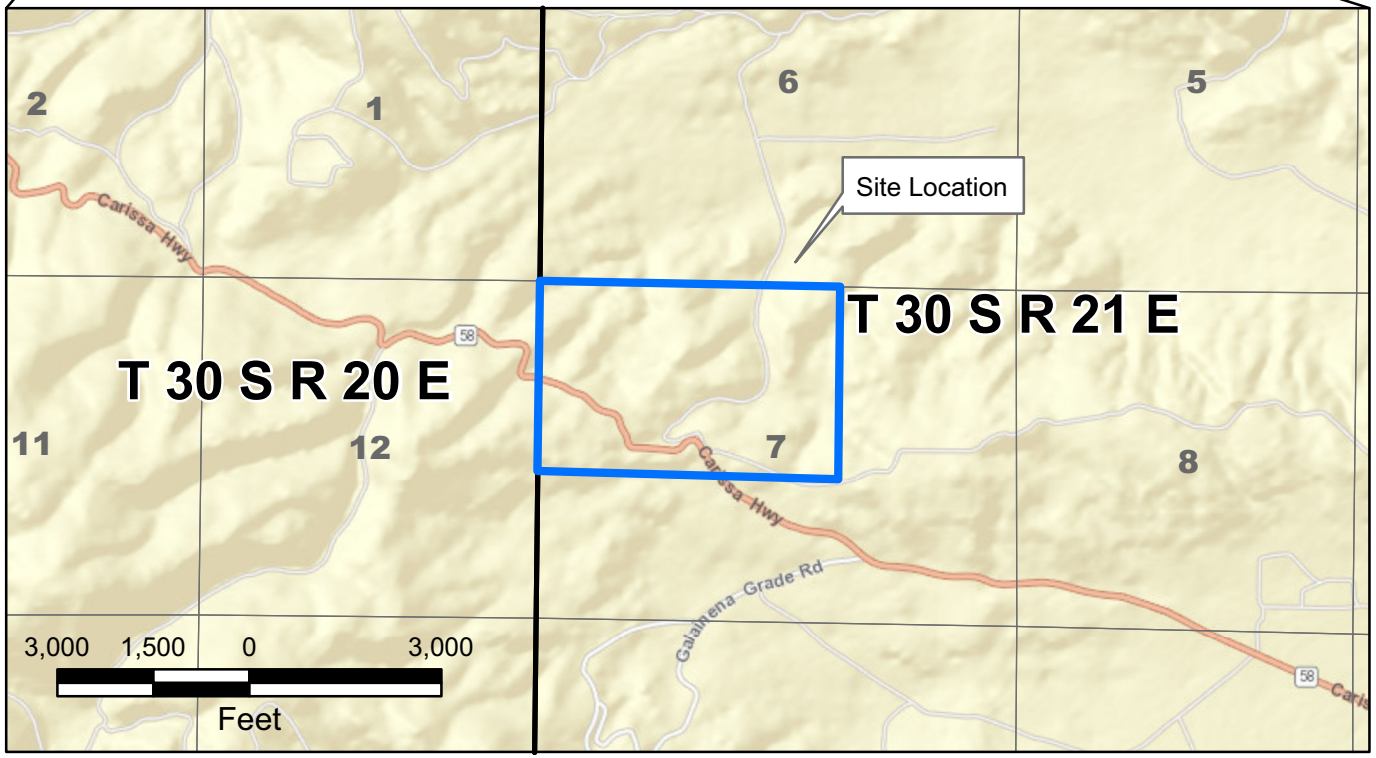
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EXHIBITS

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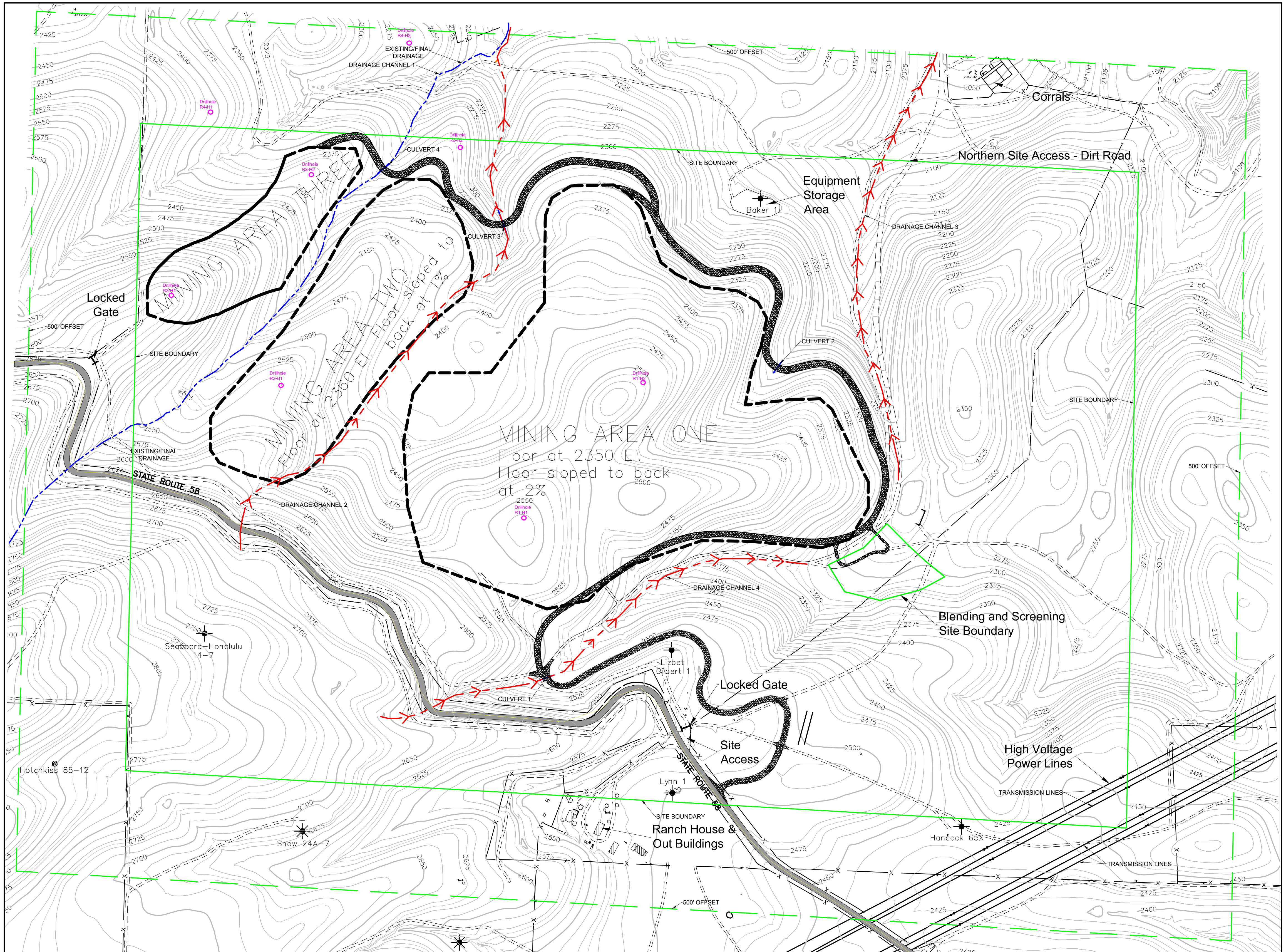
WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
ENERGY STUDY

LOCATION MAP

DATE: 5/19		EXHIBIT: 1

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LEGEND

——100——	EXISTING GROUND CONTOUR
——x——	EXISTING FENCE LINE
— —	500' PROJECT BOUNDARY OFFSET
▬ ▬ ▬	DISTURBANCE BOUNDARY
——	PROJECT BOUNDARY
======	EXISTING DIRT ROAD
▬▬	PROPOSED ACCESS ROAD
←—	INTERMITTENT DRAINAGE CHANNEL
—·—·—	"BLUE-LINE" WATERCOURSE PER USGS MAP
✳	ACTIVE DRY GAS WELL
✛	PLUGGED OIL & GAS WELL
∘	DRILLHOLE

N

500 250 0 500

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
ENERGY STUDY

SITE PLAN MAP

DATE: 6/19	JOB NO.:	EXHIBIT: 2

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Appendix G

Geotechnical Engineering, Soil, and Paleontological Resources Reports

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Appendix G.1

Geotechnical Engineering Investigation Report

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GEOTECHNICAL ENGINEERING INVESTIGATION REPORT
JOHE RANCH MINE PROJECT
McKITTRICK, CALIFORNIA

BSK PROJECT G18-194-10B

PREPARED FOR:
MR. STEVE GENTILE
GF INDUSTRIES
122 N HARBOR BLVD, SUITE 201
FULLERTON, CALIFORNIA 92832

APRIL 10, 2019

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GEOTECHNICAL ENGINEERING INVESTIGATION REPORT
JOHE RANCH MINE PROJECT
McKITTRICK, CALIFORNIA

Prepared for:

Mr. Steve Gentile
GF Industries
122 N Harbor Boulevard, Suite 201
Fullerton, California 92832

Bakersfield Project: G18-194-10B

April 10, 2019

Prepared by:



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Distribution: Client (Email: [steve.gentile@gfindustries.net])

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1. INTRODUCTION

This report presents the results of a Geotechnical Engineering Investigation Report conducted by BSK Associates (BSK), for the proposed grading at the Johe Ranch diatomite mine in McKittrick, CA (Site). The Site is located in McKittrick, Kern County, California, as shown on the Site Vicinity Map, Figure A-1. The geotechnical engineering investigation was conducted in accordance with BSK Proposal GB18-16485 dated July 27, 2018.

This report provides a description of the geotechnical conditions at the Site for the purpose of Environmental Impact Report (EIR) level County of Kern review. In the event that changes occur in the design of the project, this report's conclusions and recommendations will not be considered valid unless the changes are reviewed with BSK and the conclusions and recommendations are modified or verified in writing.

1.1. Planned Construction

BSK understands that the proposed site is located at a small diatomite mine located in western Kern County in McKittrick, California. The proposed project consists of three open pits with access roads, with a total site size of approximately 258-acres. We assume the open pits will be excavated to an approximate maximum depth of 325-feet.

1.2. Purpose and Scope of Services

The objective of this geotechnical investigation was to assess soil conditions and to provide an assessment of the slope-stability at the site relative to planned EIR level submittal. The scope of the investigation included a field exploration, laboratory testing, engineering analyses, and preparation of this report.

2. FIELD INVESTIGATION AND LABORATORY TESTING

2.1. Field Exploration

The field exploration for this investigation was conducted under the oversight of a BSK staff member. Three (3) borings were drilled at the Site on August 9, 2018 using CME 95 Drill Rig provided by Baja Exploration Drilling Specialists. The borings were drilled to a maximum depth of 51 feet beneath the existing ground surface (bgs).

The soil materials encountered in the Borings were visually classified in the field, and the logs were recorded during the drilling and sampling operations. Visual classifications of the materials encountered in the Borings were made in general accordance with the Unified Soil Classification System (ASTM D 2488). A soil classification chart is presented in Appendix A.

Boring logs are presented in Appendix A and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff based on observations made at the time of drilling, while the actual boundaries between soil types may be gradual and soil conditions may vary at other locations.

2.2 Laboratory Testing

Laboratory tests were performed on selected soil samples to evaluate moisture content, dry density, and shear strength. A description of the laboratory test methods and results are presented in Appendix B.

3. SITE AND GEOLOGY/SEISMICITY CONDITIONS

The following sections address the Site descriptions and surface conditions, regional geology and seismic hazards, subsurface conditions, and groundwater conditions at the Site. This information is based on BSK's field exploration and published maps and reports.

3.1 Site Description and Surface Conditions

The Site currently exists at the existing Johe Ranch located at 68501 CA-58 in McKittrick, California. The Site is located in the Section 7, Township 30 South, and Range 21 East of the Mount Diablo Meridian. The NAD 83 GPS coordinates for the center of the Site are 35.3301 degrees North latitude and 119.7668 degrees West longitude.

3.2 Regional Geology and Seismic Hazards Assessment

Our Scope of services included a review of published maps and reports to assess the regional geology and potential for seismic hazards.

3.2.1 Regional Geology

The site is located in the Great Valley. The Great Valley is an alluvial plain about 50 miles wide and 400 miles long in the central part of California. Its northern part is the Sacramento Valley, drained by the Sacramento River and its southern part is the San Joaquin Valley drained by the San Joaquin River. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). Great oil fields have been found in southernmost San Joaquin Valley and along anticlinal uplifts on its southwestern margin. In the Sacramento Valley, the Sutter Buttes, the remnants of an isolated Pliocene volcano, rise above the valley floor.

3.2.2 Seismic Hazards Assessment

The types of geologic and seismic hazards assessed include surface ground fault rupture, liquefaction, seismically induced settlement, slope failure, flood hazards and inundation hazards.

The purpose of the Alquist-Priolo Geologic Hazards Zones Act, as summarized in CDMG Special Publication 42 (SP 42), is to "prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." As indicated by SP 42, "the State Geologist is required to delineate "earthquake fault zones" (EFZs) along known active faults in California. Cities and counties affected by the zones must regulate certain development 'projects' within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting.

The site is not located in a Alquist-Priolo (A-P) Fault Hazard Zone. The closest A-P Hazard Zone is associated with an unnamed fault located approximately 9.2 miles northeast of the site and the San Andreas fault zone approximately 6.2 miles west of the site.

Zones of Required Investigation referred to as "Seismic Hazard Zones" in CCR Article 10, Section 3722, are areas shown on Seismic Hazard Zone Maps where site investigations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements. There are no mapped areas that have Seismic Hazard Zones in the project area.

3.3 Subsurface Conditions

The subsurface material generally consisted of weathered mudstone and silty sand to depths of approximately 5 feet. Below 5 feet dense mudstone and very hard to very firm silty clay varied throughout to the bottom of the boreholes.

The Boring logs in Appendix A provide a more detailed description of the materials encountered, including the applicable Unified Soil Classification System symbols.

3.4 Groundwater Conditions

Groundwater was not encountered at the time of drilling on August 9, 2018. Please note that the groundwater level may fluctuate both seasonally and from year to year due to variations in rainfall, temperature, pumping from wells and possibly as the result of other factors such as irrigation, that were not evident at the time of our investigation.

4. CONCLUSIONS AND RECOMMENDATIONS

Based upon the data collected during this investigation, and from a geotechnical engineering standpoint, it is our opinion that the soil conditions would not preclude the construction of the proposed improvements.

4.1 Seismic Design Criteria

Based on Section 1613.3.2 of the 2016 California Building Code (CBC), the Site shall be classified as Site Class A, B, C, D, E or F based on the Site soil properties and in accordance with Chapter 20 of ASCE 7-10. Based on the “N” values from our soil Borings, as per Table 20.3-1 of ASCE 7-10, the Site is Class D ($15 \leq N \leq 50$).

The 2016 California Building Code (CBC) utilizes ground motion based on the Risk-Targeted Maximum Considered Earthquake (MCER) that is defined in the 2016 CBC as the most severe earthquake effects considered by this code, determined for the orientation that results in the largest maximum response to horizontal ground motions and with adjustment for targeted risk. Ground motion parameters in the 2016 CBC are based on ASCE 7-10, Chapter 11.

The United States Geologic Survey (USGS) has prepared maps presenting the Risk-Targeted MCE spectral acceleration (5 percent damping) for periods of 0.2 seconds (S_S) and 1.0 seconds (S_1). The values of S_S

and S_1 can be obtained from the USGS Ground Motion Parameter Application available at: http://earthquake.usgs.gov/designmaps/us/application.php.

The USGS Ground Motion Parameter Application and Chapter 16 of the 2016 CBC based on ASCE 7-10 produced the spectral acceleration parameters risk targeted maximum considered earthquake values in Table 1 based on Site Class D conditions.

As per Section 1803.5.12 of the CBC, peak ground acceleration (PGA) utilized for dynamic lateral earth pressures and liquefaction, shall be based on a site-specific study (ASCE 7-10, Section 21.5) or ASCE 7-10, Section 11.8.3. The USGS Ground Motion Parameter Application and based on ASCE 7-10, Section 11.8.3 produced the Geometric Mean PGA value in Table 1 based on Site Class D conditions.

Table 1: Seismic Design Parameters

Seismic Design Parameter	2016 CBC Value		Reference
MCE Mapped Spectral Acceleration (g)	S_S = 1.681	S_1 = 0.795	USGS Mapped Value
Amplification Factors (Site Class D)	F_a = 1.000	F_v = 1.500	Table 1613.3.3
Site Adjusted MCE Spectral Acceleration (g)	S_{MS} = 1.681	S_{M1} = 1.193	Equations 16-37, 38
Design Spectral Acceleration (g)	S_{DS} = 1.121	S_{D1} = 0.795	Equations 16-39, 40
Geometric Mean PGA (g)	PGA = 0.673		ASCE Equations 11.8-1

As shown above, the short period design spectral response acceleration coefficient, S_{DS}, is greater than 0.50, therefore the Site lies in Seismic Design Category D as specified in Section 1613.3.4 of the 2016 CBC. The long period design spectral response acceleration coefficient, S_{D1}, is greater than 0.2, therefore the Site lies in Seismic Design Category D as specified in Section 1613.3.4 of the 2016 CBC. The MCE mapped spectral acceleration coefficient, S_1, is less than 0.75, therefore the Site lies in Seismic Design Category D as specified in Section 1613.3.5 of the 2016 CBC. In accordance with the 2016 CBC, each structure shall be assigned to the more severe seismic design category in accordance with Table 1613.3.5(1) or 1613.3.5(2), irrespective of the fundamental period of vibration of the structure.

4.2 Drainage Considerations

The control of surface drainage in the project areas is an important design consideration. BSK recommends that final grading must provide for positive and enduring drainage away from the graded slopes.

4.3 Slope Stability Analysis

The slopes were analyzed for stability in the static and pseudo-static condition using Janbu's Simplified Method of Slices and modeled in the computer program, Slide v7.0. The slope model was analyzed for stability using circular slip surfaces originating and terminating at critical points along the cross sections analyzed. The inputs required for the site include slope geometry, subsurface profile data, groundwater

conditions, horizontal and vertical ground acceleration, as well as constraints on the upper and lower limits of the search region for the critical slip circle, numbers and locations of initiation and termination points of trial surfaces, and number of trial surfaces for each initiation point.

The slopes were analyzed in the static and pseudo-static condition. The slope geometry was modeled using Google Earth and visual observations. The soil parameters were determined through our field exploration and laboratory testing. The values used in our analysis are summarized in the following table:

Table 2: Slope Stability Soil Parameters

Section	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
B-B'	95	2100	20

Variables for the pseudo-static slope stability analysis were acquired through the United States Geological Society's Unified Hazard Tool, located at *earthquake.usgs.gov/hazards/interactive/*. The horizontal ground motion site coefficient was found to be 0.6558, based on an earthquake return period of 975-years, or 5% in 50-years. Vertical ground motions and groundwater conditions were not considered in the analysis. One (1) typical cross section was selected to model the slope. For each condition, a minimum of 10,000 randomly generated slip circles were analyzed for the critical factor of safety. A summary of the critical factors of safety is provided in the table below:

Table 3: Critical Factors of Safety

SECTION	STATIC FS, cr	PSEUDO-STATIC FS, cr
1:1.75 Slope, B-B'	2.25	1.06

Based on BSK's slope stability analysis, the anticipated 1:1.75 (horizontal:vertical) cut slopes meet generally accepted minimum factor of safety for static and pseudo-static conditions of 1.5 and 1.1, respectively. BSK should be retained to verify the slope soil conditions and provide updated recommendations as appropriate during the course of site excavation.

5. LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the Borings performed at the locations shown on the Boring Location Map, Figure A-2. The report does not reflect variations which may occur between or beyond the Borings. The nature and extent of such variations may not become evident until construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-Site observations during the excavation period and noting the characteristics of the variations.

The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for

construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the Site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of the Client and members of the project design team. The report has been prepared in accordance with generally accepted geotechnical engineering practices which existed in Kern County at the time the report was written. No other warranties either expressed or implied are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

6. REFERENCES

Earth Point. http://earthpoint.us/townships.aspx, Public Land Survey System, Google Earth, 2016, August 2018.

Lee, Norman. California Geomorphic Provinces (2012): n. pag. California Department of Conservation. California Geological Survey. <http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/note_36.pdf>. August 2018.

United States Geological Survey. http://earthquake.usgs.gov/designmaps/us/application.php, United States Design Maps, August 2018.

APPENDIX A

FIELD EXPLORATION

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APPENDIX A

FIELD EXPLORATION

The field exploration for this investigation was conducted under the oversight of a BSK staff member. Three (3) borings were drilled at the Site on August 9, 2018 using CME 95 Drill Rig provided by Baja Exploration Drilling Specialists. The borings were drilled to a maximum depth of 51 feet beneath the existing ground surface (bgs).

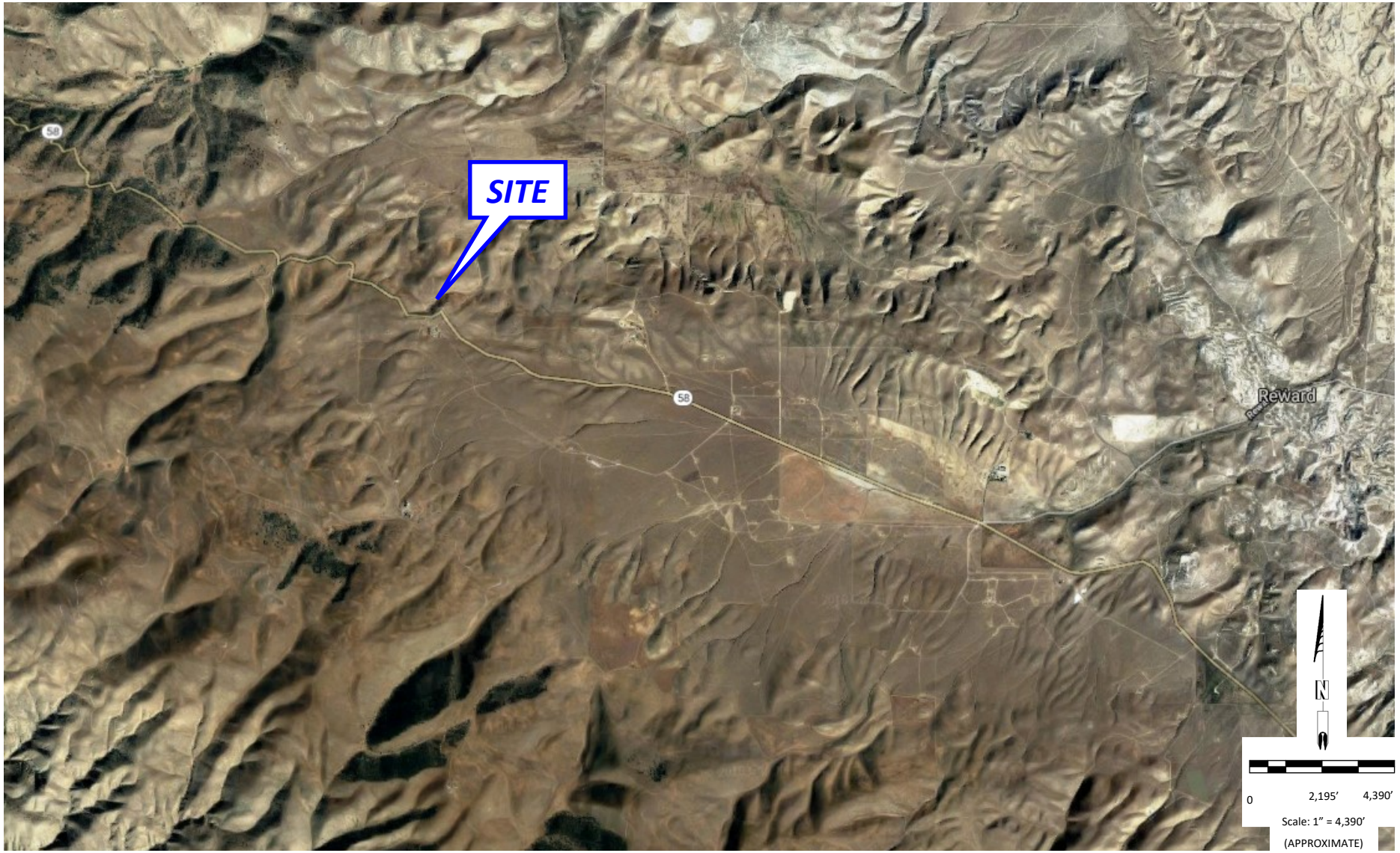
The soil materials encountered in the test Borings were visually classified in the field, and the logs were recorded during the drilling and sampling operations. Visual classification of the materials encountered in the test Borings was made in general accordance with the Unified Soil Classification System (ASTM D 2488). A soil classification chart is presented herein. Boring logs are presented herein and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff based on observations made at the time of drilling, while the actual boundaries between soil types may be gradual and soil conditions may vary at other locations.

Subsurface samples were obtained at the successive depths shown on the boring logs by driving samplers which consisted of a 2.5-inch inside diameter (I.D.) California Sampler and a 1.4-inch I.D. Standard Penetration Test (SPT) Sampler. The samplers were driven 18 inches using a 140-pound hammer dropped from a height of 30 inches by means of either an automatic hammer or a down-hole safety hammer. The number of blows required to drive the last 12 inches was recorded as the blow count (blows/foot) on the boring logs. The relatively undisturbed soil core samples were capped at both ends to preserve the samples at their natural moisture content. Soil samples were also obtained using the SPT Sampler lined with metal tubes or unlined in which case the samples were placed and sealed in polyethylene bags. At the completion of the field exploration, the test borings were backfilled with the excavated soil cuttings.

It should be noted that the use of terms such as “loose”, “medium dense”, “dense” or “very dense” to describe the consistency of a soil is based on sampler blow count and is not necessarily reflective of the in-place density or unit weight of the soils being sampled. The relationship between sampler blow count and consistency is provided in the following Tables A-1 and A-2 for coarse-grained (sandy and gravelly) soils and fine grained (silty and clayey) soils, respectively.

Table A-1: Consistency of Coarse-Grained Soil by Sampler Blow Count		
Consistency Descriptor	**SPT Blow Count (#Blows / Foot)**	**2.5" I.D. California Sampler Blow Count (#Blows / Foot)**
Very Loose	<4	<6
Loose	4 – 10	6 – 15
Medium Dense	10 – 30	15 – 45
Dense	30 – 50	45 – 80
Very Dense	>50	>80

Table A-2: Consistency of Fine-Grained Soil by Sampler Blow Count		
Consistency Descriptor	**SPT Blow Count (#Blows / Foot)**	**2.5" I.D. California Sampler Blow Count (#Blows / Foot)**
Very Soft	<2	<3
Soft	2 – 4	3 – 6
Medium Stiff	4 – 8	6 – 12
Stiff	8 – 15	12 – 24
Very Stiff	15 – 30	24 – 45
Hard	>30	>45



REFERENCE IMAGE: Google Earth 2018

BSK ASSOCIATES
700 22nd Street
Bakersfield, California 93301
Tel. (661) 327-0671

SITE VICINITY MAP

Johe Ranch Mine Project
Mckittrick, California

FIGURE A-1

JOB NO. G18-194-10B
DATE August 2018

DR. BY LP
CH. BY AXT
SCALE AS SHOWN

SHEET NO. 1 OF 1 SHEETS



REFERENCE IMAGE: Google Earth

LEGEND:

APPROXIMATE BORING LOCATION B-1

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Bakersfield, California 93301
Tel. (661) 327-0671

BORING LOCATION MAP

Johe Ranch Mine Project
McKittrick, California

FIGURE A-2

JOB NO. G18-194-10B
DATE August 2018

DR. BY AR
CH. BY AXT
SCALE AS SHOWN

SHEET NO. 1 OF 1 SHEETS

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than Half >#200	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half <#200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS , MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

Note: Dual symbols are used to indicate borderline soil classifications.

	Pushed Shelby Tube	RV	R-Value
	Standard Penetration Test	SA	Sieve Analysis
	Modified California	SW	Swell Test
	Auger Cuttings	TC	Cyclic Triaxial
	Grab Sample	TX	Unconsolidated Undrained Triaxial
	Sample Attempt with No Recovery	TV	Torvane Shear
CA	Chemical Analysis	UC	Unconfined Compression
CN	Consolidation	(1.2)	(Shear Strength, ksf)
CP	Compaction	WA	Wash Analysis
DS	Direct Shear	(20)	(with % Passing No. 200 Sieve)
PM	Permeability		Water Level at Time of Drilling
PP	Pocket Penetrometer		Water Level after Drilling (with date measured)

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA
Unified Soil Classification System

BSK ASSOCIATES

PLATE: Figure A-3

BSK Associates
700 22nd Street
Bakersfield, CA 93301
Telephone: (661) 327-0671
Fax: (661) 324-4218

LOG OF BORING NO. B-01

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: Open hilly area, dried grass.										
		SM: CLAYEY SILTY SAND:pale brown, dry, fine to coarse grained, pulverized mudstone.										
					41, 50/ 3"							
		MDSTN: VERY DENSE WEATHERED MUDSTONE:light brownish gray and strong brown, dry.										
5					56							
		...DENSE, increased weathering, strong brown.										
10					50			90	22			
		...DENSE, increased weathering.										
15		**MDSTN/CL-ML: VERY DENSE MUDSTONE AND VERY HARD SILTY CLAY:**pale brown and strong brown, dry, low plasticity, 1" mudstone.			50/ 6"							
20					73			98	22			
		MDSTN: DENSE MUDSTONE:pale brown and strong brown, dry, trace diatoms.										
25												

Completion Depth: 50.5
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS.GPJ GEOTECHNICAL 08.GDT 8/22/18

BSK Associates
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Bakersfield, CA 93301
Telephone: (661) 327-0671
Fax: (661) 324-4218

LOG OF BORING NO. B-01

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MDSTN: DENSE MUDSTONE:pale brown and strong brown, dry, trace diatoms.*(continued)* **MDSTN: VERY DENSE WEATHERED MUDSTONE:**strong brown, dry.			50/ 5"							
30		...VERY DENSE, pale brown and strong brown.			50/ 4"			93	23			
35		**MDSTN/CL-ML: VERY DENSE MUDSTONE AND VERY HARD SILTY CLAY:**pale brown, dry, low plasticity, 1/2" mudstone fragments.			37, 50/ 5"							
40		**MDSTN: VERY DENSE WEATHERED MUDSTONE:**pale brown, wet from adding water to drill.			50/ 5"			93	22			
45		**MDSTN/CL-ML: VERY DENSE MUDSTONE AND VERY HARD SILTY CLAY:**pale brown, moist from adding water to drill.			50/ 5"							
50												

Completion Depth: 50.5
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS.GPJ GEOTECHNICAL 08.GDT 8/22/18

BSK Associates
700 22nd Street
Bakersfield, CA 93301
Telephone: (661) 327-0671
Fax: (661) 324-4218

LOG OF BORING NO. B-01

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		...VERY DENSE AND VERY HARD.			50/ 4"							
		End of boring.										
55												
60												
65												
70												
75												

Completion Depth: 50.5
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

BSK Associates
700 22nd Street
Bakersfield, CA 93301
Telephone: (661) 327-0671
Fax: (661) 324-4218

LOG OF BORING NO. B-02

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: Open hilly area, dried grass.										
		SM: GRAVELLY CLAYEY SILTY SAND: dark brown, moist, fine to coarse grained, poorly graded.										
					11							
		SM: LOOSE CLAYEY SILTY SAND: dark brown, moist, fine to coarse grained, poorly graded, subangular, sand-sized fragments of mudstone.										
5					10							
		ML: FIRM SANDY CLAYEY SILT: dark reddish brown, moist, fine to coarse grained, low plasticity, trace fractured mudstone.										
10					21			91	19			
		CL: VERY FIRM GRAVELLY SILTY CLAY: dark reddish brown, moist, fine to coarse grained mudstone gravel.										
15					22							
		CL: VERY FIRM GRAVELLY SILTY CLAY: strong brown, moist, fine grained mudstone gravel fragements.										
20					26			91	21			
		MDSTN: MEDIUM DENSE VERY WEATHERED MUDSTONE: pale brown and strong brown, diatomite.										
25												

Completion Depth:	50.5	**Drilling Equipment:**	CME 95 with auto hammer
Date Started:	8/9/18	**Drilling Method:**	Hollow Stem Auger
Date Completed:	8/9/18	**Drive Weight:**	140 pounds
California Sampler:	2.4 inch inner diameter	**Hole Diameter:**	8 inches
SPT Sampler:	1.4 inch inner diameter	**Drop:**	30 inches
		Remarks:	Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS.GPJ GEOTECHNICAL 08.GDT 8/22/18

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Fax: (661) 324-4218

LOG OF BORING NO. B-02

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MDSTN: MEDIUM DENSE VERY WEATHERED MUDSTONE:pale brown and strong brown, diatomite.*(continued)*			20							
		...MEDIUM DENSE, strong brown.										
30		**MDSTN: DENSE WEATHERED MUDSTONE:**pale brown and brownish yellow, moist from adding water to drill, diatomite.			57			93	24			
35		...DENSE.			69							
40		...VERY DENSE.			50/ 4"			91	25			
45		**MDSTN: VERY DENSE MUDSTONE:**strong brown, fine to coarse grained gravel fragements of fractured rock.			50/ 3"							
50												

Completion Depth: 50.5
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-02

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Depth, feet	Graphic Log	Surface El.: / Location: / MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		MDSTN: VERY DENSE MUDSTONE: strong brown/ brownish yellow/ pale brown.			50/ 5"				20			
		End of boring.										
55												
60												
65												
70												
75												

Completion Depth: 50.5
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS.GPJ GEOTECHNICAL 08.GDT 8/22/18

BSK Associates
700 22nd Street
Bakersfield, CA 93301
Telephone: (661) 327-0671
Fax: (661) 324-4218

LOG OF BORING NO. B-03

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		SURFACE: Open hilly area, dried grass.										
		CL: SILTY CLAY WITH WEATHERED MUDSTONE: pale brown and strong brown, dry, low plasticity.										
					48							
		...VERY HARD.										
5												
					44							
		...VERY HARD.										
10												
					51		96	20				
		...VERY HARD, decreased amount of weathered mudstone.										
15												
					72							
		CL: VERY HARD SILTY CLAY: strong brown, dry, low plasticity.										
20												
					82		96	19				
		MDSTN: VERY DENSE MUDSTONE: strong brown, dry, no distinct cleavage planes as above.										
25												

Completion Depth: 51.0
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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700 22nd Street
Bakersfield, CA 93301
Telephone: (661) 327-0671
Fax: (661) 324-4218

LOG OF BORING NO. B-03

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		CL/MDSTN: VERY FIRM SILTY CLAY AND DENSE MUDSTONE:strong brown, dry, low plasticity.			71							
30		**CL: VERY HARD SILTY CLAY:**strong brown, wet from adding water to drill, low plasticity, trace fine sand.			52		94	21				
35		**CL/MDSTN: VERY FIRM SANDY SILTY CLAY AND VERY DENSE MUDSTONE:**strong brown, wet from drilling, fine grained sand, low plasticity. 1" mudstone fragments.			50/ 5"							
40		**MDSTN: VERY DENSE MUDSTONE:**pale brown and strong brown, slight moist.			82		93	21				
45		**CL/MDSTN: VERY FIRM SILTY CLAY AND VERY DENSE MUDSTONE:**strong brown, slight moist.			50/ 6"							
50												

Completion Depth: 51.0
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

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LOG OF BORING NO. B-03

Project Name: **Johe Ranch Mine Project**
Project Number: **G18-194-10B**
Project Location: **McKittrick, California**
Logged by: **L. Prosser**
Checked by: **A. Terronez**

Surface El.:
Location:

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Samples	Sample Number	Penetration Blows / Foot	Pocket Penetrometer, TSF	% Passing No. 200 Sieve	In-Situ Dry Weight (pcf)	In-Situ Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
		CL/MDSTN: VERY FIRM SILTY CLAY AND VERY DENSE MUDSTONE:strong brown, slight moist.*(continued)*			50/ 5"		95	11				
		MDSTN: VERY DENSE MUDSTONE:strong brown, dry.										
		End of boring.										
55												
60												
65												
70												
75												

Completion Depth: 51.0
Date Started: 8/9/18
Date Completed: 8/9/18
California Sampler: 2.4 inch inner diameter
SPT Sampler: 1.4 inch inner diameter

Drilling Equipment: CME 95 with auto hammer
Drilling Method: Hollow Stem Auger
Drive Weight: 140 pounds
Hole Diameter: 8 inches
Drop: 30 inches
Remarks: Borings backfilled with soil cuttings.

GEO_TARGET BORING LOGS.GPJ GEOTECHNICAL 08.GDT 8/22/18

APPENDIX B

LABORATORY TESTING RESULTS

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APPENDIX B
LABORATORY TESTING

Moisture-Density Tests

The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM D 2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in general accordance with ASTM D 2937 test procedures. Test results are presented on the Boring logs in Appendix A.

Direct Shear Test

Six (6) Direct Shear Tests were performed on a relatively undisturbed soil sample obtained at the time of drilling in the area of planned construction. The tests were conducted to determine the soil strength characteristics. The standard test method is ASTM D3080, Direct Shear Test for Soil under Consolidated Drained Conditions. The direct shear test results are presented graphically on Figures B-1 through B-6.

BSK ASSOCIATES
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Bakersfield, CA
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Fax: (661) 324-4218

Direct Shear Test

ASTM D 3080

Project Name:	Johe Ranch Mine Project	**Sample Date:**	8/9/2018
Project Number:	G18-194-10B	**Test Date:**	8/15/2018
Lab Tracking ID:	B18-339	**Report Date:**	8/20/2018
Sample Location:	B-1 @ 11-11.5 feet bgs	**Sampled By:**	L.Prosser
Sample Description:	MDSTN: DENSE WEATHERED MUDSTONE: light brownish grey and strong brown, dry.	**Tested By:**	M. Zavala

SHEAR STRENGTH DIAGRAM

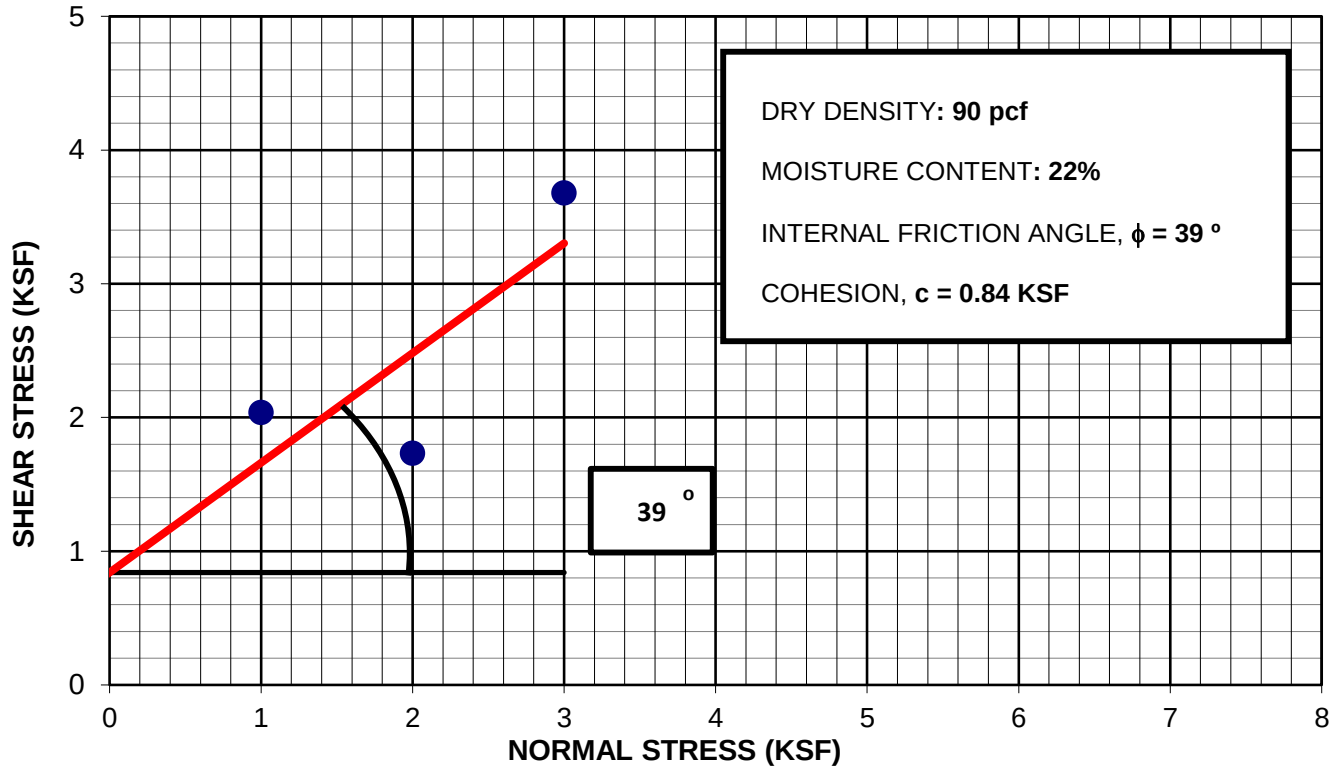


Figure B-1

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Bakersfield, CA
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Fax: (661) 324-4218

Direct Shear Test

ASTM D 3080

Project Name:	Johe Ranch Mine Project	**Sample Date:**	8/9/2018
Project Number:	G18-194-10B	**Test Date:**	8/15/2018
Lab Tracking ID:	B18-339	**Report Date:**	8/20/2018
Sample Location:	B-1 @ 21-21.5 feet bgs	**Sampled By:**	L.Prosser
Sample Description:	MDSTN: DENSE MUDSTONE: pale brown and strong brown, dry, trace of diatoms.	**Tested By:**	M. Zavala

SHEAR STRENGTH DIAGRAM

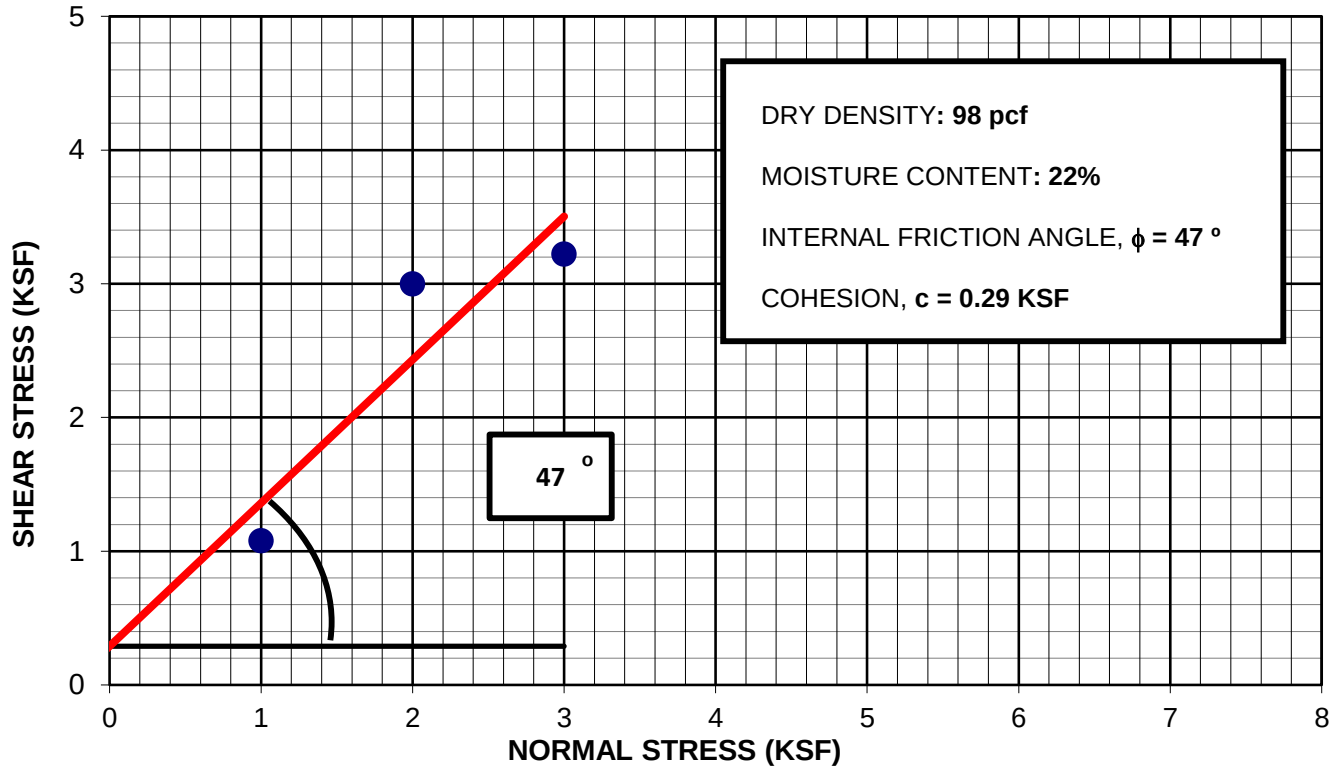


Figure B-2

BSK ASSOCIATES
700 22nd St
Bakersfield, CA
Ph: (661) 327-0671
Fax: (661) 324-4218

Direct Shear Test

ASTM D 3080

Project Name:	Johe Ranch Mine Project	**Sample Date:**	8/9/2018
Project Number:	G18-194-10B	**Test Date:**	8/17/2018
Lab Tracking ID:	B18-339	**Report Date:**	8/20/2018
Sample Location:	B-2 @ 21-21.5 feet bgs	**Sampled By:**	L. Prosser
Sample Description:	MDSTN: MEDIUM DENSE MUDSTONE: pale brown and strong brown, diatomite, weathered.	**Tested By:**	E. Lopez

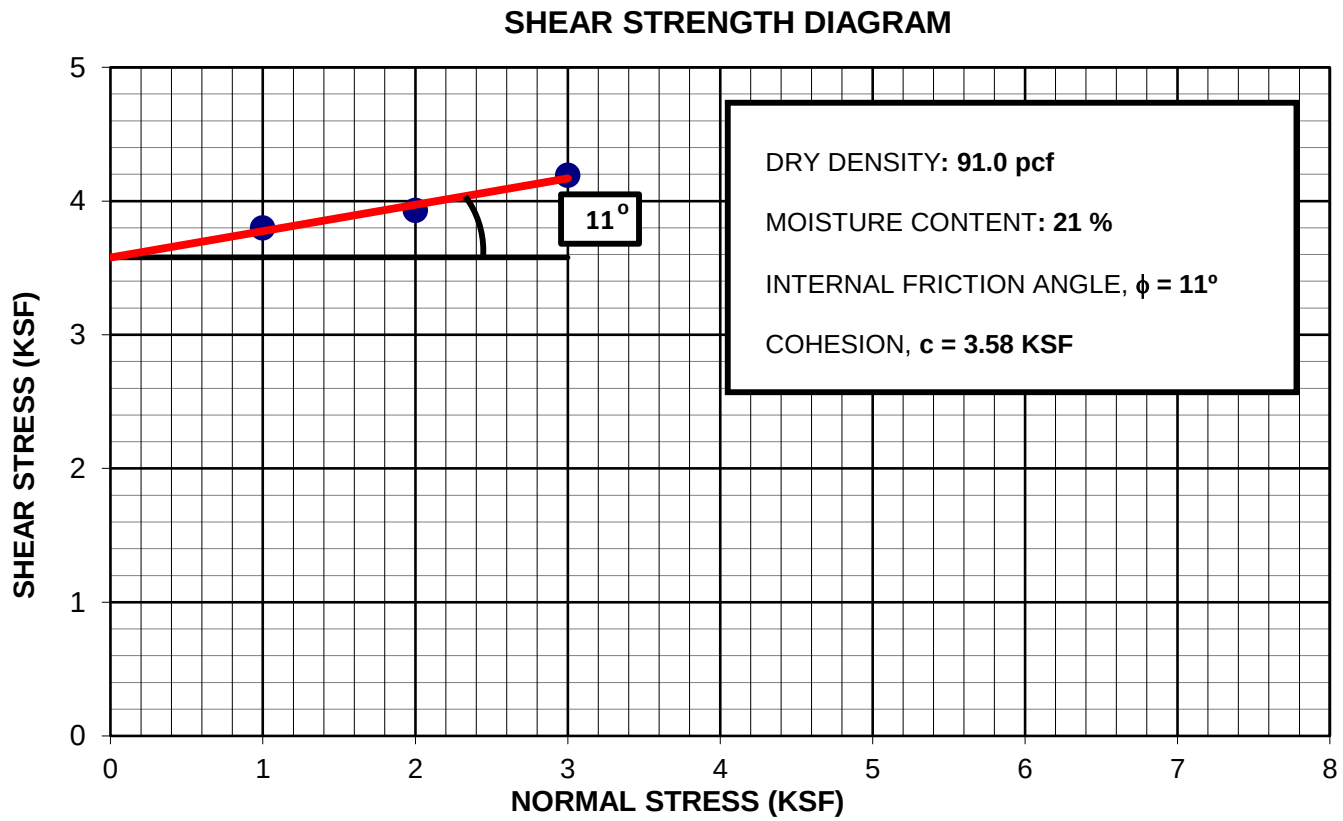


Figure B-3

BSK ASSOCIATES
700 22nd St
Bakersfield, CA
Ph: (661) 327-0671
Fax: (661) 324-4218

Direct Shear Test

ASTM D 3080

Project Name:	**Johe Ranch Mine Project**	**Sample Date:**	8/9/2018
Project Number:	G18-194-10B	**Test Date:**	8/17/2018
Lab Tracking ID:	B18-339	**Report Date:**	8/17/2018
Sample Location:	B-2 @ 31-31.5 feet bgs	**Sampled By:**	L.Prosser
Sample Description:	MDSTN: DENSE WEATHERED MUDSTONE: pale brown and brownish yellow, moist, diatomite.	**Tested By:**	E.Lopez

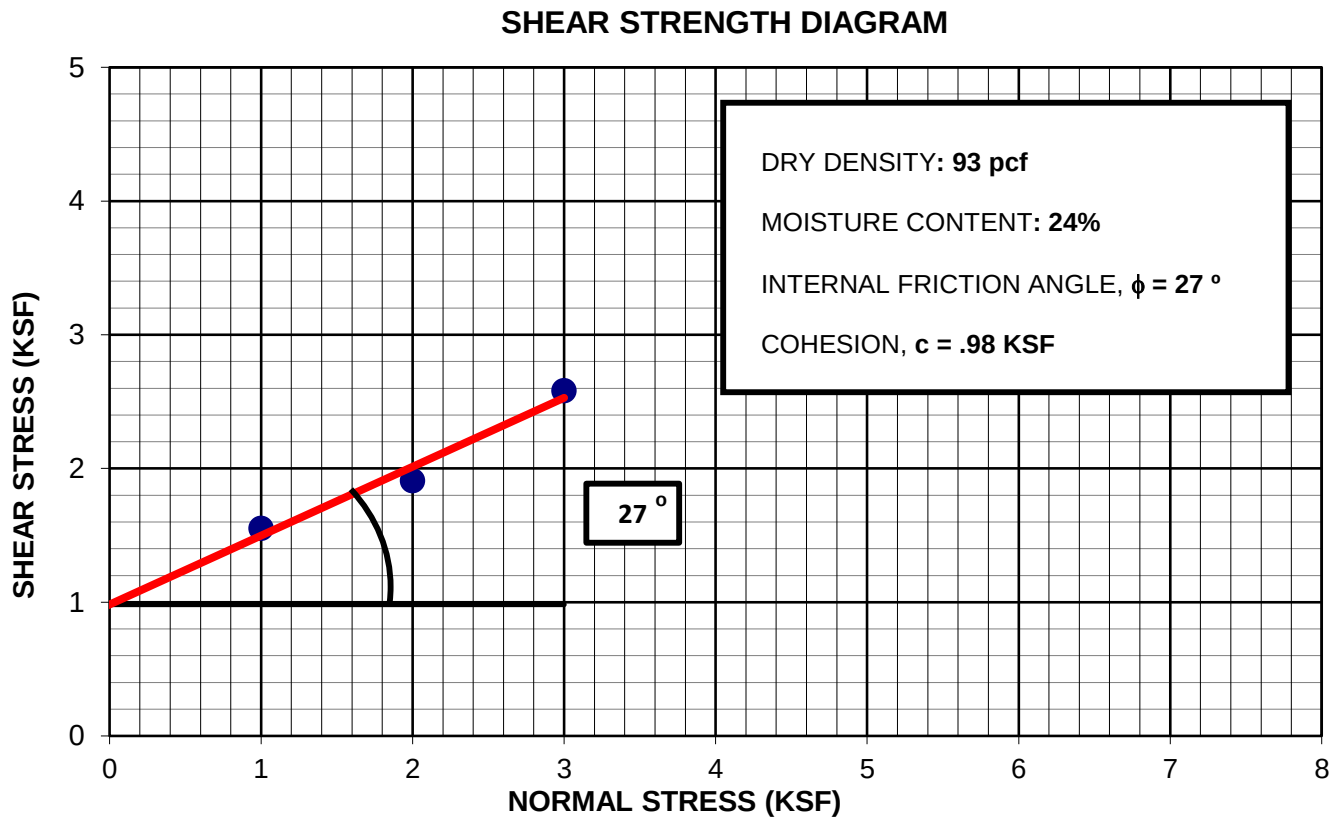


Figure B-4

BSK ASSOCIATES
700 22nd St
Bakersfield, CA
Ph: (661) 327-0671
Fax: (661) 324-4218

Direct Shear Test

ASTM D 3080

Project Name:	Johe Ranch Mine Project	**Sample Date:**	8/9/2018
Project Number:	G18-194-10B	**Test Date:**	8/17/2018
Lab Tracking ID:	B18-339	**Report Date:**	8/17/2018
Sample Location:	B-3 @ 21-21.5 feet bgs	**Sampled By:**	L.Prosser
Sample Description:	MDSTN: VERY DENSE MUDSTONE: strong brown, dry.	**Tested By:**	ILTR

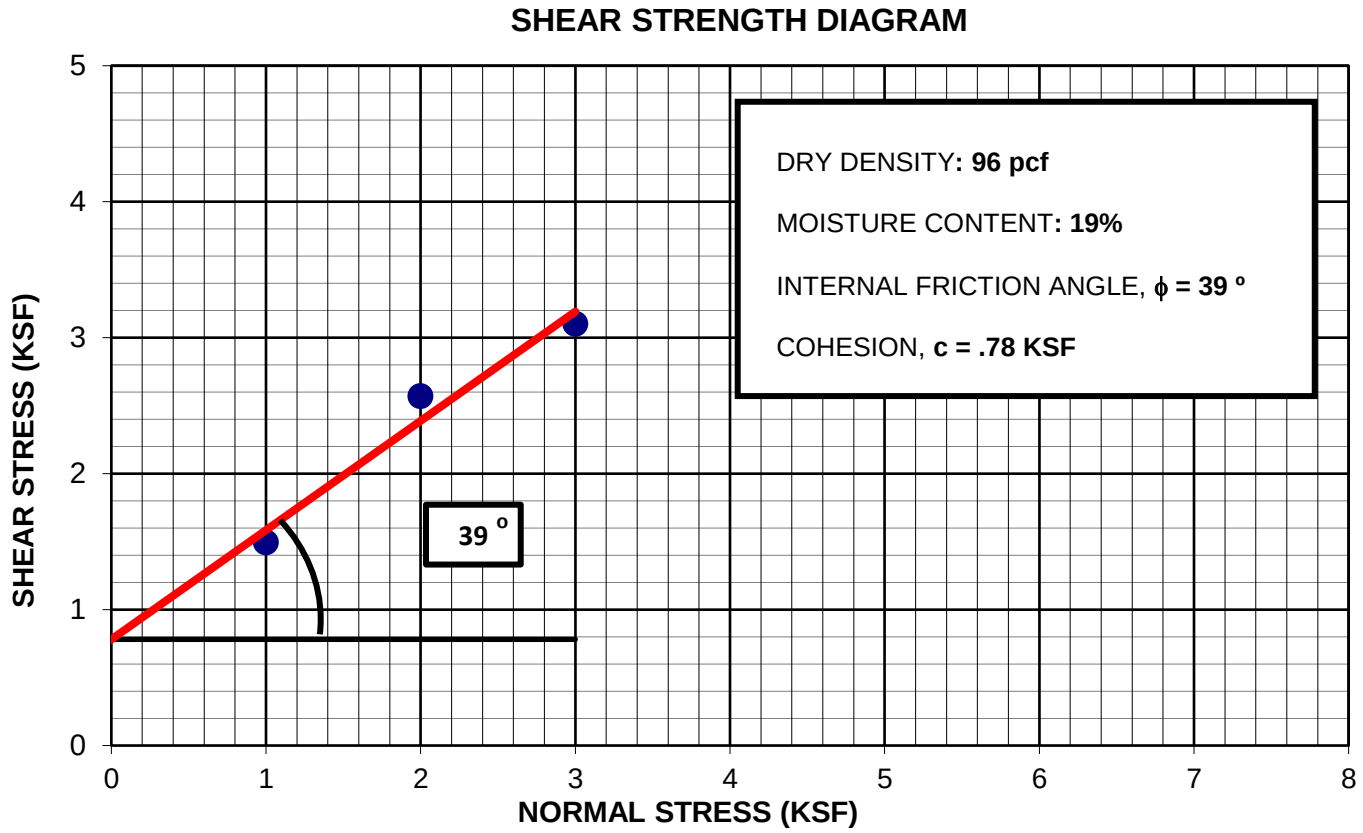


Figure B-5

BSK ASSOCIATES
700 22nd St
Bakersfield, CA
Ph: (661) 327-0671
Fax: (661) 324-4218

Direct Shear Test

ASTM D 3080

Project Name:	Johe Ranch Mine Project	**Sample Date:**	8/9/2018
Project Number:	G18-194-10B	**Test Date:**	8/17/2018
Lab Tracking ID:	B18-339	**Report Date:**	8/17/2018
Sample Location:	B-3 @ 41-41.5 feet bgs	**Sampled By:**	L.Prosser
Sample Description:	MDSTN: VERY DENSE MUDSTONE: pale brown and strong brown, slight moist.	**Tested By:**	ILTR

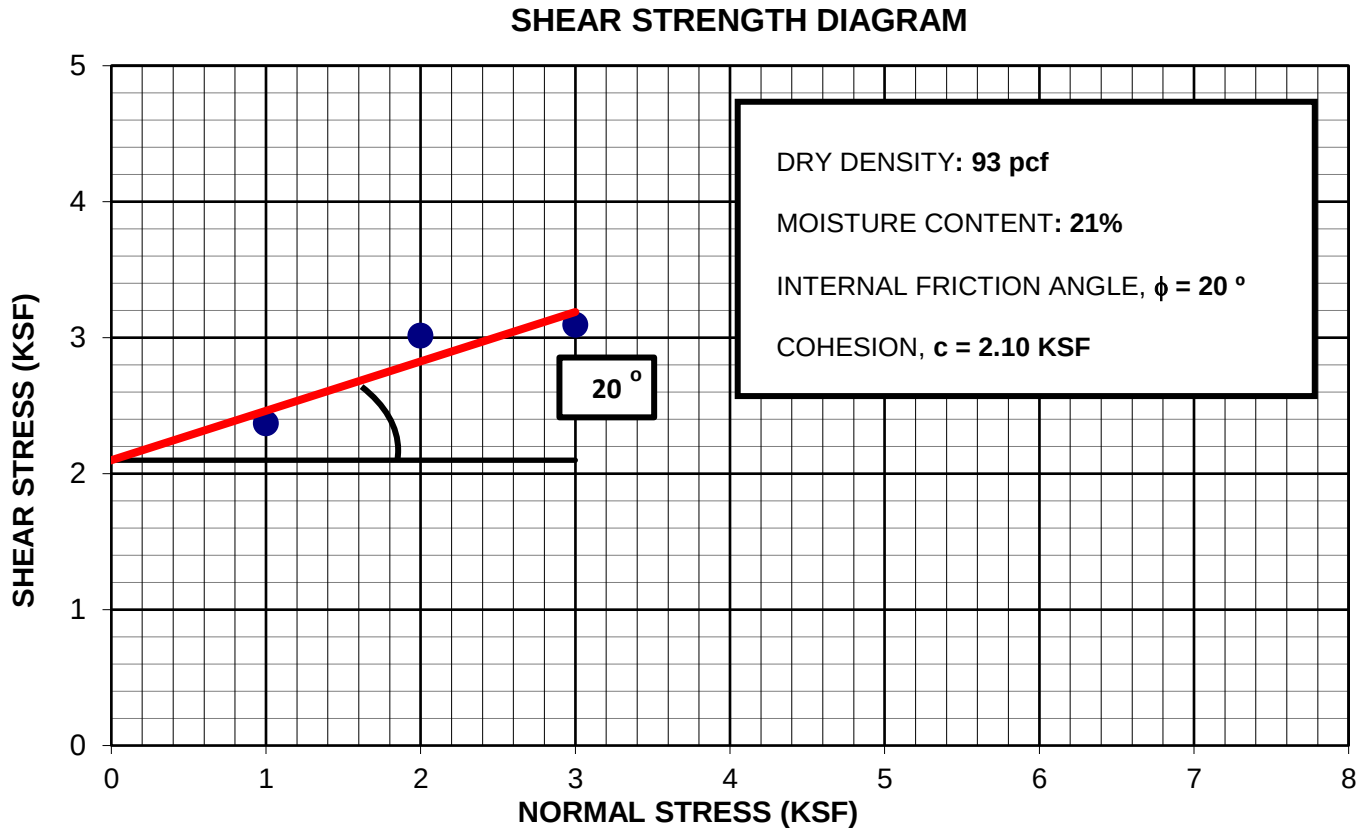


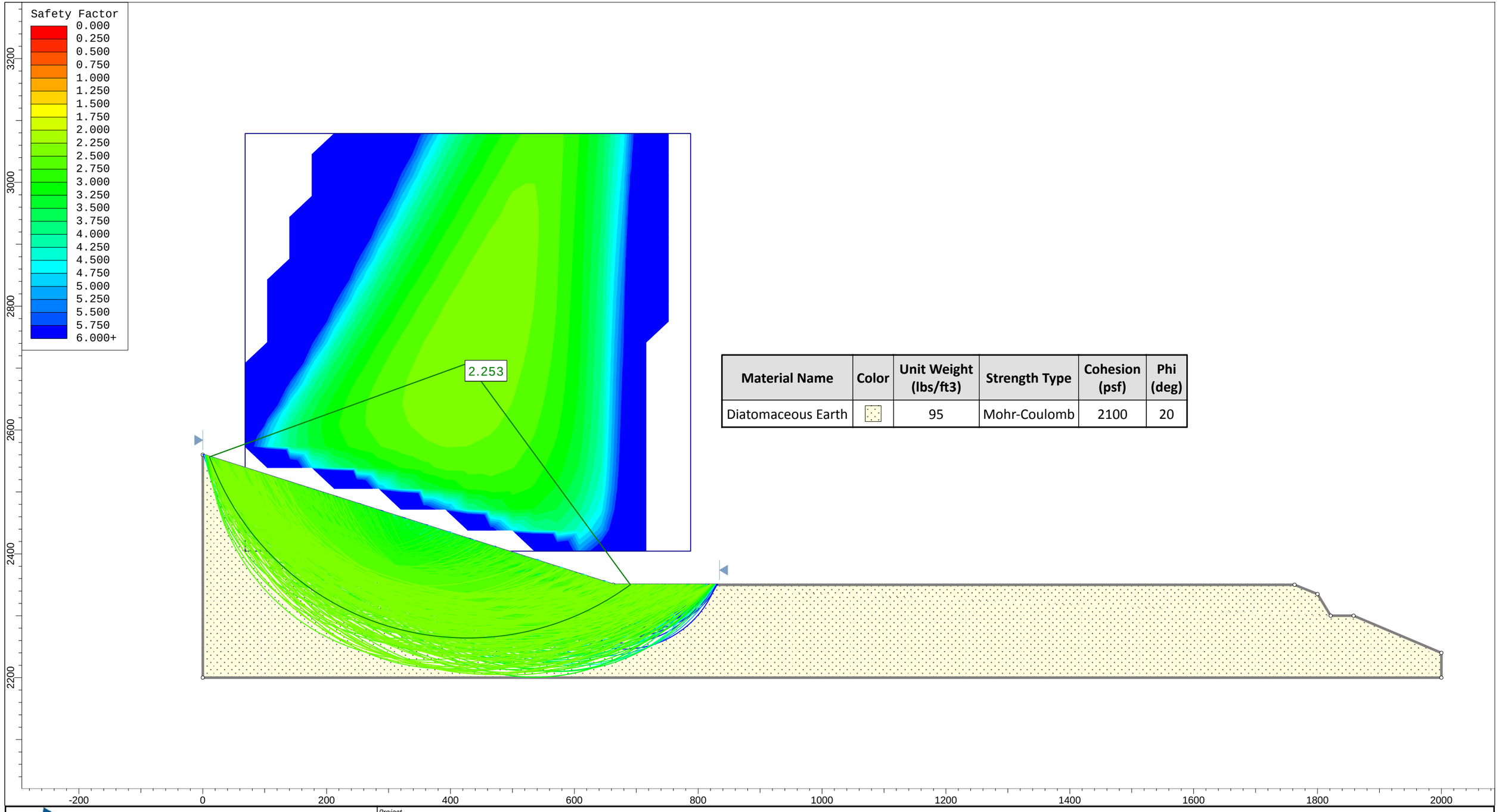
Figure B-6

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APPENDIX C

SLOPE STABILITY ANALYSIS

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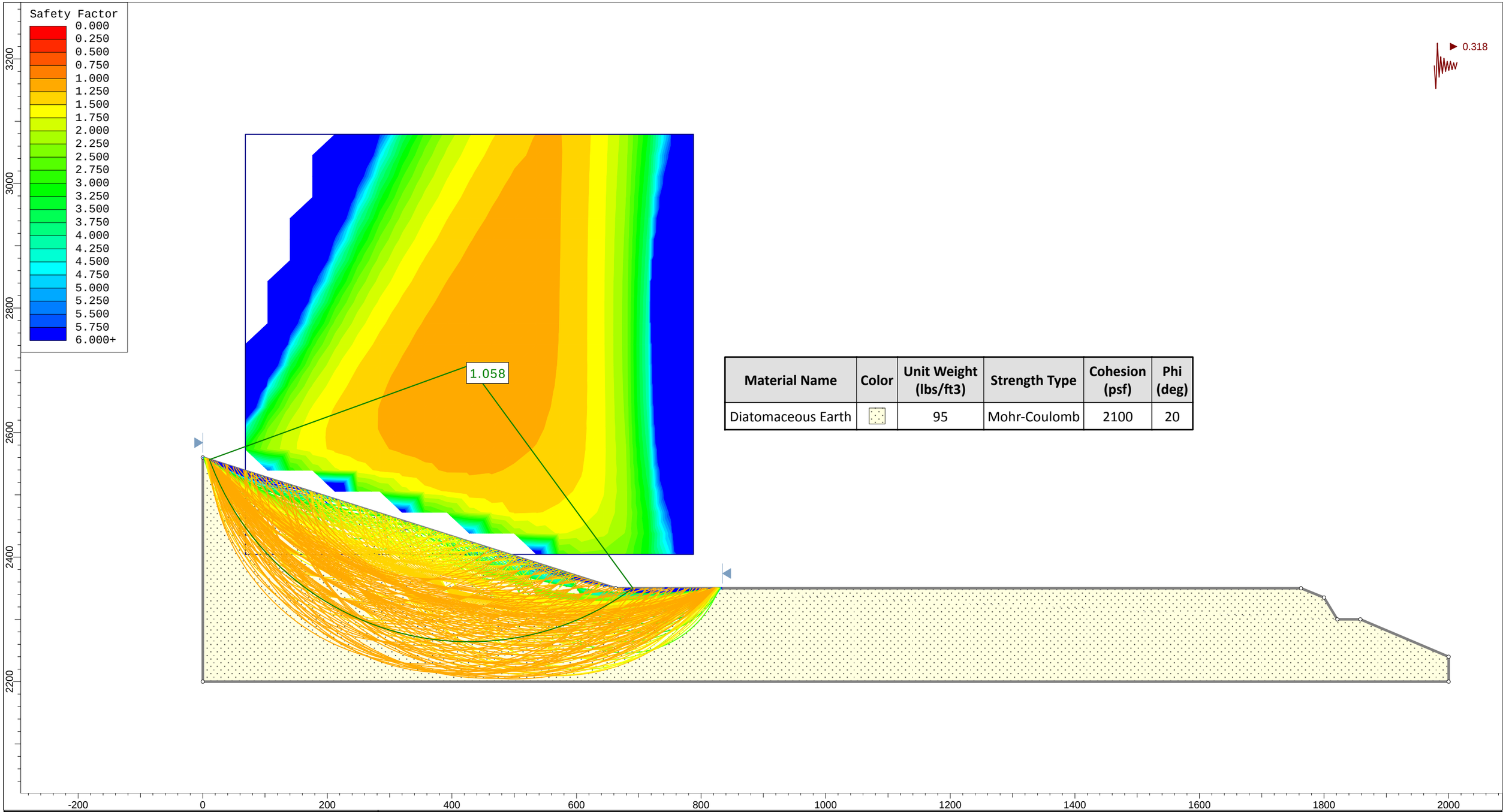


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Diatomaceous Earth		95	Mohr-Coulomb	2100	20

SLIDEINTERPRET 7.031

Project	Johe Ranch Slope Stability Analysis			
Analysis Description				
Drawn By	Logan Prosser	Scale	1:1750	Company: BSK Associates
Date	8/27/2018, 2:00:27 PM			File Name: B-B' slide.slim

Figure C-1



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Diatomaceous Earth		95	Mohr-Coulomb	2100	20

SLIDEINTERPRET 7.031

Project	Johe Ranch Slope Stability Analysis			
Analysis Description				
Drawn By	Logan Prosser	Scale	1:1750	Company: BSK Associates
Date	8/27/2018, 2:00:27 PM			File Name: B-B' slide.slim

Figure C-2

Appendix G.2
Soil Sample Report

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WZI INC.

December 12, 2018

Mr. Steve Gentile
GF Industries
122 n. Harbor Blvd., #201
Fullerton, CA 92832

Re: Soil Sample Report
Johe Ranch Mine Site, Kern County, California

Dear Mr. Gentile:

The following summarizes the results of soil samples collected for the purpose of assessing the quality of diatomite ore material that is proposed for mining at the Johe Ranch Mine site located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA (**Exhibit 1**). The property contains approximately 331 acres and is located in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian.

Existing Site Conditions and Geology
The site consists primarily of rolling topography with some steep slopes and incised drainages. The elevation of the property varies from approximately 2,800 feet above sea level near the southwestern corner to approximately 2,075 feet above sea level near the northeast corner. In the past, the site has been utilized for farming, grazing, and some natural gas production. Historically, the vicinity has been used for farming, grazing, some oil and gas production, and diatomaceous earth mining.

The majority of the property is underlain by marine sediments consisting of diatomite of the Miocene age Monterey Formation which outcrops throughout much of western Kern County (**Exhibit 2**). These deposits trend northwest, are moderately to tightly folded, and locally faulted. The diatomite is overlain by a small area of Quaternary age non-marine sediments in the northwestern portion of the property which are identified as landslide deposits (Dibblee, 2005). The site is located within the administrative boundary of the Belgian Anticline oil field (California Division of Oil and Gas, 1985). No active oil or gas wells are currently located on the property.

The site is located to the west of the San Joaquin Valley Groundwater Basin within outcrops of the Miocene diatomite of the Monterey Formation. There is no known groundwater at the site and no water wells have been drilled on the property.

Surface Soils
Soils occurring within or near the Project Site include: Reward shaly loam, Mendi-Hillbrick-Kilmer association, Reward channery loam, and Pottinger very shaly clay loam (United States Department of Agriculture, 1988). The Reward shaly loam comprises the majority of the soil types present on the Project site. This soil type is a loam type that occurs on hill slopes. These are well drained soils formed from weathered sandstone shale. A map of surface soil classifications is included as **Exhibit 3**.

Sampling
Surface diatomite deposits were sampled on August 13, 2009, January 27, 2011, and December 2, 2013 and analyzed for mercury. An additional sample was collected on February 13, 2015 and analyzed for CAM 17 metals. The purpose of the sample collection was to determine if the diatomite material was suitable for use in the manufacture of cement. The samples were collected from surface diatomite deposits in the areas of ridge one and ridge two within the area to be mined. The approximate sampling locations are depicted on **Exhibit 4**.

Laboratory Analytical Results
The sample collected on August 13, 2009 was transported to BC Laboratories and the samples collected on January 27, 2011 and December 2, 2013 were transported to Construction Technology Laboratories for chemical analysis for mercury. The sample collected on February 13, 2015 was analyzed for CAM 17 metals. Copies of the laboratory analyses and a table summarizing the laboratory analytical results are included in **Attachment 1**.

Conclusions and Recommendations
Surface diatomite samples were collected from ridge one and ridge two within the area to be mined at the proposed Johe Ranch mine site for the purpose of determining the suitability of the diatomite material in the manufacture of cement. Based on the sample analytical results, the diatomite was determined to be suitable for use in cement manufacturing and no further sampling is recommended.

Please feel free to contact me if you have any questions or require additional information.

Yours Truly,



Allen Waggoner
Certified Engineering Geologist #1818
State of California
Expiration: 03/31/19

References

California Division of Oil and Gas, 1985, *California Oil and Gas Fields - Central California*.

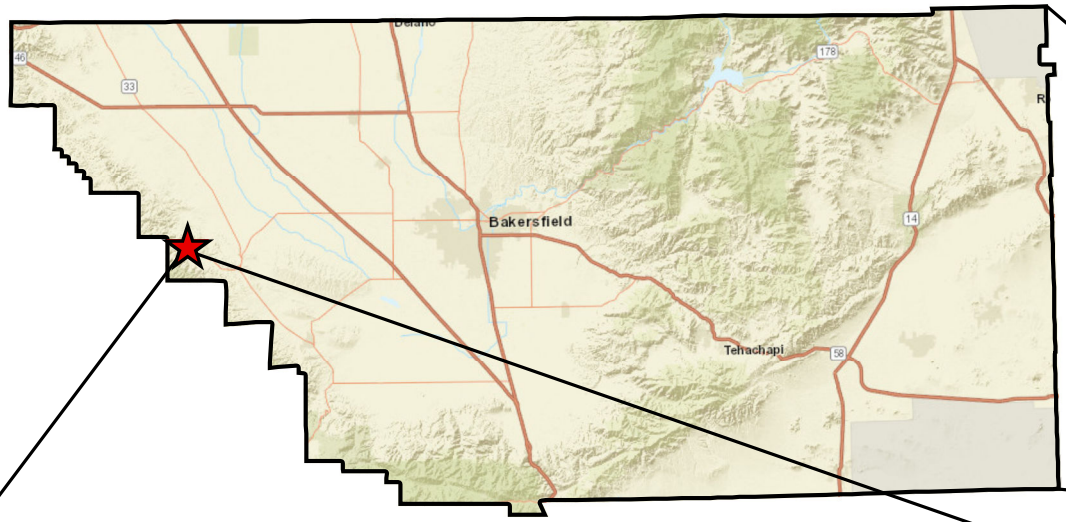
Dibblee, T.W., 2005, *Geologic Map of the McKittrick Summitt Quadrangle, San Luis Obispo and Kern County, Ca.*, Dibblee Geology Center Map #DF-101, Santa Barbara Museum of Natural History.

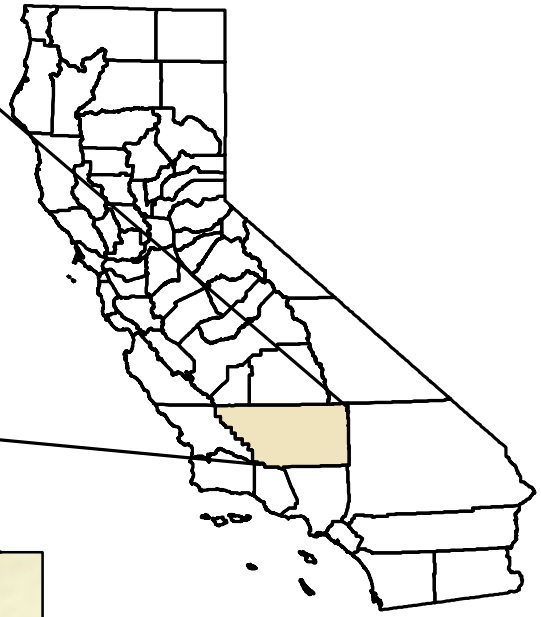
United States Department of Agriculture, 1988, *Soil Survey of Kern County, California, Northwestern Part*.

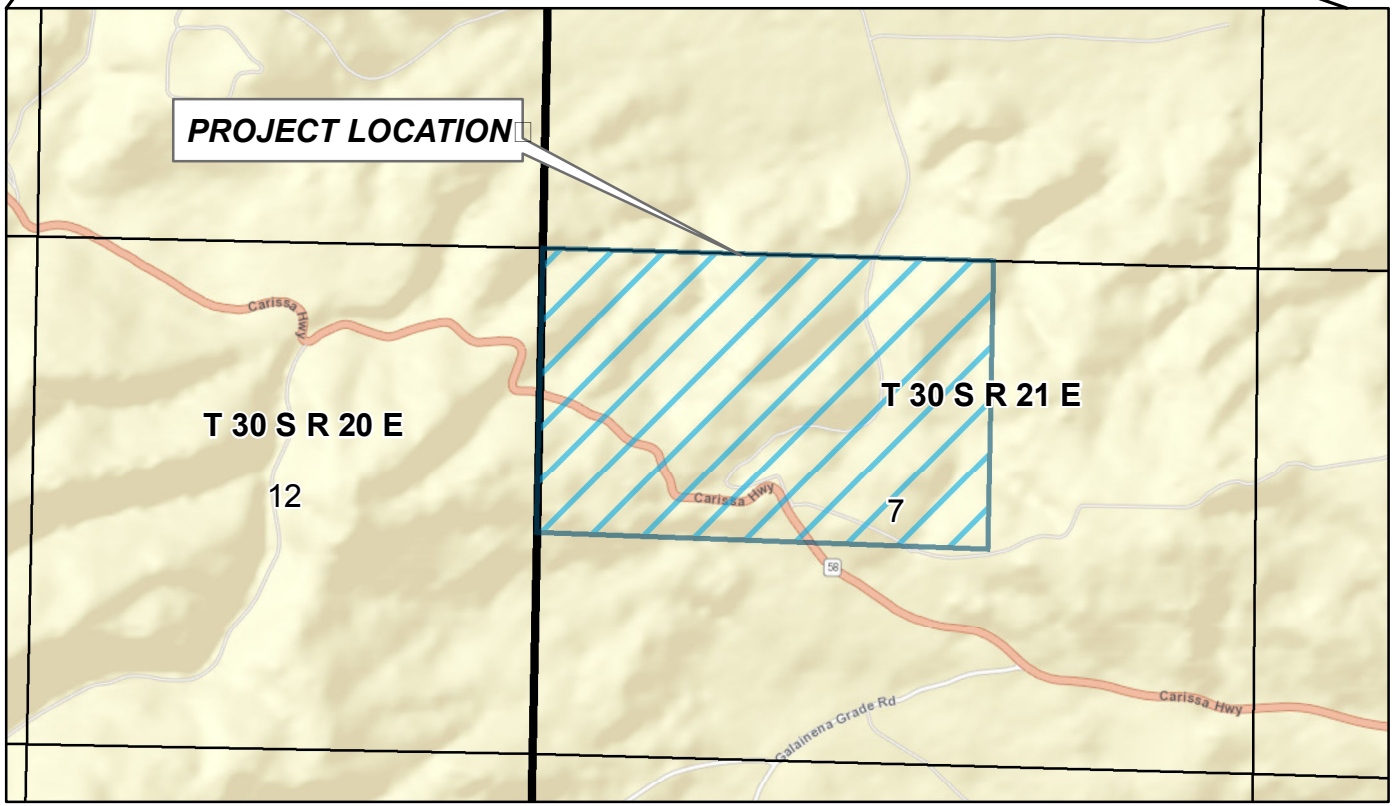
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Exhibits

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N

0 1,000 2,000 4,000

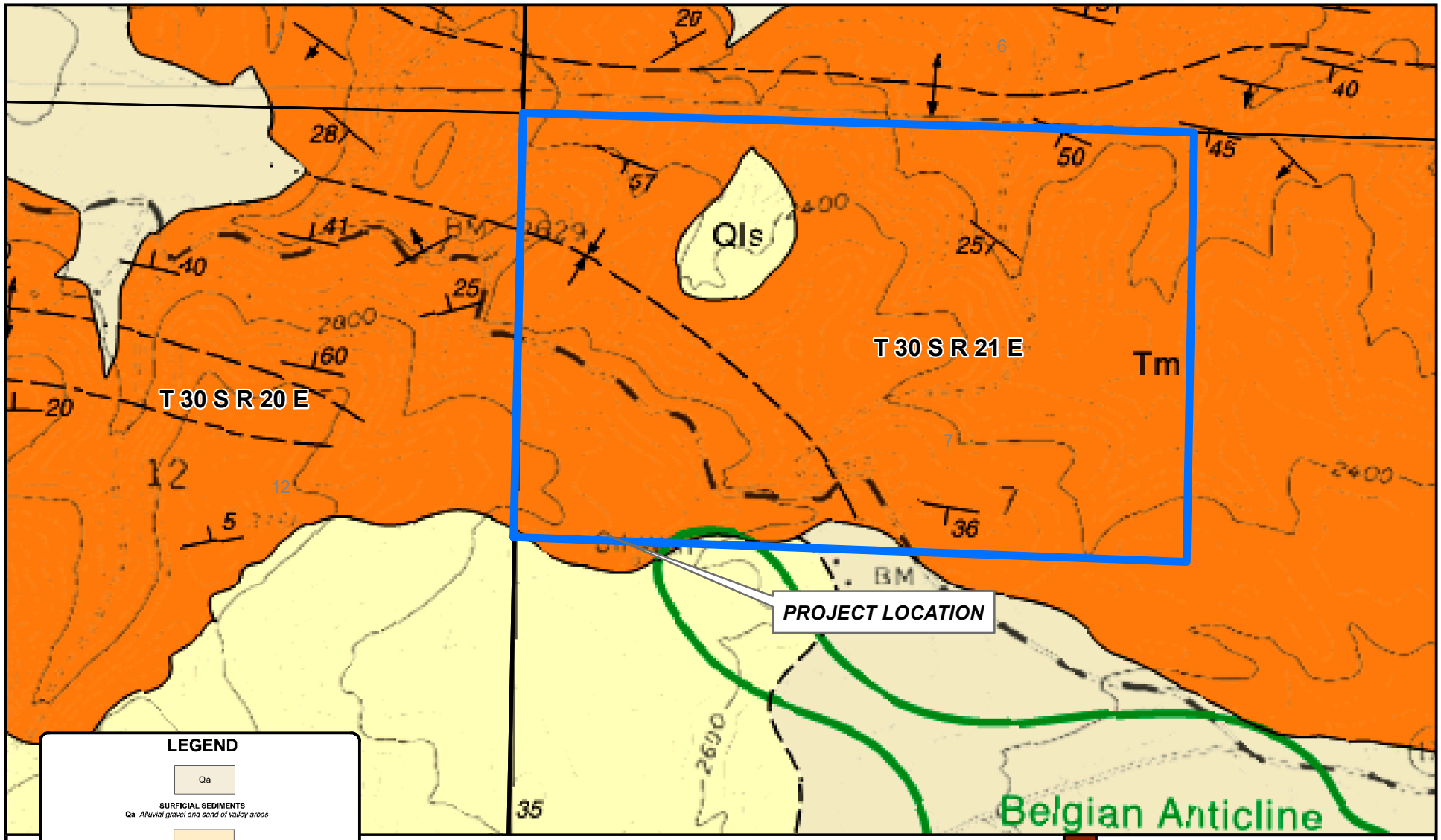
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE
KERN COUNTY, CA

LOCATION MAP

DATE:		FIGURE:
12/18		1



LEGEND

Qa

SURFICIAL SEDIMENTS
Qa *Alluvial gravel and sand of valley areas*

Qls

LANDSLIDE RUBBLE
Qls *Landslide of cream white* **Tm** *debris; merges into* **Qoa**

Qoa

OLDER DISSECTED SURFICIAL SEDIMENTS
Qoa *Dissected alluvial gravel of cream white* **Tm** *debris, merges into* **Qls**

Tm
Tmg

MONTEREY SHALE
Marine, biogenic, lithified; age Miocene
Tm *McLure Shale Member, siliceous shale, white weathering, thin bedded, platy, hard, commonly cherty, brittle, much fractured; Mohnian Stage, upper Miocene*
Tmg *Gould Shale Member, siliceous shale, semi-siliceous shale and clay shale, contains thin yellow dolomite beds, Luisian and Relizian stages, middle Miocene*

REF: Dibblee, T.W., 2005, Geologic map of the McKitterick Summitt Quadrangle, San Luis Obispo and kern County, Ca., Dibblee Geology Center Map #DF-101, Santa Barbara Museum of Natural History

N

1,000 500 0 1,000

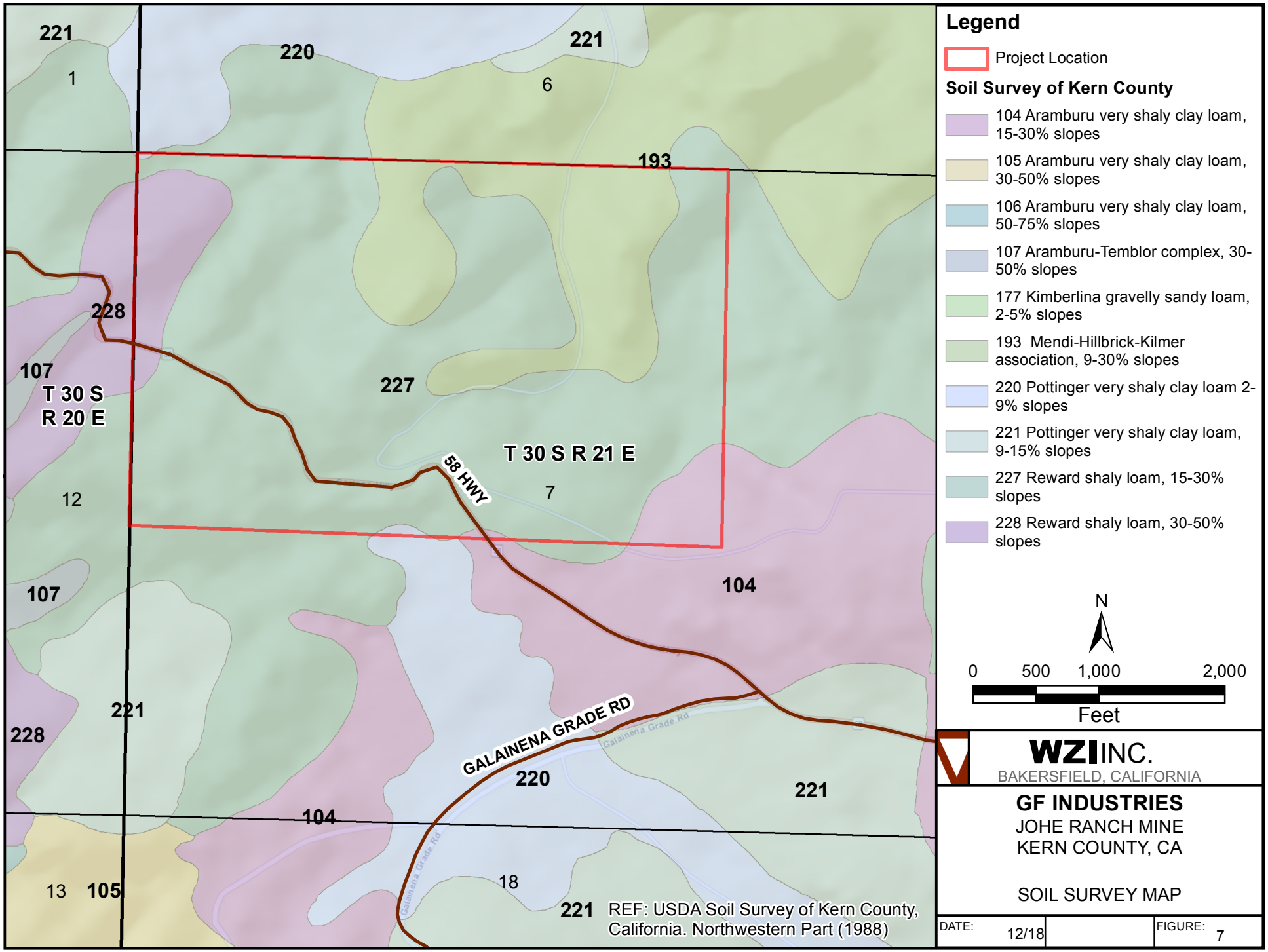
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE
KERN COUNTY, CA

SURFACE GEOLOGY MAP

DATE: 12/18 EXHIBIT: 2



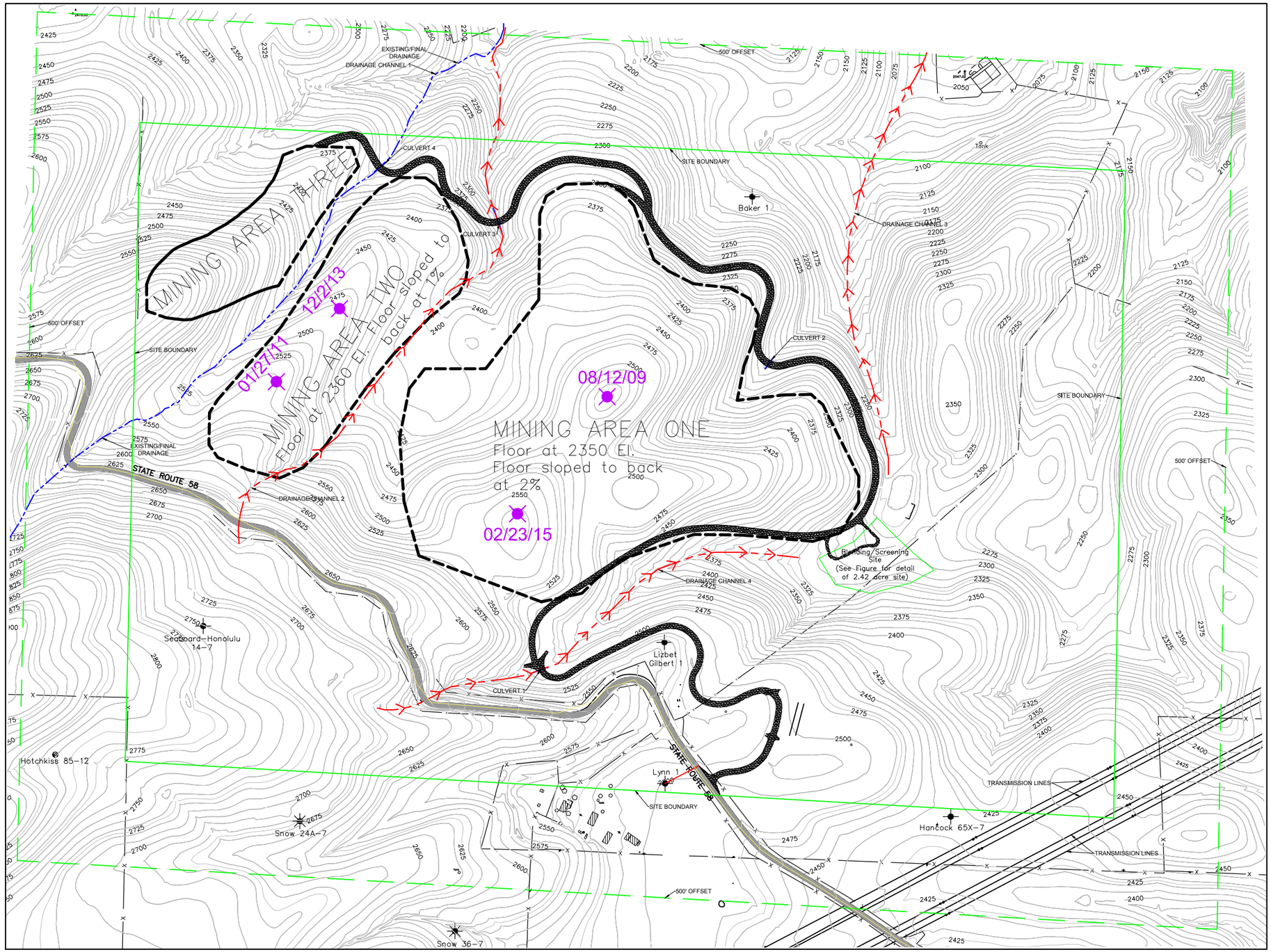
WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE
KERN COUNTY, CA

SOIL SURVEY MAP

DATE:		FIGURE:
12/18		7

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LEGEND

- 100 — EXISTING GROUND CONTOUR
- EXISTING FENCE LINE
- 500' PROJECT BOUNDARY OFFSET
- DISTURBANCE BOUNDARY
- PROJECT BOUNDARY
- EXISTING RANCH ROAD
- PROPOSED ACCESS ROAD
- INTERMITTENT DRAINAGE CHANNEL
- "BLUE–LINE" WATERCOURSE PER USGS MAP
- ACTIVE DRY GAS WELL
- PLUGGED OIL & GAS WELL
- 02/23/15 — APPROXIMATE DIATOMITE SAMPLE LOCATIONS AND DATES

N

500 250 0 500

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE
KERN COUNTY, CA
SAMPLE LOCATION MAP

DATE:	JOB NO.:	EXHIBIT:
12/18		4

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Attachment 1

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Table 1 -Johe Ranch Mine Soil Analyses

Summary of Laboratory Analytical Results

	Lab Name	BC	CTL Group	CTL Group	Alpha Scientific Corp.
	Lab No/Lab ID	0910597-01	2768901	3563101	G1502040-1
	Sample Date	8/12/2009	1/27/2011	12/2/2013	2/23/2015
	Matrix	Soil/Diatomite	Soil/Diatomite	Soil/Diatomite	Soil/Diatomite
Analyses		Results	Results	Results	Results
	Units				
Mercury	mg/kg	0.054	0.099	0.041	ND
Metal Analysis					
Antimony	mg/kg	NA	NA	NA	ND
Arsenic	mg/kg	NA	NA	NA	6.7
Barium	mg/kg	NA	NA	NA	376
Beryllium	mg/kg	NA	NA	NA	ND
Cadium	mg/kg	NA	NA	NA	25.9
Chromium	mg/kg	NA	NA	NA	47.5
Cobalt	mg/kg	NA	NA	NA	6.8
Copper	mg/kg	NA	NA	NA	30.1
Lead	mg/kg	NA	NA	NA	2.9
Mercury	mg/kg	NA	NA	NA	ND
Molybdenum	mg/kg	NA	NA	NA	27.3
Nickel	mg/kg	NA	NA	NA	97.3
Selenium	mg/kg	NA	NA	NA	ND
Silver	mg/kg	NA	NA	NA	ND
Thallium	mg/kg	NA	NA	NA	ND
Vanadium	mg/kg	NA	NA	NA	144
Zinc	mg/kg	NA	NA	NA	119

NA=Not analyzed
ND=Not Detected

02-23-2015

Mr. Steve Gentile
GF Industries
122 N. Harbor Blvd, Suite 201
Fullerton, CA 92832

Project: Jone Ranch
Project Site: Mckittrick.CA
Sample Date: 02-13-2015
Lab Job No.: GI502040

Dear Mr. Gentile:

Enclosed please find the analytical report for the sample(s) received by Alpha Scientific Corporation on 02-13-2015 and analyzed for the following parameters:

EPA 6010B/7471A for CAM Metals

All analyses have met the QA/QC criteria of this laboratory.

The sample(s) arrived in good conditions and with a chain of custody record attached.

Alpha Scientific Corporation is a CA DHS certified laboratory (Certificate Number 2633). Thank you for giving us the opportunity to serve you. Please feel free to call me at (562) 809-8880 if our laboratory can be of further service to you.

Sincerely,

Roger Wang, Ph. D.
Laboratory Director

Enclosures

This cover letter is an integral part of this analytical report.

Client: GF Industries
Project: Jone Ranch
Project Site: Mckittrick.CA
Matrix: Solid
Digestion Method: EPA 3050B
Batch No.: 0218-MS1

Lab Job No.: GI502040

Date Sampled: 02-13-2015
Date Received: 02-13-2015
Date Digested: 02-18-2014
Date Analyzed: 02-18-2014
Date Reported: 02-23-2015

EPA 6010B/7471A for Cam Metals (TTLC)
Reporting Units: mg/kg (ppm)

Element	EPA Method	Method Blank	GI502040-1 JR-13-01-02					PQL
Antimony (Sb)	6010B	ND	ND					2
Arsenic (As)	6010B	ND	6.7					0.5
Barium (Ba)	6010B	ND	376					2
Beryllium (Be)	6010B	ND	ND					2
Cadmium (Cd)	6010B	ND	25.9					2
Chromium (Cr)	6010B	ND	47.5					2
Cobalt (Co)	6010B	ND	6.8					2
Copper (Cu)	6010B	ND	30.1					2
Lead (Pb)	6010B	ND	2.9					2
Mercury (Hg)	7471A	ND	ND					0.2
Molybdenum (Mo)	6010B	ND	27.3					2
Nickel (Ni)	6010B	ND	97.3					2
Selenium (Se)	6010B	ND	ND					0.5
Silver (Ag)	6010B	ND	ND					2
Thallium (Tl)	6010B	ND	ND					2
Vanadium (V)	6010B	ND	144					2
Zinc (Zn)	6010B	ND	119					1

PQL: Practical Quantitation Limit.
ND: Not Detected (less than PQL).

02-23-2015

EPA 6010B/7471A for Cam Metals (TTLC)
Batch QA/QC Report

Client:	GF Industries	Lab Job No.:	GI502040
Project:	Jone Ranch		
Matrix:	SoiI	Lab Sample ID:	GI502040-1
Batch No.:	0218-MS1	Date Analyzed:	02-18-2014

I. MS/MSD Report
Unit: ppm

Analyte	EPA Method	MB Conc.	Spike Conc.	MS %Rec.	MSD %Rec.	% RPD	%RPD Accept. Limit	%Rec Accept. Limit
Antimony (Sb)	6010B	ND	10	90.0	93.0	3.2	30	70-130
Arsenic (As)	6010B	ND	10	97.8	99.5	1.6	30	70-130
Barium (Ba)	6010B	ND	10	100.2	101.4	1.2	30	70-130
Beryllium (Be)	6010B	ND	10	95.0	96.1	1.1	30	70-130
Cadmium (Cd)	6010B	ND	10	101.5	104.0	2.4	30	70-130
Chromium (Cr)	6010B	ND	10	102.1	104.0	1.8	30	70-130
Cobalt (Co)	6010B	ND	10	95.9	97.2	1.4	30	70-130
Copper (Cu)	6010B	ND	10	100.6	105.1	4.4	30	70-130
Lead (Pb)	6010B	ND	10	92.2	92.9	0.8	30	70-130
Molybdenum (Mo)	6010B	ND	10	100.2	102.1	1.9	30	70-130
Nickel (Ni)	6010B	ND	10	103.0	104.9	1.8	30	70-130
Selenium (Se)	6010B	ND	10	120.3	128.3	6.4	30	70-130
Silver (Ag)	6010B	ND	10	108.7	114.6	5.3	30	70-130
Thallium (Tl)	6010B	ND	10	88.0	91.9	4.4	30	70-130
Vanadium (V)	6010B	ND	10	100.5	101.5	1.0	30	70-130
Zinc (Zn)	6010B	ND	10	104.0	106.4	2.3	30	70-130

ND: Not Detected.

02-23-2015

EPA 6010B/7471A for CAM Metals
Batch QA/QC Report

Client:	GF Industries	Lab Job No.:	GI502040
Project:	Jone Ranch		
Matrix:	Soil	Lab Sample ID:	LCS
Batch No.:	0218-MS1	Date Analyzed:	02-18-2014

II. LCS Result
Unit: ppm

Analyte	EPA Method	LCS Value	True Value	Rec.%	Accept. Limit
Antimony (Sb)	6010B	11.09	10	110.9	80-120
Arsenic (As)	6010B	10.93	10	109.3	80-120
Barium (Ba)	6010B	10.46	10	104.6	80-120
Beryllium (Be)	6010B	10.38	10	103.8	80-120
Cadmium (Cd)	6010B	11.49	10	114.9	80-120
Chromium (Cr)	6010B	11.46	10	114.6	80-120
Cobalt (Co)	6010B	11.28	10	112.8	80-120
Copper (Cu)	6010B	10.18	10	101.8	80-120
Lead (Pb)	6010B	11.04	10	110.4	80-120
Molybdenum (Mo)	6010B	11.50	10	115.0	80-120
Nickel (Ni)	6010B	11.13	10	111.3	80-120
Selenium (Se)	6010B	11.06	10	110.6	80-120
Silver (Ag)	6010B	10.10	10	101.0	80-120
Thallium (Tl)	6010B	10.60	10	106.0	80-120
Vanadium (V)	6010B	10.21	10	102.1	80-120
Zinc (Zn)	6010B	11.74	10	117.4	80-120

ND:Not Detected (at the specified limit).

ALPHA SCIENTIFIC CORPORATION

CHAIN OF CUSTODY RECORD

Lab Job Number GI5020640

Client: GF Industries	**Analyses Requested**
Address 122 N. Harbor #201 Fullerton CA 92832	
Report Attention Steven Gentile / **Phone** / **Fax** / **Sampled by** SG	
Project Name/No. Jone Ranch / **Project Site** Mckittrick, CA	

T.A.T. Requested
☐ 8 hrs ☐ 24 hrs ☐ 48 hrs
☐ 3 days ☒ Normal

Sample Condition
☒ Chilled ☒ Intact
☐ Sample seals

Client Sample ID	Lab Sample ID	Sample Collection Date	Sample Collection Time	Matrix Type	Sample Preserve	No.,type* & size of container	TPH-Gasoline	TPH-Diesel	8260B (BTEX, Oxygenates)	8260B (VOCs)	8270C (SVOCs)	CAM Metals	8082 (PCBs)	Remark
JR-13-01+02	GI5020640-1	2/13/15	1PM									X		

Relinquished by	Company	Date	Time	Received by	Company	Date	Time
[signature]	GFI	2/13/15	1:50pm	[signature]	ASC	2/13/15	1:50pm
Relinquished by	Company	Date	Time	Received by	Company	Date	Time

Container types: M=Metal Tube, A=Air Bag, P=Plastic bottle, G=Glass bottle, V=VOA vial

Alpha Scientific Corporation
16760 Gridley Road
Cerritos, CA 90703

Email: ascorp@verizon.net
Tel: (562) 809-8880
Fax: (562) 809-8801

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.
Distribution: White with report, Yellow to courier.

CTL GROUP

Client:	**GF Industries**	CTL Project No:	**403984**
Project:	**Johe Ranch Mine Site**	CTL Project Mgr.:	**Boyd Clark**
		Analyst:	**Raja Naamane**
Contact:	**Steven Gentile**	Approved:	*RW Stevenson*
Submitter:	**Steven Gentile**	Date Analyzed:	**December 6, 2013**
Date Received:	**December 2, 2013**	Date Reported:	**December 10, 2013**

REPORT of MERCURY ANALYSIS

CTL ID	Client ID	Description	Mercury (Hg) (ppb)
3563101	JR-13-01+02	Diatomite	41

Notes:

1. This report represents specifically the sample(s) submitted as recieved.
2. The analysis of mercury was conducted in accordance with EPA Method 7473, utilizing a Milestone model DMA 80 direct mercury analyzer.
3. This report may not be reproduced except in its entirety.

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ENGINEERS & CONSTRUCTION TECHNOLOGY CONSULTANTS
www.CTLGroup.com

Client:	**GF Industries**	CTL Project No:	**407989**
Project:	**Mercury Analysis**	CTL Project Mgr.:	**Don Broton**
		Analyst:	**Raja Naamane**
Contact:	**Robert Thiess**	Approved:	*R W Stevenson*
Submitter:	**Robert Thiess**	Date Analyzed:	**January 31, 2011**
Date Received:	**January 27, 2011**	Date Reported:	**February 2, 2011**

REPORT of MERCURY ANALYSIS

CTL ID	Client ID	Description	Mercury (Hg) (ppb)
2768901	Johe Ranch Mine Ridge # Two	Diatomaceous Earth	99

Notes:
1. This report represents specifically the sample(s) submitted as recieved.
2. The analysis of mercury was conducted in accordance with EPA Method 7473, utilizing a Milestone model DMA 80 direct mercury analyzer.
3. This report may not be reproduced except in its entirety.

GF Industries	Project: Solid Samples	Reported: 08/21/2009 14:41
1100 East Valenica Dr.	Project Number: [none]	
Fullerton, CA 92831	Project Manager: Robert Thiess	

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
0910597-01	**COC Number:**	---	**Receive Date:**	08/13/2009 09:27
	Project Number:	---	**Sampling Date:**	08/12/2009 08:15
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Diatomaceous Earth (D.E.)	**Sample Matrix:**	Solids
	Sampled By:	Robert Thiess		

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.
All results listed in this report are for the exclusive use of the submitting party. BC Laboratories, Inc. assumes no responsibility for report alteration, separation, detachment or third party interpretation.

GF Industries 1100 East Valenica Dr. Fullerton, CA 92831	Project: Solid Samples Project Number: [none] Project Manager: Robert Thiess	**Reported:** 08/21/2009 14:41

Total Concentrations (TTLC)

BCL Sample ID: 0910597-01 | **Client Sample Name:** Diatomaceous Earth (D.E.), 8/12/2009 8:15:00AM, Robert Thiess

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Mercury	0.054	mg/kg	0.16	0.014	EPA-7471A	08/21/09	08/21/09 13:43	MEV	CETAC1	0.962	BSH1353	ND	J

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.
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GF Industries	Project: Solid Samples	Reported: 08/21/2009 14:41
1100 East Valenica Dr.	Project Number: [none]	
Fullerton, CA 92831	Project Manager: Robert Thiess	

Total Concentrations (TTLC)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Mercury	BSH1353	Duplicate	0910783-01	0.56794	0.53286		mg/kg	6.4		20		
		Matrix Spike	0910783-01	0.56794	1.4738	0.79365	mg/kg		114		85 - 115	
		Matrix Spike Duplicate	0910783-01	0.56794	1.2629	0.79365	mg/kg	26.2	87.6	20	85 - 115	Q02

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.
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GF Industries	Project: Solid Samples	Reported: 08/21/2009 14:41
1100 East Valenica Dr.	Project Number: [none]	
Fullerton, CA 92831	Project Manager: Robert Thiess	

Total Concentrations (TTLC)

Quality Control Report - Laboratory Control Sample

										Control Limits		
Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Percent Recovery	RPD	Lab Quals
Mercury	BSH1353	BSH1353-BS1	LCS	1.4785	1.5000	0.16	mg/kg	98.6		75 - 125		

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.
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GF Industries 1100 East Valenica Dr. Fullerton, CA 92831	Project: Solid Samples Project Number: [none] Project Manager: Robert Thiess	**Reported:** 08/21/2009 14:41

Total Concentrations (TTLC)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Mercury	BSH1353	BSH1353-BLK1	ND	mg/kg	0.16	0.014	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.
All results listed in this report are for the exclusive use of the submitting party. BC Laboratories, Inc. assumes no responsibility for report alteration, separation, detachment or third party interpretation.

GF Industries	Project: Solid Samples	Reported: 08/21/2009 14:41
1100 East Valenica Dr.	Project Number: [none]	
Fullerton, CA 92831	Project Manager: Robert Thiess	

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected at or above the reporting limit
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
Q02	Matrix spike precision is not within the control limits.

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BC Laboratories, Inc.

Chain of Custody Form

Page ____ of ____

Report To:
Client: GF Industries
Attn: Robert Thiess
Street Address: 1100 East Valencia Dr.
City, State, Zip: Fullerton, CA 92831
Phone: (714) 451-1631 Fax:
Email Address: robert@gfindustries.net
Work Order #: 0911597

Project #:
Project Name:
Global ID #:
Sampler(s): R. Thiess

Analysis Requested

Please refer to the back of this page for completion instructions and method legend.

Comments: PDF Report

Sample #	Description	Date Sampled	Time Sampled	# of containers	Sample Matrix: Soil	Sludge	Drinking Water	Ground Water	Waste Water	Other	Turnaround # of work days*
-1	~~Diam~~ Diatomaceous EARTH (D.E.)	8/13/09	8:15	1							

Are there any tests with holding times less than or equal to 48 hours? ☐ Yes ☐ No

* Standard Turnaround = 10 work days

Notes

CHK BY: [signature]
DISTRIBUTION: R
SUB-OUT ☐

Billing
☒ Same as above
Client:
Address:
City: State Zip
Attn:
PO#:

EDF Required? ☐ Yes ☐ No

Send Copy to State of CA? (EDT) ☐ Yes ☐ No

Sample Disposal: ☐ Return to Client ☐ Disposal by lab ☐ Archive: Months

Special Reporting: ☐ QC ☐ EDF ☐ Raw Data

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	8/13/09	930	Anna Brown	8/13/09	9:2
2.						
3.						

BC Laboratories, Inc. – 4100 Atlas Ct. – Bakersfield, CA 93308 – 661.327.4911 – Fax: 661.327.1918 – www.bclabs.com

881970 PROFORMA SOLUTIONS FOR PRINTING (661) 633-1117

BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page 1 Of 1

Submission #: 09105597

SHIPPING INFORMATION

Federal Express ☐ UPS ☐ Hand Delivery ☒

BC Lab Field Service ☐ Other ☐ (Specify)_____

SHIPPING CONTAINER

Ice Chest ☐ None ☒

Box ☐ Other ☐ (Specify)_____

Refrigerant: Ice ☐ Blue Ice ☐ None ☒ Other ☐ Comments:

Custody Seals Ice Chest ☐ Intact? Yes ☐ No ☐ Containers ☐ Intact? Yes ☐ No ☐ None ☒ Comments:

All samples received? Yes ☒ No ☐ All samples containers intact? Yes ☒ No ☐ Description(s) match COC? Yes ☒ No ☐

COC Received ☒ YES ☐ NO

Emissivity: _____ Container: PLASTIC BAG Thermometer ID: TH080

Temperature: A Room Temp °C / C _____ °C

Date/Time 8/13/09 9:27

Analyst Init AMBJ

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS										
PT CYANIDE										
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG	A									
FERROUS IRON										
ENCORE										

Comments: no description on bag or time / date

Sample Numbering Completed By: AMB Date/Time: 8/13/09 - 1520

A = Actual / C = Corrected

[H:\DOCS\WP80\LAB_DOCS\FORMS\SAMREC2.WPD]

Appendix G.3

Paleontological Resources Constraints Analysis

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51 West Dayton Street
Pasadena, California 91105
Tel 626.240.0587 Fax 626.240.0607
www.swca.com

September 27, 2018

Kern County Planning and Natural Resources Department
Attn: Randall Cates
2700 M Street, Suite 100
Bakersfield, CA 93301

RE: Results of a Paleontological Resources Constraints Analysis for the Proposed Johe Ranch Mine Project, Kern County, California.

Dear Mr. Cates,

SWCA Environmental Consultants (SWCA) was retained by (Kern County Planning and Natural Resources Department) to perform a paleontological resources constraints analysis in support of the proposed Johe Ranch Mine Project (Project) in western Kern County, California. The Project is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The property is identified by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 and contains approximately 331 acres (Figure 1). The Project proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres within the 331 acre project site. Approximately 1.4 acres of the proposed 93.67-acre disturbance area has already been disturbed as a result of existing roads. Mining will be conducted within three mine areas at the site. As proposed, no more than twenty (20) acres are planned to be disturbed at any given time. Maximum anticipated depth of mining will be 162 feet in mine area 1, 125 feet in mine area 2, and 40 feet in mine area 3. Maximum operational slopes will be 2:1 (horizontal:vertical). Maximum annual production is anticipated to be 330,000 tons of diatomaceous earth and 20,000 tons of overburden material. It is anticipated that a total of 6,600,000 tons of diatomaceous earth and 400,000 tons of overburden material will be removed during the 20 year life of the mining operation.

This Paleontological Resources Memorandum summarizes the results of a paleontological records search and a review of the relevant scientific literature, which were completed to establish the likelihood of encountering paleontological resources within the Project area. A paleontological resources survey was not conducted under the current scope of work. All paleontological work was prepared by SWCA Principal Investigator Alyssa Bell, Ph.D., who meets the guidelines of the Society of Vertebrate Paleontology (SVP) for a Qualified Paleontologist. Jacqueline Markley, M.S., served as the project manager and provided quality control.

SWCA
ENVIRONMENTAL CONSULTANTS

DEFINITION AND SIGNIFICANCE OF PALEONTOLOGICAL RESOURCES

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or un-mineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Paleontological resources include not only the fossils themselves, but also the physical characteristics of the fossils' associated sedimentary matrix.

The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced (Murphey and Daitch 2007). Fossils are important scientific and educational resources and can be used to

- study the phylogenetic relationships amongst extinct organisms, as well as their relationships to modern groups;
- elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including the biases inherent in the fossil record;
- reconstruct ancient environments, climate change, and paleoecological relationships;
- provide a measure of relative geologic dating, which forms the basis for biochronology and biostratigraphy, and is an independent and corroborating line of evidence for isotopic dating;
- study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time;
- study patterns and processes of evolution, extinction, and speciation; and
- identify past and potential future human-caused effects to global environments and climates (Murphey and Daitch 2007).

REGULATORY FRAMEWORK

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under state laws and regulations. This study satisfies project requirements in accordance with CEQA (13 Public Resources Code [PRC] 2100 et seq.) and PRC Section 5097.5 (Stats. 1965, c. 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the SVP (2010).

Federal

If any federal funding is used to wholly or partially finance a project which occurs on federal lands, involves a federal permit, and/or includes a perceived federal impact, federal laws and standards apply, and an evaluation of potential impacts on paleontological resources may be required. The management and preservation of paleontological resources on public and federal lands are prescribed under various laws, regulations, and guidelines.

The National Environmental Policy Act of 1969 (NEPA)

The National Environmental Policy Act of 1969, [NEPA] as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258 § 4(b), Sept. 13, 1982) recognizes the continuing responsibility of the Federal Government to "preserve important historic, cultural, and natural aspects of our national heritage . . ." (Sec. 101 [42 USC § 4321]) (#382). With the passage of the Paleontological Resources Preservation Act (PRPA) (2009), paleontological resources are considered to be a significant resource and it is therefore now standard practice to include paleontological resources in NEPA studies in all instances where there is a possible impact.

Antiquities Act of 1906

The Antiquities Act of 1906 (16 United States Code [USC] 431-433) states, in part:

> That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

Although there is no specific mention of natural or paleontological resources in the Act itself, or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR 3]), the term "objects of antiquity" has been interpreted to include fossils by the National Park Service (NPS), the Bureau of Land Management (BLM), the Forest Service (FS), and other federal agencies. Permits to collect fossils on lands administered by federal agencies are authorized under this Act. However, due to the large gray areas left open to interpretation due to the imprecision of the wording, agencies are hesitant to interpret this act as governing paleontological resources.

Paleontological Resources Preservation, Omnibus Public Lands Act, Public Law 111-011, Title VI, Subtitle D (PRPA, 2009)

This legislation directs the Secretaries (Interior and Agriculture) to manage and protect paleontological resources on federal land using "scientific principles and expertise." PRPA incorporates most of the recommendations of the report of the Secretary of the Interior entitled Assessment of Fossil Management on Federal and Indian Lands (2000) in order to formulate a consistent paleontological resources management framework. In passing the PRPA, Congress officially recognized the scientific importance of paleontological resources on some federal lands by declaring that fossils from these lands are federal property that must be preserved and protected. The PRPA codifies existing policies of the BLM, National Park Service, U.S. Forest Service, Bureau of Reclamation, and U.S. Fish and Wildlife Service, and provides the following:

- Uniform criminal and civil penalties for illegal sale and transport, and theft and vandalism of fossils from federal lands;

- Uniform minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants);

- Uniform definitions for "paleontological resources" and "casual collecting;" and

- Uniform requirements for curation of federal fossils in approved repositories.

This document does not specifically trigger any paleontological requirements, other than those under NEPA for project impact evaluations if there is a federal nexus.

Federal Land Policy and Management Act (FLPMA) of 1976

The Federal Land Policy and Management Act (FLPMA) of 1976 (43 U.S.C. 1712[c], 1732[b]); sec. 2, Federal Land Management and Policy Act of 1962 [30 U.S.C. 611]; Subpart 3631.0 et seq.), Federal Register Vol. 47, No. 159, 1982 does not refer specifically to fossils. However, "significant fossils" are understood and recognized in policy as scientific resources. Permits, which authorize the collection of significant fossils for

scientific purposes, are issued under the authority of FLPMA. Under FLPMA, Federal agencies are charged to:

- Manage public lands in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, archaeological, and water resources, and, where appropriate, preserve and protect certain public lands in their natural condition (Section 102 (a)(8) (11));

- Periodically inventory public lands so that the data can be used to make informed land-use decisions (Section 102(a)(2)); and

- Regulate the use and development of public lands and resources through easements, licenses, and permits (Section 302(b)).

State of California Authorities

Guidelines for the Implementation of CEQA, as amended March 29, 1999 (Title 14, Chapter 3, California Code of Regulations 15000 et seq.), define procedures, types of activities, persons, and public agencies required to comply with CEQA, and include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?"

Other state requirements for paleontological resource management are included in the PRC Division 5, Chapter 1.7, Section 5097.5, and Division 20, Chapter 3, Section 30244. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state, county, city, and district) lands.

RESOURCE ASSESSMENT GUIDELINES

The loss of any identifiable fossil that could yield information important to prehistory, or that embodies the distinctive characteristics of a type of organism, environment, period of time, or geographic region, would be a significant environmental impact. Direct impacts on paleontological resources primarily concern the potential destruction of nonrenewable paleontological resources and the loss of information associated with these resources. This includes the unauthorized collection of fossil remains. If potentially fossiliferous bedrock or surficial sediments are disturbed, the disturbance could result in the destruction of paleontological resources and subsequent loss of information (a significant impact). At the

project-specific level, direct impacts can be mitigated to below a significant level through the implementation of paleontological mitigation.

The CEQA threshold of significance for a significant impact to paleontological resources is reached when a project is determined to "directly or indirectly destroy a significant paleontological resource or unique geologic feature" (Appendix G, State CEQA Guidelines). In general, for project areas that are underlain by paleontologically sensitive geologic units, the greater the amount of ground disturbance, the higher the potential for significant impacts to paleontological resources. For project areas that are directly underlain by geologic units with no paleontological sensitivity, there is no potential for impacts on paleontological resources unless sensitive geologic units that underlie the non-sensitive unit are also affected.

Professional Standards

The SVP has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation (1995, 2010). Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological laws, ordinances, regulations, and standards accept and use the professional standards set forth by the SVP.

As defined by the SVP (2010:11), significant paleontological resources are defined as:

> fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).

Based on the significance definitions of the SVP (2010), all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information about the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association

with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be sensitive to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from the definition for archaeological resources as follows:

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontological sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case (SVP 1995).

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are often contained within surficial sediments or bedrock, and are therefore not observable or detectable unless exposed by erosion or human activity.

In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of fossils on the surface, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside the study area), a similar geologic unit, or based on whether the unit in question was deposited in a type of environment that is known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources," the SVP (2010:1–2) defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential:

High Potential. Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

Low Potential. Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

Undetermined Potential. Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

No Potential. Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources. [SVP 2010:1–2].

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PALEONTOLOGICAL RESOURCES

The geology surrounding the project area has been mapped in detail by Dibblee and Minch (2005). The majority of the Project area is underlain by the marine Monterey Formation, with small outcrops of landslide rubble occurring in the southern and central Project area and older alluvium occurring in the southcentral Project area (Figure 2). These sediments and their paleontological sensitivity are discussed below.

Landslide Rubble (Qls). Landslide rubble dates from the Holocene to late Pleistocene and consists of detritus from the Monterey Formation deposited during slope failure events and erosion (Dibblee and Minch 2005). While the deeper layers of this unit may be old enough to preserve fossil resources (i.e., >5,000 years, as per the SVP 2010), these deposits form under high energy conditions that are not conducive to the preservation of scientifically significant fossils. However, this unit likely overlies older alluvium and the Monterey Formation in the Project area. While the depth of the landslide deposits are unknown, ground excavating activities may exceed the depth of this unit and impact underlying high sensitivity sediments (see descriptions below). Therefore, landslide rubble has low-to-high paleontological sensitivity, increasing with depth.

Older Alluvium (Qoa). Older alluvium dates to the Pleistocene (>10,000 years ago) and consists of alluvial gravels deposited by streams and erosion (Dibblee and Minch 2005). Pleistocene-aged alluvial sediments have a rich fossil history in southern California (Jefferson 1991a and b, Miller 1971, Scott and Cox 2008). The most common Pleistocene terrestrial mammal fossils include the bones of mammoth, bison, deer, and small mammals, but other taxa, including horse, lion, cheetah, wolf, camel, antelope, peccary, mastodon, capybara, and giant ground sloth, have been reported (Graham and Lundelius 1994). In addition to illuminating the striking differences between Southern California in the Pleistocene and today, this abundant fossil record has been vital in studies of extinction (e.g. Sandom, et al., 2014; Scott, 2010), ecology (e.g. Connin et al., 1998), and climate change (e.g. Roy et al., 1996). Therefore, older alluvium has high paleontological sensitivity.

Monterey Formation (Tm). The majority of the Project area is mapped as the McClure Shale Member of the Monterey Formation (Dibblee and Minch 2005). This member consists of a white-weathering, diatomaceous siliceous shale that is thinly bedded and dates to the Mohnian Stage of the upper Miocene (7.5 – 13.5 million years ago). The Monterey Formation records the filling of a deep basin formed by tectonism along the California margin (Pisciotto and Garrison 1981) and constitutes one of the major elements of California geology and can range up to several thousands of feet thick (Bramlette 1946). The Monterey Fomration has yielded a diverse fauna consisting of some mollusks (Bramlette 1946) and common fish skeletons, particularly from laminated diatomaceous beds like those in the project area (Bramlette 1946, Dibblee 1973), and remains of larger

marine macrofauna such as whales (Pyenson and Haasl 2007) and the giant extinct Desmostylus (Hannibal 1922), as well as birds (Warheit 1992), crocodiles (Barboza et al. 2017) and rare land organisms such as horse and land plants (Bramlette 1946). The closest fossil locality known to the Natural History Museum of Los Angeles County (LACM) in the Monterey Shale is at Wood Canyon, east-southeast of the Project area, where fossil fish specimens of herring (*Xyne* and *Ganolytes*), pipefish (Syngnathidae), and mackerel (*Scomber*) were collected (McLeod 2018). Given the extensive fossil record preserved in the Monterey Formation, this unit has high paleontological sensitivity.

CONCLUSION

This constraints analysis indicates that the Project area contains two geologic units that are well known for preserving fossil resources and have high paleontological sensitivity, older alluvium (Qoa) and the Monterey Formation (Tm). This determination was made following the guidelines of the SVP (2010) after a review of the relevant scientific literature and a records search from the LACM. Given the high sensitivity of the Monterey Formation, which makes up the majority of the Project area and is the target of the mining operations, it is recommended that a qualified paleontologist develop a Paleontological Monitoring and Mitigation Plan, to include paleontological monitoring, for all ground disturbing activities in high sensitivity sediments.

If you have any questions regarding this letter report, please do not hesitate to contact me at (626) 240-0587 ext. 6655, or edenniston@swca.com.

Sincerely,

Jacqueline Markley
Project Manager

Alyssa Bell
Paleontological Principal Investigator

Attachment A: Report Figures
Attachment B: Report References

ATTACHMENT A:
Report Figures

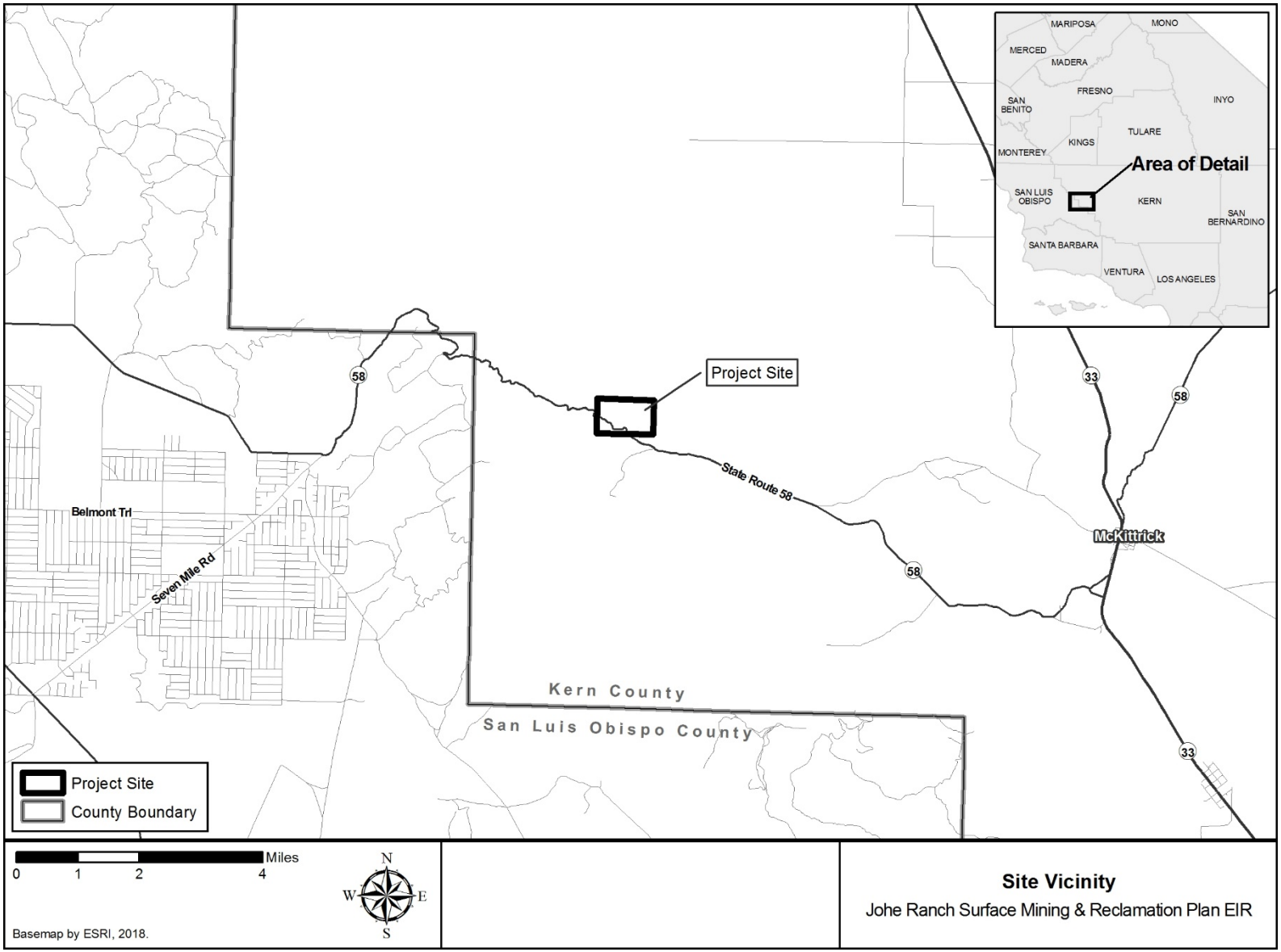


Figure 1. Project Vicinity Map

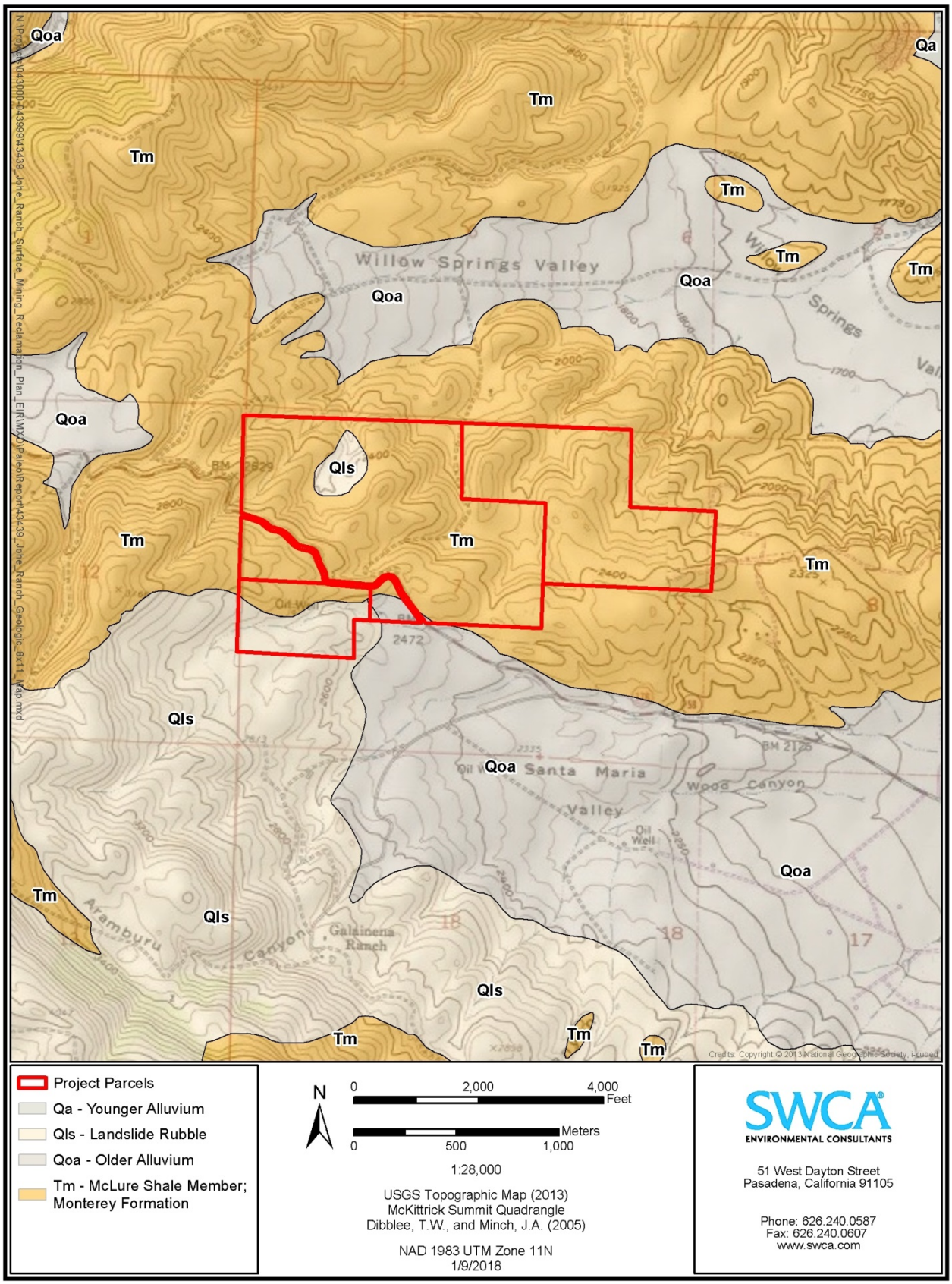


Figure 2. Geologic map of the Project area.

ATTACHMENT B:
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Appendix H

Phase I Environmental Site Assessment and Fuel and Oil Spill Contingency Plan

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Appendix H.1

Phase I Environmental Site Assessment

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WZI INC.

Johe Ranch Mine
Section 7, Township 30 South, Range 21 East
Kern County, CA

Phase I Site Assessment

April 2017

(Revised December 2018)

Submitted to:
GF Industries
122 North Harbor Blvd., #201
Fullerton, CA 92832

Prepared by:
WZI Inc.
1717 28th Street
Bakersfield, California 93301

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1.0 EXECUTIVE SUMMARY

At the request of GF Industries, WZI Inc. has conducted a Phase I Environmental Site Assessment on the proposed Johe Ranch Mine site located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The property is identified by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 and contains approximately 331 acres.

The 331 acre site is primarily occupied by undeveloped land. State Highway 58 extends across the southwest portion of the property. The property is accessed through a locked gate located on a dirt road that extends off of State Highway 58 near the southern property boundary. An additional locked gate is located along the western property boundary off of State Highway 58. Several dirt roads are also located on the property. A barbed wire fence extends to the southwest across the eastern area of the property from the northeast property corner. A valve box for a steel water line and a trough for watering cattle are located near the gated entrance to the property. The water line received water from a tank located offsite at the adjacent residence and was used for watering cattle. The valve box and water line are no longer in service. An area near the northern property boundary is utilized for storing farming equipment. Two sets of high voltage power transmission lines extend across the southeast corner of the site. Several natural drainages traverse the site from southwest to the northeast.

A residence and several associated ranch buildings are currently located immediately south of the property on the south side of State Highway 58. Oil and gas production at the Belgian Anticline Oil Field is located to the south and southeast of the site. The remainder of the surrounding properties are primarily undeveloped and utilized as grazing land for cattle.

The property is located within the administrative boundary of the Belgian Anticline Oil Field. According to the California Division of Oil, Gas, and Geothermal Resources (DOGGR) four abandoned oil and gas wells are located on the subject property. According to the records reviewed, abandonments of all the wells on the subject property were approved by the DOGGR.

No evidence of drums, containers, or any other item which might be used to store hazardous materials was found. No evidence of staining, spills, or stressed vegetation was found.

This environmental assessment was prepared specifically for GF Industries. No areas of environmental concern or recognized environmental conditions were identified on the subject property and no additional investigation is recommended.

WZI is a professional services consulting firm with experience in regulatory compliance and environmental engineering and geology. The members of WZI are State of California Registered Environmental Assessors and Professional Engineers and Geologists. WZI expresses no opinion as to disciplines, subjects and practices outside those specifically enumerated above. Further, WZI expresses no opinion herein as to any matters of California or federal law. This Phase I Environmental Site Assessment is based on the foregoing and subject to the limitations, qualifications, exceptions and assumptions set forth herein.

2.0 INTRODUCTION

2.1 Purpose

This Phase I Environmental Site Assessment has been prepared following Standard Practice E-1527-13 of the American Society for Testing and Materials (ASTM). As stated in the practice, the purpose of a Phase I Environmental Site Assessment is to identify, to the extent feasible, recognized environmental conditions in connection with the property. The term *recognized environmental conditions* means the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release or a material threat of a release of any hazardous or nonhazardous substances, which are designated wastes or petroleum products, into structures on the property or into the ground, groundwater or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with rules, regulations and/or law. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

2.2 Special Terms and Conditions

There are no special terms or conditions associated with the performance of this assessment.

2.3 Limitations and Exceptions of Assessment

This Environmental Site Assessment addresses only the surface features observed during the one-day field investigation, a review of aerial photographs and interviews with selected regulatory agencies and other persons knowledgeable regarding the history or past operations of the property. Boreholes were not drilled for the purpose of obtaining subsurface samples, nor were surface samples gathered for analysis. A full regulatory audit of all permits and practices regarding the property and conditions regarding the adjacent properties was not conducted and was beyond the scope of the project. Investigations for the presence of asbestos, lead paint, and radon were outside the scope of the site inspection.

2.4 Limiting Conditions and Methodology Used

WZI encountered no conditions which limited the performance of this assessment. The methodology included performance of ASTM-recommended research, interviews and inspections as described in Standard Practice E-1527-13.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The site is located in the Temblor Range foothills approximately 8.5 miles west of the town of McKittrick, CA. The subject property consists of a rectangular shaped parcel located along State Highway 58 in the northwestern part of Kern County near the western boundary of the county line. The area encompasses approximately 331 acres and is located in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. **(Exhibit 1, Location Map)**.

The area studied is covered on the United States Geological Survey McKittrick Summit topographic sheet, "Scale 1:24,000" **(Exhibit 2, Topographic Map)**. The property is described by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 (**Exhibit 3, Assessor's Parcel Map**). The land use designation is 8.3

(Extensive Agriculture) and 2.4 (Steep Slope). The site is zoned A (Exclusive Agriculture). The FIRM flood zone designation for the property is C, areas of minimal flooding.

3.2 Site and Vicinity Characteristics

The subject property consists of a rectangular shaped parcel of undeveloped land that includes approximately 331 acres. State Highway 58 extends across the southwest portion of the property. The property is accessed through a locked gate located on a dirt road that extends off of State Highway 58 near the southern property boundary. An additional locked gate is located along the western property boundary off of State Highway 58. Several dirt roads are also located on the property. A barbed wire fence extends to the southwest across the eastern area of the property from the northeast property corner. Two sets of high voltage power transmission lines extend across the southeast corner of the site. Several natural drainages traverse the site from southwest to the northeast (Site Plan Map **Exhibit 4**).

A residence and several associated ranch buildings are located immediately south of the property on the south side of State Highway 58. Oil and gas production at the Belgian Anticline Oil Field is located to the south and southeast of the site. The remainder of the surrounding properties are primarily undeveloped and utilized as grazing land for cattle.

Exhibits 5 to 12 are aerial photographs taken during 1937, 1942, 1953, 1973, 1984, 1994, 2005, and 2012 over flights. No aerial photo coverage was available prior to the 1930's or for the decade of the 1960's. The aerial photos cover the project site; a narrative review of the photos, in chronological order, is presented below.

In the 1937 aerial photo (**Exhibit 5**), the site appears to be primarily undeveloped. A portion of the property along the southern boundary appears to be under cultivation. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. A ranch house and several associated out buildings are located just to the south of the property. The surrounding properties are undeveloped with the exception of dirt roads.

In the 1942 aerial photo (**Exhibit 6**) areas of the southern and eastern portions of the site appear to be under cultivation. An area which appears to be utilized for equipment storage and possible livestock corrals is located in the southern area of the property adjacent to State Highway 58. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. The ranch house and associated out buildings are still located just to the south of the property. Portions of the property to the north of the site appear to be under cultivation. The remainder of the surrounding property is undeveloped with the exception of dirt roads.

In the 1953 aerial photo (**Exhibit 7**) cultivated areas appear to be present throughout the site. The area of equipment storage and possible livestock corrals still appears to be present in the southern area of the property adjacent to State Highway 58. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. The ranch house and associated out buildings are still located just to the south of the property. Portions of the surrounding property on all sides appear to be under cultivation. The remainder of the surrounding property is undeveloped with the exception of dirt roads

In the 1973 aerial photo (**Exhibit 8**) cultivated areas still appear to be present throughout the site. The area of equipment storage and possible livestock corrals appears to no longer be in use in the southern area of the property adjacent to State Highway 58. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. Several areas of disturbed soil are present adjacent to dirt roads on the site. The ranch house and several associated out buildings are still located just to the south of the property. Portions of the surrounding property on all sides appear to be under cultivation. The remainder of the surrounding property is primarily undeveloped with the exception of dirt roads

In the 1984 aerial photo (**Exhibit 9** the property no longer appears to be under cultivation and is primarily undeveloped. The area of equipment storage and possible livestock corrals in the southern area of the property adjacent to State Highway 58 no longer appear to be present. Two sets of high voltage power transmission lines extend across the southeast corner of the site. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. Only minor areas of disturbed soil are present adjacent to dirt roads on the site. The ranch house and associated out buildings are still located just to the south of the property. Portions of the property to the north and southwest of the site appear to be under cultivation. The remainder of the surrounding property is primarily undeveloped with the exception of dirt roads

In the 1994 aerial photo (**Exhibit 10**) the property still appears to be primarily undeveloped. Two sets of high voltage power transmission lines extend across the southeast corner of the site. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. The ranch house and associated out buildings are still located just to the south of the property. Portions of the property to the north and southwest of the site appear to be under cultivation. A livestock corral appears to be present to the north of the property near the northeast corner. The remainder of the surrounding property is primarily undeveloped with the exception of dirt roads

In the 2005 aerial photo (**Exhibit 11**) the property still appears to be primarily undeveloped. A small area which appears to be utilized for equipment storage is located near the northern property boundary. Two sets of high voltage power transmission lines extend across the southeast corner of the site. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. The ranch house and associated out buildings are still located just to the south of the property. Portions of the property to the north of the site appear to be under cultivation. A livestock corral and equipment storage area appears to be present to the north of the property near the northeast corner. The remainder of the surrounding property is primarily undeveloped with the exception of dirt roads

In the 2012 aerial photo (**Exhibit 12**) the property appears to be primarily undeveloped. A small area which appears to be utilized for equipment storage is still located near the northern property boundary. Two sets of high voltage power transmission lines extend across the southeast corner of the site. State Highway 58 extends through the southwestern area of the property and several dirt roads extend across the site. The ranch house and associated out buildings are still located just to the south of the property. A portion of the property to the north of the site appears to be disturbed and may be under cultivation. A livestock corral and equipment storage area still

appears to be present to the north of the property near the northeast corner. The remainder of the surrounding property is primarily undeveloped with the exception of dirt roads

3.3 Geology and Hydrology

The subject property is located in the western area of Kern County within the foothills of the Temblor Range. The majority of the property is underlain by marine sediments consisting of diatomite of the Miocene age Monterey Formation which outcrops throughout much of western Kern County (Dibblee, 2005). The diatomite is overlain by a small area of Quaternary age non-marine sediments in the northwestern portion of the property which are identified as landslide deposits. A geologic map is included as **Exhibit 13.**

The site consists primarily of rolling topography with some steep slopes and incised drainages. The elevation of the property varies from approximately 2,800 feet above sea level near the southwestern corner to approximately 2,075 feet above sea level near the northeast corner (**Topographic Map, Exhibit 2**).

The site is located to the west of the San Joaquin Valley Groundwater Basin within outcrops of the Miocene diatomite of the Monterey Formation. There is no known groundwater at the site and no water wells have been drilled on the property.

3.4 Description of Structures, Roads and Other Improvements on the Site

The 331 acre site is primarily occupied by undeveloped land. State Highway 58 extends across the southwest portion of the property. Several dirt roads are also located on the property. A valve box for an abandoned water line and a trough for watering cattle are located near the gated entrance to the property. A barbed wire fence extends to the southwest across the eastern area of the property from the northeast property corner. Two sets of high voltage power transmission lines extend across the southeast corner of the site. No other improvements or development were identified on the site.

3.5 Information Reported by User Regarding Environmental Liens or Specialized Knowledge or Experience

No information regarding environmental liens or specialized knowledge of environmental conditions was acquired by WZI during this investigation.

3.6 Current Uses of the Property

The property is currently undeveloped and utilized as grazing land for cattle. An area near the northern property boundary is utilized for storing farming equipment.

3.7 Past Uses of the Property

Historically, the subject property was primarily undeveloped and utilized as grazing land for cattle. Portions of the property have also been under cultivation. There are no indications of historical development on the property beyond the identified agricultural and grazing uses previously described.

3.8 Current and Past Uses of Adjoining Properties

A residence and several associated ranch buildings are currently located immediately south of the property on the south side of State Highway 58. Oil and gas production at the Belgian

Anticline Oil Field is located to the south and southeast of the site. The remainder of the surrounding properties are primarily undeveloped and utilized as grazing land for cattle. Historically, the adjoining properties have primarily been utilized as grazing land and for oil and gas production or were undeveloped.

4.0 RECORDS REVIEW

The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the property.

4.1 Standard Environmental Record Sources

As required by Standard Practice E-1527 7.2.1, the following records were reviewed by obtaining an EDR Radius Map with GeoCheck from Environmental Data Resources, Inc. Supporting documentation, reports and notes for this section are in **Appendices 1 and 2**.

Standard Environmental Record Sources

Record	Searched?	If not, why not?	Potential for Recognized Environmental Conditions? (discuss below)
Federal NPL site list	yes		no
Federal CERCLIS list	yes		no
Federal RCRA TSD facilities list	yes		no
Federal RCRA generators list	yes		no
Federal ERNS list	yes		no
State NPL, CERCLIS equv.	yes		no
State solid waste disposal sites	yes		no
State UST list	yes		no
State leaking UST list	yes		no

According to the EDR Report, no underground storage tanks have been located on the subject property or on surrounding properties. No other areas of environmental concern were identified by the EDR Report on the subject property or surrounding properties.

Additional Environmental Record Sources

Record	Searched?	If not, why not?	Potential for Recognized Environmental Conditions? (discuss below)
SARA Title III: 311, 312 and 304	yes		no
Landfills and illegal dump sites	yes		no
Known monitoring wells	yes		no
Utility transformer records	NA		NA
Interviews	yes		no

4.2 Physical Setting Sources

As required by Standard Practice E-1527-8.2.4, the following records were reviewed:

Physical Setting Sources

Record	Searched?	If not, why not?	Potential for Recognized Environmental Conditions? (discuss below)
Standard Source			
USGS 7.5 min quad maps: McKittrick Summit, California	yes		no
Non-Standard Source			
Kern County Public Health Services Department Environmental Health Division	yes		no
California Department of Water Resources Groundwater Surface Elevation map	yes		no
California Division of Oil, Gas & Geothermal Resources	yes		no

Ms. Lydia Von Sydow of the Kern County Public Health Services Department Environmental Health Services Division (Environmental Health) was contacted on April 7, 2017 regarding the subject property. Ms. Von Sydow indicated that the Environmental Health had no record of any environmental issues on the site.

The property is located within the administrative boundary of the Belgian Anticline Oil Field. According to the California Division of Oil, Gas, and Geothermal Resources (DOGGR) four abandoned oil and gas wells are located on the subject property. The abandoned wells on the property include:

1) Baker 1 (API # 02913535)
2) Seaboard-Honolulu 14-7 (API # 02925390)
3) Lizbet Gilbert 1 (API # 02937652)
4) Lynn 1 (API # 02937726)

An oil field map depicting the location of wells on the site and surrounding area is included as **Exhibit 14**. According to the records reviewed, abandonments of all the wells on the subject property were approved by the DOGGR (**Appendix 3**).

4.3 Historical Use Information

The objective of consulting historical sources is to develop a history of the previous uses or occupancies of the property and surrounding area in order to identify those uses or occupancies that are likely to have led to recognized environmental conditions in connection with the property.

As required by Standard Practice E-1527-8.3, historical records were reviewed by obtaining an

EDR Radius Map with GeoCheck from Environmental Data Resources, Inc which is in **Appendix 1**. Supporting documentation, reports and notes for this section are in **Appendix 2**. Aerial photographs were reviewed and are described in Section 3.2 and included as **Exhibits 4 through 11**.

Historical Sources

Record	Searched?	If not, why not?	Potential for Recognized Environmental Concerns? (discuss below)
Standard Sources - 1940-present			
Aerial photographs dates (1937, 1942, 1953, 1973, 1984, 1994, 2005, and 2012)	yes		no
Fire insurance map	no	none found	
Chain-of-Title	no	outside scope	
Property tax files	no	outside scope	
Standard Sources - prior to 1940			
Aerial photograph 1937	yes		no
Other Sources			
Interview with owner/lessee	yes		no

Mr. David Cooper, the property owner, was interviewed at the subject property on April 11, 2017. Mr. Cooper indicated that there was no electrical, sewage, or other utilities currently serving the property. With the exception of the high voltage transmission lines that cross the southeast corner of the site, no power lines or transformers are located on the property. Mr. Cooper also stated that no herbicides, pesticides or other chemicals had ever been stored on the site. Mr. Cooper indicated that there was a valve box located adjacent to the site entrance off of State Highway 58. The box received water from a tank located offsite at the adjacent residence and was connected to a steel water line used for watering cattle located on the property. The valve box and water line are no longer in service. Mr. Cooper indicated that portions of the property had historically been under cultivation with wheat, barley, and safflower but was now utilized as grazing land.

4.4 Additional Record Sources

No additional records were searched for this environmental assessment.

5.0 INFORMATION FROM SITE RECONNAISSANCE AND REVIEWS

The purpose of the site reconnaissance was to obtain information indicating the likelihood of identifying recognized environmental conditions in connection with the property. For this report, Allen Waggoner of WZI visited the property on April 7, 2017. In accordance with Standard Practice E 1527-13, WZI visually and physically observed the property. The methodology used to inspect the site was to traverse the site by vehicle and on foot, record observations and take

photographs. The areas surrounding the subject property were also observed.

Appendix 2 contains a checklist of observations required by Standard Practice E 1527-13 including but not limited to, hazardous substances, solid wastes, stains and odors. No inspection for asbestos, radon or lead paint was conducted. In addition, no survey for gamma or alpha radiation or for other radionuclides was conducted. **Appendix 4** contains a series of photographs that document conditions encountered during the site inspection.

5.1 Hazardous Substances in Connection with Identified Uses

No hazardous substances in connection with identified uses were observed on the property.

5.2 Hazardous Substance Containers and Unidentified Substance Containers

No hazardous substance containers or unidentified substance containers were observed on the site.

5.3 Storage Tanks

According to the EDR report and the Kern County Environmental Health Services Department, no underground storage tanks have ever been known to be located on the property. No storage tanks were observed on the property.

5.4 Indication of PCBs

No transformers or other potential sources of PCBs were observed on the subject property.

5.5 Indications of Solid Waste Disposal

No indications of solid waste disposal were observed on the property.

5.6 Physical Setting Analysis

There are no other obvious environmental liabilities or threats to the subject property from adjacent properties and the surrounding area.

5.7 Any Other Conditions of Concern

WZI did not observe any other conditions of concern on the subject property.

6.0 FINDINGS AND CONCLUSIONS

WZI has performed a Phase I Environmental Site Assessment in general conformance with the scope and limitations of ASTM Standard Practice E-1527 on the in an unincorporated area of Kern County in the Temblor Range foothills approximately 8.5 miles west of the town of McKittrick, CA. in Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian **(Exhibit 1, Location Map)**. The property is described by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 and contains approximately 331 acres.

Any exceptions to, or deletions from this practice are described in Section 1 of this report.

The 331 acre site is primarily occupied by undeveloped land. State Highway 58 extends across the southwest portion of the property. The property is accessed through a locked gate located on a dirt road that extends off of State Highway 58 near the southern property boundary. An

additional locked gate is located along the western property boundary off of State Highway 58. Several dirt roads are also located on the property. A barbed wire fence extends to the southwest across the eastern area of the property from the northeast property corner. A valve box for a steel water line and a trough for watering cattle are located near the gated entrance to the property. The water line received water from a tank located offsite at the adjacent residence and was used for watering cattle. The valve box and water line are no longer in service. An area near the northern property boundary is utilized for storing farming equipment. Two sets of high voltage power transmission lines extend across the southeast corner of the site. Several natural drainages traverse the site from southwest to the northeast.

A residence and several associated ranch buildings are currently located immediately south of the property on the south side of State Highway 58. Oil and gas production at the Belgian Anticline Oil Field is located to the south and southeast of the site. The remainder of the surrounding properties are primarily undeveloped and utilized as grazing land for cattle.

The property is located within the administrative boundary of the Belgian Anticline Oil Field. According to the California Division of Oil, Gas, and Geothermal Resources (DOGGR) four abandoned oil and gas wells are located on the subject property. According to the records reviewed, abandonments of all the wells on the subject property were approved by the DOGGR.

No evidence of drums, containers, or any other item which might be used to store hazardous materials was found. No evidence of staining, spills, or stressed vegetation was found.

No areas of environmental concern or recognized environmental conditions were identified on the subject property and no additional investigation is recommended.

7.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS / ENVIRONMENTAL PROFESSIONAL STATEMENT

I certify that the information presented here regarding the Phase I Environmental Site Assessment of the subject property described as Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10, located approximately 8.5 miles west of the town of McKittrick, CA. in Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian, conducted during April 2017, is accurate and complete to the best of my knowledge and belief.

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental professional as defined in 312.10 of 40 CFR 312 and I have the qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

James Allen Waggoner
Certified Engineering Geologist
State of California No. 1818
Expiration Date: 03/31/19



I have reviewed this report and concur with these findings.

Mary Jane Wilson
President
Register Environmental Property Assessor 450065



8.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS CONDUCTING INVESTIGATION

WZI was formed in 1987 and employs a staff of geologists and engineers with extensive experience across a wide range of environmental site assessment and remediation projects. Relevant experience of key personnel includes conducting environmental site assessments of properties and development of remedial action groundwater and vadose-zone programs for a wide variety of contaminated sites including service stations, landfills, refineries, bulk fuel storage plants, agricultural sites and industrial facilities.

Ms. Mary Jane Wilson, President

Mary Jane Wilson is an engineer and a National Registered Environmental Property Assessor experienced in managing environmental activities. She has interfaced extensively with local, state and federal agencies. Her knowledge of environmental site assessments is unique because she has been involved in the development of environmental regulations as well as representing clients at public hearings. Her technical expertise in the field of reservoir engineering greatly enhances her ability to assess the impacts of environmental decisions. Ms. Wilson's published papers have given her national recognition as an expert in hazardous waste management.

James Allen Waggoner, PG, CEG, CHG

Mr. Waggoner earned his Bachelors and Masters degrees in geology from San Diego State University. He is a Senior Professional Geologist with over 37 years of experience in various aspects of geologic, hydrogeologic, and engineering geology investigations in California. Mr. Waggoner has extensive experience conducting projects that involve environmental investigation, groundwater, and regulatory compliance. He has also provided technical review and assistance for many additional environmental projects. He has extensive experience in conducting environmental site assessments, subsurface investigations, sample collection, and remedial action. Professional responsibilities have included project management and oversite, technical support, and report preparation and review for a wide variety of private sector entities including oil, mining, and industrial clients. Mr. Waggoner is a registered professional geologist, certified engineering geologist, and certified hydro geologist with the State of California.

9.0 REFERENCES

American Society for Testing and Materials, 2006, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process,* ASTM Standards On Environmental Site Assessments For Commerical Real Estate, Fifth Edition: E-1527-05, 75 p.

California Department of Water Resources, 2009, *http://www.water.ca.gov/*

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Diblee, T.W., 2005, *Geologic Map of the McKittrick Summitt Quadrangle, San Luis Obispo and Kern County, Ca.*, Dibblee Geology Center Map #DF-101, Santa Barbara Museum of Natural History.

Munger, A. H., 2003, *Munger Map Book*, Forty-Second Edition.

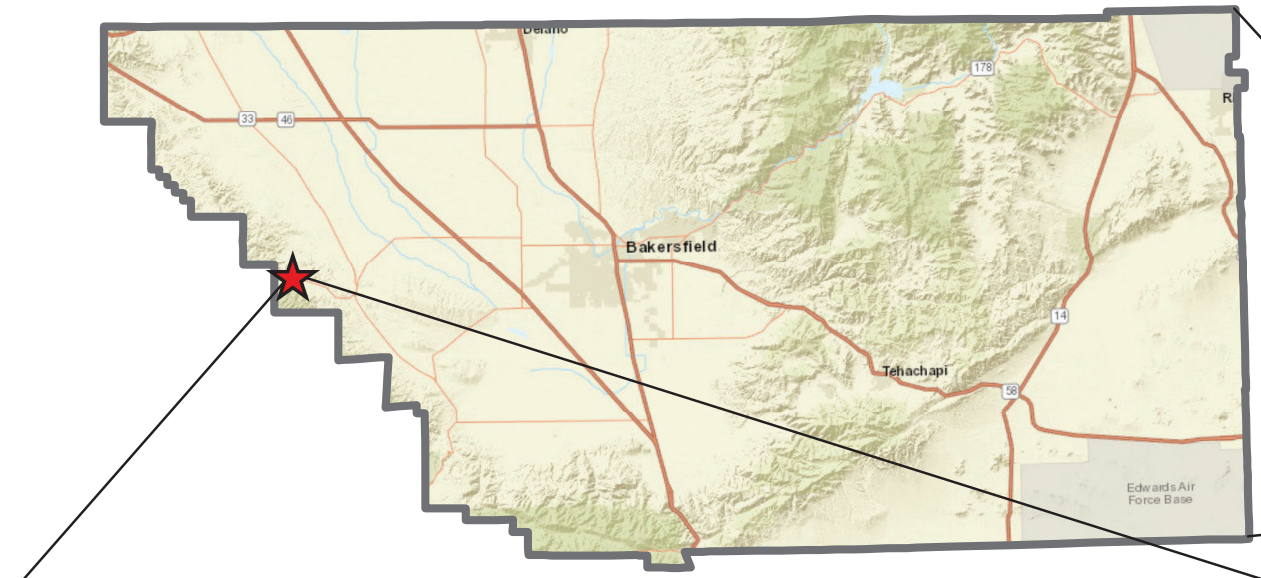
United States Geological Survey, 1959, *McKittrick Summit 7.5 Minute Series*, California, Kern County.

Wood, P. R., and Davis, G. H., 1959, *Ground-Water Conditions in the Avenal-McKittrick Area Kings and Kern Counties California*, Geologic Survey Water Supply Paper 1457, Prepared in Cooperation with the U. S. Bureau of Reclamation.

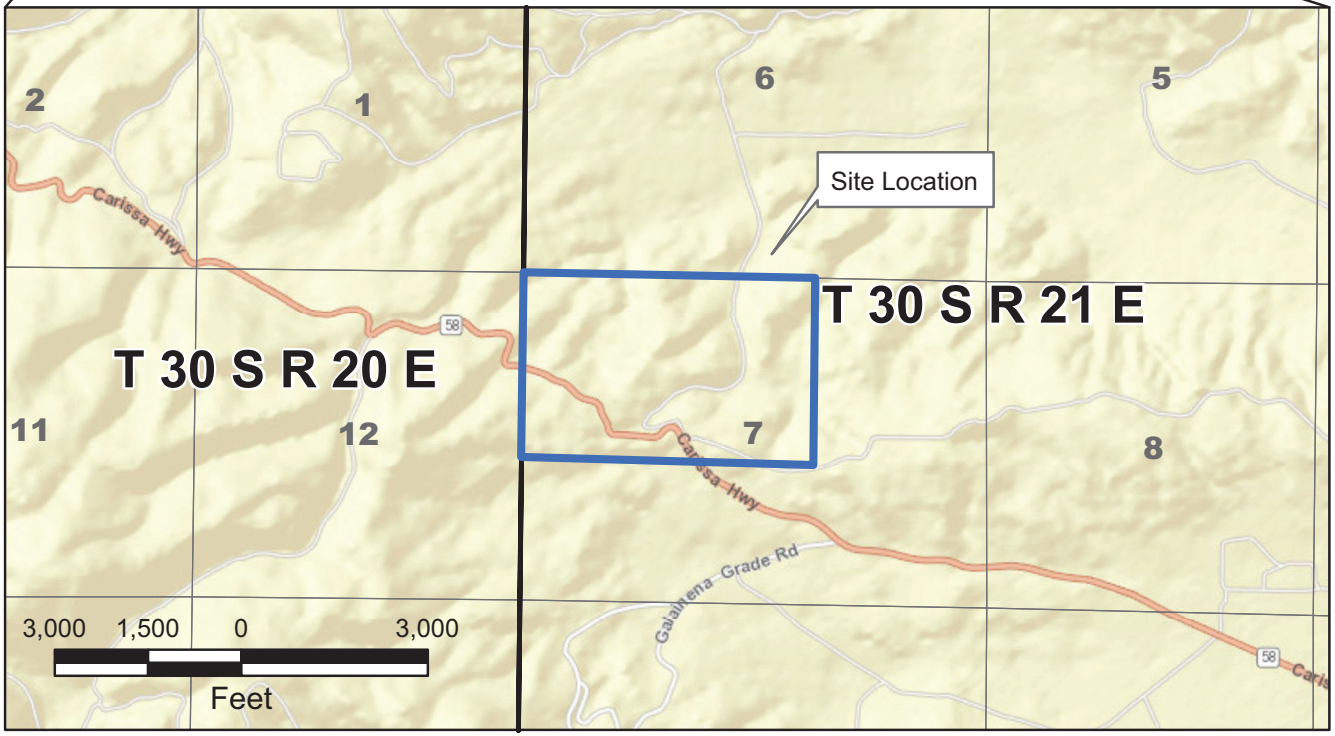
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EXHIBITS

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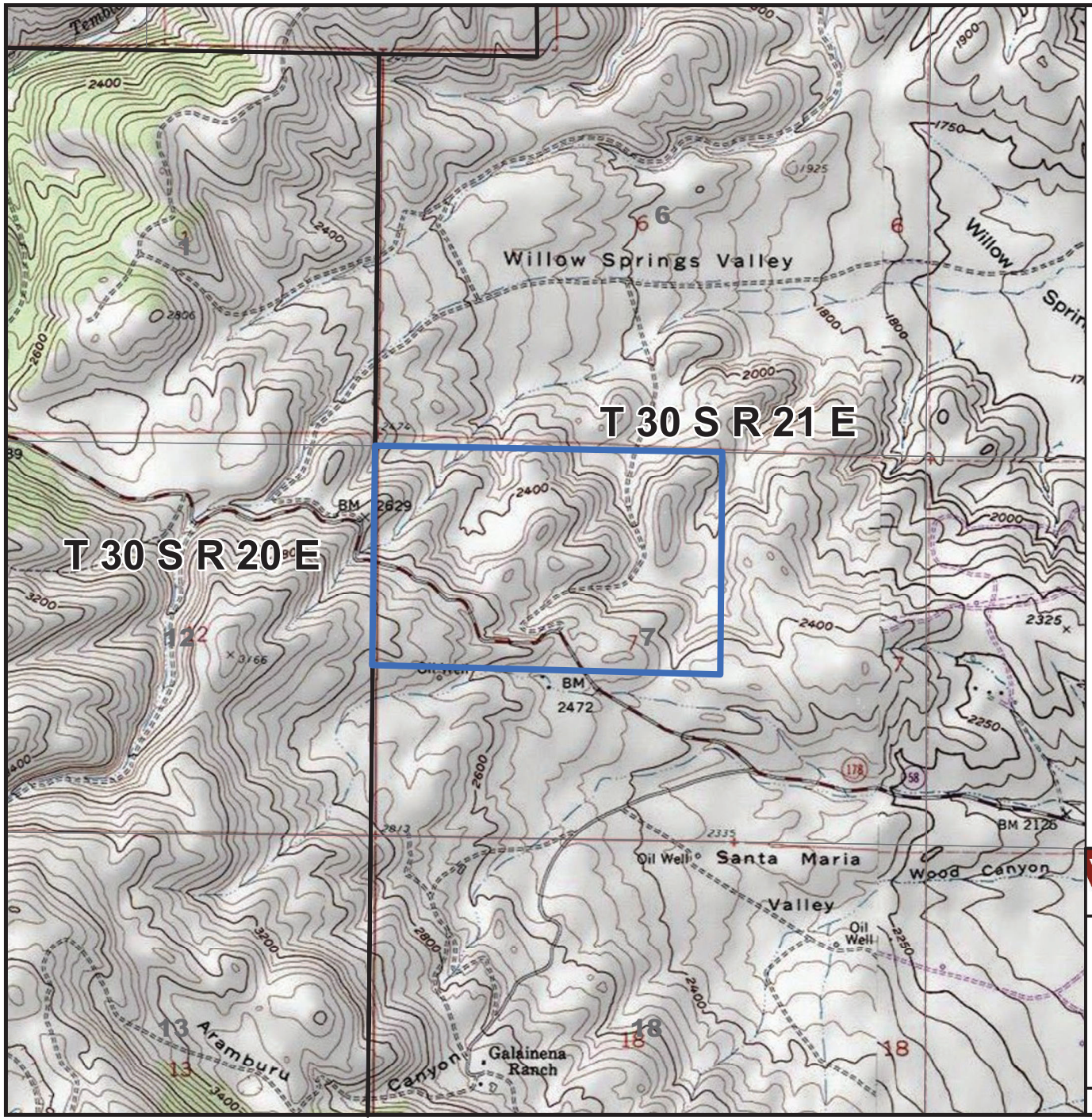


WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

LOCATION MAP

DATE: 12/18		EXHIBIT: 1



Legend

Site Location

N

2,000 1,000 0 2,000

Feet

WZI INC.

BAKERSFIELD, CALIFORNIA

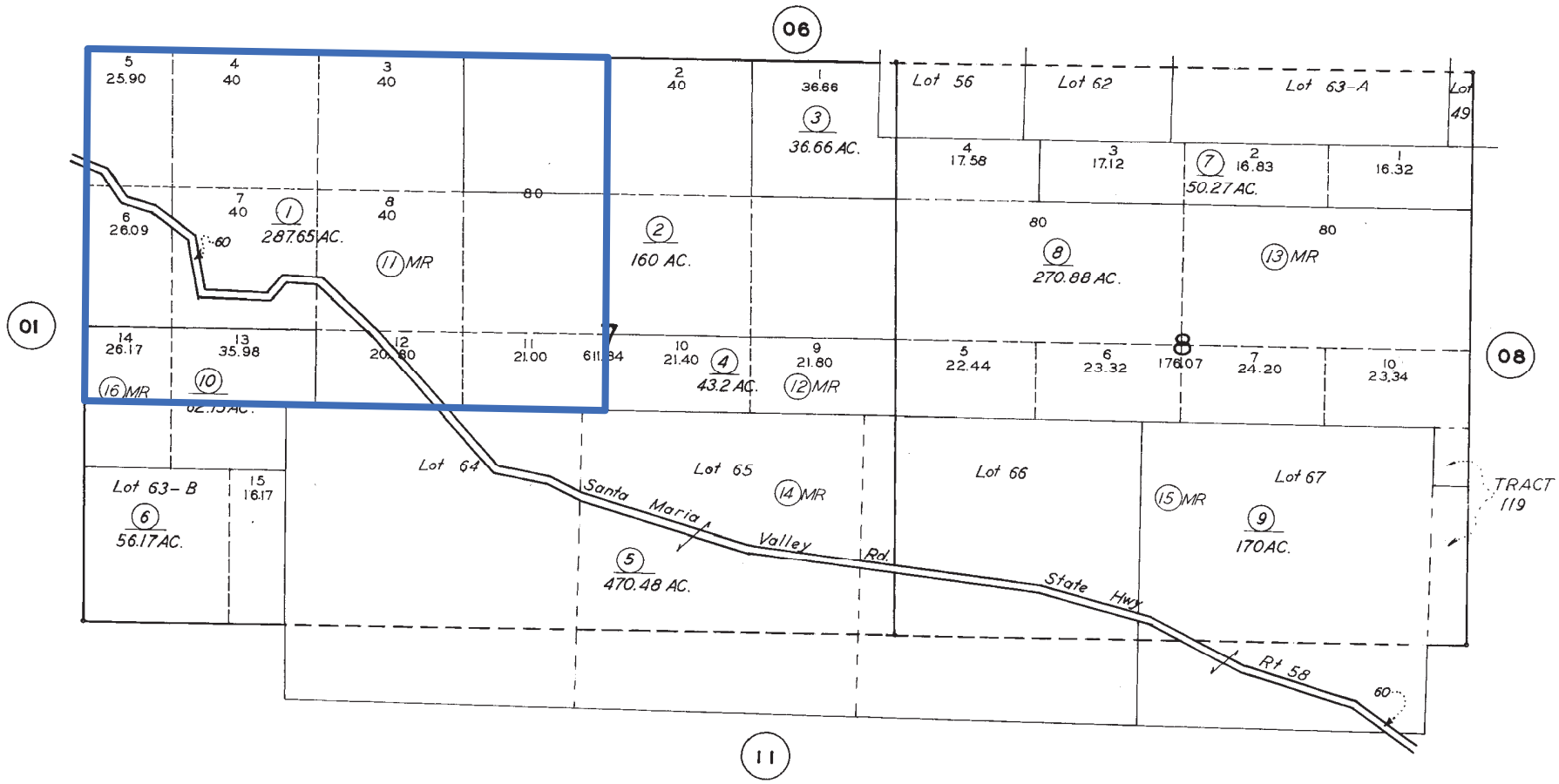
GF INDUSTRIES

JOHE RANCH MINE SITE

PHASE ONE SITE ASSESSMENT

TOPOGRAPHIC MAP

DATE:	12/18		EXHIBIT:	2



Legend

Site Location

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1,500 750 0 1,500

Feet

WZI INC.

BAKERSFIELD, CALIFORNIA

GF INDUSTRIES

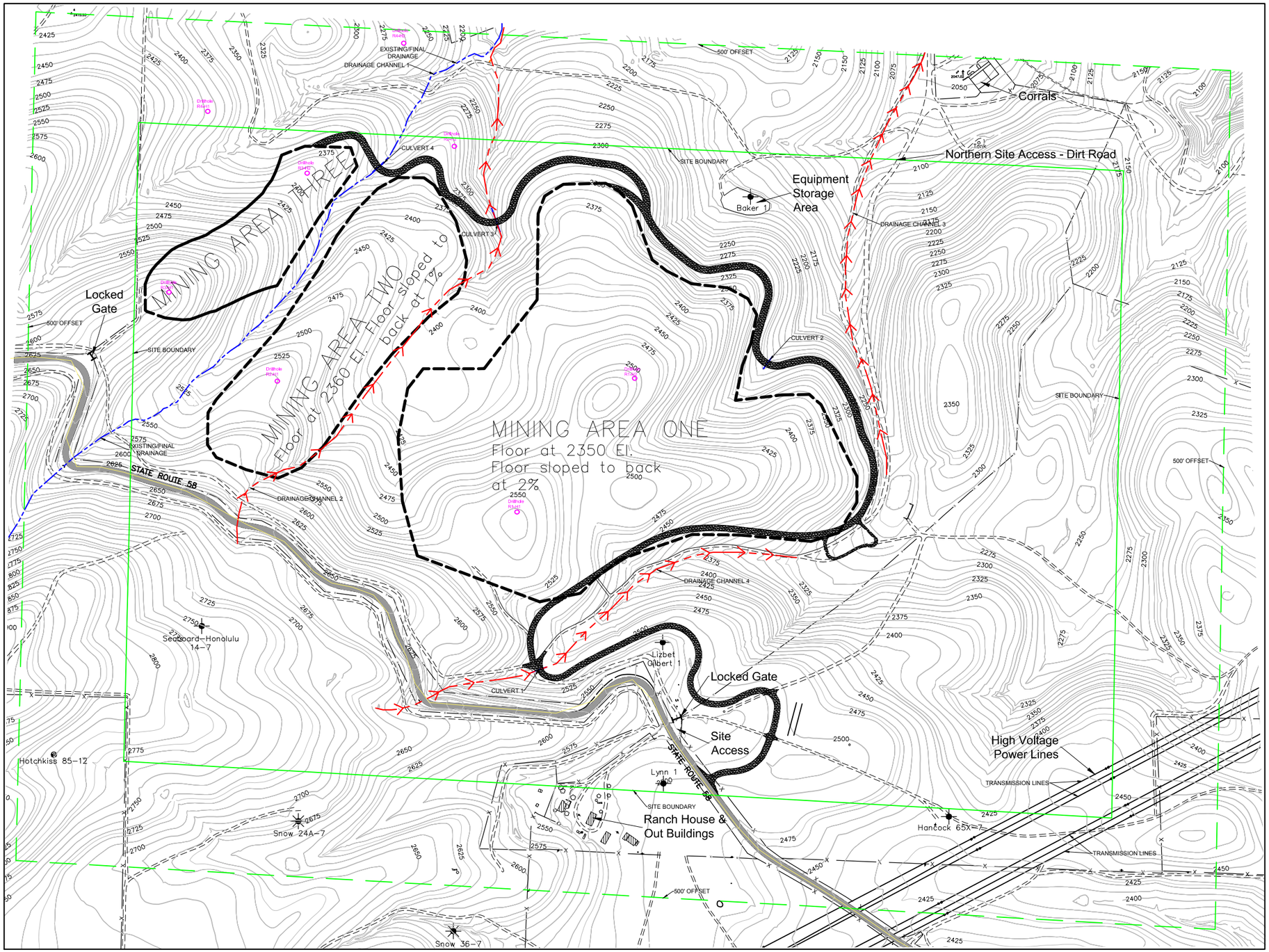
JOHE RANCH MINE SITE

PHASE ONE SITE ASSESSMENT

ASSESSORS PARCEL MAP

DATE: 12/18		EXHIBIT: 3

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LEGEND

- 100 — EXISTING GROUND CONTOUR
- EXISTING FENCE LINE
- 500' PROJECT BOUNDARY OFFSET
- DISTURBANCE BOUNDARY
- PROJECT BOUNDARY
- EXISTING DIRT ROAD
- PROPOSED ACCESS ROAD
- INTERMITTENT DRAINAGE CHANNEL
- "BLUE-LINE" WATERCOURSE PER USGS MAP
- ACTIVE DRY GAS WELL
- PLUGGED OIL & GAS WELL
- DRILLHOLE

N

500 250 0 500

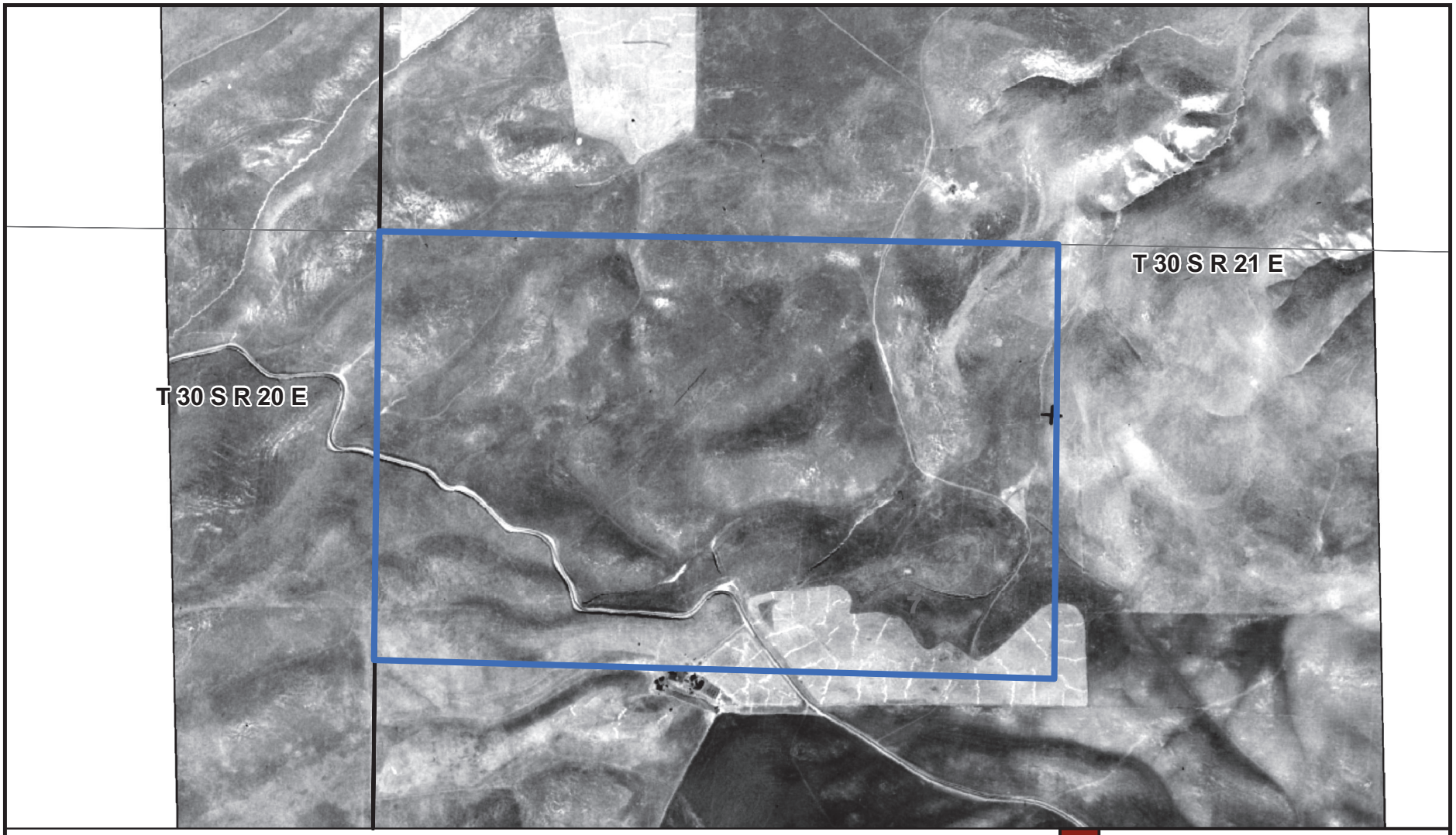
WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

SITE PLAN MAP

DATE:	JOB NO.:	EXHIBIT:
12/18		4

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Site Location

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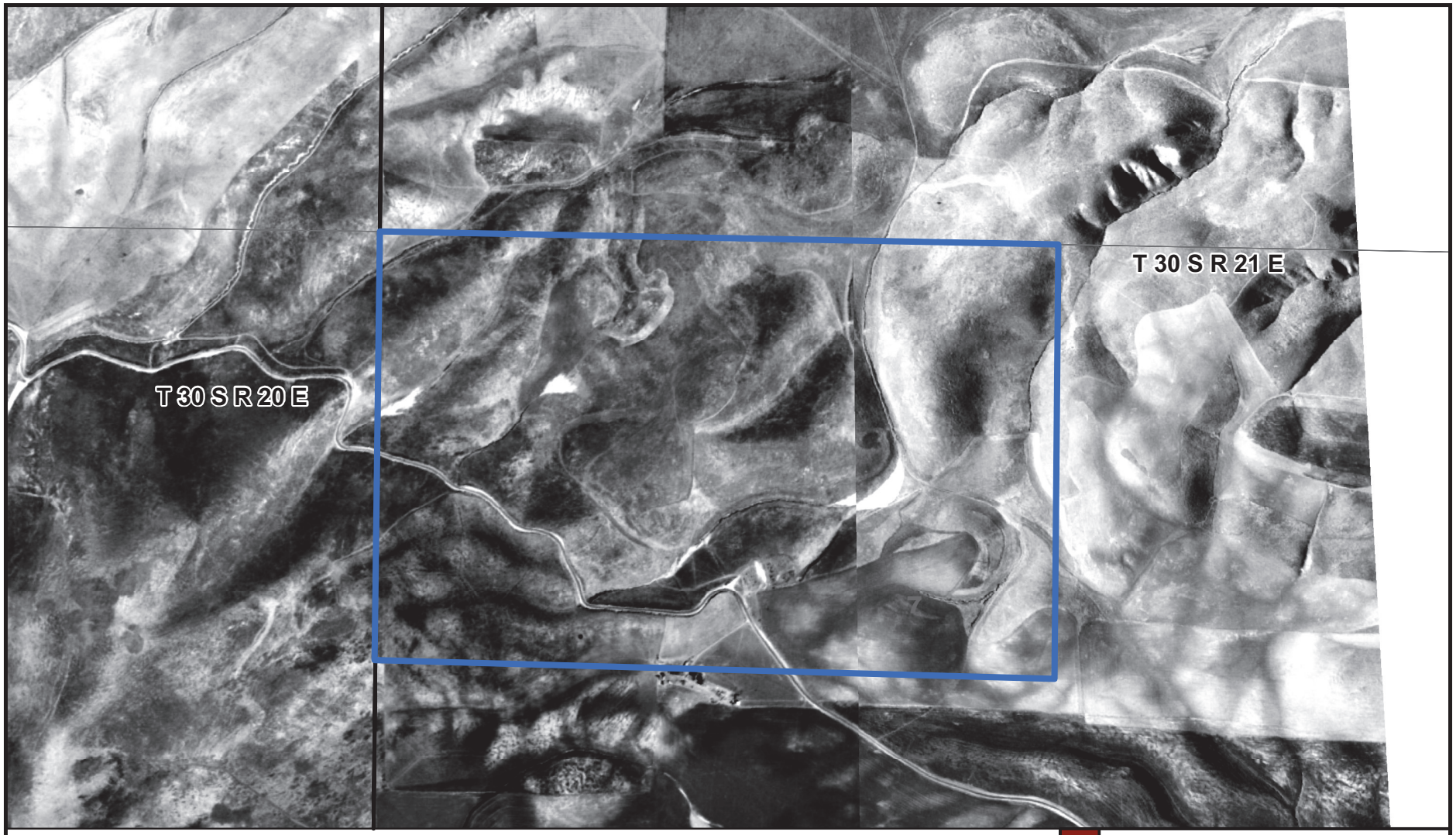
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WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 1937

DATE: 12/18		EXHIBIT: 5



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Site Location

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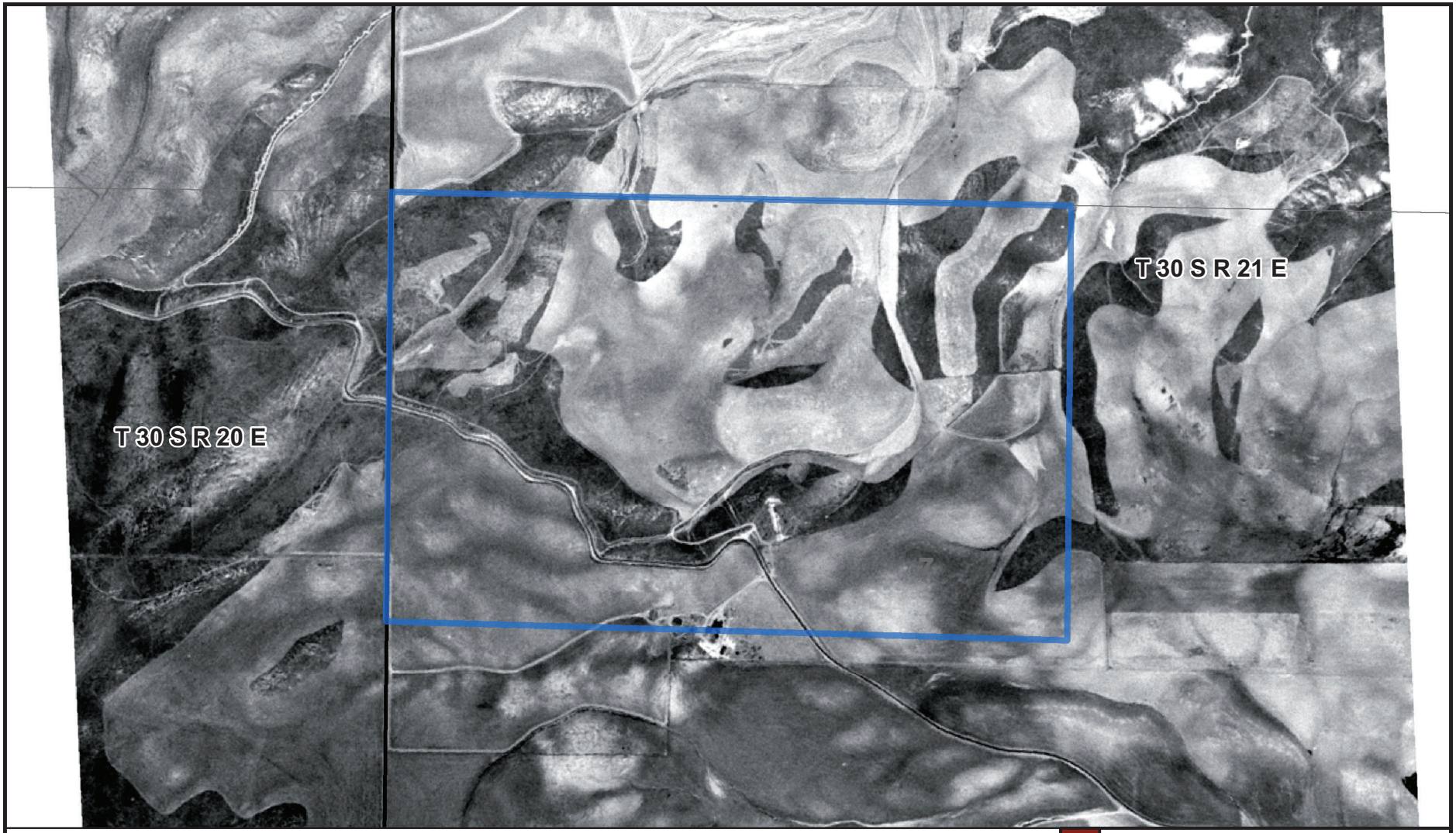
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WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 1942

DATE: 12/18		EXHIBIT: 6



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Site Location

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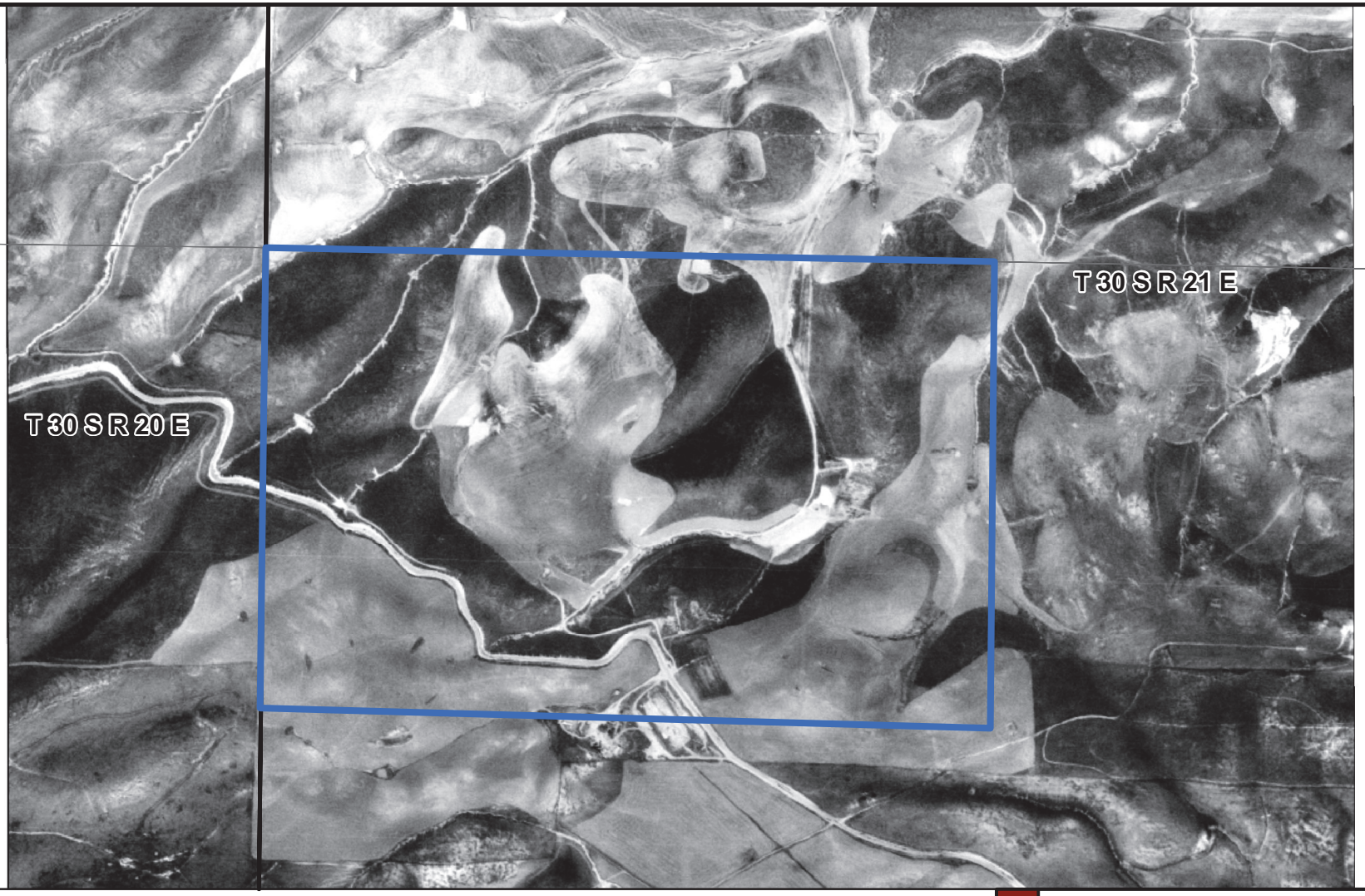
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WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 1953

DATE: 12/18		EXHIBIT: 7



Legend

Site Location

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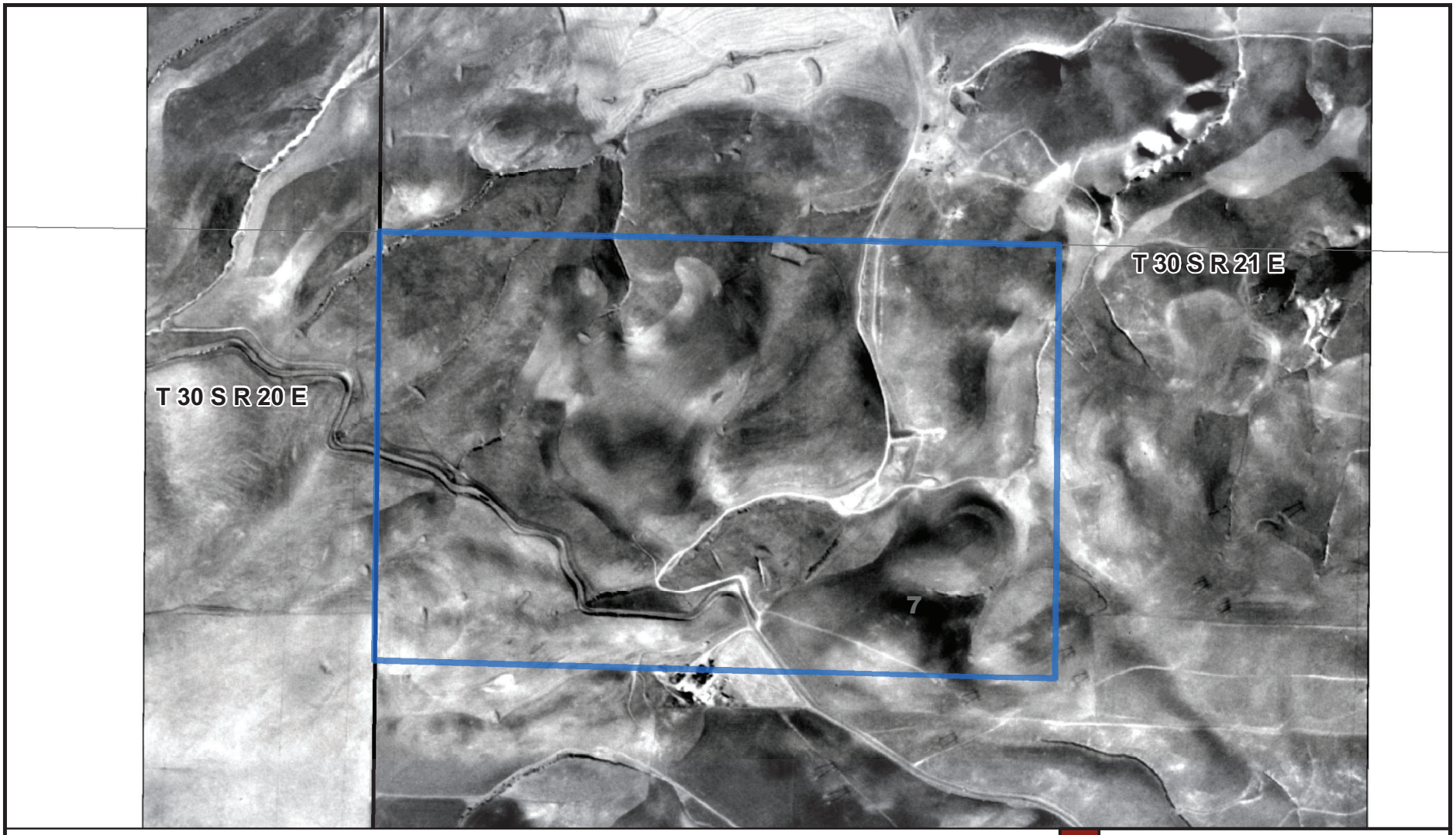
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WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 1973

DATE: 12/18		EXHIBIT: 8



Legend

Site Location

N

1,000 500 0 1,000

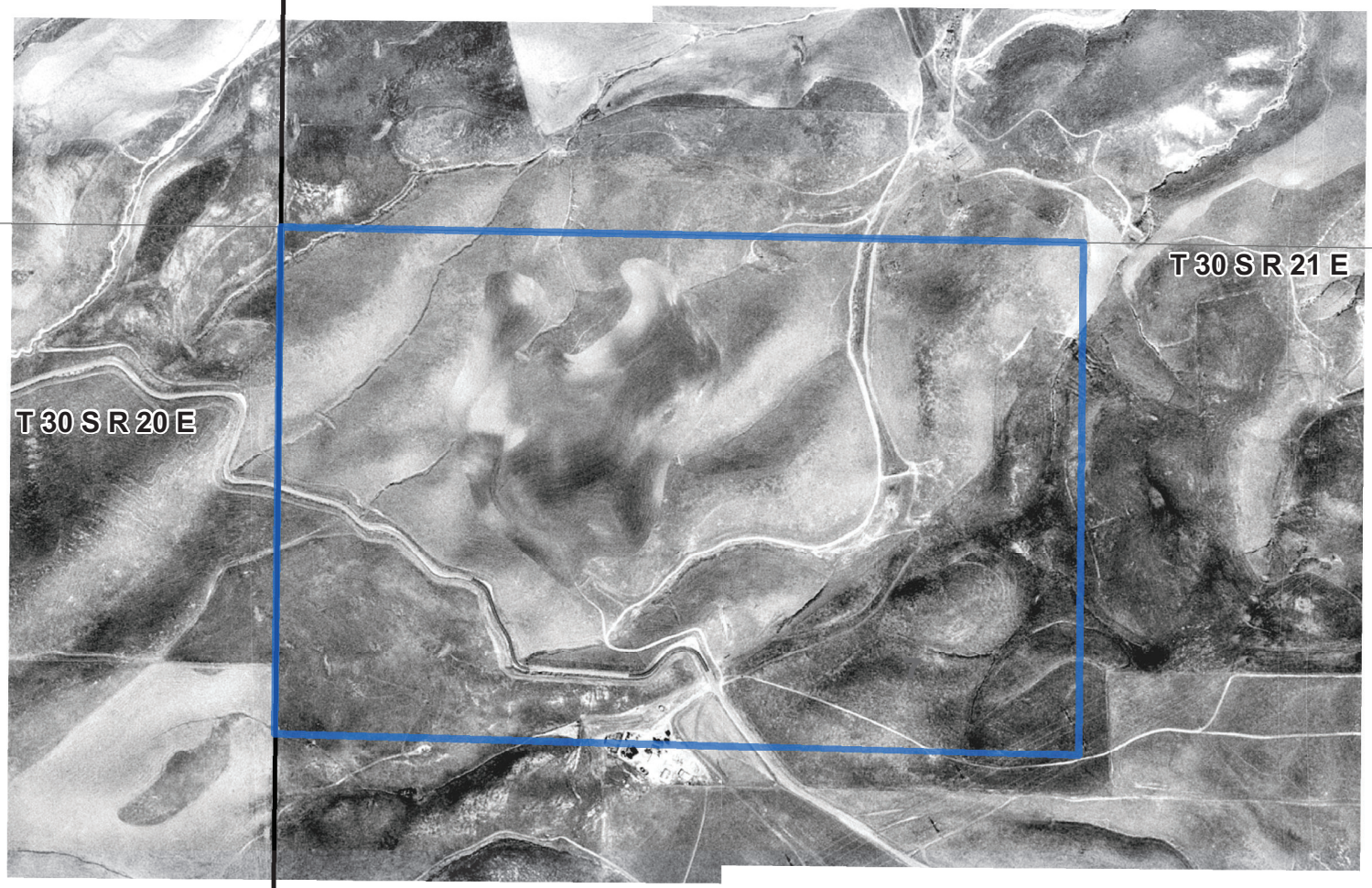
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 1984

DATE: 12/18		EXHIBIT: 9



Legend

Site Location

N

1,000 500 0 1,000

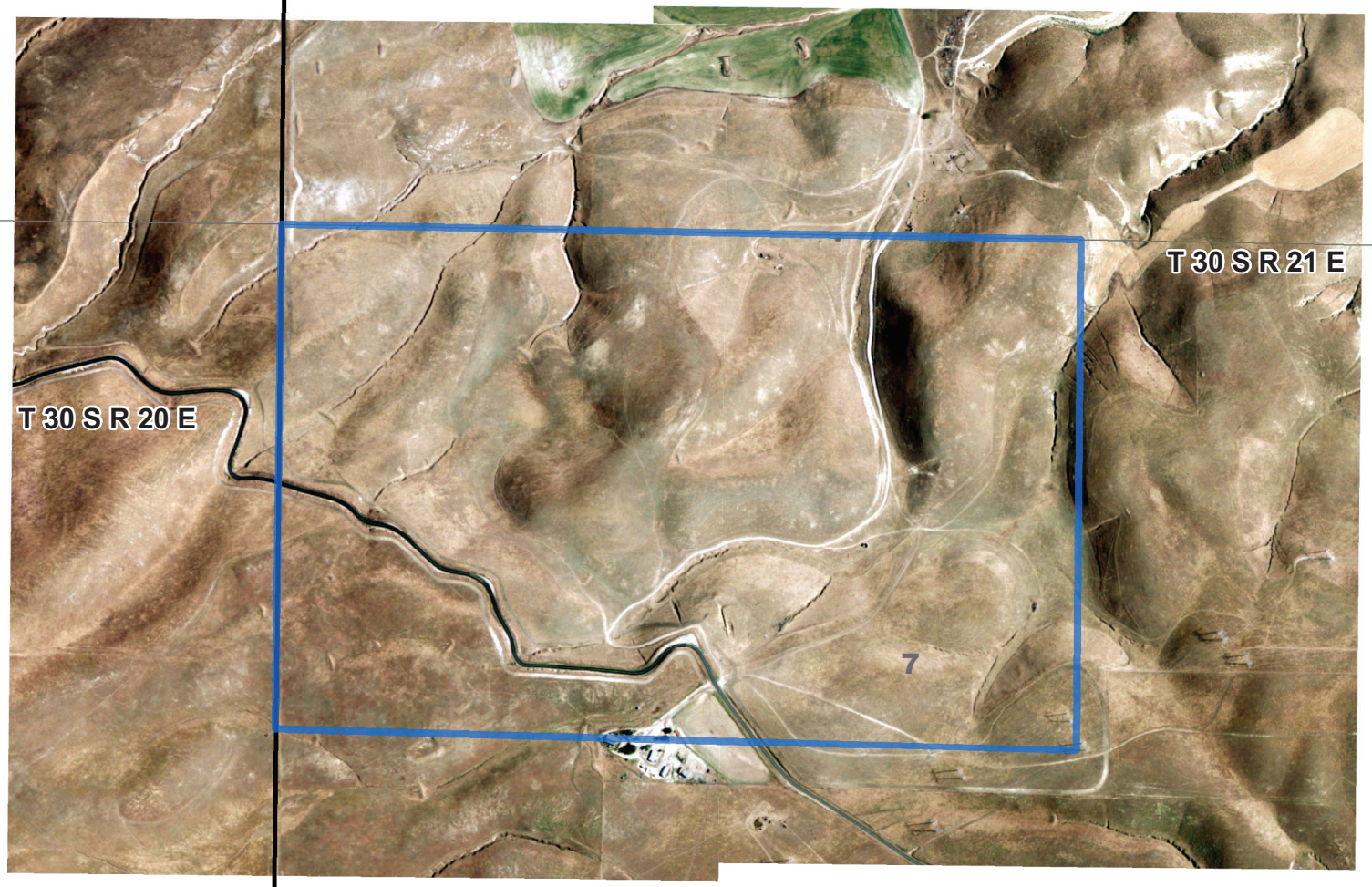
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 1994

DATE: 12/18		EXHIBIT: 10



Legend

Site Location

N

1,000 500 0 1,000

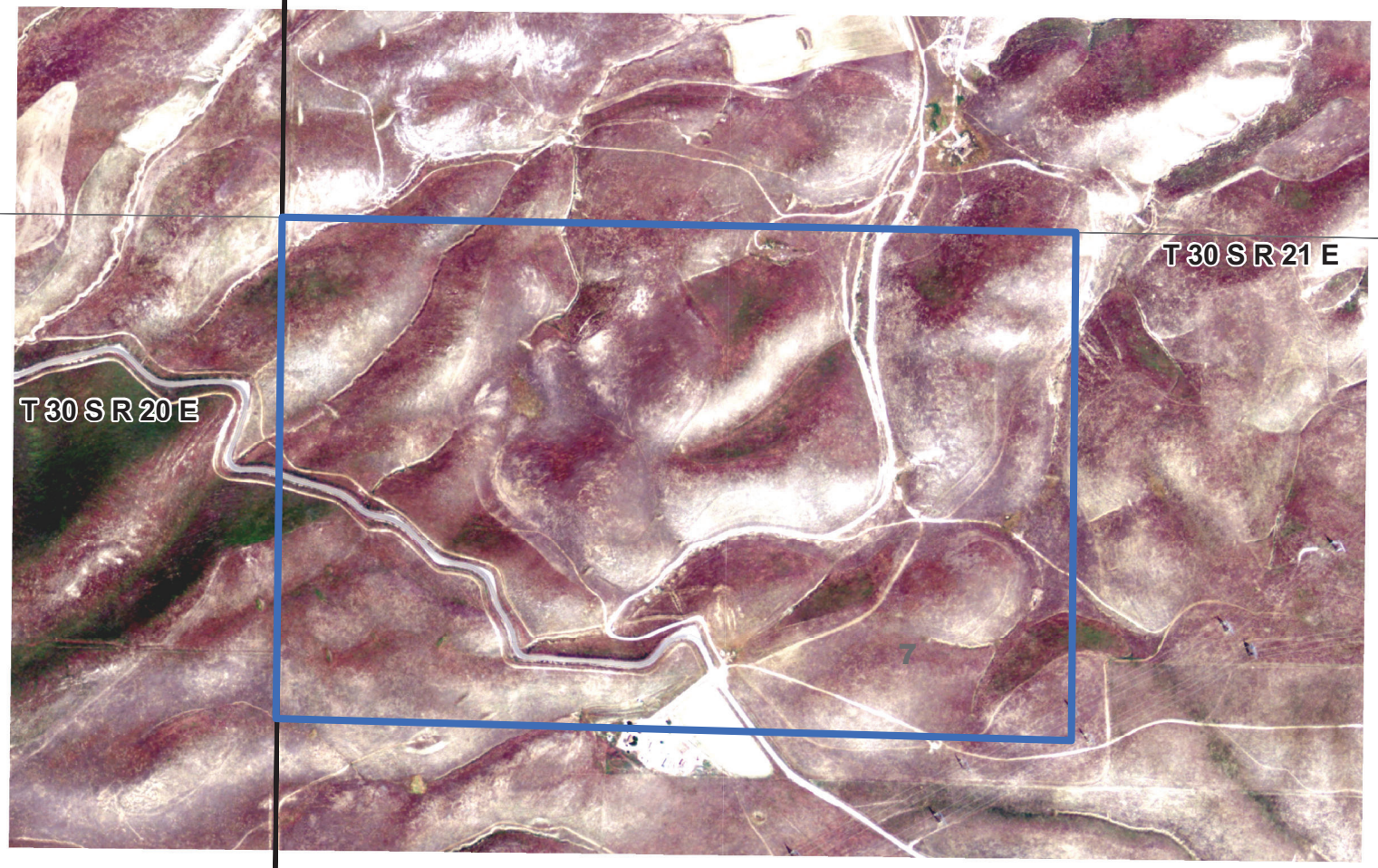
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 2005

DATE: 12/18		EXHIBIT: 11



Legend

Site Location

N

1,000 500 0 1,000

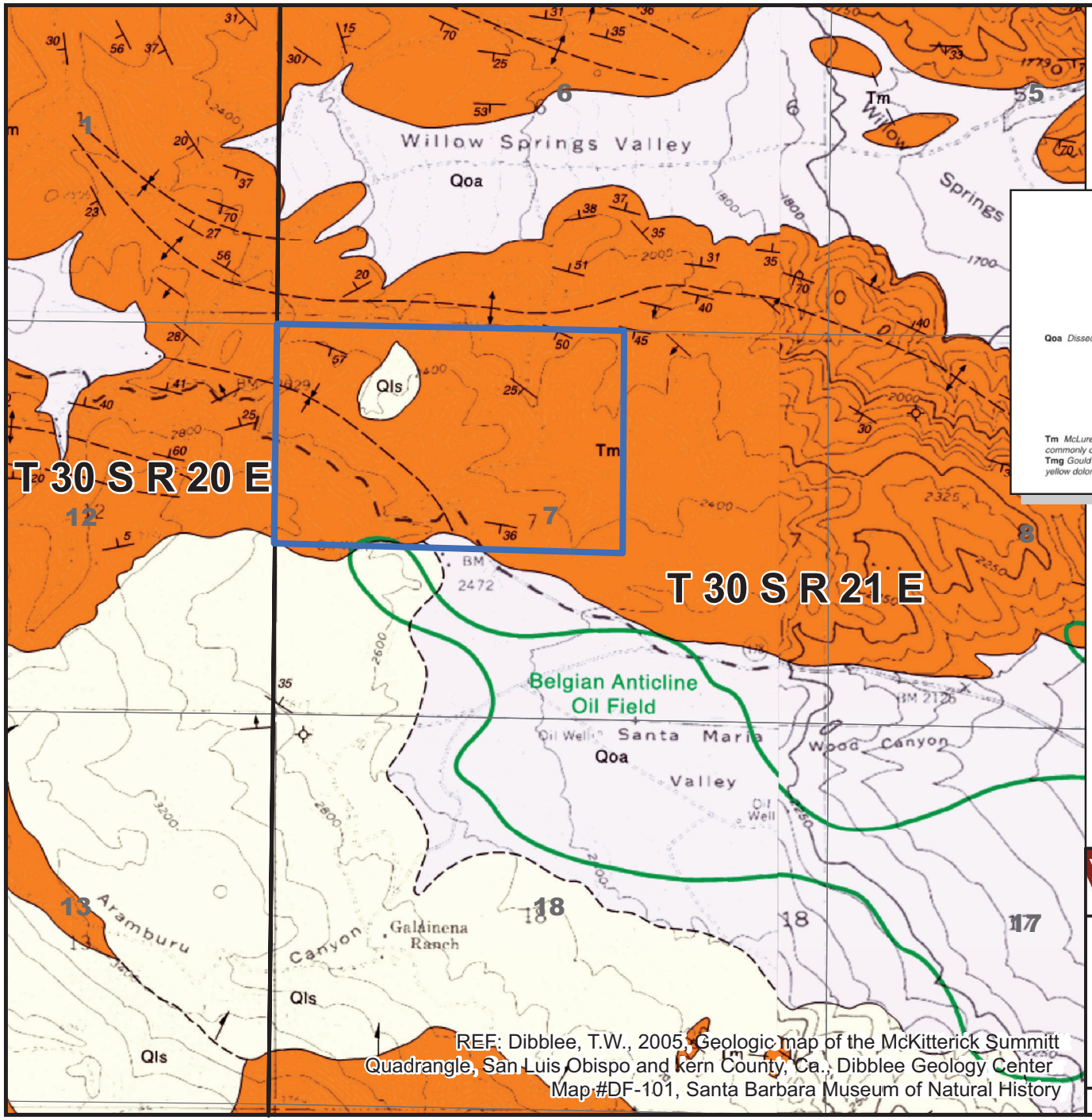
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

AERIAL PHOTOGRAPH 2012

DATE: 12/18		EXHIBIT: 12



REF: Dibblee, T.W., 2005, Geologic map of the McKitterick Summitt Quadrangle, San Luis Obispo and kern County, Ca., Dibblee Geology Center Map #DF-101, Santa Barbara Museum of Natural History

Legend

Site Location

Geology Legend

Qls

LANDSLIDE RUBBLE

Qls *Landslide of cream white* **Tm** *debris; merges into* **Qoa**

Qoa

OLDER DISSECTED SURFICIAL SEDIMENTS

Qoa *Dissected alluvial gravel of cream white* **Tm** *debris, merges into* **Qls**

Tm
Tmg

MONTEREY SHALE

Marine, biogenic, lithified; age Miocene

Tm *McLure Shale Member, siliceous shale, white weathering, thin bedded, platy, hard, commonly cherty, brittle, much fractured; Mohnian Stage, upper Miocene*

Tmg *Gould Shale Member, siliceous shale, semi-siliceous shale and clay shale, contains thin yellow dolomite beds, Luisian and Relizian stages, middle Miocene*

N

2,000 1,000 0 2,000

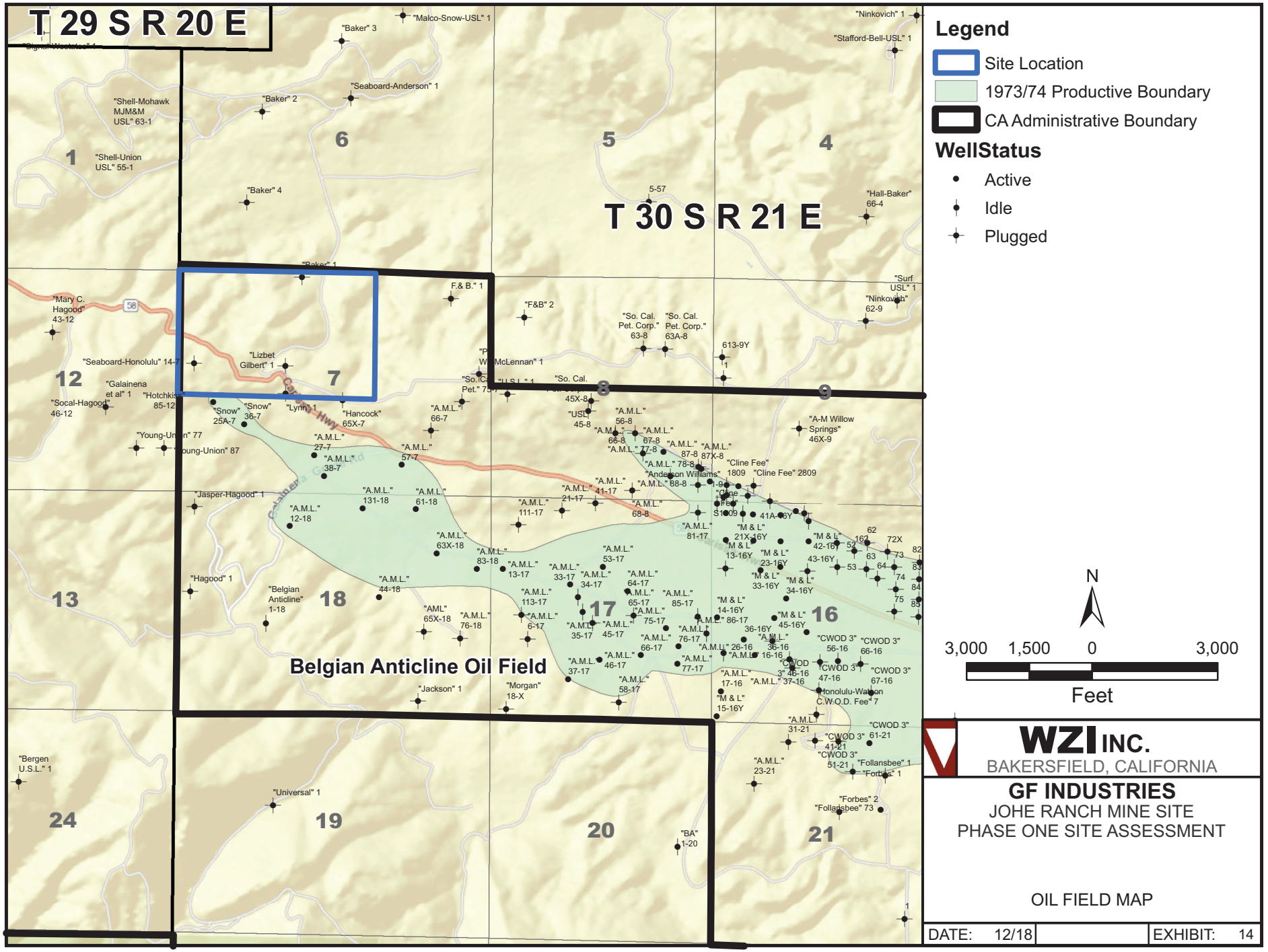
Feet

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT

GEOLOGIC MAP

DATE:	12/18		EXHIBIT:	13


T 29 S R 20 E
T 30 S R 21 E
Belgian Anticline Oil Field
Belgian Anticline 1-18
Legend
Site Location
1973/74 Productive Boundary
CA Administrative Boundary
WellStatus
Active
Idle
Plugged
N
3,000 1,500 0 3,000
Feet
WZI INC.
BAKERSFIELD, CALIFORNIA
GF INDUSTRIES
JOHE RANCH MINE SITE
PHASE ONE SITE ASSESSMENT
OIL FIELD MAP
DATE: 12/18
EXHIBIT: 14

APPENDIX 1

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Johe Ranch Mine
State Highway 58
Mc Kittrick, CA 93251

Inquiry Number: 4898470.2s
April 04, 2017

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Detail Map	3
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Map Findings	8
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Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
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Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

STATE HIGHWAY 58
MC KITTRICK, CA 93251

COORDINATES

Latitude (North):	35.3330970 - 35° 19' 59.14''
Longitude (West):	119.7660830 - 119° 45' 57.89''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	248579.0
UTM Y (Meters):	3913296.2
Elevation:	2514 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5639084 MCKITTRICK SUMMIT, CA
Version Date:	2012
East Map:	5639094 REWARD, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140619, 20140601
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
STATE HIGHWAY 58
MC KITTRICK, CA 93251

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	JOHE RANCH QUARRY		MINES	Lower	1 ft.
2	LIQUID WASTE MANAGEM	HWY 33 AND HWY 58	EMI	Lower	1 ft.
3	SMART SMR OF CALIFOR	APN 156-180-013, T30	FINDS	Lower	2505, 0.474, NNE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List

US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR ---------- EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

LUST ---------- Geotracker's Leaking Underground Fuel Tank Report
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land
SLIC ---------- Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST ---------- Underground Storage Tank Listing
UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

State and tribal Brownfields sites

BROWNFIELDS ---------- Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT ---------- Waste Management Unit Database
SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
ODI ---------- Open Dump Inventory
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations

IHS OPEN DUMPS - Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL - Delisted National Clandestine Laboratory Register
HIST Cal-Sites - Historical Calsites Database
SCH - School Property Evaluation Program
CDL - Clandestine Drug Labs
Toxic Pits - Toxic Pits Cleanup Act Sites
US CDL - National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

SWEEPS UST - SWEEPS UST Listing
HIST UST - Hazardous Substance Storage Container Database
CA FID UST - Facility Inventory Database

Local Land Records

LIENS - Environmental Liens Listing
LIENS 2 - CERCLA Lien Information
DEED - Deed Restriction Listing

Records of Emergency Release Reports

HMIRS - Hazardous Materials Information Reporting System
CHMIRS - California Hazardous Material Incident Report System
LDS - Land Disposal Sites Listing
MCS - Military Cleanup Sites Listing
SPILLS 90 - SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR - RCRA - Non Generators / No Longer Regulated
FUDS - Formerly Used Defense Sites
DOD - Department of Defense Sites
SCRD DRYCLEANERS - State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR - Financial Assurance Information
EPA WATCH LIST - EPA WATCH LIST
2020 COR ACTION - 2020 Corrective Action Program List
TSCA - Toxic Substances Control Act
TRIS - Toxic Chemical Release Inventory System
SSTS - Section 7 Tracking Systems
ROD - Records Of Decision
RMP - Risk Management Plans
RAATS - RCRA Administrative Action Tracking System
PRP - Potentially Responsible Parties
PADS - PCB Activity Database System
ICIS - Integrated Compliance Information System
FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS - Material Licensing Tracking System
COAL ASH DOE - Steam-Electric Plant Operation Data
COAL ASH EPA - Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER - PCB Transformer Registration Database

RADINFO ---- Radiation Information Database
HIST FTTS ---- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---- Incident and Accident Data
CONSENT ---- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---- Indian Reservations
FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
US MINES ---- Mines Master Index File
DOCKET HWC ---- Hazardous Waste Compliance Docket Listing
UXO ---- Unexploded Ordnance Sites
CA BOND EXP. PLAN ---- Bond Expenditure Plan
Cortese ---- "Cortese" Hazardous Waste & Substances Sites List
CUPA Listings ---- CUPA Resources List
DRYCLEANERS ---- Cleaner Facilities
ENF ---- Enforcement Action Listing
Financial Assurance ---- Financial Assurance Information Listing
HAZNET ---- Facility and Manifest Data
ICE ---- ICE
HIST CORTESE ---- Hazardous Waste & Substance Site List
HWP ---- EnviroStor Permitted Facilities Listing
HWT ---- Registered Hazardous Waste Transporter Database
MWMP ---- Medical Waste Management Program Listing
NPDES ---- NPDES Permits Listing
PEST LIC ---- Pesticide Regulation Licenses Listing
PROC ---- Certified Processors Database
Notify 65 ---- Proposition 65 Records
UIC ---- UIC Listing
WASTEWATER PITS ---- Oil Wastewater Pits Listing
WDS ---- Waste Discharge System
WIP ---- Well Investigation Program Case List
FUELS PROGRAM ---- EPA Fuels Program Registered Listing
ABANDONED MINES ---- Abandoned Mines
ECHO ---- Enforcement & Compliance History Information

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---- EDR Exclusive Historic Gas Stations
EDR Hist Cleaner ---- EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

EXECUTIVE SUMMARY

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 07/15/2016 has revealed that there is 1 FINDS site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SMART SMR OF CALIFOR	APN 156-180-013, T30	NNE 1/4 - 1/2 (0.474 mi.)	3	9

EMI: Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies

A review of the EMI list, as provided by EDR, and dated 12/31/2014 has revealed that there is 1 EMI site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
LIQUID WASTE MANAGEM Facility Id: 730	HWY 33 AND HWY 58	0 - 1/8 (0.000 mi.)	2	8

MINES: A listing of mine site locations from the Office of Mine Reclamation.

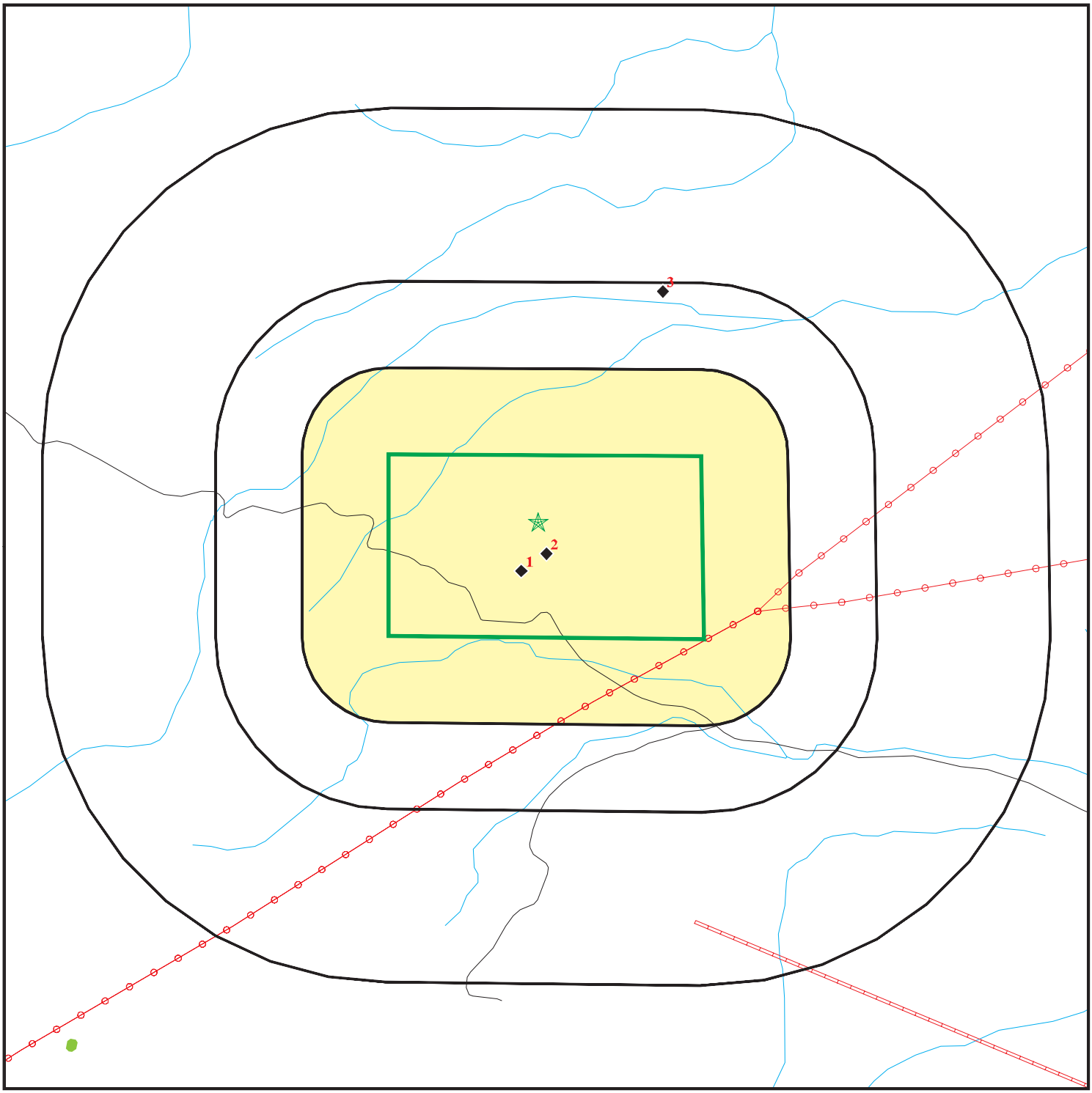
A review of the MINES list, as provided by EDR, and dated 09/12/2016 has revealed that there is 1 MINES site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
JOHE RANCH QUARRY		0 - 1/8 (0.000 mi.)	1	8

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 4898470.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Power transmission lines

Pipelines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands

Areas of Concern

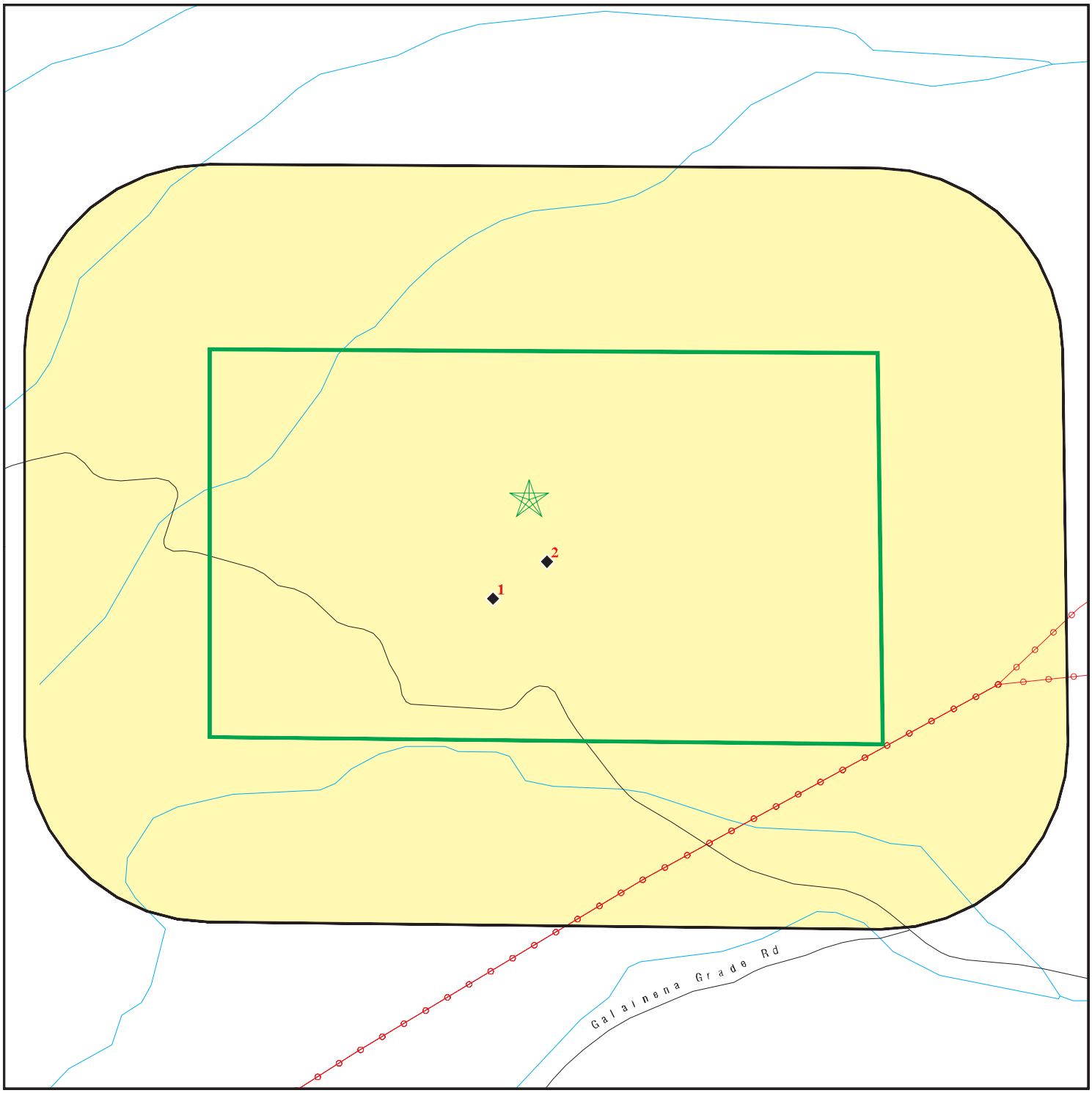
N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Johe Ranch Mine ADDRESS: State Highway 58 Mc Kittrick CA 93251 LAT/LONG: 35.333097 / 119.766083	CLIENT: WZI Inc. CONTACT: Allen Waggoner INQUIRY #: 4898470.2s DATE: April 04, 2017 8:09 pm

Copyright © 2017 EDR, Inc. © 2015 TomTom Rel. 2015.

DETAIL MAP - 4898470.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

Sensitive Receptors

National Priority List Sites

Dept. Defense Sites

0 1/8 1/4 1/2 Miles

Indian Reservations BIA

Power transmission lines

100-year flood zone

500-year flood zone

Areas of Concern

N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Johe Ranch Mine	CLIENT:	WZI Inc.
ADDRESS:	State Highway 58 Mc Kittrick CA 93251	CONTACT:	Allen Waggoner
		INQUIRY #:	4898470.2s
LAT/LONG:	35.333097 / 119.766083	DATE:	April 04, 2017 8:33 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	1.000		0	0	0	0	NR	0
SEMS	1.000		0	0	0	0	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	1.000		0	0	0	0	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	1.000		0	0	0	0	NR	0
Federal RCRA generators list								
RCRA-LQG	1.000		0	0	0	0	NR	0
RCRA-SQG	1.000		0	0	0	0	NR	0
RCRA-CESQG	1.000		0	0	0	0	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	1.000		0	0	0	0	NR	0
US ENG CONTROLS	1.000		0	0	0	0	NR	0
US INST CONTROL	1.000		0	0	0	0	NR	0
Federal ERNS list								
ERNS	1.000		0	0	0	0	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	1.000		0	0	0	0	NR	0
State and tribal leaking storage tank lists								
LUST	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	1.000		0	0	0	0	NR	0
SLIC	1.000		0	0	0	0	NR	0
State and tribal registered storage tank lists								
FEMA UST	1.000		0	0	0	0	NR	0
UST	1.000		0	0	0	0	NR	0
AST	1.000		0	0	0	0	NR	0
INDIAN UST	1.000		0	0	0	0	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	1.000		0	0	0	0	NR	0
VCP	1.000		0	0	0	0	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	1.000		0	0	0	0	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	1.000		0	0	0	0	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	1.000		0	0	0	0	NR	0
SWRCY	1.000		0	0	0	0	NR	0
HAULERS	1.000		0	0	0	0	NR	0
INDIAN ODI	1.000		0	0	0	0	NR	0
ODI	1.000		0	0	0	0	NR	0
DEBRIS REGION 9	1.000		0	0	0	0	NR	0
IHS OPEN DUMPS	1.000		0	0	0	0	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	1.000		0	0	0	0	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	1.000		0	0	0	0	NR	0
CDL	1.000		0	0	0	0	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	1.000		0	0	0	0	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	1.000		0	0	0	0	NR	0
HIST UST	1.000		0	0	0	0	NR	0
CA FID UST	1.000		0	0	0	0	NR	0
Local Land Records								
LIENS	1.000		0	0	0	0	NR	0
LIENS 2	1.000		0	0	0	0	NR	0
DEED	1.000		0	0	0	0	NR	0
Records of Emergency Release Reports								
HMIRS	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
CHMIRS	1.000		0	0	0	0	NR	0
LDS	1.000		0	0	0	0	NR	0
MCS	1.000		0	0	0	0	NR	0
SPILLS 90	1.000		0	0	0	0	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	1.000		0	0	0	0	NR	0
US FIN ASSUR	1.000		0	0	0	0	NR	0
EPA WATCH LIST	1.000		0	0	0	0	NR	0
2020 COR ACTION	1.000		0	0	0	0	NR	0
TSCA	1.000		0	0	0	0	NR	0
TRIS	1.000		0	0	0	0	NR	0
SSTS	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	1.000		0	0	0	0	NR	0
RAATS	1.000		0	0	0	0	NR	0
PRP	1.000		0	0	0	0	NR	0
PADS	1.000		0	0	0	0	NR	0
ICIS	1.000		0	0	0	0	NR	0
FTTS	1.000		0	0	0	0	NR	0
MLTS	1.000		0	0	0	0	NR	0
COAL ASH DOE	1.000		0	0	0	0	NR	0
COAL ASH EPA	1.000		0	0	0	0	NR	0
PCB TRANSFORMER	1.000		0	0	0	0	NR	0
RADINFO	1.000		0	0	0	0	NR	0
HIST FTTS	1.000		0	0	0	0	NR	0
DOT OPS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	1.000		0	0	0	0	NR	0
LEAD SMELTERS	1.000		0	0	0	0	NR	0
US AIRS	1.000		0	0	0	0	NR	0
US MINES	1.000		0	0	0	0	NR	0
FINDS	1.000		0	0	1	0	NR	1
DOCKET HWC	1.000		0	0	0	0	NR	0
UXO	1.000		0	0	0	0	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	1.000		0	0	0	0	NR	0
CUPA Listings	1.000		0	0	0	0	NR	0
DRYCLEANERS	1.000		0	0	0	0	NR	0
EMI	1.000		1	0	0	0	NR	1
ENF	1.000		0	0	0	0	NR	0
Financial Assurance	1.000		0	0	0	0	NR	0
HAZNET	1.000		0	0	0	0	NR	0
ICE	1.000		0	0	0	0	NR	0
HIST CORTESE	1.000		0	0	0	0	NR	0
HWP	1.000		0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
HWT	1.000		0	0	0	0	NR	0
MINES	1.000		1	0	0	0	NR	1
MWMP	1.000		0	0	0	0	NR	0
NPDES	1.000		0	0	0	0	NR	0
PEST LIC	1.000		0	0	0	0	NR	0
PROC	1.000		0	0	0	0	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	1.000		0	0	0	0	NR	0
WASTEWATER PITS	1.000		0	0	0	0	NR	0
WDS	1.000		0	0	0	0	NR	0
WIP	1.000		0	0	0	0	NR	0
FUELS PROGRAM	1.000		0	0	0	0	NR	0
ABANDONED MINES	1.000		0	0	0	0	NR	0
ECHO	1.000		0	0	0	0	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	1.000		0	0	0	0	NR	0
EDR Hist Cleaner	1.000		0	0	0	0	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	1.000		0	0	0	0	NR	0
RGA LUST	1.000		0	0	0	0	NR	0
- Totals --		0	2	0	1	0	0	3

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1 **JOHE RANCH QUARRY** **MINES** **S117661836**
N/A

< 1/8 **, CA**
1 ft.

Relative:
Lower

Actual:
2504 ft.

MINES:

Latitude:	35.331111
Longitude:	-119.766944
Lead Agency identification code:	15
Lead Agency name:	County of Kern
Year of the operator supplied annual report:	0
Type of report submitted by operator:	Not reported
Number of acres disturbed by the mine:	0
Status of mining operation:	Not reported
Status of mine reclamation:	Not reported
Mine operator:	Not reported
Operator Address:	Not reported
Operator City, State, Zip:	Not reported
Operator County:	Not reported
Mine owner:	Not reported
Owner Address:	Not reported
Owner City, State, Zip:	Not reported
Owner County:	Not reported
Reclamation plan identification number:	Not reported
Primary product produced by the mine:	Not reported
Other products produced by the mine:	Not reported
Type of mining utilized by mine:	Not reported
Conditional use permit identification number:	Not reported
Number of acres permitted for mining disturbance:	Not reported
Total amount of funds posted by the mine for reclamation:	$0.00
Financial Assurance Cost Estimate for reclamation:	$0.00

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2 **LIQUID WASTE MANAGEMENT, INC.** **EMI** **S106834555**
HWY 33 AND HWY 58 **N/A**

< 1/8 **MCKITTRICK, CA**
1 ft.

Relative:
Lower

Actual:
2487 ft.

EMI:

Year:	1995
County Code:	15
Air Basin:	SJV
Facility ID:	730
Air District Name:	SJU
SIC Code:	4959
Air District Name:	SAN JOAQUIN VALLEY UNIFIED APCD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0
Reactive Organic Gases Tons/Yr:	0
Carbon Monoxide Emissions Tons/Yr:	0
NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

3
NNE
1/4-1/2
0.474 mi.
2505 ft.

SMART SMR OF CALIFORNIA INC
APN 156-180-013, T30S R21E#569
MCKITTRICK, CA 93251

FINDS **1011976114**
N/A

Relative:
Lower

Actual:
1930 ft.

FINDS:

Registry ID: 110038089886

Environmental Interest/Information System
AIR EMISSIONS CLASSIFICATION UNKNOWN

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 29

Source: EPA
Telephone: N/A
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 09/14/2016
Date Data Arrived at EDR: 10/04/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 17

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/10/2016
Date Data Arrived at EDR: 10/20/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 78

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 10/10/2016
Date Data Arrived at EDR: 10/20/2016
Date Made Active in Reports: 01/06/2017
Number of Days to Update: 78

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/13/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/15/2016
Date Data Arrived at EDR: 11/29/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/15/2016
Date Data Arrived at EDR: 11/29/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 66

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 43

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/15/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 66

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/15/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 37

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 12/11/2015
Date Data Arrived at EDR: 02/19/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 105

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 10/09/2015
Date Data Arrived at EDR: 02/12/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 112
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/13/2015
Date Data Arrived at EDR: 10/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 118
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/25/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 02/17/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 02/05/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 35
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/24/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

SLIC: Statewide SLIC Cases

Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 40

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/16/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 03/24/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 12/03/2015
Date Data Arrived at EDR: 02/04/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 120

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 02/05/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 35

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/24/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 02/25/2016
Date Data Arrived at EDR: 04/27/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 37

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 01/26/2016
Date Data Arrived at EDR: 02/05/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 119

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/26/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 01/03/2017
Date Data Arrived at EDR: 01/04/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 57

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/19/2016
Date Data Arrived at EDR: 12/20/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 78

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 08/25/2016
Date Data Arrived at EDR: 08/26/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 49

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 02/13/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/31/2016
Next Scheduled EDR Contact: 02/13/2017
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 36

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 10/31/2016
Date Data Arrived at EDR: 11/01/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 08/31/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 34

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 12/05/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 67

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 12/01/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 35

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 02/27/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 48

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 01/24/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 45

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 37

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 83

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 01/25/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 37

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 37

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 10/11/2016
Date Data Arrived at EDR: 11/16/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 02/15/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/10/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/24/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 133

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2016
Date Data Arrived at EDR: 08/22/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 02/10/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2016
Date Data Arrived at EDR: 04/28/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 127
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/17/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/17/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 01/29/2016
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 35
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/06/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/01/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 77

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/22/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 03/02/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 04/10/2017
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/05/2016
Date Data Arrived at EDR: 09/01/2016
Date Made Active in Reports: 09/23/2016
Number of Days to Update: 22

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/03/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/03/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Varies

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/15/2016
Date Data Arrived at EDR: 09/07/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 65

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/03/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 91

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 67

Source: Department of Defense
Telephone: 571-373-0407
Last EDR Contact: 01/20/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 64

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/29/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/27/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 79

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 09/23/2016
Date Made Active in Reports: 10/24/2016
Number of Days to Update: 31

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/21/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/09/2016
Date Made Active in Reports: 01/18/2017
Number of Days to Update: 40

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 04/25/2016
Date Data Arrived at EDR: 04/29/2016
Date Made Active in Reports: 06/21/2016
Number of Days to Update: 53

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/20/2017
Number of Days to Update: 63

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 02/13/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 64

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 02/22/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 62

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/22/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 64

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/11/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 09/12/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 03/13/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Varies

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 86
Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/15/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 107
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/15/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 12/06/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/03/2017
Number of Days to Update: 87
Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 03/07/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 78
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 12/16/2016
Date Data Arrived at EDR: 12/22/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 70
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 09/14/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 30
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/14/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water board?s review found that more than one-third of the region?s active disposal pits are operating without permission.

Date of Government Version: 04/15/2015
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/23/2015
Number of Days to Update: 67

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 01/13/2017
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Varies

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 02/17/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/24/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 06/09/2016
Date Data Arrived at EDR: 06/13/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 81

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 03/13/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 12/11/2016
Date Data Arrived at EDR: 12/20/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 59

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 03/21/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/21/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 73

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/22/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Quarterly

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/14/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 35

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/06/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 10/10/2016
Date Data Arrived at EDR: 10/12/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 90

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 11/10/2016
Date Data Arrived at EDR: 12/13/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 9

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 10/21/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 11/18/2016
Number of Days to Update: 23

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 38

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 11/22/2016
Date Made Active in Reports: 01/26/2017
Number of Days to Update: 65

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 11/01/2016
Date Data Arrived at EDR: 11/03/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 19

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/22/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 55

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/10/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 51

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 01/23/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 36

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing

Kern County Sites and Tanks Listing.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/08/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 63

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List

A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/14/2016
Date Data Arrived at EDR: 12/16/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 6

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 01/18/2017
Date Data Arrived at EDR: 01/20/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 41

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern

San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: No Update Planned

HMS: Street Number List

Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 66

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities

Solid Waste Facilities in Los Angeles County.

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 10/18/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 58

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/18/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2016
Date Data Arrived at EDR: 01/26/2016
Date Made Active in Reports: 03/22/2016
Number of Days to Update: 56

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 03/29/2016
Date Data Arrived at EDR: 04/06/2016
Date Made Active in Reports: 06/13/2016
Number of Days to Update: 68
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/02/2015
Date Made Active in Reports: 04/13/2015
Number of Days to Update: 11
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/17/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 11/04/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 12/17/2015
Number of Days to Update: 34
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 10/04/2016
Date Data Arrived at EDR: 10/11/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 93
Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 12/09/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 41
Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 10/19/2016
Date Data Arrived at EDR: 10/25/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 79
Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 42

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/05/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 17

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/24/2016
Date Data Arrived at EDR: 06/27/2016
Date Made Active in Reports: 08/09/2016
Number of Days to Update: 43

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/08/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 44

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 11/03/2016
Date Data Arrived at EDR: 11/11/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 73

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 11/04/2016
Date Data Arrived at EDR: 11/11/2016
Date Made Active in Reports: 01/23/2017
Number of Days to Update: 73

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 11/03/2016
Date Data Arrived at EDR: 11/08/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 65

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/07/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/02/2016
Date Data Arrived at EDR: 09/06/2016
Date Made Active in Reports: 10/14/2016
Number of Days to Update: 38

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 01/19/2017
Date Data Arrived at EDR: 01/25/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 36

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 10/20/2016
Date Data Arrived at EDR: 10/25/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 77
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 56
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/08/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 56
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/05/2017
Next Scheduled EDR Contact: 04/17/2017
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 12/09/2016
Date Data Arrived at EDR: 12/13/2016
Date Made Active in Reports: 03/03/2017
Number of Days to Update: 80
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 10/05/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 86
Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/10/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 02/03/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 52
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 12/21/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/14/2017
Number of Days to Update: 49
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/20/2017
Next Scheduled EDR Contact: 07/03/2017
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 59
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/07/2016
Date Made Active in Reports: 06/22/2016
Number of Days to Update: 15
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/16/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 76
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28
Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 59
Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/10/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 75
Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 02/06/2017
Next Scheduled EDR Contact: 05/22/2017
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 11/16/2016
Date Data Arrived at EDR: 11/21/2016
Date Made Active in Reports: 01/19/2017
Number of Days to Update: 59

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 12/13/2016
Date Data Arrived at EDR: 12/16/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 76

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/21/2016
Date Made Active in Reports: 12/22/2016
Number of Days to Update: 1

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 11/29/2016
Date Data Arrived at EDR: 12/22/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 19

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/09/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 12/22/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 65

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 55

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/27/2017
Next Scheduled EDR Contact: 07/10/2017
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 12/02/2016
Date Data Arrived at EDR: 12/06/2016
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 35

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 03/06/2017
Next Scheduled EDR Contact: 06/19/2017
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/25/2017
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 34

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 01/17/2017
Number of Days to Update: 82

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/13/2017
Next Scheduled EDR Contact: 05/29/2017
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 10/27/2016
Date Made Active in Reports: 01/24/2017
Number of Days to Update: 89

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/23/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 11/28/2016
Date Data Arrived at EDR: 12/14/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 29

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/15/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 01/12/2017
Number of Days to Update: 55

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/31/2017
Next Scheduled EDR Contact: 07/17/2017
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 10/28/2016
Date Data Arrived at EDR: 11/03/2016
Date Made Active in Reports: 12/15/2016
Number of Days to Update: 42

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 01/30/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 11/11/2016
Next Scheduled EDR Contact: 02/27/2017
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 01/03/2017
Number of Days to Update: 96

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/09/2017
Next Scheduled EDR Contact: 04/24/2017
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 02/01/2017
Date Made Active in Reports: 02/13/2017
Number of Days to Update: 12

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/01/2017
Next Scheduled EDR Contact: 05/08/2017
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 07/22/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 123

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/12/2017
Next Scheduled EDR Contact: 05/01/2017
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/21/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 04/14/2016
Date Made Active in Reports: 06/03/2016
Number of Days to Update: 50

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/13/2017
Next Scheduled EDR Contact: 06/26/2017
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data

Source: PennWell Corporation

This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

JOHE RANCH MINE
STATE HIGHWAY 58
MC KITTRICK, CA 93251

TARGET PROPERTY COORDINATES

Latitude (North):	35.333097 - 35° 19' 59.15''
Longitude (West):	119.766083 - 119° 45' 57.90''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	248579.0
UTM Y (Meters):	3913296.2
Elevation:	2514 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5639084 MCKITTRICK SUMMIT, CA
Version Date:	2012
East Map:	5639094 REWARD, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

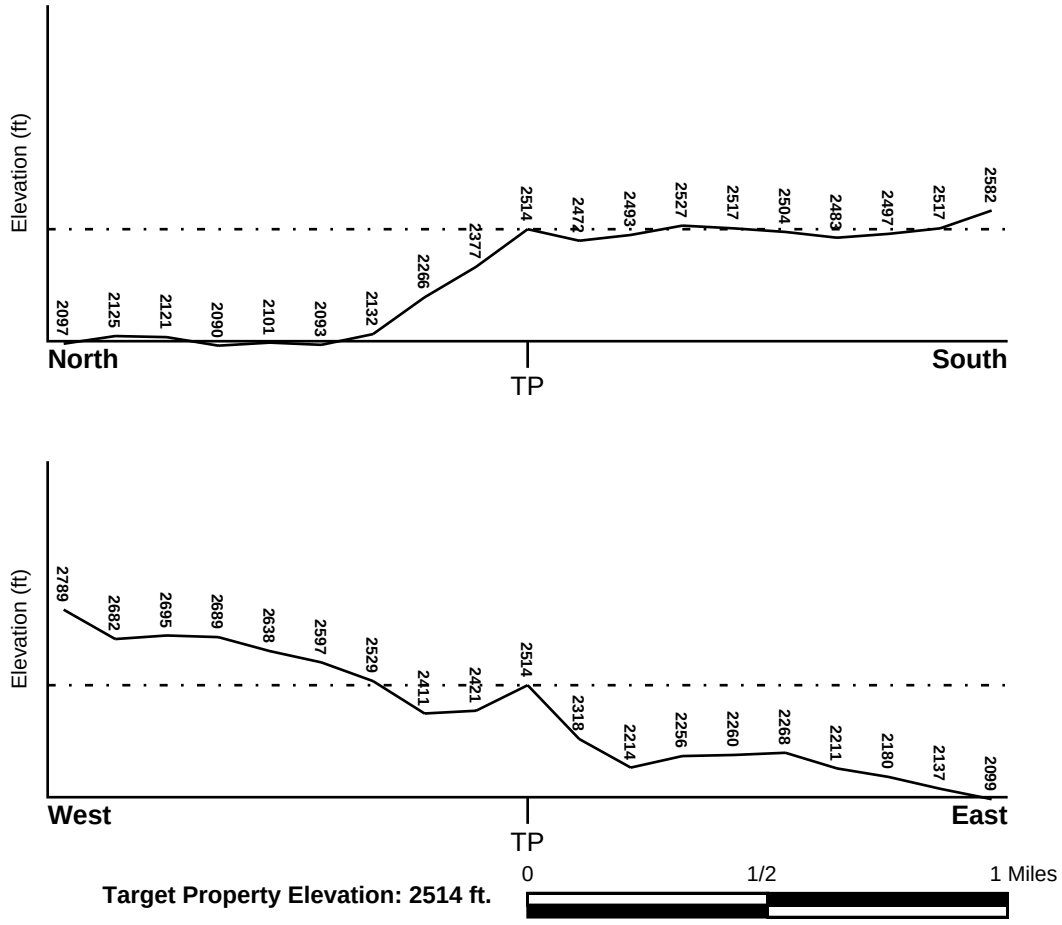
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NNE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 2514 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06029C2150E	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06029C2175E	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
MCKITTRICK SUMMIT	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

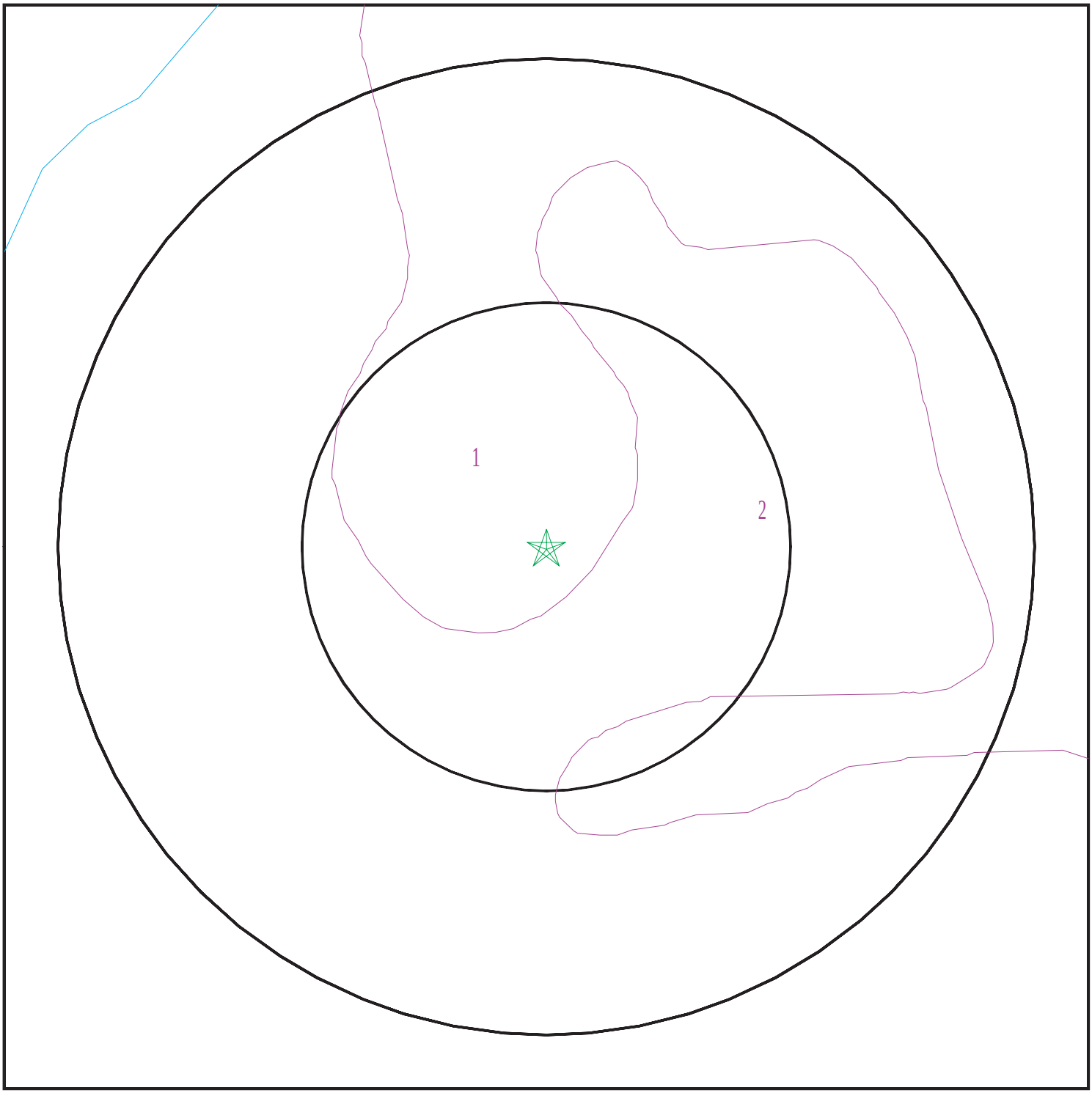
Era:	Cenozoic
System:	Tertiary
Series:	Miocene
Code:	Tm *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 4898470.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Johe Ranch Mine	CLIENT:	WZI Inc.
ADDRESS:	State Highway 58 Mc Kittrick CA 93251	CONTACT:	Allen Waggoner
LAT/LONG:	35.333097 / 119.766083	INQUIRY #:	4898470.2s
		DATE:	April 04, 2017 8:55 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: MENDI

Soil Surface Texture:
Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 38 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	20 inches		Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9
2	20 inches	40 inches		Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9
3	40 inches	72 inches		Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9
4	72 inches	75 inches		Not reported	Not reported	Max: Min:	Max: Min:

Soil Map ID: 2

Soil Component Name: REWARD

Soil Surface Texture:
Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	24 inches		Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9
2	24 inches	38 inches		Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9
3	38 inches	59 inches		Not reported	Not reported	Max: 14 Min: 4	Max: 8.4 Min: 7.9
4	59 inches	64 inches		Not reported	Not reported	Max: Min:	Max: Min:

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1.000 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

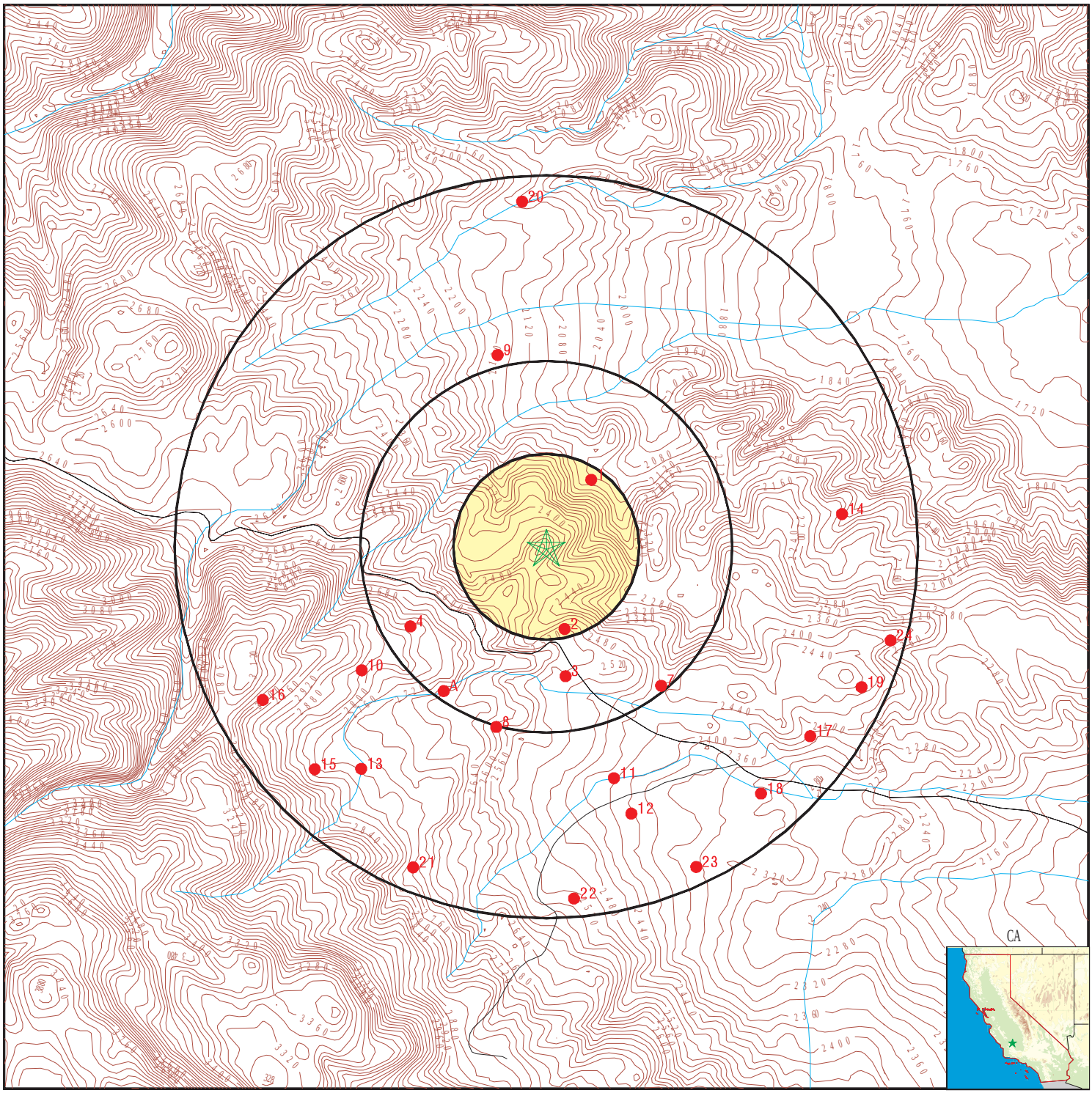
MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CAOG11000015956	1/8 - 1/4 Mile NE
2	CAOG11000047229	1/8 - 1/4 Mile SSE
3	CAOG11000047319	1/4 - 1/2 Mile South
4	CAOG11000030300	1/4 - 1/2 Mile WSW
A5	CAOG11000015959	1/4 - 1/2 Mile SW
A6	CAOG11000015960	1/4 - 1/2 Mile SW
7	CAOG11000028057	1/4 - 1/2 Mile SE
8	CAOG11000015961	1/2 - 1 Mile SSW
9	CAOG11000016112	1/2 - 1 Mile NNW
10	CAOG11000028225	1/2 - 1 Mile SW
11	CAOG11000015952	1/2 - 1 Mile SSE
12	CAOG11000015953	1/2 - 1 Mile SSE
13	CAOG11000046395	1/2 - 1 Mile SW
14	CAOG11000015957	1/2 - 1 Mile East
15	CAOG11000046394	1/2 - 1 Mile SW
16	CAOG11000055328	1/2 - 1 Mile WSW
17	CAOG11000015955	1/2 - 1 Mile SE
18	CAOG11000015954	1/2 - 1 Mile SE
19	CAOG11000015962	1/2 - 1 Mile ESE
20	CAOG11000016110	1/2 - 1 Mile North
21	CAOG11000030784	1/2 - 1 Mile SSW
22	CAOG11000016013	1/2 - 1 Mile South
23	CAOG11000016017	1/2 - 1 Mile SSE
24	CAOG11000015958	1/2 - 1 Mile ESE

PHYSICAL SETTING SOURCE MAP - 4898470.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	Johe Ranch Mine	CLIENT:	WZI Inc.
ADDRESS:	State Highway 58 Mc Kittrick CA 93251	CONTACT:	Allen Waggoner
LAT/LONG:	35.333097 / 119.766083	INQUIRY #:	4898470.2s
		DATE:	April 04, 2017 8:52 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
NE **OIL_GAS** **CAOG11000015956**
1/8 - 1/4 Mile

District nun:	4	Api number:	02913535
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	CalResources LLC		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2192 DF
Locationde:	Fr NW cor 2848Ely 210Sly		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Baker	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000015956		

2
SSE **OIL_GAS** **CAOG11000047229**
1/8 - 1/4 Mile

District nun:	4	Api number:	02937652
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Stanley Johnson		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2527 GL
Locationde:	Fr W/4 cor 350N 2470E		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Lizbet Gilbert	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000047229		

3
South **OIL_GAS** **CAOG11000047319**
1/4 - 1/2 Mile

District nun:	4	Api number:	02937726
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	R. B. Watkins		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2507 KB
Locationde:	Fr SW cor 2300N 2500E		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Lynn	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000047319		

4
WSW **OIL_GAS** **CAOG11000030300**
1/4 - 1/2 Mile

District nun:	4	Api number:	02925390
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2765 KB
Locationde:	Fr W/4 cor 330N 330E		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Seaboard-Honolulu	Wellnumber:	14-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000030300		

A5
SW **OIL_GAS** **CAOG11000015959**
1/4 - 1/2 Mile

District nun:	4	Api number:	02913538
Blm well:	Y	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2689 KB
Locationde:	Fr SW cor 2142N 858E		
Gissourcec:	opr		

Comments:	Not Reported		
Leasename:	Snow	Wellnumber:	25A-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000015959		

A6
SW
1/4 - 1/2 Mile

OIL_GAS **CAOG11000015960**

District nun:	4	Api number:	02913538
Blm well:	Y	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2689 KB
Locationde:	Fr SW cor 2142N 858E		
Gissourcec:	opr		
Comments:	Not Reported		
Leasename:	Snow	Wellnumber:	25A-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000015960		

7
SE
1/4 - 1/2 Mile

OIL_GAS **CAOG11000028057**

District nun:	4	Api number:	02923697
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Union Oil Company of California		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2437 KB
Locationde:	Fr SW cor 376E 228N		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Hancock	Wellnumber:	65X-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000028057		

Map ID
Direction
Distance

Database EDR ID Number

8
SSW **OIL_GAS** **CAOG11000015961**
1/2 - 1 Mile

District nun:	4	Api number:	02913539
Blm well:	Y	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2592 GL
Locationde:	Fr SW cor 1635N 1591E		
Gissourcec:	opr		
Comments:	Not Reported		
Leasename:	Snow	Wellnumber:	36-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000015961		

9
NNW **OIL_GAS** **CAOG11000016112**
1/2 - 1 Mile

District nun:	4	Api number:	02913691
Blm well:	N	Redrill can:	Not Reported
Dryhole:	Y	Well status:	P
Operator name:	Shell Western Exploration & Production Inc.		
County name:	Kern	Fieldname:	Any Field
Area name:	Any Area	Section:	6
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2164 DF
Locationde:	Fr SW cor 1520N 1660E		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Baker	Wellnumber:	4
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000016112		

10
SW **OIL_GAS** **CAOG11000028225**
1/2 - 1 Mile

District nun:	4	Api number:	02923845
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	U
Operator name:	Union Oil Company of California		
County name:	Kern	Fieldname:	Any Field
Area name:	Any Area	Section:	12
Township:	30S	Range:	20E
Base meridian:	MD	Elevation:	2794 GL
Locationde:	Fr E/4 cor 330S 330W		
Gissourcec:	mip		
Comments:	Not Reported		
Leasename:	Hotchkiss	Wellnumber:	85-12
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	UNK
Site id:	CAOG11000028225		

11
SSE **OIL_GAS** **CAOG11000015952**
1/2 - 1 Mile

District nun:	4	Api number:	02913531
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2452 DF
Locationde:	Fr SE cor 950N 4250W		
Gissourcec:	opr		
Comments:	Not Reported		
Leasename:	A.M.L.	Wellnumber:	27-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000015952		

12
SSE **OIL_GAS** **CAOG11000015953**
1/2 - 1 Mile

District nun:	4	Api number:	02913532
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2402 DF
Locationde:	Fr SW cor 3506Ely 360Nly		
Gissourcec:	gps		

Comments:	Not Reported		
Leasename:	A.M.L.	Wellnumber:	38-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000015953		

13
SW
1/2 - 1 Mile

OIL_GAS **CAOG11000046395**

District nun:	4	Api number:	02936672
Blm well:	Y	Redrill can:	Not Reported
Dryhole:	Y	Well status:	P
Operator name:	John M. Young		
County name:	Kern	Fieldname:	Any Field
Area name:	Any Area	Section:	12
Township:	30S	Range:	20E
Base meridian:	MD	Elevation:	2770 KB
Locationde:	Fr SE cor 990N 330W		
Gissourcec:	mip		
Comments:	Not Reported		
Leasename:	Young-Union	Wellnumber:	87
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Not Directionally drilled	Gissymbol:	UNK
Site id:	CAOG11000046395		

14
East
1/2 - 1 Mile

OIL_GAS **CAOG11000015957**

District nun:	4	Api number:	02913536
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	CalResources LLC		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2143 DF
Locationde:	Fr NE cor 550Sly 1000Wly		
Gissourcec:	mip		
Comments:	Not Reported		
Leasename:	Grant F.& B.	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000015957		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

15
SW
1/2 - 1 Mile

OIL_GAS **CAOG11000046394**

District nun:	4	Api number:	02936671
Blm well:	N	Redrill can:	Not Reported
Dryhole:	Y	Well status:	P
Operator name:	John M. Young		
County name:	Kern	Fieldname:	Any Field
Area name:	Any Area	Section:	12
Township:	30S	Range:	20E
Base meridian:	MD	Elevation:	2774 RT
Locationde:	Fr SE cor 990N 990W		
Gissourcec:	mip		
Comments:	Not Reported		
Leasename:	Young-Union	Wellnumber:	77
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Not Directionally drilled	Gissymbol:	UNK
Site id:	CAOG11000046394		

16
WSW
1/2 - 1 Mile

OIL_GAS **CAOG11000055328**

District nun:	4	Api number:	02943036
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	U
Operator name:	Chevron U.S.A. Inc.		
County name:	Kern	Fieldname:	Any Field
Area name:	Any Area	Section:	12
Township:	30S	Range:	20E
Base meridian:	MD	Elevation:	2936 KB
Locationde:	Fr SE cor 1980N 1720W		
Gissourcec:	mip		
Comments:	Not Reported		
Leasename:	Galainena et al	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	UNK
Site id:	CAOG11000055328		

17
SE
1/2 - 1 Mile

OIL_GAS **CAOG11000015955**

District nun:	4	Api number:	02913534
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2386 DF
Locationde:	Fr SE cor 1450Wly 1550Nly		
Gissourcec:	hud		
Comments:	FR SE COR 1550NLY 14		
Leasename:	A.M.L.	Wellnumber:	66-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	POG
Site id:	CAOG11000015955		

18
SE
1/2 - 1 Mile

OIL_GAS **CAOG11000015954**

District nun:	4	Api number:	02913533
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2359 DF
Locationde:	Fr SE cor 2170Wly 750Nly		
Gissourcec:	opr		
Comments:	Not Reported		
Leasename:	A.M.L.	Wellnumber:	57-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000015954		

19
ESE
1/2 - 1 Mile

OIL_GAS **CAOG11000015962**

District nun:	4	Api number:	02913540
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	CalResources LLC		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2457 DF
Locationde:	Fr SE cor 2290Nly 720Wly		
Gissourcec:	mip		

Comments:	Not Reported		
Leasename:	So. Cal. Pet.	Wellnumber:	75-7
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000015962		

20
North
1/2 - 1 Mile

OIL_GAS **CAOG11000016110**

District nun:	4	Api number:	02913689
Blm well:	N	Redrill can:	Not Reported
Dryhole:	Y	Well status:	P
Operator name:	Shell Western Exploration & Production Inc.		
County name:	Kern	Fieldname:	Any Field
Area name:	Any Area	Section:	6
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2145 DF
Locationde:	Fr SW cor 3600N 1850E		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Baker	Wellnumber:	2
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000016110		

21
SSW
1/2 - 1 Mile

OIL_GAS **CAOG11000030784**

District nun:	4	Api number:	02925741
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	Chevron U.S.A. Inc.		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	18
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	Not Reported
Locationde:	Fr W/4 cor 298N 339E		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	Jasper-Hagood	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000030784		

Map ID
Direction
Distance

Database EDR ID Number

22
South **OIL_GAS** **CAOG11000016013**
1/2 - 1 Mile

District nun:	4	Api number:	02913591
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	18
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2522 DF
Locationde:	Fr NE cor 800S 4800W		
Gissourcec:	opr		
Comments:	Not Reported		
Leasename:	A.M.L.	Wellnumber:	12-18
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000016013		

23
SSE **OIL_GAS** **CAOG11000016017**
1/2 - 1 Mile

District nun:	4	Api number:	02913595
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	A
Operator name:	E & B Natural Resources Management Corporation		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	18
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2352 DF
Locationde:	Fr NE cor 175S 3100W		
Gissourcec:	opr		
Comments:	Not Reported		
Leasename:	A.M.L.	Wellnumber:	131-18
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	ADG
Site id:	CAOG11000016017		

24
ESE **OIL_GAS** **CAOG11000015958**
1/2 - 1 Mile

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

District nun:	4	Api number:	02913537
Blm well:	N	Redrill can:	Not Reported
Dryhole:	N	Well status:	P
Operator name:	CalResources LLC		
County name:	Kern	Fieldname:	Belgian Anticline
Area name:	Northwest	Section:	7
Township:	30S	Range:	21E
Base meridian:	MD	Elevation:	2419 KB
Locationde:	Fr NE cor 2412S 250W		
Gissourcec:	hud		
Comments:	Not Reported		
Leasename:	P. W.--McLennan	Wellnumber:	1
Epawell:	N	Hydraulica:	N
Confidenti:	N	Spuddate:	Not Reported
Welldeptha:	0		
Redrillfoo:	0		
Abandonedd:	Not Reported	Completion:	Not Reported
Directiona:	Unknown	Gissymbol:	PDH
Site id:	CAOG11000015958		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
93251	1	0

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 93251

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.700 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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Johe Ranch Mine
State Highway 58
Mc Kittrick, CA 93251

Inquiry Number: 4898470.3
April 04, 2017

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

04/04/17

Site Name:

Johe Ranch Mine
State Highway 58
Mc Kittrick, CA 93251
EDR Inquiry # 4898470.3

Client Name:

WZI Inc.
1717 28th Street
Bakersfield, CA 93301
Contact: Allen Waggoner

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by WZI Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 7B13-4A91-8816

PO # NA

Project Johe Ranch Mine Phase I

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 7B13-4A91-8816

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- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

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APPENDIX 2

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Phase I ESA Forms

Record of Conversation

Name Mr. David Cooper

Agency Property Owner

Address

Date 4/11/17

Phone number (661) 201-1568

In-person or phone interview In person

Mr. David Cooper, the property owner, was interviewed at the property on 4/11/17. Mr Cooper indicated that there was no electrical, sewage, or other utilities serving the property. With the exception of high voltage transmission lines that cross the SE corner of the property, no power lines or transformers are located on the site. No herbicides, pesticides, or other chemicals have been stored on the property. A valve box and water tank for cattle is located near the site entrance gate. The box received water from an offsite tank at the adjacent residence. It was connected to a steel water line for watering cattle. The valve box and water line are no longer in service. Mr. Cooper indicated that portions of property had historically been under cultivation with wheat, barley, and safflower. Land was now used for cattle grazing.

Property John Ranch Mine Site

Phase I ESA Forms

Street Directory Review

Address _____
North Subject Property

Undeveloped property, livestock corral

Address _____
East Subject Property

Undevelped property, high voltage power lines east of southeast corner

Environmental Concern? __ yes X no

Environmental Concern? __ yes X no

Address _____
West Subject Property

State Hwy. 58, undeveloped property

Address _____
South Subject Property

Ranch house with associated out buildings, State Hwy 58, Undeveloped property

Environmental Concern? __ yes X no

Environmental Concern? __ yes X no

Property Jake Ranch Mine Site

Phase I ESA Forms-1 *Aerial Photograph Review Summary*

Year of Photo 1937	Environmental Concern? ___ yes X no
Property	Primarily undeveloped, some cultivation in Southern part. State Hwy 58, dirt roads
North	Undeveloped, some cultivation
East	Undeveloped
South	Ranch house, Hwy. 58, some cultivation
West	Undeveloped, Hwy. 58
Surrounding Area	OK
Year of Photo 1942	Environmental Concern? ___ yes X no
Property	Primarily undeveloped, southern and eastern portions under cultivation.
North	Undeveloped, under cultivation
East	Undeveloped, under cultivation
South	Ranch house, Hwy 58, some cultivation
West	Undeveloped, Hwy 58, some cultivation
Surrounding Area	OK

Property John Ranch Mine Site

Phase I ESA Forms-1 *Aerial Photograph Review Summary*

Year of Photo 1953	Environmental Concern? ___ yes X no
Property	Mostly under cultivation, some undeveloped
North	Mostly under cultivation, some undeveloped
East	Under cultivation or undeveloped
South	Ranch house, Hwy 58, cultivated land
West	Under cultivation or undeveloped
Surrounding Area	OK
Year of Photo 1973	Environmental Concern? ___ yes X no
Property	Under cultivation or undeveloped
North	Under cultivation or undeveloped
East	Under cultivation or undeveloped
South	Ranch house, Hwy 58, cultivation
West	Under cultivation or undeveloped, Hwy 58
Surrounding Area	OK

Property John Ranch Mine Site

Phase I ESA Forms-1 *Aerial Photograph Review Summary*

Year of Photo	1984 — Environmental Concern? ___ yes X no
Property	Primarily undeveloped land
North	Cultivation or undeveloped
East	Primarily undeveloped, power lines
South	Ranch house, undeveloped land, power lines
West	Undeveloped land, Hwy 58
Surrounding Area	OK
Year of Photo	1994 — Environmental Concern? ___ yes X no
Property	Primarily undeveloped
North	Undeveloped, cultivated land
East	Primarily undeveloped, power lines
South	Ranch house, Hwy 58, some cultivation, power lines
West	Primarily undeveloped, Hwy 58
Surrounding Area	OK

Property John Ranch Mine Site

Phase I ESA Forms-1 *Aerial Photograph Review Summary*

Year of Photo 2005	Environmental Concern? ___ yes X no
Property	Undeveloped
North	Undeveloped, some cultivation
East	Undeveloped, power lines
South	Ranch house, Hwy 58, power lines
West	Undeveloped
Surrounding Area	OK
Year of Photo 2012	Environmental Concern? ___ yes X no
Property	Undeveloped
North	Undeveloped, some cultivation
East	Undeveloped, power lines
South	Ranch house, Hwy 58, powerlines, undeveloped land
West	Undeveloped
Surrounding Area	OK

Property John Ranch Mine Site

Phase I ESA Forms - 2 *Physical Data Regulatory Review*

Subject Property Name Johe Ranch Mine Site

Subject Property Address State Hwy 58, McKittrick, CA

Closest Intersections State Hwy 58 and Reward Rd.

Legal Description APN # 156-070-21 and portions of 156-070-02 and 156-070-10

Map Coordinate _____ Zoning A

USGS Quad Map McKittrick Summit Elevation above MSL _____

Section 7 Township 30 South Range 21 East

Terrain Description Rolling terrain with incised drainages

Watercourse One blue line drainage Direction/Distance NW area of site - drains SE

Approximate Depth to Groundwater No known groundwater

Subject property is listed on

yes	no	
☐	☒	NPL (National Priorities List)
☐	☒	CERCLIS
☐	☒	RCRA Notifiers List
☐	☒	SARA
☐	☒	LUST Remediation List
☐	☒	UST Registration List
☐	☒	ERNS Database

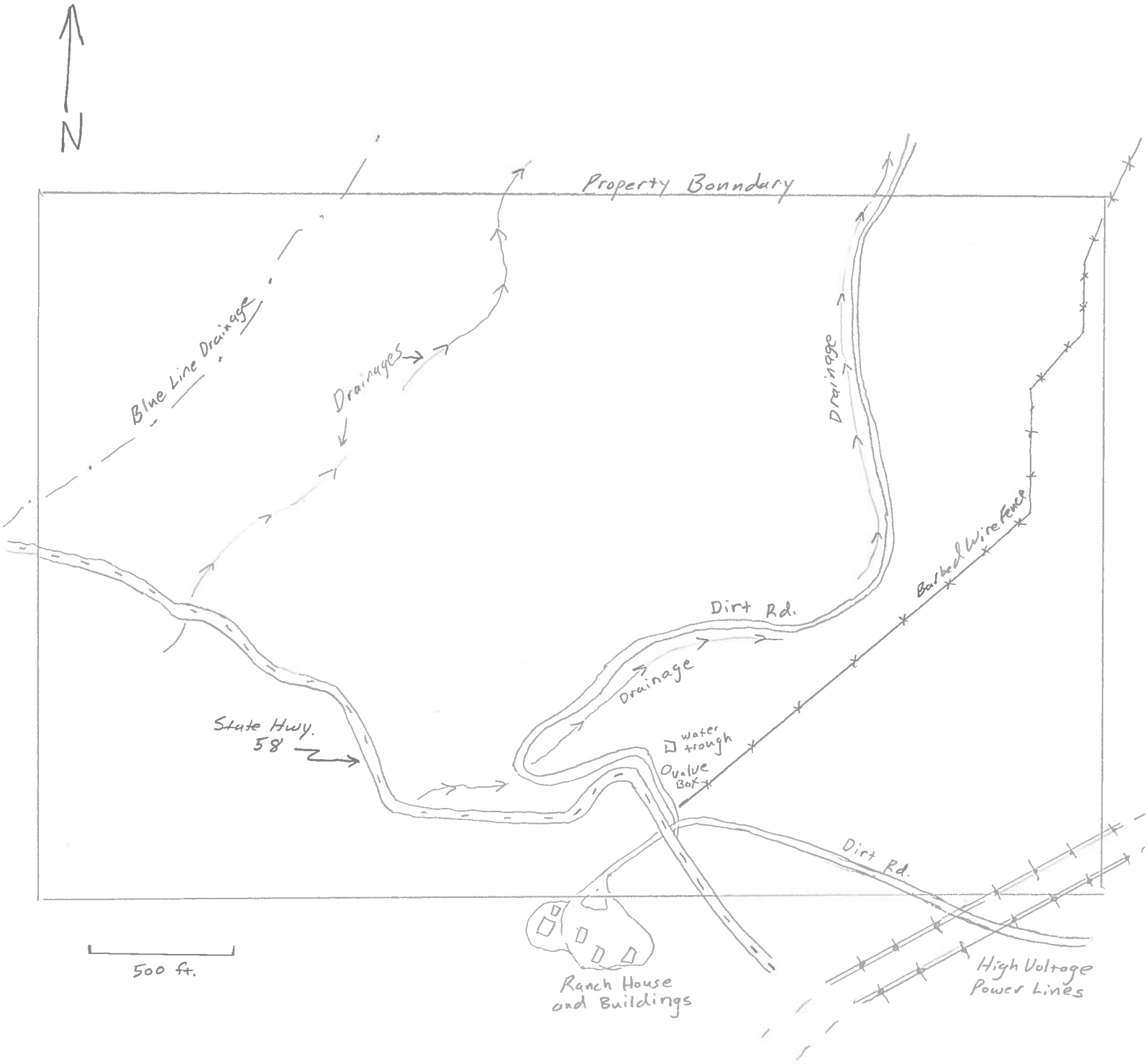
Age of Structure None

- ☐ Built after 1986; lead soldered plumbing banned
- ☐ Built after 1985; PCBs banned in commercial buildings
- ☐ Built after 1980; manufacture and distribution of new PCBs banned
- ☐ Built after 1978; asbestos-containing decorative materials banned
- ☐ Built after 1978; lead content in paint reduced to 0.06%
- ☐ Built after 1975; asbestos pipe lagging banned
- ☐ Built after 1973; lead content in paint reduced to 0.5%
- ☐ Built after 1973; sprayed-on friable asbestos banned

Property Johe Ranch Mine Site

Phase I ESA Forms - 2

Site Sketch



Property John Ranch Mine Site

Phase I ESA Forms - 3 *General Interior (E1527-8.2.2)*

On the interior of structures on the property, accessible common areas expected to be used by occupants or the public (such as lobbies, hallways, utility rooms, recreation areas, etc.), maintenance and repair areas, including boiler rooms, and a representative sample of occupant spaces, should be visually and physically observed. It is not necessary to look under floors, above ceilings, or behind walls.

Describe Methodology of Inspection (describe general order of inspection)

Traversed the site by vehicle and on foot. Recorded observations and took photos.

Limitations to Inspection (barriers, locked doors, etc.)

Entrance to property is gated, gate locked

Property John Ranch Mine Site

Phase I ESA Forms - 4 *Interior Observations (E1527-8.4.3)*

Identify and describe the means of heating and cooling for the building.

Heat system NA

Condition of equipment

Location

Insulation NA

Condition of insulation

Cooling system NA

Condition of equipment

Location

Insulation

Condition of insulation NA

Property John Ranch Mine Site

Phase I ESA Forms - 5 *Interior Observations (E1527-8.4.3)*

To the extent visually or physically observed describe the following.

Floor drains and sumps NA

Where

What

Potential substances into drain NA

Condition of drain or sump NA

Floor drains and sumps NA

Where

What

Potential substances into drain NA

Condition of drain or sump NA

Property John Ranch Mine Site

Phase I ESA Forms - 6 *Interior Observations (E1527-8.4.3)*

To the extent visually or physically observed describe the following.

Stains or corrosion on floors, walls, ceilings NA

Area

Where

What type of stain or corrosion NA

Source

Severity

Stains or corrosion on floors, walls, ceilings NA

Area

Where

What type of stain or corrosion NA

Source

Severity

Property Jobe Ranch Mine Site

(E1527-8.4.2.3)

Has the potential for hazardous substances been noted in the records review or interviews?

No

Note to the extent you can visually or physically observe the following.

Are hazardous substances used on the property? No

Types of hazardous substances None

Quantities of hazardous substances NA

Types of containers NA

Storage location NA

Condition NA

Property John Ranch Mine Site

(E1527-8.4.2.3)

Note to the extent you can visually or physically observe the following or identify from the records reviews.

Are hazardous substances stored on the property? NO

Types of hazardous substances stored on the property NA

Quantities of hazardous substances stored on property NA

Types of storage containers NA

Storage location NA

Condition of storage containers NA

Are hazardous substances disposed of from the property? No

Types of hazardous substances disposed of from property NA

Quantities of hazardous substances disposed of from property NA

Types of containers substance is disposed from NA

Where is substance disposed of NA

Condition of containers or disposal receptacle NA

Property John Ranch Mine Site

Hazardous Substances and Petroleum
Phase I ESA Forms - 9 Products in Connection with identified Uses

(E1527-8.4.2.3)

Note to the extent you can visually or physically observe the following or identify from the records reviews.

Are hazardous substances treated on the property? No

Types of hazardous substances treated NA

Quantities of hazardous substances used for treatment NA

Types of containers treated substance is stored in NA

Area on property treated with substances NA

Condition of storage containers NA

Are hazardous substances generated on the property? No

Types of hazardous substances generated NA

Quantities of hazardous substances generated NA

Types of containers used in substance generation NA

Area on property where substances are generated NA

Condition of containers NA

Property John Ranch Mine Site

Phase I ESA Forms - 10 General Exterior (E1527-8.4.2.3)

The periphery of the property shall be visually and physically observed, as well as the periphery of all structures on the property, and the property should be viewed from all adjacent public thoroughfares. If roads or paths with no apparent outlet are observed on the property, the use of the road or path should be identified to determine whether it was likely to have been used as an avenue for disposal of hazardous substances or petroleum products.

Date of Inspection 4/11/17 Time 10:00 am

Inspector Allen Waggoner

Weather Cloudy

Describe Methodology of Inspection (areas traversed, transects, etc.)

Met with owner, David Cooper, at site. Traversed site by vehicle and on foot. Took photos and recorded observations.

Limitations to Inspection (weather, barriers, etc.)

None

Property John Ranch Mine Site

Phase I ESA Forms - 11 Physical Conditions (E1527-8.4.1.6)

To the extent visually or physically observed, describe the physical conditions of the property.

Topography

Surrounding Area Rolling topography

Subject Property Rolling topography with incised drainages.

Surface Hydrology

Run-off (suspended or observed) None

Run-on (suspected or observed) None

Property John Ranch Mine Site

Generally describe the structures or improvements on the property.

Number of buildings/improvements on property None

Name NA

Number of stories NA

Approximate age NA

Approximate square footage NA

Number of occupant spaces NA

Name

Number of stories

Approximate age

Approximate square footage

Number of occupant spaces

Property Jake Ranch Mine Site

Identify the following.

Roads, streets, or public thoroughfares adjoining the property.

State Hwy 58 extends across the property — adjoins site on south and west sides.

Roads, streets, or parking facilities on the property.

State Hwy 58 extends across southwest portion of the property. Several dirt roads on the property.

Property Johe Ranch Mine Site

Phase I ESA Forms - 14 Utilities *(E1527-8.4.1.9 and 8.4.1.10)*

Identify the following to the extent visually and physically observed.

Source of potable water None

Sewage disposal None

Electric supply None

Solid waste disposal None

Condition of disposal receptacle, if on-site NA

Transformers on property? No

Identification number

Leaking?

Pad-or Pole-mounted?

Natural gas? None

Propane? No

Property Joe Ranch Mine Site

Phase I ESA Forms - 15 — Storage Tanks (E1527-8.4.2.4)

Has the potential for storage tanks been noted in the records review or interviews?

No

Note to the extent you visually or physically observed the following.

Above-ground storage tanks? None

Contents NA

Capacity NA

Age NA

Underground storage tanks? None

Reconciliation records or registration on-site? NA

Contents NA

Capacity NA

Age NA

Vent pipes NA

Pumps & fill pipes NA

Subsidence NA

Property Yohe Ranch Mine Site

To the extent visually or physically observed describe the following.

Odors None

Where noted NA

Describe odor NA

How strong NA

Source NA

Pools of liquid/sumps None

Where noted NA

Pool content NA

Size NA

Source NA

PCB-containing equipment (fluorescent light ballasts do not need to be noted) None

Where noted NA

What NA

Condition of equipment NA

Property John Ranch Mine Site

To the extent visually or physically observed describe the following.

Drums (not identified elsewhere) None

Where noted NA

Drum size NA

Drum condition NA

Drum content NA

Hazardous substance and petroleum containers (not identified elsewhere)

None

Where noted NA

Size of container NA

Container condition NA

Container content NA

Unidentified substance containers (not identified elsewhere)

None

Where noted NA

Size of container NA

Container condition NA

Container content NA

Property John Ranch Mine Site

To the extent visually or physically observed describe the following.

Pits, ponds, lagoons None

Where NA

Size or area NA

Contents NA

Origins NA

Stained soil or pavement None

Size or area NA

Where NA

Source of stain NA

Stressed Vegetation None

Size of area NA

Where NA

Source of stain NA

Evidence of soil contamination NA

Property John Ranch Mine Site

To the extent visually or physically observed describe the following.

Solid waste or trash dumping None

Extent NA

Materials observed NA

Waste water None

Content of waste water NA

Method of disposal NA

Septic System None

Location of leach field NA

Wells 4 abandoned oil/gas wells

Monitoring or water NA

Location On property

Owner of well

Age of well

Property Jahe Ranch Mine Site

Uses and Conditions
Current Uses of Property

(E1527-8.4.1.1)

Note current uses to the extent visually and physically observed.

Exterior Site (functional areas)

Undeveloped grazing land

Number of Buildings None

Building Use(s) N/A

Property John Ranch Mine Site

Has the potential for recognized environmental conditions been noted in the records review or interviews?

NO

Note indications of past uses of the property that are visually or physically observed.

(signs, dumping, abandoned buildings, equipment)

Dirt roads, cattle grazing

Property John Ranch Mine Site

Phase I ESA Forms - 22

(E1527-8.4.1.3 and 8.4.1.4)

North

Current Use Undeveloped grazing land, corral for cattle, dirt roads

Current condition OK

Has the potential for recognized environmental conditions been noted in the records review or interviews?

No

Note indications of past uses of the property that are visually or physically observed.
(signs, dumping, abandoned buildings, equipment)

None

East

Current Use Undeveloped grazing land, high voltage power lines.

Current condition OK

Has the potential for recognized environmental conditions been noted in the records review or interviews?

No

Note indications of past uses of the property that are visually or physically observed.
(signs, dumping, abandoned buildings, equipment)

None

Property John Ranch Mine Site

South

Current Use Ranch house and buildings, State Hwy 58, undeveloped grazing land.

Current condition OK

Has the potential for recognized environmental conditions been noted in the records review or interviews?

No

Note indications of past uses of the property that are visually or physically observed.
(signs, dumping, abandoned buildings, equipment)

None

West

Current Use Undeveloped grazing land, State Hwy 58

Current condition OK

Has the potential for recognized environmental conditions been noted in the records review or interviews?

No

Note indications of past uses of the property that are visually or physically observed.
(signs, dumping, abandoned buildings, equipment)

None

Property Jahe Ranch Mine Site

Uses and Conditions Current and General Pasts Uses of Surrounding Areas

(E1527-8.4.1.5)

To the extent that the general type of current or past uses (e.g., residential, commercial, industrial) of properties surrounding the property are visually or physically observed on the site visit or going to or from the property for the site visit, or are identified in the interviews or record review, they shall be noted by the environmental professional, and uses so identified shall be described in the report if they are likely to indicate recognized environmental conditions in connection with the property.

Current Uses

Surrounding properties primarily contain undeveloped grazing land. One residence and associated out buildings are located on the south side of State Hwy 58 to the south of the property

Has the potential for recognized environmental conditions been noted in the records review or interviews?

No

Note indications of past uses of the area that are visually or physically observed.

None

Property Jake Ranch Mine Site

Property _____

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APPENDIX 3

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FORM 159 (9-49)

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Taft, California

October 20, 1954

Mr Carl A Steiner Agent for
Union Oil Co of California Operator
2700 F Street
Bakersfield California

Dear Sir

Your report of abandonment of Well No. "Seaboard-Honolulu" 11-7, Sec. 7, T. 30 S, R. 21 E, B D B. & M., field, Kern County, dated September 3 1954, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

cc - C A Steiner
U S Geological Survey (2)
WHP/ARD

E. H. MUSSER
State Oil and Gas Supervisor

By G. S. Reiser
Deputy Supervisor

98081 4-54 11,200 SPO

FORM 159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Taft, California

July 23 1969

Mr. E H Jackson, Agent for
OIL WELL SERVICE CO (Contractor)
2300 Gibson
Bakersfield Calif

(029-37652)

STANLEY JOHNSON

Your report of abandonment of Well No. / "Lizbet Gilbert" 1,

Sec. 7, T. 30 S, R. 21 E, M D B. & M., Belgian Anticline field,

Kern County, dated May 3 1969, received May 7 1969,

has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

cc - The Harweld Co
USGS (2)
Conservation Committee-LA

F. E. KASLINE
State Oil and Gas Supervisor

ALL:fc
Bond dated 4/19/66
150b enc

By G. G. Peirce
Deputy Supervisor

24231-705 9-68 10M OSP

FORM 159

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Taft California

September 29 1965

Mr. W T Woodward
PO Box 325
Taft Calif
Agent for R B Watkins Operator

DEAR SIR:

Your report of abandonment of Well No. "Lynn" 1, Sec. 7, T. 30 S, R. 21 E, M D B. & M., Belgian Anticline field, Kern County, dated August 11 1965, received August 13 1965, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

OPEN TO INSPECTION

cc - R B Watkins Operator
Conservation Committee-LA
USGS (2)
EMA/mm
Bond No 3268957
dated 3-25-65
150b enc

E. R. MURRAY-AARON
State Oil and Gas Supervisor

By G. G. Rau
Deputy Supervisor

27538-705 7-64 10M OSP

FORM 159 (9-49)

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Taft California

December 1 1960

Mr. R S MacAlister
Box 999
Bakersfield California
Agent for Shell Oil Co

DEAR SIR:

Your report of abandonment of Well No. "Baker" 1,
Sec. 7, T. 30 S, R. 21 E, M D B. & M., - - - field,
Kern County, ~~dated~~ received October 6 1960, has been examined in conjunction with records filed in this office.

A review of the reports and records shows that the requirements of this Division, which are based on all information filed with it, have been fulfilled.

cc - Area Prod Manager
R S MacAlister
USGS (2)
Conservation Committee-LA

AL/ls

E. H. MUSSER
State Oil and Gas Supervisor

By G. G. Peirce
Deputy Supervisor

84442 9-58 10M SPO

APPENDIX 4

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Gated entrance to property off of State Hwy. 58, looking northwest near southern property boundary.

Valve box for abandoned water line and watering trough located adjacent to property entrance, looking northeast near southern property boudnary.





Barbed wire fence extending across subject property to the northwest from entrance gate, looking northwest.

APPENDIX 4



Subject property, looking east from western property boudnary.

Blue line drainage, looking northwest from western property boundary.





Abandoned steel water line previously utilized for watering cattle, looking northwest

APPENDIX 4



Equipment storage area near northern property boundary, looking east.

Subject property with equipment storage area, looking south near northeast property boundary





High voltage transmission lines extending across southeast property corner, looking northeast.

APPENDIX 4



Subject property, looking northwest from eastern property boundary.

Subject property, looking north from southern boundary



APPENDIX 4

Appendix H.2

Fuel and Oil Spill Contingency Plan

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WZI INC.

Johe Ranch Mine
Section 7, Township 30 South, Range 21 East
Kern County, CA

Fuel and Oil Spill Contingency Plan

December 2018

Submitted to:
GF Industries
122 North Harbor Blvd., #201
Fullerton, CA 92832

Prepared by:
WZI Inc.
1717 28th Street
Bakersfield, California 93301

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4.0 fuel delivery and transfer description 2
5.0 initial response action 2

EXHIBITS

Exhibit 1 Site Plan Map

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1.0 INTRODUCTION

The proposed Johe Ranch Mine site is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The property is identified by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 and contains approximately 331 acres. The 331 acre site is primarily occupied by undeveloped land which is proposed for mining of diatomite.

This Oil Spill Contingency Plan follows the general compliance elements of 40 CFR part 109 and describes the distribution of responsibilities and basic procedures for responding to an oil discharge and performing cleanup operations. The plan is intended meet the requirements of

2.0 DESCRIPTION

GF Industries, as operator, proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres within the 331 acre project site. Surface mining operations will be conducted from 6:00 am to 7:30 pm, Monday through Friday. Four employees will be the maximum number on site at any given time.

Equipment utilized for the mining operation will include the following:

- 2 rubber tired loaders,
- haul trucks,
- a water truck,
- a tire truck
- portable screening unit.

Prior to mining activities, between two and six inches of topsoil will be removed and stockpiled on site. The diatomaceous earth and overburden will then be excavated by a single loader pushing the material to an area adjacent to an access road within the active mining area, where it will be formed into small temporary stockpiles then loaded directly on to dump trucks. The location of load out areas within the active mine operation will vary based on the location of mining activity on any given day. The trucks will be weighed before leaving the site on a portable scale located near the blending site (screening area) and sent out for delivery and/or additional processing. If there is a special order of material requiring sizing other than the normal run-of-mine, a portable screening plant, such as, Extec S5 5X10, will be brought on-site during the special order period and then removed. Any material considered "overburden" or "waste" will be sold to Waste Management Inc. for use as absorbent or blended with higher grade material and sold to cement plants. Such material will be stockpiled within the active mining area on a temporary basis prior to being sold.

Mining equipment will be stored, maintained, and fueled at the blending and screening site located to the southeast of mining area one (**Figure 1**). Equipment maintained on site will include loaders, the water truck, the tire truck, and the portable screening unit. The haul trucks will not be fueled or maintained on the property.

Equipment fueling and maintenance will be conducted on an as-needed basis by service vehicles

that will not remain on site. Bulk diesel (approximately 100 gallons) will be off-loaded by means of a pump and hose between the truck and the mining equipment.

No hazardous materials or wastes will be generated or stored on the mine site.

3.0 FUEL AND OIL SPILL RESPONSE EQUIPMENT

As previously noted, the only hazardous material that will be on site is bulk diesel fuel which will be brought on site on an as needed basis to fuel equipment. Approximately 100 gallons of diesel will be brought to the site at any one time. The following inventory of spill response equipment will be maintained at the site.

1. Non-Steel scoop shovel
2. Empty drum

In addition, sorbent materials such as pads or pillows will be available to cleanup any spilled fuel. All spent sorbent material and liquid or solid waste will be contained in a labeled and dated 55 gallon steel drum and disposed of in accordance with state and federal regulations.

4.0 FUEL DELIVERY AND TRANSFER DESCRIPTION

The fuel/oil will be trucked from off site to the Johe Ranch Mine. Bulk diesel (approx. 100 Gal.) will be off-loaded by means of a pump and hose between the truck and the Mining Equipment.

5.0 INITIAL RESPONSE ACTION

Upon discovery of a spill, the first person on the scene will:

- Protect the safety and lives of anyone in the spill area
- Isolate or remove any potential ignition source if safe and possible
- Locate source or cause of spill and stop flow (do not take unnecessary risks)
- Assess the likely size, extent and condition of spill
- Notify Supervisor
- Control access to area
- Contain spread of spill and/or shovel contaminated material into spill drum
- Transfer recovered waste to an approved waste dump

The spill response equipment will be maintained at the blending and screening site where equipment fueling will be conducted.

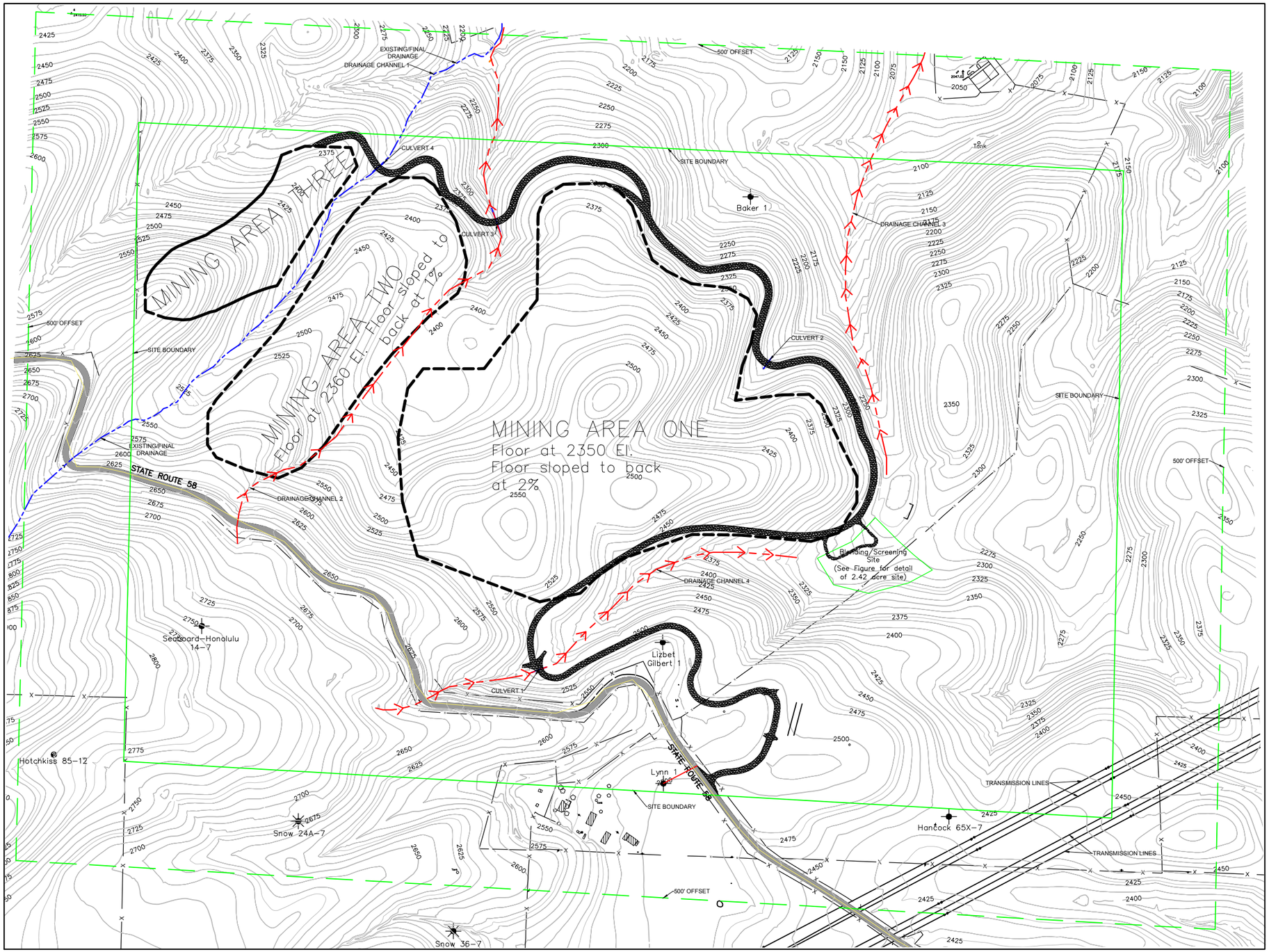
California state law requires the notification of the California Office of Emergency Services for any significant release or threatened release of a hazardous substance if it poses a threat to public health or the environment. Due to the small quantity of diesel fuel that will be on site and the fact that the fuel will only be present temporarily on an as needed basis, the potential for a significant spill/release at the site is considered very small. In the event that a significant spill does occur, the following notifications will be made as required:

- California Office of Emergency Services
  1 (800) 852-7550 or (916) 845-8911
- Kern County Public Health Services Dept., Environmental Health Division
  (661) 862-8740 or (661) 549-9927 for hazardous materials emergency

Additional GF Industries notifications:

- Mr. David Cooper
  (661) 2011568
- Mr. Steve Gentile
  G F Industries
  122 N. Harbor Blvd. #201
  Fullerton, CA 92832
  (714) 525 8816

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LEGEND

- 100 — EXISTING GROUND CONTOUR
- EXISTING FENCE LINE
- 500' PROJECT BOUNDARY OFFSET
- DISTURBANCE BOUNDARY
- PROJECT BOUNDARY
- EXISTING RANCH ROAD
- PROPOSED ACCESS ROAD
- INTERMITTENT DRAINAGE CHANNEL
- "BLUE–LINE" WATERCOURSE PER USGS MAP
- ACTIVE DRY GAS WELL
- PLUGGED OIL & GAS WELL

N

500 250 0 500

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE - FUEL AND OIL SPILL CONTINGENCY PLAN
SITE MAP

DATE:	JOB NO.:	EXHIBIT:
1/19		1

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Appendix I

Hydrology Study

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Hydrology Study

for

Johe Ranch Mine,

County of Kern, California

July 29, 2015

Revised April 24, 2019

Project No. 15-654

Prepared for:

GF Industries



Submitted by: Matthew K. VoVilla 4/24/19

Matthew K. VoVilla, R.C.E. 43130 ***Date***

***LAV//Pinnacle* Engineering**
12418 Rosedale Hwy., Suite A
Bakersfield, CA 93312
(661) 869-0184

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Appendix "B": Hydrology Calculations

Appendix "C": Culvert & Rip-Rap Calculations

1.0 INTRODUCTION

This Hydrology Study has been prepared as a component of the Reclamation Plan for the Johe Ranch Quarry, hereinafter sometimes referred to as "Project" and "Site".

This study has been prepared in accordance with requirements of the California Environmental Quality Act, (CEQA), and the requirements of the County of Kern.

1.1 Purpose and Scope of Study

This purpose of this study is twofold: 1) To identify possible or potential impacts from storm water runoff due to development and operations of the mine; and 2) To determine appropriate measures to mitigate these impacts to a level that is less than significant.

If storm water runoff is not mitigated, potential impacts include excessive erosion, loss of vegetation, sedimentation of downstream watercourses, alteration of watershed boundaries, and non-containment of pollutants from equipment. All of these potentially affect water quality, and the ecology of the area. Unmitigated, these potential impacts extend well beyond the limits of the proposed project.

Implementation of mitigation measures and Best Management Practices, (BMPs) also benefit the proposed project by minimizing long-term maintenance costs. As an example, poor grading practices or improper use of erosion control measures will result in greater damage after a storm event, requiring higher maintenance expenditures.

1.2 Project Description

The Johe Ranch Mine project is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The property is identified by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 and contains approximately 331 acres. A location map is included as Exhibit "A", in Appendix A herein.

A Conditional Use Permit (CUP) was requested for a new surface mining operation and development of a reclamation plan, on the project site which is approximately 331 acres in size. The applicant proposes to mine diatomite at the site. Within the approximate 331-acre project site, disturbance would be confined to 93.67 acres. Approximately 1.4 acres of the proposed 93.67-acre disturbance area has already been disturbed as a result of existing roads. On May 19, 2016, the applicant, Diatom, LLC submitted an application for a new surface mining and reclamation plan (SMARA). In correspondence of February 9, 2017, the application was deemed complete by the Kern County Planning and Natural Resources Department

The mine excavations are proposed to drain internally, and the areas of cut are to be surrounded by an earth berm. Approximately 2 miles of mine access and haul roads will be constructed to facilitate extraction of diatomite.

Culverts are proposed at four locations where haul roads cross the Project's ephemeral drainage courses. Exhibit "F" herein, are plans for the mine access and haul roads, and show proposed culvert locations, culvert crossing details, road down-drains, and storm water Best Management Practices (BMP's). Storm water BMP's and drainage improvements are thoroughly discussed in Section 5.0, later in this report. The storm water BMP plan, along with re-vegetation plans and specifications, are considered the erosion control plan.

Topsoil will be removed from the areas of proposed excavation, and stockpiled, to be ultimately re-used for re-vegetation of disturbed areas. Topsoil stockpile locations are shown on Exhibits "B" and "F".

1.2.1 Site Geology/Hydrogeology

The subject property is located in the western area of Kern County within the foothills of the Temblor Range. The majority of the property is underlain by marine sediments consisting of diatomite of the Miocene age Monterey Formation which outcrops throughout much of western Kern County. These deposits trend northwest, are moderately to tightly folded and locally faulted. The diatomite is overlain by a small area of Quaternary age non-marine sediments in the northwestern portion of the property which are identified as landslide deposits. The site is located to the west of the San Joaquin Valley Groundwater Basin within outcrops of the Miocene diatomite of the Monterey Formation. There is no known groundwater at the site and no water wells have been drilled on the property.

1.2.2 Proposed Mining Operation

GF Industries, as operator, proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres within the 331-acre project site. Surface mining operations will be conducted from 6:00 am to 7:30 pm, Monday through Friday. Four employees will be the maximum number on site at any given time.

Equipment utilized for the mining operation will include rubber-tired loaders, haul trucks, a water truck, a tire truck, and a portable screening unit. Prior to mining activities, between two and six inches of topsoil will be removed and stockpiled on site. The diatomaceous earth and overburden will then be excavated by a single loader pushing the material to an area adjacent to an access road within the active mining area, where it will be formed into small temporary stockpiles then loaded directly on to dump trucks. The location of load out areas within the active mine operation will vary based on the location of mining activity on any given day. The trucks will be weighed before leaving the site on a portable scale located near the blending site (screening area) and sent out for delivery and/or additional processing. If there is a special order of material requiring sizing other than the normal run-of-mine, a portable screening plant, such as, Extec S5 5X10, will be brought on-site during the special-order period and then removed. Any material considered "overburden" or "waste" will be sold to Waste Management Inc. for use as absorbent or blended with higher grade material and sold to cement plants. Such material will be stockpiled within the active mining area on a temporary basis prior to being sold.

Mining will be conducted within three mine areas at the site. Exhibit "B" herein shows the natural topographical contours via an aerial survey, as well as the Project Site Plan, and the proposed contours after mining operations have ceased. As proposed, no more than twenty (20) acres are planned to be disturbed at any given time. Maximum anticipated depth of mining will be 162 feet in mine area 1, 125 feet in mine area 2, and 40 feet in mine area 3. Maximum operational slopes will be 2:1 (horizontal:vertical). Maximum annual production is anticipated to be 330,000 tons of diatomaceous earth and 20,000 tons of overburden material. It is anticipated that a total of 6,600,000 tons of diatomaceous earth and 400,000 tons of overburden material will be removed during the 20-year life of the mining operation.

Produced water from adjacent oil field operations will be utilized for dust control during onsite road grading and mining operations. Prior to application of produced water from oilfield operations on the project site, all necessary permits and approvals will be obtained from the California Regional Water Quality Control Board, Central Valley Region. Upon completion of mining in each of the mining areas, potable water will be utilized for dust control during reclamation activities; this water will be obtained from the West Kern Water District, in accordance with a will serve letter, from a nearby water supply line, and will be conveyed to the project site in a water truck.

1.2.3 Reclamation

The project site will be reclaimed to its current use as grazing land. The 1.4 acres of existing road access disturbance will not be reclaimed, as these roads will be needed in conjunction with the grazing operations after the site has been deemed fully reclaimed. As such, the reclamation plan will encompass 92.27 acres (93.67 total acres of disturbance minus 1.4 acres of existing road access disturbance).

In accordance with the Reclamation plan, disturbed areas will be re-seeded with an approved native mix, and protected from erosion until natural germination occurs. A Vegetation Baseline Survey Data was performed by Pruett and Associates in 2008 utilizing square meter plot methods and pedestrian transects to estimate plant species richness and vegetation cover. In accordance with SMARA, a test plot will be employed to confirm the adequacy of the reclamation plan. The proposed roadways, slopes and pit floors will be decompacted by ripping to depths of between 6 and 18 inches, followed by the site being disked and left in a rough condition prior to seeding. As proposed, less than 6 inches of top soil will be placed in reclamation areas. Grasses and forbs will be planted and/or seeded between October and December to coincide with the onset of winter rains in the vicinity of the project site. The seed mix will be tacked into the growth medium with a sheep's foot or other implement to help germination and prevent blowing/washing away.

Maximum final reclaimed mining area slopes will be 3:1 (horizontal:vertical). The site is currently used as grazing land and will be returned to that standard. A grazing standard of 0.25 AUM per acre for two consecutive years shall be achieved.

1.2.1 County of Kern General Plan Land Use Designation and Zoning

The Kern County General Plan designates the Land Use as 8.3/2.4 "Extensive Agriculture" with a Steep Slope Overlay; and 8.4/2.2 "Mineral and Petroleum" with a Landslide overlay. The Zoning for the entirety of the project is "A" - Agriculture. The proposed mine is compatible with said General Plan Land Use designation and Zoning.

Existing Land Use and Zoning of adjacent and surrounding areas to the proposed mine are also designated for agricultural use.

2.0 EXISTING CONDITIONS

The site consists primarily of rolling topography with some steep slopes and incised drainages. The elevation of the property varies from approximately 2,800 feet above sea level near the southwestern corner to approximately 2,075 feet above sea level near the northeast corner. Historically, the site has been used for farming, grazing, and some gas production. Historically, the vicinity has been used for farming, grazing, some oil and gas production, and diatomaceous earth mining. There are two approved surface mining operations located in the vicinity (State Mine ID #91-15-0036 and 91-15-0038). These mining operations are located approximately 3.5 miles and 4 miles to the east. There is a residence located to the south of the project site. According to the California Department of Conservation, Department of Oil, Gas and Geothermal Resources (DOGGR), four abandoned gas wells are located on the 331 acre project site. The wells are located outside the proposed disturbance areas.

The Project site is located entirely within the Tulare-Buena Vista Lakes watershed. A field reconnaissance of the site revealed a few defined watercourses through the site, all of which are ephemeral. These watercourses can be seen on the USGS Quadrangle Map ***McKittrick Summit***, as well as the Site's aerial topographic survey. The aerial "topo" has been included herein as Exhibit "B". No water, flowing or stagnate, was observed during field the field reconnaissance of May 2015.

The local watershed that contributes storm water to the Site, or tributary area, comprises roughly 196 acres. The tributary watershed, is roughly 3/4 of a mile at its greatest dimension, and exhibits an elevation change of about 870-feet. The highest point of the watershed (off-site) is about 3,100 feet above mean sea level. Gradients within the watershed range from 10 percent up to 50 percent in some areas. Gradients of the ephemeral watercourses through the Project range from 10 to 15 percent.

The following photos show the site as it exists at the time of this writing. Photo locations are shown on Exhibits "B" and "C".



Photo 1: Facing North at the Location of Proposed Culvert No. 1.



Photo 2: Taken from the Southwest corner of the Site, facing Northeast.

Exhibit "C", the Hydrologic Study Map, included in Appendix "A" herein, is the USGS Quadrangle Map, with the Project boundary and proposed access roads superimposed. This map also shows terrain and geographic features.

In a normal year, the project area receives approximately 6.5-inches of rainfall. According to data from the National Oceanic and Atmospheric Administration (NOAA), rainfall for a given storm event, such as the 100-year 24-hour storm, is consistent over the entire watershed. This is due to the relative small size of the localized watershed. According to NOAA data, the 100-year, 24-hour rainfall is 4.04 inches. The 100-year event can be described as a storm of such magnitude that it has a one percent chance of being equaled or exceeded in any given year. Similarly, the 2-year event has a 50 percent chance of occurring in any given year. The 2-year 24-hour rainfall is expected to be 1.37-inches over the watershed.

2.1 Flood Zones

The Federal Emergency Management Agency (FEMA) has classified Flood Zones for the Project. FEMA's Flood Insurance Rate Map (FIRM), Panel 2150E of Community Panel Number 06029C, dated September 2008, has been superimposed over the Project boundary on Exhibit "D" herein. Exhibit "D" shows the project site boundaries and designated flood zone areas.

As shown on Exhibit "D", the entire project site is designated as Flood Zone "X." Flood Zone "X" is defined as an area of minimal flood hazard, usually depicted on FIRM's as above the 500-year flood level.

2.2 Soils

Specific Soil Groups have been shown in Table 1 herein. Soil groups were taken from the published surveys by the National Resources Conservation Service (NRCS): Soils Survey of Kern County, Northwestern Part, California, 1981. The NRCS is a branch of the United States Department of Agriculture. A majority of the soils found on the site fall into hydrologic group "B", with a small percentage within the Project's boundary falling into group "C". NRCS detailed soil survey maps data, including Hydrologic Soil Group, has been shown in the following Table 1.

(Continued)

Table 1: Specific Soils Groups

(1)	(2)	(3)
Soil Map Unit (Per USDA Soil Conservation Service)	Soil Map Description	Hydrologic Soils Group
104	Aramburu very shaly clay loam, 15 to 30 percent slopes	C
193	Medi-Hillbrick-Kilmer association, 9 to 30 percent slopes	B
220	Pottinger very shaly clay loam, 2 to 9 percent slopes	C
227	Reward shaly loam, 15 to 30 percent slopes	B
228	Reward channery loam, 30 to 50 percent slopes	B

1) Soil information taken from USDA Soil Conservation Service National Cooperative Web Soil Survey - Kern County (Southeastern Part)

3.0 REGULATORY FRAMEWORK

3.1 Clean Water Act

The Federal Clean Water Act (CWA) 33 U.S.C 1251-1387 has its origin in 1899 with the Rivers and Harbor Act. Since that time, the CWA has evolved into its present form via numerous amendments; notably, the Federal Water Pollution Control Act of 1972 (P.L. 92-217), the Clean Water Act of 1977 (P.L. 95-217), and the Water Quality Act of 1987 (P.L. 100-4). The Clean Water Act is administered by the Federal Environmental Protection Agency, which has delegated authority and enforcement to some states, including California.

The stated objective of the Clean Water Act is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” Except within the provisions of the Clean Water Act, discharge of pollutants into any navigable waters of the United States is prohibited. Pollutants have been broadly defined to include anything introduced from the outside world, or an increase in a material that is already present. This includes erosion of natural material into the watershed in excess of that which naturally occurs.

The jurisdiction of the Clean Water Act is based on Congress’s authority to protect the flow if interstate commerce. One component of interstate commerce is protection of navigable waters of the United States. The Clean Water Act defines “Navigable Waters” as “waters of the United States.” Under the regulation of the Environmental Protection Agency and U.S. Army Corps of Engineers, “waters of the United States”, includes the following:

1. All waters that are currently used, were used in the past, or may be susceptible to use in the future, in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;

2. All interstate waters, including interstate "wetlands";

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds of which the use, degradation, or destruction would affect or could affect interstate or foreign commerce;

4. All impoundments of waters otherwise defined as waters of the United States under this definition;

5. Tributaries of waters identified in 1–4 of this definition;

6. The territorial seas; and

7. "Wetlands" adjacent to waters identified in 1–6 of this definition.

3.2 Porter-Cologne Water Quality Control Act (California Water Code Section 13000 Et Seq.)

Water quality in California is further protected under the Porter-Cologne Water Quality Control Act. This law assigns responsibility for protection of water quality to the State Water Resources Control Board (SWRCB). The SWRCB is divided into nine statewide Regional Water Quality Control Boards (RWQCBs), which enforce water quality standards. The project site falls within the jurisdiction of the Central Valley Regional Water Quality Control Board, Fresno Office.

Under the California Porter-Cologne Water Quality Control Act, the SWRCB has released a legal memorandum confirming the State's jurisdiction over isolated wetlands. Said memorandum has indicated generally that discharges to "Waters of the State" are subject to State Regulation. "Waters of the State" have been defined under State law to mean any surface water, groundwater, or saline water, within the State's boundary. As a result, the SWRCB's regulates discharges to "Waters of the State" and isolated waters similarly to waters of the United States. Again, for federally non-jurisdictional waters, regulation is under the authority of Porter-Cologne rather than the Clean Water Act.

3.3 Permitting and Compliance for the Clean Water Act

The Clean Water Act (CWA) contains a broad range of tools, to meet the statutory objectives, including the following:

a. ***Section 301*** of the Clean Water Act prohibits discharges of pollutants, except as provided by the CWA.

b. ***Section 401*** of the Clean Water Act requires any activity, which may result in any discharge into navigable water, to provide certification to the appropriate State Agency, that any such discharge will comply with the applicable provisions of the Clean Water Act. In the case of

California, the enforcing agency is the Regional Water Quality Control Board.

c. ***Section 402*** of the Clean Water Act established a framework for regulating municipal and industrial discharges of storm water into waters of the United States under the National Pollution Discharge Elimination System (NPDES) permit program. The latest update to the NPDES program, (referred to as Phase II rule – effective December 8, 1999), requires permitting for construction activity that disturbs land greater than or equal to one acre.

   The Federal Regulations for the NPDES process allows two permitting options for storm water discharges (Individual and General Permits). However, SWRCB has opted to acquire one statewide General Permit (NPDES No. CAS000002) to cover all construction activity in the State of California, except Tribal Lands, projects by the California Department of Transportation, and the Lake Tahoe Hydrologic Unit. These exceptions are regulated under separate permits.

   The State Water Resources Control Board Has issued Water Quality Order 99-08-DWQ and ensures that coverage under the General Construction Storm Water Permit is obtained thru submittal of appropriate Permit Registration Documents (NOI, SWPPP, etc.) to the Regional Water Quality Control Board.

The project site itself is covered under the State's General Permit (provided the provisions of the permit are followed).

The State of California General Permit was issued with the requirement that all construction activity, which disturbs one or more acres, is subject to the following requirements:

1. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must specify BMPs to prevent construction pollutants from contacting storm water, and keeping all products of erosion from moving off site into receiving waters.
2. Eliminate or reduce non-storm water discharges to storm sewer systems and other waters of the United States.
3. Perform inspections of BMPs.
4. Prior to commencement of grading or other land disturbance, the Landowner must provide notification to the State Water Resources Control Board. This obligation is met when the Landowner files a "Notice of Intent" (NOI), with the SWRCB, and pays the appropriate fee. The NOI is a mechanism to establish responsible parties, dischargers, and scope of the proposed operations.

d. ***Section 404*** of the Clean Water Act requires a permit for the discharge or placement of dredge or fill material within "jurisdictional waters," or waters of the United States. This permit is issued by the United States Army Corps of Engineers (USACE).

However, under the California Porter-Cologne Water Quality Control Act, the SWRCB has released a legal memorandum confirming the State's jurisdiction over isolated wetlands. Said memorandum has indicated generally that discharges to "Waters of the State" are subject to State Regulation. "Waters of the State" have been defined under State law to mean any surface water, groundwater, or saline water, within the State's boundary. As a result, the SWRCB regulates

discharges to "Waters of the State" and isolated waters similarly to waters of the United States. Again, for federally non-jurisdictional waters, regulation is under the authority of Porter-Cologne rather than the Clean Water Act.

In effect, ***the Project must comply with will all the requirements of the NPDES permitting process, including noticing, preparation and implementation of a storm water pollution prevention plan, and establishing a monitoring program.***

3.4 Review Authority (with respect to drainage and hydrology)

1. **The State of California Office of Mine Reclamation (OMR)** will review the mining plan for the site, including all grading, excavation, construction of access roads, and reclamation. Among other things, reclamation includes erosion and sedimentation control, slope stabilization, and re-vegetation. The reclamation process is typically an on-going operation throughout the life of the mining project.

2. **The County of Kern, Department of Planning and Development Services** will review drainage improvements, including hydrology and hydraulic calculations, as well as Best Management Practices (BMP's) for storm water mitigation, erosion and sedimentation control. Included in this process is review of culverts and watercourse crossings for haul roads, and all associated calculations.

   As indicated in item 1 above, review of grading and excavation operations for the mines falls under the purview of the OMR, and thus review of grading, and issuance of a grading permit will not fall under the authority of the County of Kern.

3. **The State of California Department of Fish and Wildlife** may review the Project in accordance with the requirements of Section 1600 of the State Fish and Game Code. Said Section 1600 applies to all perennial, intermittent and ephemeral rivers, streams and lakes in the State. CDFW will determine if a Lake or Streambed Alteration Agreement will be needed for the project refinement.

4. **The State Water Resources Control Board** will review a Storm Water Pollution Prevention Plan for the Project, and will require the Project to obtain a Waste Discharge Identification Number or WDID number.

4.0 HYDROLOGY – SURFACE WATER

Management of storm water requires quantifying the volume and rate of run-off through hydrologic calculations. The calculations herein determine storm water run-off for the 10-year, 50 year, and 100-year storm events for tributary area to the Project. Quantification of these flows permit sizing of drainage appurtenances as well as other storm water management measures.

It should be noted that the State Office of Mining and Reclamation has indicated a minimum design storm of 25 year – 1 hour. As a conservative measure, the 50-year 24 hour storm is used

herein for development of mitigation, culvert and rip-rap sizing.

Exhibit "C" in Appendix "A" of this report shows tributary areas for the Project.

As discussed, the Project has several defined watercourses through the site.

4.1 Methods and Findings

4.1.1 Hydrology: The ***Synthetic Unit Hydrograph Method***, **as prescribed in the Kern County Hydrology Manual (KCHM)**, was used to determine storm water flows for the 10-year, 50 year and 100-Year events. Computer Software: CIVILCADD/CIVILDESIGN, 2004, Version 7.0, was used to facilitate extensive calculations.

Appendix "B" herein includes determination of Cn using Figure C-2 from the Kern County Hydrology Manual.

Computer printouts in Appendix "B" include rainfall for the 2-year 6-hour, the 2-year 24-hour, the 100-year 6-hour, and the 100-year 24-hour events. Rainfall information was taken from data provided by the NOAA Atlas 14, Volume 6, Version 2.0 for California, and can be accessed via the NOAA's website (http://hdsc.nws.noaa.gov/hdsc/pfds/). Precipitation-frequency data used for the watershed can be found in Appendix "B", herein.

Table 2: Precipitation Data

	Centroid Coordinates		Precipitation Frequency (inches)			
	Longitude	Latitude	2yr-6hr Storm Event	2yr-24hr Storm Event	100yr-6hr Storm Event	100yr-24hr Storm Event
Tributary to Project Site	-119.7706°	35.3318°	0.816	1.37	2.34	4.04

Notes:
1) Precipitation data is taken from NOAA Atlas 14, Volume 6, Version 2.0 for California.

It should be noted that the State of California Office of Mining and Reclamation (OMR), has required drainage improvements be designed to mitigate a 25-year, 1 hour storm. Again, as a more conservative measure, and due to the difficulty in modifying computer software for the stated design storm, a 50 year - 24 hour storm was used to size all drainage improvements, including watercourse crossings. The following Table 3 shows the calculated storm water generated from the 50 -year events, using the methods previously discussed.

Table 3: Summary of Hydrology

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Drainage Area	Description	Tributary Area (acres)	Length - Drainage Course (ft)	Length - Centriod (ft)	Elev Change (ft)	Curve Number (Cn)	50-Year Event Q50 (cfs)	Total Runoff Volume (af)
A	Existing (Undeveloped)	8.4	1,240	605	270	69	18	0.88
	Proposed Mine 3					86	21	1.61
B	Culvert 4	52	4,130	1,830	770	69	82	5.41
C	Existing (Undeveloped)	34	3,425	1,790	870	69	53	3.54
	Proposed Mine 2					79	58	5.16
D	Culvert 3	10	2,225	1,305	405	69	19	1.04
E	Existing (Undeveloped)	70	2,990	1,955	405	69	109	7.29
	Proposed Mine 3					83	125	12.18
F	Culvert 2	20	2,150	1,110	332	69	40	2.08
G	Culvert 1	1.0	215	120	55	69	2.8	0.10

4.2 Storm Water Retention and Post Construction Water Balance

Although the various agencies may have slightly different criteria for the design storm, all typically require any project to retain the differential in total storm water runoff between developed conditions, and pre-project or undeveloped conditions. The County of Kern Standards typically require the "10-Year, 5-day" storm to calculate the total storm water runoff and size retention basins. In this case, under "developed" conditions, there is no increase in "hardscape" such as roofs, concrete, or pavement. Since the soil type is consistent through-out the site, it can be argued that the proposed mine would not result in any change from historical runoff. However, temporary removal of vegetation and modification of the natural terrain to be more hydraulically efficient, will reduce infiltration, and increase runoff. For the 50-year, 24 hour storm, the previous Table 3 provides the total runoff, or area "under" the hydrograph, for both "developed" and "undeveloped" conditions. As discussed in the following section, the differential in total storm water runoff between "developed" and "undeveloped" conditions, should be retained.

5.0 MITIGATION

5.1 Site Design

The following design recommendations do not preclude other options that achieve the same mitigation objectives. However, the following are minimum recommended measures to effectively mitigate the impacts of storm water.

5.2 Storm Water Retention

To remediate any increase in storm water runoff, the mine is proposed to be excavated such that mine pits drain "inward" or internally. In effect, the mine will be graded to store more storm water than the differential between "undeveloped" and "developed" conditions. Additionally, a berm will be constructed around the perimeter of the mine excavations. The berm and the mine pits will also function as sediment traps. The berms will also function as a broad-crested weir: In the event of any overflow, storm water will be released in the form of low velocity, minimally erosive sheet flow. Additionally, the mine pit along with berming, will serve to trap the majority of sediments in the storm water flow.

As discussed, the previous Table 3 provides the difference in total storm water runoff between "undeveloped" and "developed" conditions. Similarly, the following Table 4 reiterates said differential, and for comparison provides the retention volume provided for each mine pit. As indicated on the following table, the retention volume provided in each mine pit far exceeds the run-off differential between "developed" and "undeveloped" conditions.

(Continued)

Table 4: "Pre" and "Post" Development Storm Water Runoff Volumes

(1)	(2)	(3)
Item	Description	Total Runoff Volume (50yr Storm Event) (af)
Mine Area 1	Existing (Undeveloped)	7.3
	Proposed (Developed)	12.2
	Volume Differential – Mine 1:	4.9
	Retention Volume Provided:	290.0
Mine Area 2	Existing (Undeveloped)	3.5
	Proposed (Developed)	5.2
	Volume Differential – Mine 2:	1.6
	Retention Volume Provided:	14.3
Mine Area 3	Existing (Undeveloped)	0.9
	Proposed (Developed)	1.6
	Volume Differential – Mine 3:	0.7
	Retention Volume Provided:	2.1

5.3 Water Course Crossings

As discussed earlier, all watercourses in the vicinity of the Project are ephemeral. Additionally, as shown on Exhibit "B" herein, mine pits are not proposed within any naturally defined drainage courses. Although this situation can be mitigated, avoiding natural drainage courses is far less problematic, and strongly recommended.

However, as part of this project, mine haul and access roads must traverse four defined watercourses. These watercourse crossings should be improved to receive and discharge storm water flow without increasing erosive potential, or adding undesirable components to the storm flow. This is achieved through proper engineering and construction, to include the following: The crossing or culvert should be perpendicular to the watercourse. Culverts should be sized and sloped to convey the design storm without flowing under pressure. The culvert should also be sized to minimize velocity, with rip-rap armoring at inlets and outlets. Rip-rap should also be used to armor the natural channel downstream from the outlet to a point where the flow has been returned to its natural velocity. Rock rip rap should be sized sufficiently such that it will not be displaced by the design flow, or flow from the culvert outlet. And additionally, culverts should have adequate bedding, compacted backfill, and cover, to withstand the wheel-loads from vehicles used in the mining operation.

Table 5, in the following, provides recommended sizes of culvert pipes, rip-rap armoring, and pipe hydraulics. Supporting calculations for Table 5 are included in Appendix "C" of this report. It should be noted that all hydraulic calculations were based on the properties of corrugated metal pipe. This should preclude the use of an approved plastic pipe such as High Density Polyethylene (HDPE).

Table 5: Summary of Culverts & Rip-Rap Sizing

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Culvert No.	Pipe Size (in)	Pipe Slope (%)	Pipe Flow 50-year (cfs)	Normal Depth (In)	Critical Depth (In)	Velocity Normal Depth (ft/s)	Velocity Critical Depth (ft/s)	Required Rip-Rap Size (D_{50} -in)	Provided Rip-Rap Size (D_{50} -in)	Rip-Rap Apron (L'xW'XT')
1	42	1.0	40.0	26.7	23.6	6.2	7.2	4.4	6.5	14x20x1
2	18	1.5	2.8	7.9	7.6	3.7	3.9	0.1	6.5	6x9x1
3	36	1.0	19.0	18.6	16.8	5.2	5.9	2.3	6.5	12x17x1
4	(1) 60	1	82.0	32.8	30.8	7.5	8.1	4.9	6.5	20x28x1
4 (Optional)	(2) 42	1	82.0	27.3	23.9	6.2	7.3	(Same as above)		

5.4 Mine Haul and Access Roads

As shown on Exhibit F, herein, proposed mine and haul roads are proposed to be out-sloped, with a 3 foot-plus high berm on the "downslope" side. As is shown on Exhibit F, storm-water captured within the road section by said berm, should be released downslope via engineered down-drains, and restored to as close to a natural condition as possible. The challenge with down-drains is that storm water is released as a point discharge. This must be mitigated. Rip-rap pads at the down-drain discharge points are recommended to re-spread the flow, dissipate energy, and lower velocity to a minimally erosive state.

An additional component of the haul roads should include earth swales, or a combination of berm and swales, at the top of the "daylight" of the cut slopes. Swales should be directed down-slope to the natural water course. Any potentially erosive situation should be remediated using rip-rap, or other equally suitable means.

5.5 Storm Water Pollution Prevention (SWPPP)

Development of the Project will involve disturbance of the natural ground cover. If unmitigated, storm events can cause excessive erosion, sedimentation, and transport of pollutants. As discussed in Section 3, the Project must comply with the requirements of the State's General Permit under the NPDES program. The Permit's requirements include preparation of a SWPPP. Through prescribing Best Management Practices (BMPs), the objective of the SWPPP is to reduce or eliminate sediment or other pollutants from entering storm water runoff. The SWPPP

shall identify the precise implementation of BMPs. The following are recommended BMPs.

5.5.1 Re-Vegetation

Re-vegetation efforts should commence very soon upon completion of grading or mining within an area, It is understood that a separate re-vegetation plan has been prepared specifically for the Project, and therefore the following recommendations are general.

- Planting and mulching of areas is necessary to prevent loss of seeds and soil. Natural germination, as opposed to watering, is recommended. Watering or irrigation of seeded areas is impractical, and usually results in early germination and die-off, without establishment.

- Any slopes must be stabilized using techniques that, along with re-vegetation, include products to minimize storm water velocity such as wattles, compost tubes, and compost blankets.

5.5.2 Sediment Control

- Sediment basins or sediment traps can be used to form a temporary basin by excavation or by constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is released. As discussed, this is achieved within the mine excavation itself.

5.5.3 Dust Control:

Wind erosion or dust control applications can be implemented by applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by mining activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

Consideration should be given to grading only those areas for which final construction is imminent. Completing one portion of the work at a time to minimize surface disturbance will result in more manageable BMPs. A Dust Control Plan will be prepared for the project and submitted to the San Joaquin Air Pollution Control District for approval.

5.5.4 Containment of Fuels, Lubricants, and Other Possible Sources of Pollution:

Non-containment of these pollutants has the greatest potential for pollution of ground water. Ground-water recharge within the vicinity of the Project and surrounding area is primarily via percolation of storm water. Special care must be taken during fueling of construction vehicles. Spills must be contained and disposed of, including removal of contaminated soil. Storage of chemicals, paints, solvents, fertilizers, toxic materials, or potential pollutants shall be stored in watertight containers.

Spill prevention measures should be in place to prevent or reduce the discharge of pollutants to watercourses, by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees in spill prevention.

5.5.5 Construction Water:

Potable Water/Irrigation management should consist of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, and planned and unplanned discharges from potable water sources. Releases of water should be directed from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.

5.5.6 Sanitary Facilities:

Temporary sanitary facilities provided on site should be located away from drainage facilities, watercourses, and traffic areas. Temporary sanitary facilities are normally placed a minimum of 50 feet from drainage conveyances and traffic areas. In the case of this Project, there are no defined or eroded watercourses through Project.

Temporary sanitary facilities should be secured to prevent overturning if subjected to high winds. Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to receiving water or drainage systems. Any permanent septic systems should be designed in accordance with the County of Kern Health Department Standards and the Uniform Plumbing Code. In-ground septic system should only be used for their intended purpose: Septic systems should not be used for disposal of chemicals, solvents, or paints.

5.5.7 Solid Waste Disposal:

Solid waste management procedures and practices should be implemented and designed to prevent or reduce the discharge of pollutants to storm-water from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

6.0 CONCLUSIONS AND ADDITIONAL RECOMMENDATIONS

Maintenance procedures should include periodic inspection of all “drainage” improvements, and additional inspections after storm events. Routine maintenance should include removal of clogging debris and sediment, and replacement of any dislodged rock armoring.

Immediate efforts to re-vegetate disturbed areas, upon completion of ground disturbing activities, is strongly recommended. It is noted that a separate re-vegetation plan and a reclamation plan have been prepared as part of the Project.

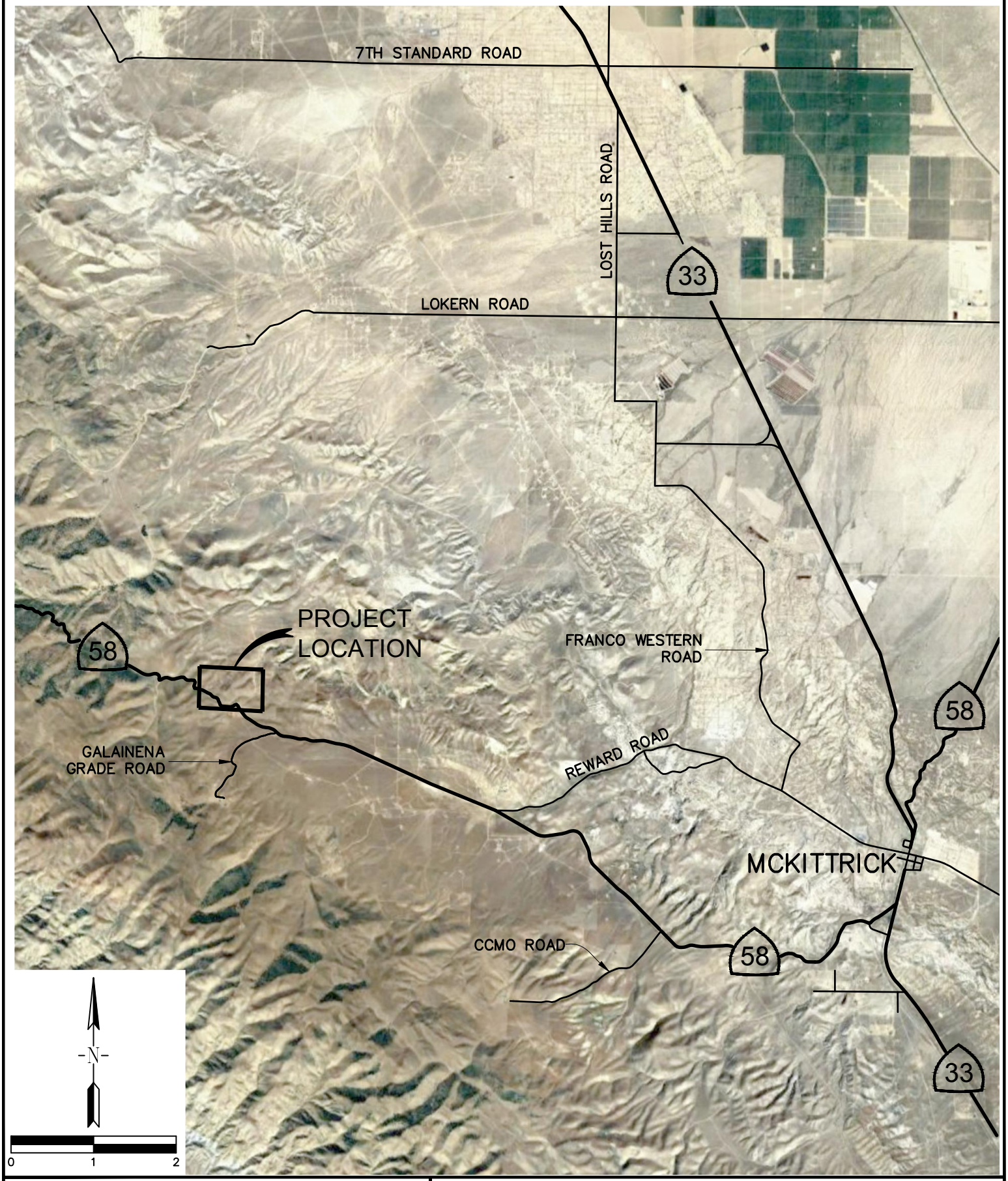
The Site will operate under an approved SWPPP in compliance with the Industrial General Permit (IGP), and Site inspections will be conducted as required by the general permit conditions under a registered QSP.
Final improvement plans should include BMP placement, and technical specifications for materials, rip-rap, earthwork, and BMP's.

Final design of the site should also include hydraulic calculations to support the selection and sizing of all drainage "improvements". At a minimum, these should include calculations for retention basin(s), open channels, drainage inlets, culverts, and rock rip-rap armoring.

Implementation of the recommendations and "findings" of this report, including the preparation and compliance with the SWPPP and BMPs, will reduce impacts of storm water, and impacts to water quality to a level of ***less than significant***.

APPENDIX “A”:
Exhibits

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LAV// Pinnacle Engineering
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Phone: (661) 869-0184 Fax: (661) 885-4155

EXHIBIT "A" - VICINITY MAP
HYDROLOGY STUDY
JOHE RANCH MINE
KERN COUNTY, CALIFORNIA

JOB No.: 15-654	DWG No.: HYDROLOGY	DATE: 04/23/2019

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LEGEND

① → PHOTO LOCATION AND DIRECTION

PROJECT BOUNDARY

CULVERT 4

CULVERT 3

MINING AREA THREE

MINING AREA TWO
Floor at 2360 El.
Floor sloped to back at 1%

MINING AREA ONE
Floor at 2350 El.
Floor sloped to back at 2%

Topsoil stockpiles

FUTURE MINING ROAD "D"
(APPROX. ALIGMENT)

CULVERT 2

OPTIONAL MINING ROAD "C"

MINING ROAD "B"

initial loadout for single trailer trucks

Stockpile

blend site screening plant

portable truck scale

topsoil stockpiles

topsoil stockpiles

PROJECT BOUNDARY

SR-58

CULVERT 1

MINING ROAD "A"

SR-58

NORTH

SCALE: 1" = 200'

0 100 200 400

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MATTHEW K. VOVILLA RCE 43130 EXP. 3/31/20

REVISIONS	DATE
-	-
-	-
-	-
-	-

REGISTERED PROFESSIONAL ENGINEER * MATTHEW K. VOVILLA * RCE 43130 Exp. 3-31-20 * CIVIL * STATE OF CALIFORNIA

EXHIBIT "B" - SITE PLAN
HYDROLOGY STUDY FOR
JOHE RANCH MINE
KERN COUNTY, CALIFORNIA

JOB No.:	15-654
DWG NO.:	Hydrology
DATE:	04/23/2019
DRAWN BY:	ADA
CHECKED BY:	MKV
SHEET	1
	OF 1 SHEETS

LEGEND

- TRIBUTARY DRAINAGE AREA BOUNDARY
- PROPOSED ACCESS ROAD
- EXISTING DIRT ROAD
- WATERCOURSE CROSSING
- PHOTO LOCATION AND DIRECTION

AREA "A"
8.4 AC.

AREA "B"
52 AC.

AREA "C"
34 AC.

AREA "D"
10 AC.

AREA "E"
70 AC.

AREA "F"
20 AC.

AREA "G"
1.0 AC.

CENTROID OF OVERALL TRIBUTARY AREA

MINE 1

MINE 2

MINE 3

CULVERT 1

CULVERT 2

CULVERT 3

CULVERT 4

PROPOSED ACCESS ROAD

PROPOSED ACCESS ROAD

topsoil stockpiles

topsoil stockpi

SR-58

SR-58

NORTH
SCALE: 1" = 200'
0 100 200 400

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MATTHEW K. VOVILLA RCE 43130 EXP. 3/31/20

REVISIONS | DATE

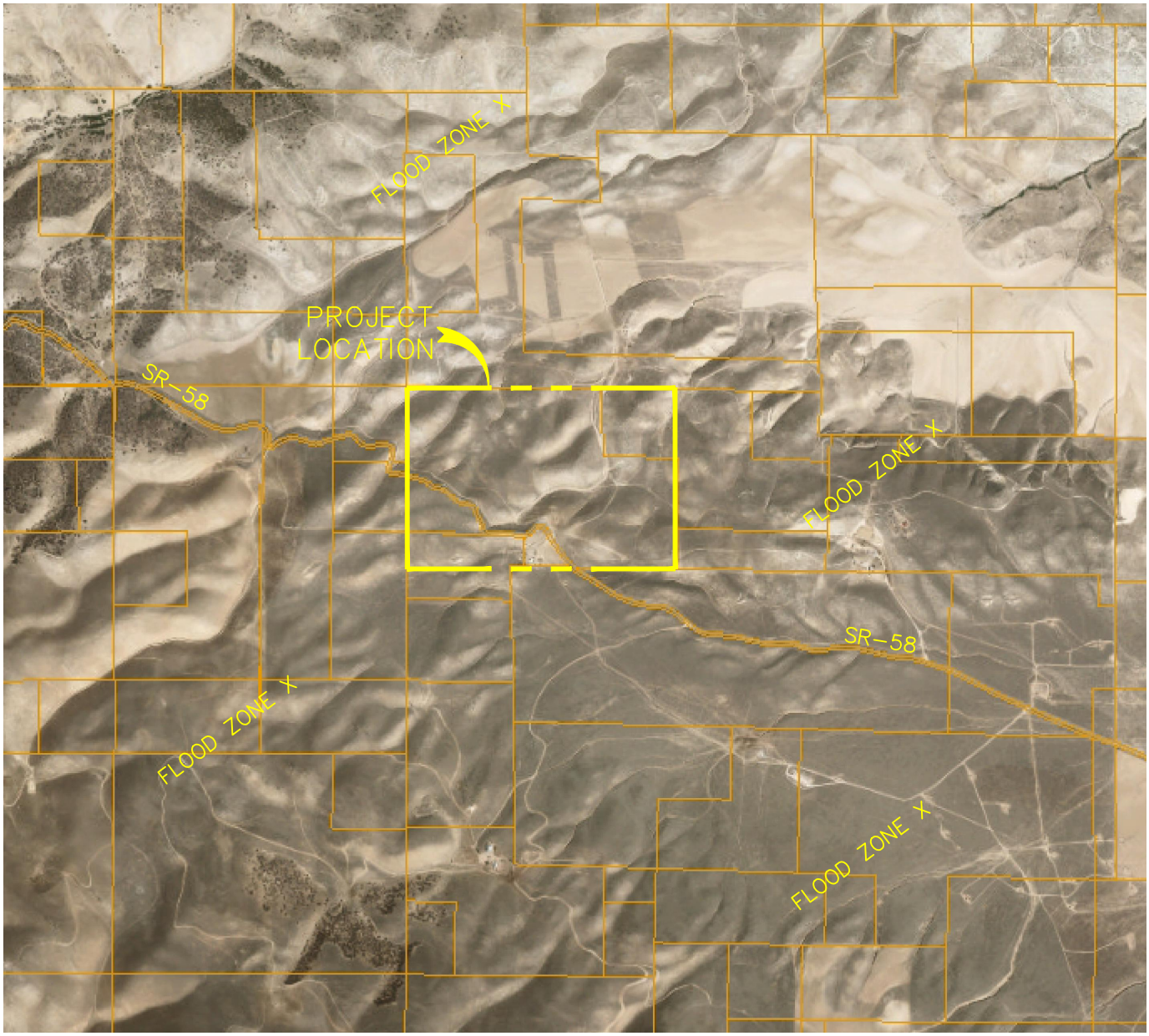
REGISTERED PROFESSIONAL ENGINEER MATTHEW K. VOVILLA RCE 43130 Exp. 3-31-20 CIVIL STATE OF CALIFORNIA

EXHIBIT "C"
TRIBUTARY DRAINAGE AREAS
HYDROLOGY STUDY FOR
JOHE RANCH MINE
KERN COUNTY, CALIFORNIA

JOB No.:	15-654
DWG NO.:	Hydrology
DATE:	04/23/2019
DRAWN BY:	ADA
CHECKED BY:	MKV
SHEET	1
	OF 1 SHEETS

FLOOD ZONE DESCRIPTIONS

ZONE X (UNSHADED): AREA OF MINIMAL FLOOD HAZARD, USUALLY DEPICTED ON FIRMS AS ABOVE THE 500-YEAR FLOOD LEVEL. ZONE X IS THE AREA DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD AND PROTECTED BY LEVEE FROM 100-YEAR FLOOD.



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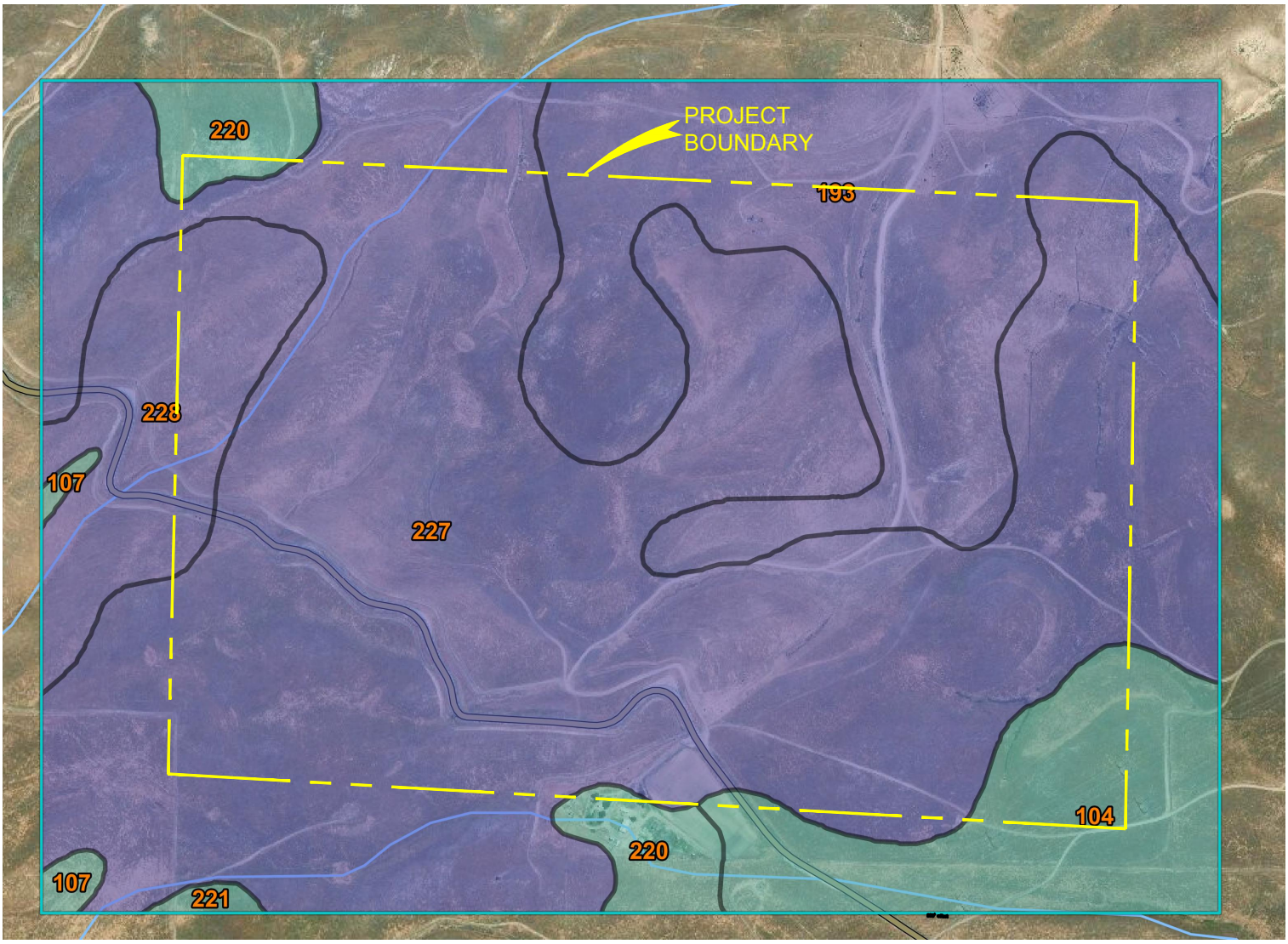
EXHIBIT "D" - FLOOD ZONES
HYDROLOGY STUDY
JOHE RANCH MINE
KERN COUNTY, CALIFORNIA

JOB No.: 15-654	DWG No.: HYDROLOGY	DATE: 04/23/2019

LEGEND:

SOIL GROUP "B"

SOIL GROUP "C"



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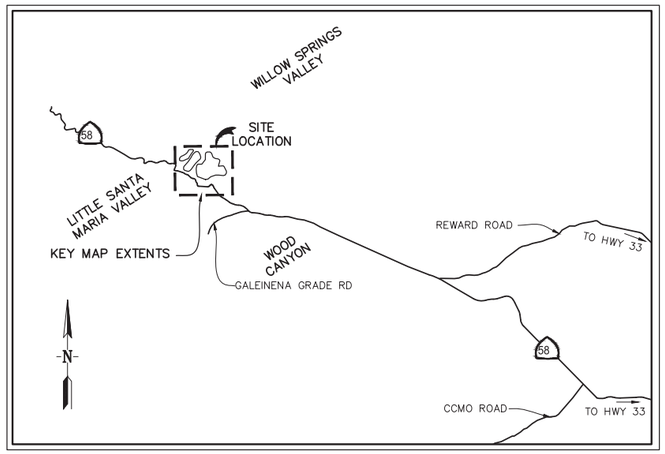
EXHIBIT "E" - HYDROLOGIC SOIL GROUPS
HYDROLOGY STUDY
JOHE RANCH MINE
KERN COUNTY, CALIFORNIA

JOB No.: 15-654	DWG No.: HYDROLOGY	DATE: 04/23/2019

JOHE RANCH MINE
ACCESS ROADS IMPROVEMENT PLAN
KERN COUNTY, CALIFORNIA

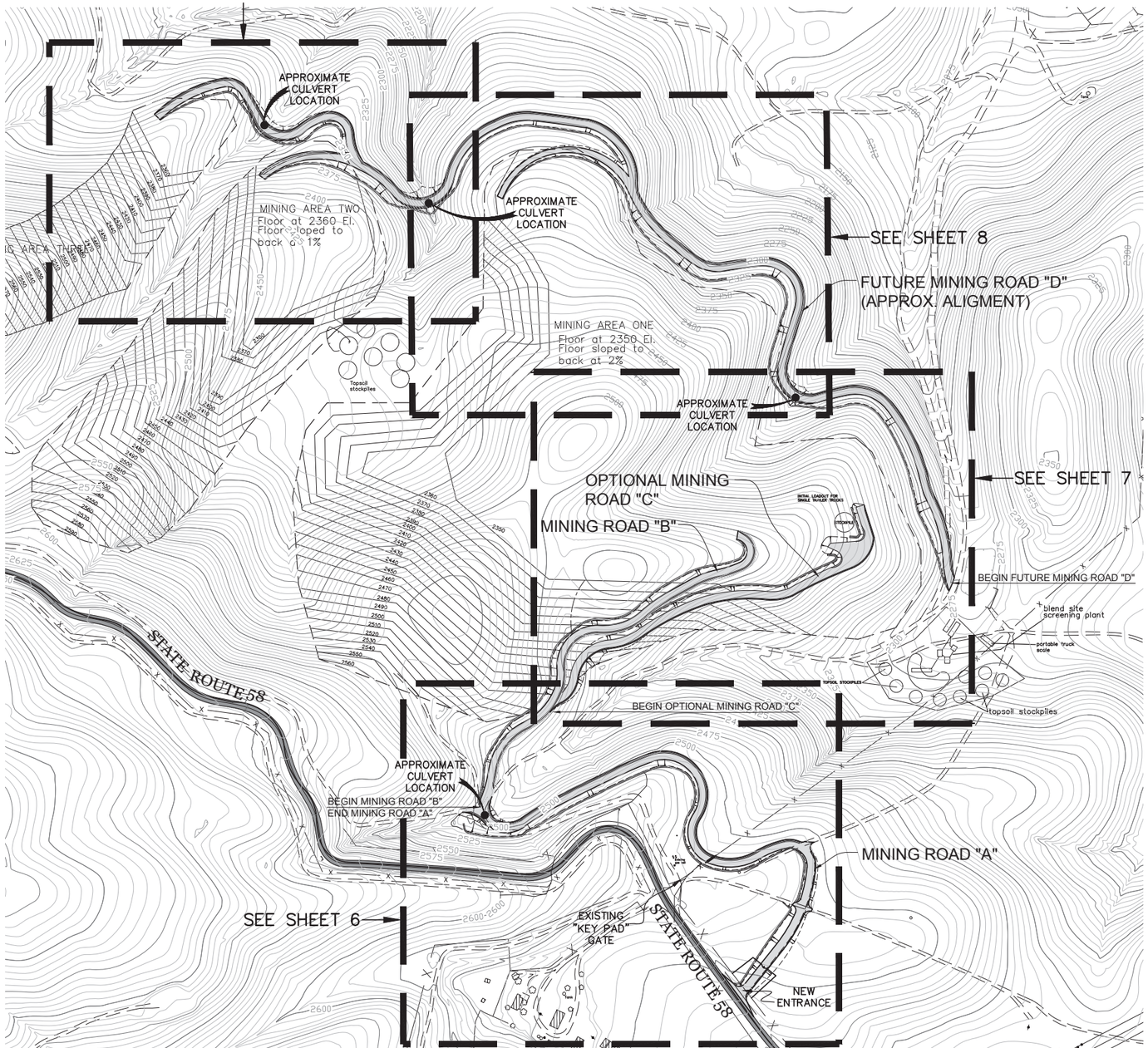
SHEET No. INDEX

1 COVER SHEET
2 NOTES
3&4 DETAILS
5 EROSION CONTROL DETAILS
6 ACCESS PLAN PLANS
7 ACCESS ROAD PLANS
8 ACCESS ROAD PLANS
9 ACCESS ROAD PLANS



VICINITY MAP
SCALE 1"=5000'

SEE SHEET 9



KEY MAP
SCALE: 1" = 200'

SITE STATISTICS:

FEMA FLOOD ZONE: "X"
ASSESSOR'S PARCEL NO'S: 156-070-01
SITE ADDRESS: 68501 HIGHWAY 58

KEY MAP LEGEND:

PROPOSED MINE ACCESS ROAD
===== EXISTING DIRT ROAD

EXHIBIT "F"

LAV//Pinnacle Engineering
5401 Business Park South, Suite 204, Bakersfield, CA 93309
Phone: (661) 869-0184 Fax: (661) 377-0076

DATE
REVISIONS

JOHE RANCH
ACCESS ROADS AND
CULVERT IMPROVEMENT PLANS
KERN COUNTY, CALIFORNIA

JOB No.:	15-654
DWG NO.:	15-654BM
DATE:	08/25/2015
DRAWN BY:	TTP
CHECKED BY:	MKV
SHEET	1 OF 9 SHEETS

GENERAL NOTES:

1. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY: THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS: THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FOR THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

2. LAV//PINNACLE ENGINEERING, INC. SHALL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO, OR USES OF, THESE PLANS.

3. IN THE EVENT CONSTRUCTION STAKING BASED ON CONSULTANT'S PLANS, DRAWINGS OR OTHER DOCUMENTS IS ACCOMPLISHED BY OTHER THAN THE CONSULTANT, CLIENT AGREES TO HOLD CONSULTANT HARMLESS AND RELEASE CONSULTANT FROM ALL LIABILITY ARISING FROM THE USE OF SAID PLANS, DRAWINGS OR OTHER DOCUMENTS.

4. EXCEPT AS OTHERWISE PROVIDED HEREIN, CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE START OF CONSTRUCTION. THE OWNER HAS OBTAINED THE CALTRANS ENCROACHMENT PERMIT FOR INGRESS AND EGRESS FROM STATE ROUTE 58. THE CALTRANS PERMIT SHALL BE CONSIDERED A PART OF THESE PLANS, AND THE CONTRACTOR SHALL COMPLY WITH ALL THE REQUIREMENT THEREOF.

5. IF A PROBLEM SHOULD ARISE DURING THE COURSE OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER IMMEDIATELY PRIOR TO ANY FURTHER WORK.

6. THE LOCATIONS OF EXISTING UTILITIES AND UNDERGROUND PIPELINES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND DEPTH OF ALL EXISTING UTILITIES AND UNDERGROUND PIPELINES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE, PRESERVE AND PROTECT ANY AND ALL UNDERGROUND UTILITIES AND PIPELINES. THE CONTRACTOR SHALL CALL U.S.A. (UNDERGROUND SERVICE ALERT) 811 TWO WORKING DAYS PRIOR TO ANY CONSTRUCTION OR EXCAVATION.

7. IF THE CONTRACTOR IS IN DOUBT AS THE MEANING OF ANY PART OF THE PLAN AND SPECIFICATIONS OR FINDS DISCREPANCIES IN OR OMISSIONS FROM THE DRAWINGS, HE SHALL SUBMIT A WRITTEN REQUEST FOR AN INTERPRETATION OR A CORRECTION THEREOF, PRIOR TO FILING HIS BID PRICE FOR THE PROJECT.

8. PRIOR TO CONSTRUCTION COMMENCING: ALL SURVEY MONUMENTS WITHIN THE PROJECT LIMITS IN JEOPARDY OF BEING COVERED, DAMAGED, DESTROYED OR OTHERWISE DISTURBED SHALL BE TIED OUT AND HAVE A CORNER RECORD FILED WITH THE COUNTY SURVEYOR. UPON COMPLETION OF CONSTRUCTION, THE MONUMENTS WILL BE RESET, IF NECESSARY, AND A STANDARD SURVEY MONUMENT ENCASEMENT (PLATE R-70) SHALL BE INSTALLED. A NEW CORNER RECORD SHALL BE FILED WITH THE COUNTY SURVEYOR FOR ALL RESET AND/OR REPLACED MONUMENTS. CORNER RECORDS ARE TO BE SUBMITTED BY A LICENSED LAND SURVEYOR. REFER TO SECTION 8771 (b) OF THE PROFESSIONAL LAND SURVEYORS ACT.

DEMOLITION NOTES:

1. CONTRACTOR SHALL PERFORM ALL NECESSARY DEMOLITION CLEARING & GRUBBING WITHIN THE LIMITS OF WORK AS REQUIRED TO COMPLETE CONSTRUCTION INDICATED ON THE PLANS. SEE CIVIL AND ARCHITECT'S PLANS FOR SPECIFIC ITEMS AND LIMITS FOR BOTH DEMOLITION AND "PROTECT IN PLACE".

2. ALL MATERIAL GENERATED FROM DEMOLITION, INCLUDING PIPING, PLANTS, ORGANIC MATERIAL, A.C. PAVEMENT, CONCRETE, AND MISCELLANEOUS DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND PROPERLY DISPOSED OF IN ACCORDANCE WITH ALL LAWS AND ORDINANCES.

GRADING NOTES:

1. ALL GRADING AND SITE PREPARATION SHALL CONFORM TO THIS PLAN AND SHALL CONFORM TO KERN COUNTY GRADING ORDINANCE & THE CALIFORNIA UNIFORM BUILDING CODE.

2. ALL GRADING AND SITE PREPARATION SHALL SHALL BE DONE UNDER PERMIT FROM THE COUNTY OF KERN BUILDING INSPECTION DEPARTMENT.

3. ALL DESIGN ELEVATIONS SHOWN ARE TO FINISH GRADE.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING THE PAD AND PAVING AREAS TO WITHIN 0.1 FOOT OF SUBGRADE. IF SUCH AREAS SHOULD BE FOUND TO BE MORE THAN 0.1 FOOT FROM THE DESIGN SUBGRADE ELEVATION AFTER COMPLETION OF GRADING, THE CONTRACTOR SHALL RETURN AND CORRECT THE GRADING AT NO COST TO THE OWNER.

5. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE START OF CONSTRUCTION. AN ENCROACHMENT PERMIT SHALL BE OBTAINED FROM THE COUNTY OF KERN FOR ANY WORK TO BE PERFORMED IN THE COUNTY RIGHT-OF-WAY.

6. INTENTIONALLY LEFT BLANK.

7. IF A PROBLEM OR CONFLICT SHOULD ARISE DURING THE COURSE OF THIS PROJECT, IT IS THE RESPONSIBILITY OF THE OWNER OR THE GRADING CONTRACTOR TO NOTIFY THE ENGINEER IMMEDIATELY PRIOR TO ANY FURTHER WORK.

8. ALL GRADING WORK SHALL BE SUPERVISED AS "ENGINEERED GRADING" IN ACCORDANCE WITH KERN COUNTY GRADING ORDINANCE. THE DESIGN ENGINEER SHALL EXERCISE SUFFICIENT SUPERVISORY CONTROL DURING GRADING AND CONSTRUCTION TO ENSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS AND CODE WITHIN HIS PURVIEW.

9. DUST CONTROL: IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PREVENT A DUST NUISANCE FROM ORIGINATING FROM THE SITE OF WORK AS A RESULT OF HIS OPERATIONS DURING THE EFFECTIVE PERIOD OF THIS CONTRACT. PREVENTATIVE MEASURES TO BE TAKEN BY THE CONTRACTOR SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
   A. WATER SHALL BE APPLIED TO ALL UNPAVED AREAS AS REQUIRED TO PREVENT THE SURFACES FROM BECOMING DRY ENOUGH TO PERMIT DUST FORMATION.
   B. PAVED SURFACES OVER WHICH VEHICULAR TRAFFIC IS PERMITTED TO TRAVEL SHALL BE KEPT FREE OF DIRT.

10. INTENTIONALLY LEFT BLANK.

11. THE SOILS ENGINEER SHALL PROVIDE SUFFICIENT INSPECTIONS DURING THE PREPARATION OF THE NATURAL GROUND AND THE PLACEMENT AND COMPACTION OF THE FILL TO BE SATISFIED THAT THE WORK IS BEING PERFORMED IN ACCORDANCE WITH THE PLAN AND APPLICABLE CODE REQUIREMENTS.

12. EXISTING UTILITY AND UNDERGROUND LINES HAVE BEEN SHOWN ON THIS PLAN ACCORDING TO AVAILABLE RECORDS. THE ENGINEER IS NOT RESPONSIBLE FOR POSSIBLE ERRORS OR OMISSIONS. THE CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING OF ANY WORK. UNDERGROUND SERVICE ALERT (U.S.A.: 811) SHALL BE CONTACTED AT LEAST TWO WORKING DAYS PRIOR TO ANY CONSTRUCTION OR EXCAVATION.

GRADING NOTES CON'T:

13. DURING GRADING, REASONABLE SEARCHING SHALL BE PERFORMED FOR CONCEALED SUBSURFACE OBSTRUCTIONS. ALL ABANDONED SUBSURFACE OBSTRUCTIONS SHOULD BE REMOVED. IF THE TERMINUS OF ANY ABANDONED PIPING IS OUTSIDE THE PROJECT LIMITS, THE PIPING SHOULD BE REMOVED WITHIN THE PROJECT AND PROPERLY CAPPED AT THE PROJECT BOUNDARY.

14. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT; INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

15. THE STAKING AND MARKING OF THE PROJECT SHALL BE DONE ONLY ONCE BY THE OWNER AND ALL RESTAKING OR REMARKING SHALL BE DONE AT THE EXPENSE OF THE CONTRACTOR.

16. ALL ONSITE OR OFFSITE OBSTRUCTIONS SHALL BE REMOVED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

17. ANY EXISTING IMPROVEMENT OR UTILITY REMOVED, DAMAGE OR UNDERCUT BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE ENGINEER AND APPROVED BY THE COUNTY OF KERN AT THE CONTRACTOR'S EXPENSE.

18. ALL SLOPES SHALL BE 2:1 OR FLATTER; UNLESS OTHERWISE NOTED, AND APPROVED BY THE SOILS ENGINEER.

19. WHERE THE GROUND SLOPE OF AREAS TO RECEIVE FILL EXCEEDS 20% (5' HORIZONTAL TO 1' VERTICAL) THE AREA SHALL BE BENCHED INTO COMPETENT MATERIAL. EXCEPT AS OTHERWISE SHOWN ON PLAN. HILL BENCHES SHALL BE HORIZONTAL WITH A MINIMUM WIDTH OF EIGHT FEET (8').

20. SITE PREPARATION AND GRADING SHALL BE DONE UNDER THE SUPERVISION OF THE SOILS ENGINEER. THE SOILS ENGINEER AND DESIGN ENGINEER SHALL BE NOTIFIED AT LEAST TWO DAYS BEFORE THE STARTING OF ANY OF THIS WORK.

21. THE LIMITS OF WORK SHALL BE CLEARED OR GRUBBED OF ALL VEGETATION, INCLUDING ROOTS, LOOSE FILL, TRASH AND OTHER DELETERIOUS MATERIALS. ANY HOLES OR VOIDS LEFT AFTER THE REMOVAL OF TREES, ROOTS, SEPTIC TANKS, ABANDONED FOUNDATIONS, PIPELINES OR THE LIKE, SHALL BE FILLED AS REQUIRED BY THE SOILS ENGINEER.

22. FILL MATERIAL SHALL BE SUBJECT TO THE SOILS ENGINEER'S APPROVAL.

23. THE CUT AND FILL QUANTITIES ARE CALCULATED USING A COMPACTING FACTOR OF 15%. THE ENGINEER MAKES NO WARRANTEE EITHER DIRECTS OR IMPLIED THAT THIS WILL BE THE ACTUAL COMPACTION FACTOR. IF A DEFICIENCY OR AN EXCESS OF SOIL ARISES, THE GRADING CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER, WHO SHALL DETERMINE IF ADJUSTMENTS CAN BE MADE TO IMPROVE THE BALANCE BETWEEN CUT AND FILL.

24. THE CUT AND FILL QUANTITIES SHOWN ON THIS PLAN ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR SHALL, AFTER EXAMINING THE PLAN, SOILS REPORT AND THE SITE TERRAIN, PREPARE HIS BID PRICE FOR THE PROJECT, BASED ON HIS OWN EARTHWORK CALCULATIONS.

25. EXPORT MATERIAL SHALL BE DISPOSED OF AT AN APPROVED SITE COORDINATED WITH THE INSPECTOR AT THE TIME OF GRADING.

26. INTENTIONALLY LEFT BLANK.

27. IF THE CONTRACTOR IS IN DOUBT AS TO THE MEANING OF ANY PART OF THE PLAN AND SPECIFICATIONS OR FINDS DISCREPANCIES IN OR OMISSIONS FROM THE DRAWING, HE SHALL SUBMIT A WRITTEN REQUEST FOR AN INTERPRETATION OR A CORRECTION THEREOF, PRIOR TO FILING HIS BID PRICE FOR THE PROJECT.

28. THE CONTRACTOR SHALL COORDINATE WITH THE INSPECTOR AND THE ENGINEER THE LOCATION OR THE BORROW AREAS PRIOR TO BEGINNING CONSTRUCTION.

29. IN THE EVENT CONSTRUCTION STAKING BASED ON CONSULTANT'S PLANS, DRAWINGS OR OTHER DOCUMENTS IS ACCOMPLISHED BY OTHER THAN THE CONSULTANT, CLIENT AGREES TO HOLD CONSULTANT HARMLESS AND RELEASE CONSULTANT FROM ALL LIABILITY ARISING FROM THE USE OF SAID PLANS, DRAWINGS OR OTHER DOCUMENTS.

30. ANY TRENCHING TO BE DONE WITHIN THE PROJECT SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE COUNTY OF KERN STANDARDS.

31. SURFACE DRAINAGE SHALL BE DIRECTED TO APPROVE DRAINAGE FACILITIES AT A MINIMUM OF 1% SLOPE, EXCEPT AS WAIVED BY THE BUILDING OFFICIAL.

32. IT IS THE RESPONSIBILITY OF THE OWNER AND HIS GRADING CONTRACTOR TO:
   A. FAMILIARIZE THEMSELVES WITH THE FOREGOING RECOMMENDATIONS.
   B. NOTIFY THE ENGINEER WHEN SITE PREPARATION BEGINS AND BEFORE THE PLACEMENT OF FILLS.
   C. INFORM THE ENGINEER IF ITEMS WHICH MIGHT EFFECT FOUNDATION STABILITY ARE ENCOUNTERED DURING EARTHWORK OPERATIONS SO THAT THEY MAY BE TREATED UNDER HIS DIRECTION (THESE MIGHT INCLUDE BURIED TRASH OR VEGETATION, PIPELINES, ABANDONED WELLS, OLD FILLS, ETC.)

33. FLOODING, JETTING, OR SIMILAR CONSOLIDATIONS METHODS OF COMPACTION SHALL NOT BE PERMITTED.

34. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR THE PROPER MAINTENANCE OF THE DRAINAGE FACILITIES INCLUDING SWALES, BERMS, AND VEGETATION (GROUND COVER) TO ENSURE ADEQUATE EROSION CONTROL.

35. ANY ABANDONED WELLS ON THE PROPERTY DISCOVERED DURING GRADING SHALL BE ADEQUATELY CAPPED IN ACCORDANCE WITH ALL APPLICABLE CITY, COUNTY AND STATE ORDINANCES.

36. ENGINEERED FILL SHOULD BE PLACED IN THIN LAYERS (LESS THAN EIGHT INCHES [8"] IN UNCOMPACTED THICKNESS, OR AS RECOMMENDED IN THE SOILS REPORT), BROUGHT TO NEAR THE OPTIMUM MOISTURE CONTENT OR TO A MOISTURE CONTENT COMMENSURATE WITH EFFECTIVE COMPACTING AND SOIL STABILITY, AND COMPACTED TO A MINIMUM OF NINETY FIVE PERCENT (95%) OF THE MAXIMUM DENSITY OBTAINABLE BY ASTM TEXT METHOD D1557-78, METHOD A.

37. A BERM OR DRAINAGE SWALE SHALL BE CONSTRUCTED ALONG THE TOP OF ALL CUT AND FILL SLOPES TO PREVENT RUNOFF FROM GOING OVER THE SLOPE. THE FACE OF ALL CUT AND FILL SLOPES SHALL BE COVERED WITH GROUND COVER, RIP RAP, HYDROMULCH OR ANOTHER SLOPE PROTECTION METHOD.

38. UNLESS OTHERWISE SPECIFIED IN THE SOILS REPORT, GROUND SURFACES TO RECEIVE CONCRETE DRIVEWAYS AND BITUMINOUS PAVEMENTS SHOULD BE SCARIFIED AND COMPACTED TO A MINIMUM DEPTH OF TWELVE INCHES (12") BELOW THE EXISTING GROUND SURFACE IN AREAS TO BE FILLED. COMPACTING IN PROPOSED PAVEMENT AREAS SHOULD BE TO A MINIMUM OF NINETY-FIVE PERCENT (95%) OF THE MAXIMUM DENSITY AS OBTAINED BY ASTM TEST METHOD D1557-78, METHOD A, AND SHOULD EXTEND TO A MINIMUM DISTANCE OF TWO FEET (2') BEYOND THE OUTSIDE EDGES OF PAVEMENTS.

GRADING NOTES CON'T:

39. STRUCTURE AREAS (CUT AND/OR FILL):
   A. EXCEPT AS OTHERWISE SHOWN IN THE SOILS REPORT, IN CUT AREAS, "OVER-EXCAVATE" SOILS ON A LEVEL PLANE TO A MINIMUM DEPTH OF 2.0' BELOW BOTTOM OF THE LOWEST FOOTING FOR A MINIMUM DISTANCE OF 5.0' BEYOND THE OUTER EDGE OF EXTERIOR FOOTING LINES.
   B. EXCEPT AS OTHERWISE SHOWN IN THE SOILS REPORT, SCARIFY SOILS IN CUT AREAS FOR A DEPTH OF 6" BELOW THE BOTTOM OF EXCAVATIONS.
   C. EXCEPT AS OTHERWISE SHOWN IN THE SOILS REPORT, IN NON-STRUCTURAL AREAS OF FILL, SCARIFY SOILS TO A DEPTH OF 12" BELOW THE EXISTING SURFACE FOLLOWING STRIPPING AND CLEARING OPERATIONS.
   D. EXCEPT AS OTHERWISE SHOWN IN THE SOILS REPORT, BRING MOISTURE CONTENT IN SCARIFIED AREAS TO NO LESS THAN 2% BELOW AND NO GREATER THAN 1% ABOVE THE OPTIMUM MOISTURE CONTENT, AS DEFINED ABOVE, OR CONSISTENT WITH EFFECTIVE SOIL STABILITY.
   E. EXCEPT AS OTHERWISE SHOWN IN THE SOILS REPORT, SCARIFIED AREAS AND ANY FILL PLACED, SHOULD BE COMPACTED IN THIN LIFTS (LESS THAN 10" UNCOMPACTED THICKNESS), MOISTENED AS DESCRIBED ABOVE, AND COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY A DESCRIBED ABOVE.

40. FILL AREA SLOPING STEEPER THAN 5:1 SHALL BE KEYED AND BENCHED TO SUPPORT FILL. CODE OF BUILDING REGULATIONS SEC. 7.28.110-C.

41. ALL FILL AREAS SHALL BE CLEARED OF ALL VEGETATION AND OTHER UNSUITABLE MATERIAL FOR A STRUCTURAL FILL AND THE AREA SCARIFIED TO A DEPTH OF 6 INCHES. CODE OF BUILDING REGULATIONS SEC. 7.28.110-C.

42. ALL FILL MATERIALS SHALL NOT CONTAIN DETRIMENTAL AMOUNTS OF ORGANIC MATTER. NO ROCK OF IRREDUCIBLE MATERIAL WITH A MINIMUM DIMENSION GREATER THAN 12 INCHES SHALL BE BURIED OR PLACE IN FILL. CODE OF BUILDING REGULATIONS SEC. 17.28.110-D.

43. FILL MATERIALS SHALL BE PLACED IN LAYERS NOT EXCEEDING 6 INCHES IN COMPACTED THICKNESS AND COMPACTED AT OPTIMUM MOISTURE CONTENT BY APPROVED METHOD.

44. SURFACE DRAINAGE TO BE 2% TOWARD APPROVED DRAINAGE. (LIMITED WAIVERS TO ALLOW 1% DRAINAGE FROM THE BUILDING PAD MAY BE ALLOWED IF WAIVED PER SECTION 17.28.130-D.

45. EROSION AND SEDIMENTATION WILL BE CONTROLLED BY BERMS, PLANTING, RIPRAP OR OTHER METHODS. CODE OF BUILDING REGULATIONS SEC. 17.28.140-B.

46. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ANY AND ALL CHANGES TO THESE PLANS MUST BE APPROVED BY LAV//PINNCALE ENGENDERING, INC.

HIGH DENSITY POLYETHYLENE PIPE SPECIFICATIONS:

1. PIPE:
   PIPE SHALL BE HIGH DENSITY POLYETHYLENE IN ACCORDANCE WITH THESE SPECIFICATIONS. PIPE SHALL MEET ASTM F2648.

2. PIPE REQUIREMENTS:
   PIPE SHALL BE ADS N-12 WT IB PIPE, OR APPROVED EQUAL (PER ASTM F2648,) AND SHALL HAVE A SMOOTH INTERIOR AND ANNULAR EXTERIOR CORRUGATIONS.
   4-THROUGH 60-INCH (100 TO 1500 MM) SHALL MEET ASTM F2648.
   MANNING'S "N" VALUE FOR USE IN DESIGN SHALL BE 0.012.

3. JOINT PERFORMANCE:
   4-THORUGH 60-INCH (100 TO 1500 MM) SHALL BE WATERTIGHT ACCORDING TO THE REQUIREMENTS OF ASTM D3212. GASKETS SHALL BE MADE OF POLYISOPRENE MEETING THE REQUIREMENTS OF ASTM F477.GASKETS SHALL BE INSTALLED BY THE PIPE MANUFACTURER AND COVERED WITH A REMOVABLE, PROTECTIVE WRAP TO ENSURE THE GASKET IS FREE FORM DEBRIS. A JOINT LUBRICANT AVAILABLE FROM THE MANUFACTURER SHALL BE USED ON THE GASKET AND BELL DURING ASSEMBLY.
   12-THROUGH 60-INCH (300 TO 1500 MM) DIAMETERS SHALL HAVE A REINFORCED BELL WITH A BELL TOLERANCE DEVICE. THE BELL TOLERANCE DEVICE SHALL BE INSTALLED BY THE MANUFACTURER.

4. FITTINGS:
   FITTINGS SHALL CONFORMS TO ASTM F2306. BELL AND SPIGOT CONNECTIONS SHALL UTILIZE A SPUN-ON OR WELDED BELL AND VALLEY OR SADDLE GASKETS, MEETING THE WATERTIGHT JOINT PERFORMANCE REQUIREMENTS OF ASTM F2606.

5. FILED PIPE AND JOINT PERFORMANCE:
   TO ASSURE WATERTIGHTNESS, FIELD PERFORMANCE VERIFICATION MAY BE ACCOMPLISHED BY TESTING IN ACCORDANCE WITH ASTM F2487. APPROPRIATE SAFETY PRECAUTIONS MUST BE USED WHEN FIELD-TESTING ANY PIPE MATERIAL. CONTACT THE MANUFACTURER FOR RECOMMENDED LEAKAGE RATES.

6. MATERIAL PROPERTIES:
   MATERIAL FOR PIPE PRODUCTION SHALL BE AN ENGINEERED COMPOUND OF VIRGIN AND RECYCLED HIGH-DENSITY POLYETHYLENE CONFORMING WITH THE MINIMUM REQUIREMENTS OF CELL CLASSIFICATION 42442OC (ESCR TEST CONDITION B) FOR 4-THROUGH 10-INCH (100 TO 250 MM) DIAMETER, AND 435420C (ESCR TEST CONDITION B) FOR 12-THROUGH 60-INCH (300 TO 1500 MM) DIAMETERS, AS DEFINED AND DESCRIBED IN THE LATEST VERSION OF ASTM D3350, EXCEPTS THAT CARBON BLACK CONTENT SHOULD NOT EXCEED 4%. THE DESIGN ENGINEER SHALL VERIFY COMPATIBILITY WITH OVERALL SYSTEM INCLUDING STRUCTURAL, HYDRAULIC, MATERIAL, AND INSTALLATION REQUIREMENTS FOR A GIVEN APPLICATION.

7. INSTALLATION:
   A. INSTALLATION SHALL BE IN ACCORDANCE WITH ASTM D2321 AND THE MANUFACTURER'S PUBLISHED INSTALLATION GUIDELINES. BACKFILL FOR MINIMUM COVER SITUATIONS SHALL CONSIST OF CLASS 1 (COMPACTED,) OR CLASS 2 (MINIMUM 90% SPD) MATERIAL. MAXIMUM FILL HEIGHTS DEPEND ON EMBEDMENT MATERIAL AND COMPACTION LEVEL.
   B. TRENCH EXCAVATION SHALL PROVIDE SUFFICIENT WIDTH ON EITHER SIDE OF THE PIPE TO ACCOMMODATE COMPACTION EQUIPMENT.
   C. BACKFILL WITHIN THE PIPE ZONE, BEDDING, AND TO 2 FEET ABOVE THE PIPE SHALL BE GRANULAR MATERIAL WITH A SAND EQUIVALENT OF 20, AND SHALL BE FREE OF ORGANIC MATERIAL, LARGE STONES OR ANY MATERIAL THAT MAY DAMAGE PIPE OR COATING. BACKFILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8-INCHES IN COMPACTED THICKNESS, MOISTURE CONDITIONED AND COMPACTED TO 90 PERCENT RELATIVE DENSITY PER ASTM D-1557. CONTRACTOR SHALL EXERCISE SUFFICIENT CARE DURING BACKFILL AND COMPACTION TO AVOID DAMAGE OR DEFLECTION OF THE PIPE. ROADWAY EMBANKMENT ABOVE INDICATED LEVEL SHALL MEET THE REQUIREMENTS OF SECTION 19 OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS.
   D. PIPE BEDDING SHALL BE PLACED, COMPACTED AND SHAPED TO RECEIVE CSP. BEDDING SHALL BE CAREFULLY GRADED TO PROVIDE UNIFORM SUPPORT TO THE PIPE.

CORRUGATED STEEL PIPE SPECIFICATIONS:

1. EXCEPT AS OTHERWISE PROVIDED HEREIN, CORRUGATED STEEL PIPE (CSP) SHALL CONFORM TO SECTION 66 OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS.

2. CORRUGATED STEEL PIPE SHALL BE GALVANIZED (2 OZ.), 14 GAGE (0.0.79 INCH WALL THICKNESS), WITH 1-INCH DEEP CORRUGATIONS, CAPABLE OF WITHSTANDING H20, H25, AND E80 LIVE LOADS.

3. SUFFICIENT CARE SHALL BE TAKEN TO AVOID ABRADING GALVANIZED COATING DURING HANDLING AND INSTALLATION.

4. TRENCH EXCAVATION SHALL PROVIDE SUFFICIENT WIDTH ON EITHER SIDE OF THE PIPE TO ACCOMMODATE COMPACTION EQUIPMENT.

5. BACKFILL WITHIN THE PIPE ZONE, BEDDING, AND TO 2 FEET ABOVE THE PIPE SHALL BE GRANULAR MATERIAL WITH A SAND EQUIVALENT OF 20, AND SHALL BE FREE OF ORGANIC MATERIAL, LARGE STONES OR ANY MATERIAL THAT MAY DAMAGE PIPE OR COATING. BACKFILL SHALL BE PLACED IN LIFTS NOT TO EXCEED 8-INCHES IN COMPACTED THICKNESS, MOISTURE CONDITIONED AND COMPACTED TO 90 PERCENT RELATIVE DENSITY PER ASTM D-1557. CONTRACTOR SHALL EXERCISE SUFFICIENT CARE DURING BACKFILL AND COMPACTION TO AVOID DAMAGE OR DEFLECTION OF THE PIPE. ROADWAY EMBANKMENT ABOVE INDICATED LEVEL SHALL MEET THE REQUIREMENTS OF SECTION 19 OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS.

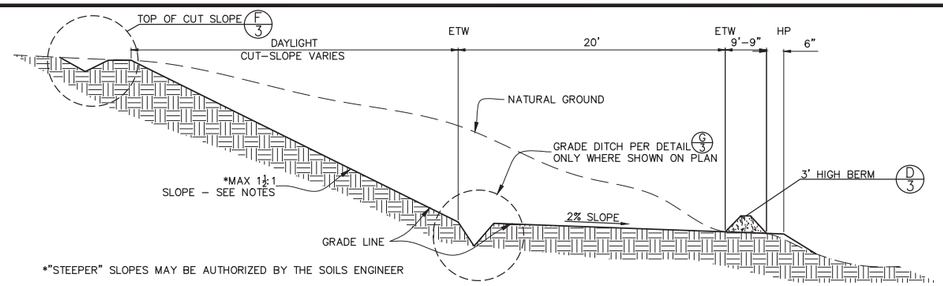
6. PIPE BEDDING SHALL BE PLACED, COMPACTED AND SHAPED TO RECEIVE CSP. BEDDING SHALL BE CAREFULLY GRADED TO PROVIDE UNIFORM SUPPORT TO THE PIPE.

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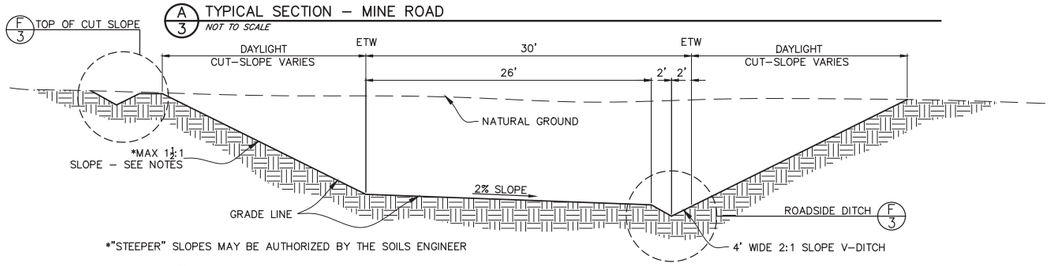
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OF	9 SHEETS



*"STEEPER" SLOPES MAY BE AUTHORIZED BY THE SOILS ENGINEER

A 3 TYPICAL SECTION – MINE ROAD

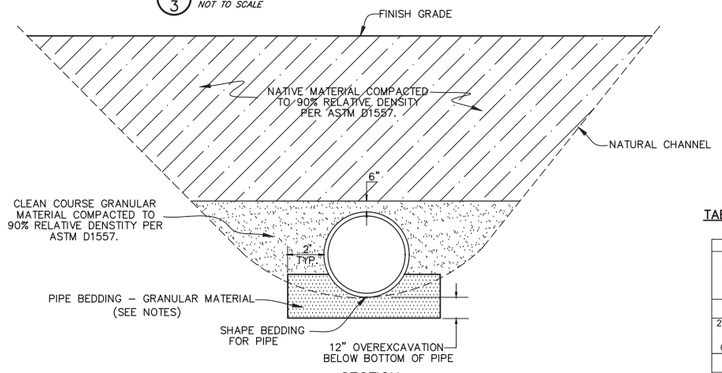
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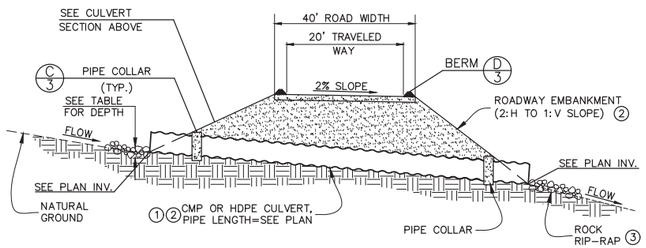
*"STEEPER" SLOPES MAY BE AUTHORIZED BY THE SOILS ENGINEER

A2 3 TYPICAL SECTION – MINE ROAD CUT SECTION

NOT TO SCALE



SECTION



B 3 DETAIL – ROAD CULVERTS

NOT TO SCALE

TABLE 1: SUMMARY OF CULVERTS

(1) Culvert No.	(2) Pipe Size (in)	(3) Pipe Slope (%)	(4) Pipe Flow 50-year (cfs)	(5) Normal Depth (In)	(6) Critical Depth (In)	(7) Velocity Normal Depth (ft/s)	(8) Velocity Critical Depth (ft/s)	(9) Provided Rip-Rap Size (D_{50}-in)	(10) Rip Rap Apron (L'xW'xT')
1	42	1.0	40.0	26.7	23.6	6.2	7.2	6.5	14 x 20 x 1
2 & Down Drain Culverts	18	1.5	2.8	7.9	7.6	3.7	3.9	6.5	6 x 9 x 1
3	36	1.0	19.0	18.6	16.8	5.2	5.9	6.5	12 x 17 x 1
4	(1) 60	1	82.0	32.8	30.8	7.5	8.1	6.5	20 x 28 x 1
4 (Optional)	(2) 42	1	82.0	27.3	23.9	6.2	7.3	(Same as above)	

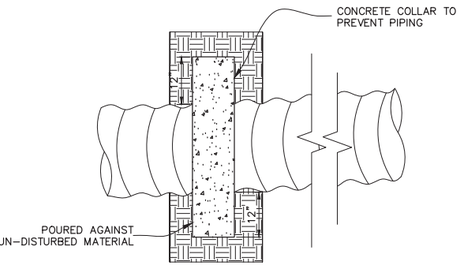
CULVERT DETAIL NOTES:

① PRIOR TO PLACEMENT OF CULVERT PIPE, OVER–EXCAVATE A MINIMUM OF 12–INCHES BELOW THE BOTTOM OF PIPE TO REMOVE SILTS, ORGANIC MATERIAL, AND ROCKS. ACTUAL DEPTH OF OVER–EXCAVATION SHALL BE DETERMINED BY THE ENGINEER.

② PIPE BACKFILL AND ROADWAY EMBANKMENT SHALL BE PLACED, MOISTURE CONDITIONED, AND COMPACTED IN LIFTS NOT EXCEEDING 8–INCHES IN DEPTH. PIPE BACKFILL AND ROAD EMBANKMENT MATERIAL SHALL BE APPROVED BY THE ENGINEER, AND SHALL BE COMPACTED TO A MINIMUM OF 90% RELATIVE DENSITY PER ASTM D–1557.

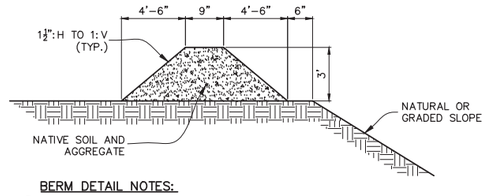
③ ROCK RIP–RAP FOR SLOPES SHALL HAVE A D50 PER TABLE HERE–ON, AND SHALL BE PLACED IN THE CHANNEL AND FILL SLOPES TO A MINIMUM OF 1–FOOT ABOVE PIPE SOFFIT.

④ PROVIDE BMP'S IN ACCORDANCE WITH THE EROSION CONTROL PLAN.



C 3 ANTI–PIPING COLLAR

NOT TO SCALE

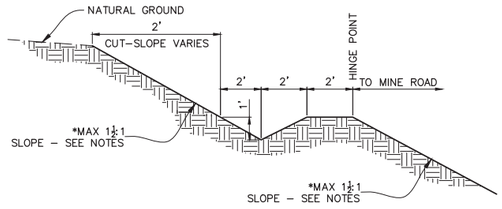


BERM DETAIL NOTES:

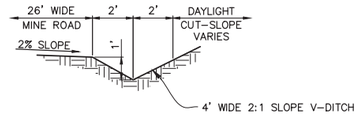
① BERM SHALL BE MOISTURE CONDITIONED AND COMPACTED TO 90% RELATIVE DENSITY PER ASTM D–1557.

D 3 ROADWAY SAFETY BERM

NOT TO SCALE



TOP OF CUT SLOPE



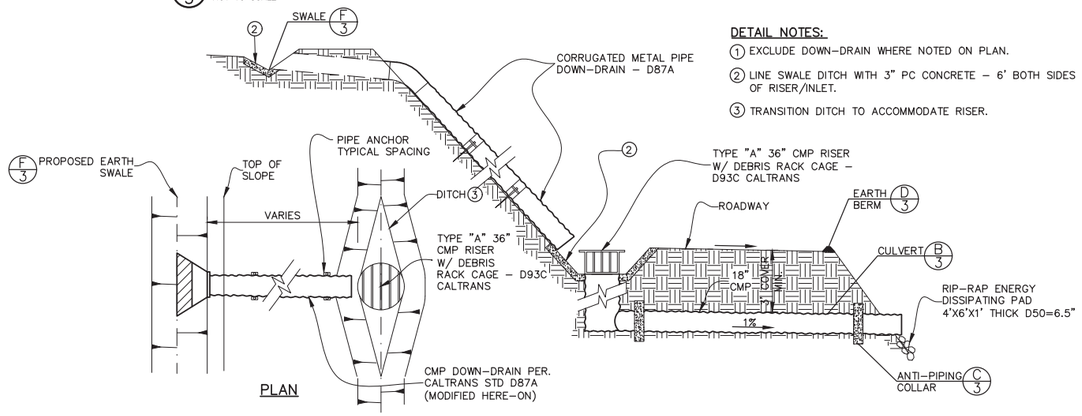
ROADSIDE DITCH

DETAIL NOTES:

① LINE SWALE DITCH WITH 3" PC CONCRETE – 6' BOTH SIDES OF INLETS.

F 3 DRAINAGE SWALE

NOT TO SCALE



PLAN

DETAIL NOTES:

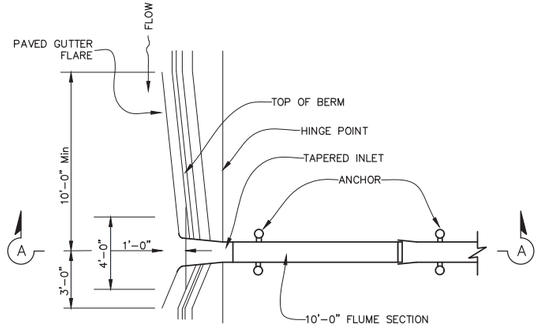
① EXCLUDE DOWN–DRAIN WHERE NOTED ON PLAN.

② LINE SWALE DITCH WITH 3" PC CONCRETE – 6' BOTH SIDES OF RISER/INLET.

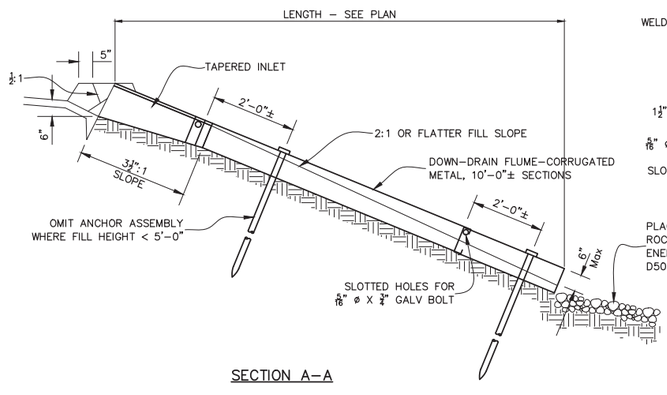
③ TRANSITION DITCH TO ACCOMMODATE RISER.

G 3 CMP DOWN DRAIN – CULVERT

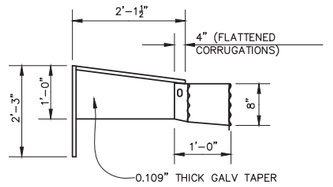
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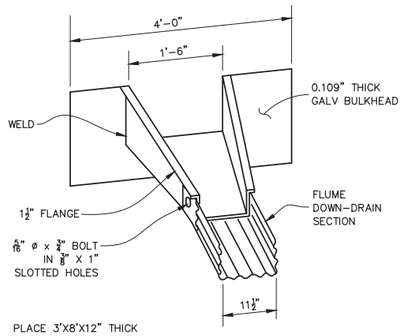


PLAN



SECTION A–A





TAPERED INLET

E 3 CALTRANS STANDARD DETAIL D87D – OVER–SIDE TAPERED INLET DOWN DRAIN

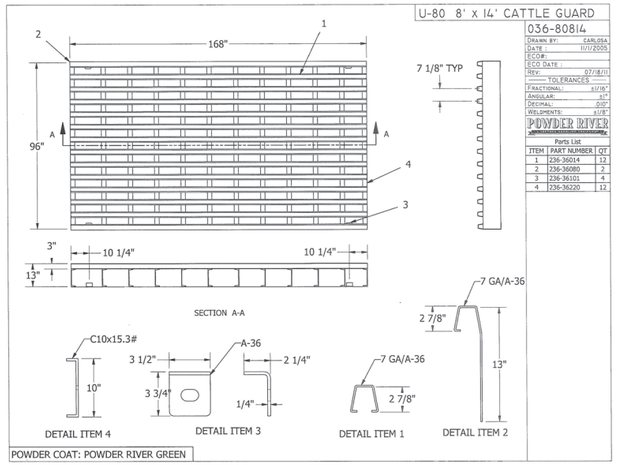
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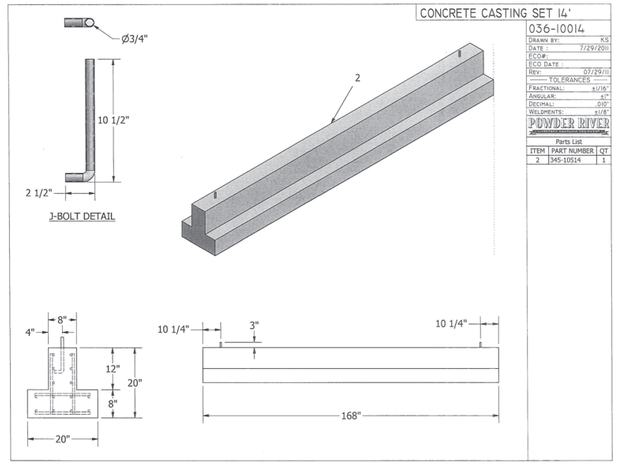
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KERN COUNTY, CALIFORNIA

JOB No.:	15-654
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DRAWN BY:	TTP
CHECKED BY:	MKV
SHEET	3
	OF 9 SHEETS

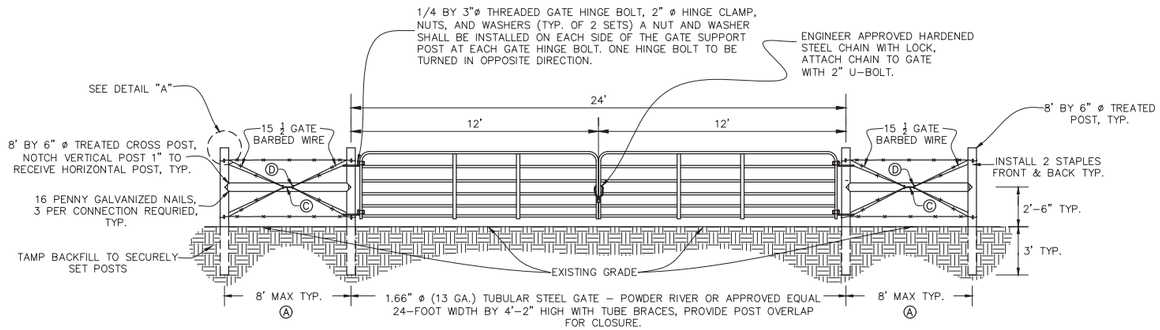


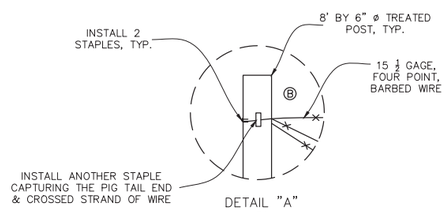


DETAIL NOTES:

1. SEDIMENTS AND OTHER MATERIALS SHALL NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS SHALL BE STABILIZED SO AS TO PREVENT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC ROADS. DEPOSITIONS MUST BE SWEPT IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS INTO THE STORM DRAIN SYSTEM.
2. STABILIZED CONSTRUCTION ENTRANCE SHALL BE:
   A. LOCATED AT ANY POINT WHERE TRAFFIC WILL BE ENTERING OR LEAVING A CONSTRUCTION SITE TO OR FROM A PUBLIC RIGHT OF WAY, STREET, ALLEY, AND SIDEWALK OR PARKING AREA.
   B. A SERIES OF STEEL PLATES WITH "RUMBLE STRIPS." AND/OR MIN 4" COARSE AGGREGATE WITH LENGTH, WIDTH & THICKNESS AS NEEDED TO ADEQUATELY PREVENT ANY TRACKING ONTO PAVED SURFACES.
3. ADDING A WASH RACK WITH A SEDIMENT TRAP LARGE ENOUGH TO COLLECT ALL WASH WATER CAN GREATLY IMPROVE EFFICIENCY.
4. ALL VEHICLES ACCESSING THE CONSTRUCTION SITE SHALL UTILIZE THE STABILIZED CONSTRUCTION ENTRANCES SITES.
   A. REMOVE ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS IMMEDIATELY.
   B. SWEEP PAVED AREAS THAT RECEIVE CONSTRUCTION TRAFFIC WHENEVER SEDIMENT BECOMES VISIBLE.
   C. PAVEMENT WASHING WITH WATER IS PROHIBITED IF IT RESULTS IN A DISCHARGE TO THE STORM DRAIN SYSTEM.

A/4 CATTLE GUARD / ANTI-TRACKOUT
NOT TO SCALE





DETAIL NOTES:

Ⓐ INSTALL BOTH SETS OF GATE SUPPORT POSTS PRIOR TO INSTALLING THE GATE. ALL POST SHALL BE 8' BY 6" ø OR 8' AND 6" BY 6" SQUARE AND PRESSURE TREATED LUMBER.

Ⓑ WRAP FENCE AROUND EACH GATE SUPPORT POST EXTENDING FROM 6" TO 8" FROM THE TOP AND 6" TO 8" FROM THE GROUND POST FORMING A LOOP OF WIRE AROUND BOTH POSTS. OVERLAP ENDS OF LOOPED WIRE 4" MINIMUM IN EACH DIRECTION. OVERLAP SHOULD BE PLACED ON OUTSIDE OF INSTALLED GATE SUPPORT POST INSTALLATION AND ATTACHED TO THE GATE SUPPORT POST BY TWO 1-1/2" NUMBER 9 STAPLES. PLACE THE STAPLES AT THE INTERSECTION OF THE OVERLAP FENCE STRANDS CAPTURING BOTH STRANDS. BEND THE PIG TAIL OF FENCE BACK ALONG THE ALIGNMENT OF OVERLAPPED STRAND. CONTINUE THE PROCESS ON THE OPPOSITE POST FORMING AN "X" CONFIGURATION AS SHOWN.

Ⓒ PLACE A STEEL BAR AT THE "X" INTERSECTION ADJACENT TO THE HORIZONTAL SUPPORT POST. TWIST THE FENCE STRANDS TOGETHER TO BRING THE GATE SUPPORT POSTS INTO TENSION.

Ⓓ INSTALL TWO 1-1/2" NUMBER 9 STAPLES INTO THE HORIZONTAL SUPPORT POST AT THE END OF THE TWISTED STRANDS AS SHOWN, FOUR STAPLES ARE REQUIRED PER INSTALLATION.

Ⓔ GATE SHALL BE INSTALLED TO SWING OPEN MORE THAN 90°.

B/4 DETAIL – 24-FOOT DOUBLE SWING GATE
NOT TO SCALE

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KERN COUNTY, CALIFORNIA

JOB No.:	15-654
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SHEET	4
OF	9 SHEETS

EROSION CONTROL NOTES (BEST MANAGEMENT PRACTICES):

1. SOIL STABILIZATION:
   (A) TEMPORARY SEEDING – WITHIN 7 DAYS AFTER CONSTRUCTION ACTIVITY CEASES ON ANY PARTICULAR AREA, ALL DISTURBED GROUND WHERE THERE WILL NOT BE CONSTRUCTION FOR LONGER THAN 21 DAYS MUST BE SEEDED WITH FAST-GERMINATING TEMPORARY SEED AND PROTECTED WITH MULCH.

   (B) PERMANENT SEEDING – ALL AREAS AT FINAL GRADE MUST BE SEEDED WITHIN 14 DAYS AFTER COMPLETION OF THE MAJOR CONSTRUCTION ACTIVITY. SEEDED AREAS SHOULD BE PROTECTED WITH MULCH.

   (C) STRUCTURAL CONTROLS – GENERAL:
   1. MINIMIZE THE LIMITS OF DISTURBED SOIL. LIMIT CONSTRUCTION EQUIPMENT TO THE PRECISE WORK AREA.
   2. INSTALL SILT FENCES AND/OR FIBER ROLLS AT THE BOTTOM OF SLOPES IN ACCORDANCE WITH PLAN DETAILS.
   3. STAKE FIBER ROLLS ONTO SLOPES PERPENDICULAR TO FLOW AT INTERMITTENT INTERVALS.
   4. VEHICLE FUELING AREAS, EQUIPMENT MAINTENANCE AREAS, MATERIAL STOCKPILE AREAS, AND CONCRETE WASH OUT AREAS SHALL BE CONTAINED VIA BERMING, IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS.

   (D) FINAL SITE STABILIZATION IS ACHIEVED WHEN TURF GRASS COVER PROVIDES PERMANENT STABILIZATION FOR AT LEAST 70 PERCENT OF THE DISTURBED SOIL SURFACE, EXCLUSIVE OF AREAS THAT HAVE BEEN PAVED.

2. OTHER POLLUTANT CONTROLS:
   (A) DUST CONTROL – CONSTRUCTION TRAFFIC MUST ENTER AND EXIT THE SITE AT THE STABILIZED CONSTRUCTION ENTRANCE. THE PURPOSE IS TO TRAP DUST AND MUD THAT WOULD OTHERWISE BE CARRIED OFF-SITE BY CONSTRUCTION TRAFFIC.

   WATER TRUCKS WILL BE USED AS NEEDED DURING CONSTRUCTION TO REDUCE DUST GENERATED ON THE SITE. DUST CONTROL MUST BE PROVIDED BY THE GENERAL CONTRACTOR TO A DEGREE THAT IS ACCEPTABLE TO THE PG&E CONSTRUCTION MANAGER, AND IN COMPLIANCE WITH APPLICABLE LOCAL AND STATE DUST CONTROL REGULATIONS. AFTER CONSTRUCTION, THE SITE WILL BE STABILIZED (AS DESCRIBED ELSEWHERE), WHICH WILL REDUCE THE POTENTIAL FOR DUST GENERATION.

   (B) SOLID WASTE DISPOSAL – NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED FROM THE SITE WITH STORM WATER. ALL SOLID WASTE, INCLUDING DISPOSABLE MATERIALS INCIDENTAL TO THE MAJOR CONSTRUCTION ACTIVITIES, MUST BE COLLECTED AND PLACED IN CONTAINERS. THE CONTAINERS WILL BE EMPTIED PERIODICALLY BY A CONTRACT TRASH DISPOSAL SERVICE AND HAULED AWAY FROM THE SITE.

   SUBSTANCES THAT HAVE THE POTENTIAL FOR POLLUTING SURFACE AND/OR GROUNDWATER MUST BE CONTROLLED BY WHATEVER MEANS NECESSARY IN ORDER TO ENSURE THAT THEY DO NOT DISCHARGE FROM THE SITE. AS AN EXAMPLE, SPECIAL CARE MUST BE EXERCISED DURING EQUIPMENT FUELING AND SERVICING OPERATIONS. IF A SPILL OCCURS, IT MUST BE CONTAINED AND DISPOSED SO THAT IT WILL NOT FLOW FROM THE SITE OR ENTER GROUNDWATER, EVEN IF THIS REQUIRES REMOVAL, TREATMENT, AND DISPOSAL OF SOIL. IN THIS REGARD, POTENTIALLY POLLUTING SUBSTANCES SHOULD BE HANDLED IN A MANNER CONSISTENT WITH THE IMPACT THEY REPRESENT.

   (C) SANITARY FACILITIES – ALL PERSONNEL INVOLVED WITH CONSTRUCTION ACTIVITIES MUST COMPLY WITH STATE AND LOCAL SANITARY OR SEPTIC SYSTEM REGULATIONS. TEMPORARY SANITARY FACILITIES WILL BE PROVIDED AT THE SITE THROUGHOUT THE CONSTRUCTION PHASE. THEY MUST BE UTILIZED BY ALL CONSTRUCTION PERSONNEL AND WILL BE SERVICED BY A COMMERCIAL OPERATOR.

   (D) WATER SOURCE – NON-STORM WATER COMPONENTS OF SITE DISCHARGE MUST BE CLEAN WATER. WATER USED FOR CONSTRUCTION, WHICH DISCHARGES FROM THE SITE, MUST ORIGINATE FROM A PUBLIC WATER SUPPLY OR PRIVATE WELL APPROVED BY THE STATE HEALTH DEPARTMENT. WATER USED FOR CONSTRUCTION THAT DOES NOT ORIGINATE FROM AN APPROVED PUBLIC SUPPLY MUST NOT DISCHARGE FROM THE SITE. IT CAN BE RETAINED IN THE PONDS UNTIL IT INFILTRATES AND EVAPORATES.

   (E) LONG-TERM POLLUTANT CONTROLS – STORM WATER POLLUTANT CONTROL MEASURES INSTALLED DURING CONSTRUCTION, WHICH WILL ALSO PROVIDE BENEFITS AFTER CONSTRUCTION, INCLUDE DETENTION BASINS THAT WILL SERVE AS SEDIMENTATION BASINS. THOSE SEDIMENT BARRIERS THAT DO NOT INTERFERE WITH NORMAL OPERATIONS AND APPEAR TO PROVIDE LONG-TERM BENEFITS CAN BE LEFT IN PLACE AFTER CONSTRUCTION IS COMPLETED.

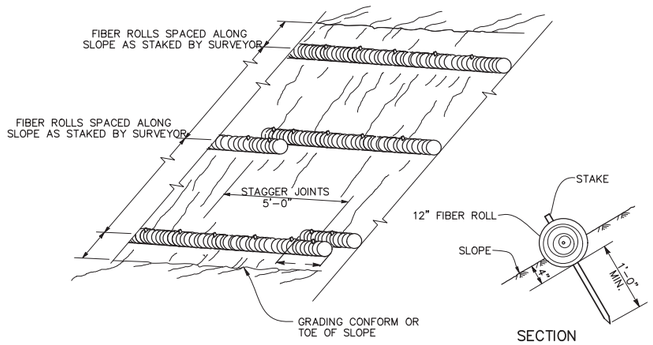
3. CONSTRUCTION PHASE "BEST MANAGEMENT PRACTICES" – DURING THE CONSTRUCTION PHASE, THE GENERAL CONTRACTOR WILL IMPLEMENT THE FOLLOWING MEASURES:

   (A) MATERIAL RESULTING FROM THE CLEARING AND GRUBBING OPERATION WILL BE STOCKPILED UP SLOPE FROM ADEQUATE SEDIMENTATION CONTROLS.

   (B) THE GENERAL CONTRACTOR WILL DESIGNATE AREAS FOR EQUIPMENT CLEANING, MAINTENANCE, AND REPAIR. THE GENERAL CONTRACTOR AND SUBCONTRACTORS WILL UTILIZE THOSE AREAS. THE AREAS WILL BE PROTECTED BY A TEMPORARY PERIMETER BERM.

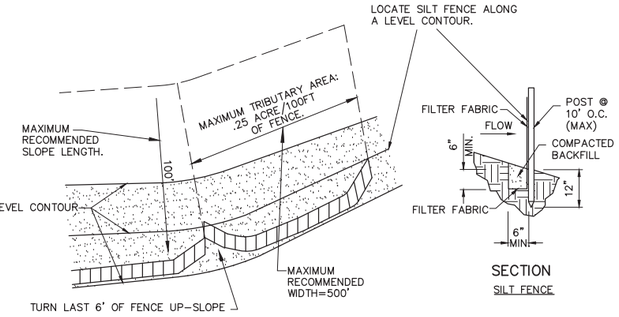
   (C) USE OF DETERGENTS FOR LARGE-SCALE WASHING IS PROHIBITED (I.E., VEHICLES, BUILDINGS, PAVEMENT SURFACES, ETC.).

   (D) CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER TOXIC MATERIAL MUST BE STORED IN WATERPROOF CONTAINERS. EXCEPT DURING APPLICATION, THE CONTENTS MUST BE KEPT IN TRUCKS OR WITHIN STORAGE FACILITIES. RUNOFF CONTAINING SUCH MATERIAL MUST BE COLLECTED, REMOVED FROM THE SITE, TREATED, AND DISPOSED AT AN APPROVED SOLID WASTE OR CHEMICAL DISPOSAL FACILITY.



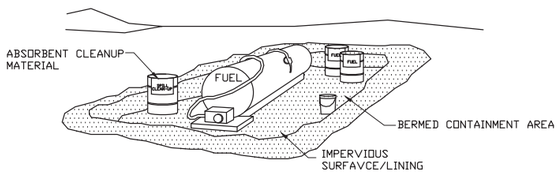
DETAIL NOTES:
1. FIBER ROLL SPACING TO BE STAKED BY SURVEYOR
2. EXCEPT AS OTHERWISE SHOWN ON THE PLAN, FIBER ROLLS SHALL BE INSTALLED AT ELEVATION DIFFERENTIAL OF 6-FEET OR LESS.

A/5 FIBER ROLL INSTALLATION ON SLOPE
NOT TO SCALE



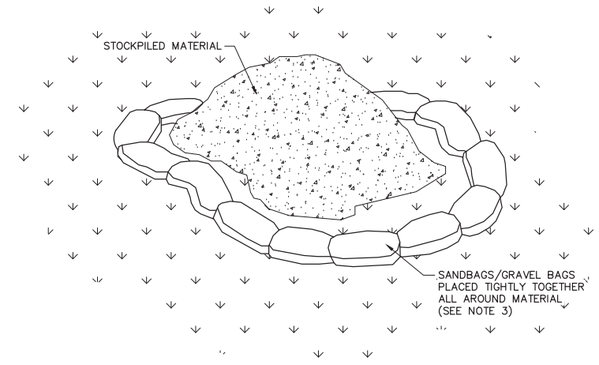
NOTES:
1. CONSTRUCT THE SILT FENCE ALONG A LEVEL CONTOUR.
2. SILT FENCES SHALL REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED.
3. PROVIDE SUFFICIENT ROOM FOR RUNOFF TO POND BEHIND THE FENCE AND ALLOW SEDIMENT REMOVAL EQUIPMENT TO PASS BETWEEN THE SILT FENCE AND TOE OF SLOPE OR OTHER OBSTRUCTIONS. ABOUT 1200 SQ. FT. OF PONDING AREA SHALL BE PROVIDED FOR EVER ACRE DRAINING TO THE FENCE.
4. TURN THE ENDS OF THE FILTER FENCE UPHILL TO PREVENT STORM WATER FROM FLOWING.
5. LEAVE AN UNDISTURBED OR STABILIZED AREA IMMEDIATELY DOWN SLOPE FROM THE FENCE.
6. DO NOT PLACE IN LIVE STREAM OR INTERMITTENTLY FLOWING CHANNELS.
7. WHEN STANDARD FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UP SLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1" LONG, TIE WIRES OR HOG RINGS.

B/5 SILT FENCE
NOT TO SCALE



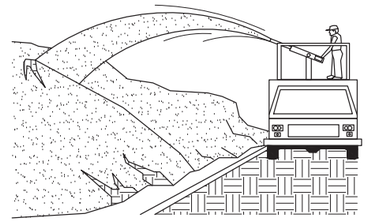
NOTES:
1. FUELING SHALL BE PERFORMED IN A DESIGNATED AREA AWAY FROM DRAINAGE COURSES.
2. ABSORBENT CLEANUP MATERIAL SHALL BE ON SITE AND USED IMMEDIATELY IN THE EVENT OF A SPILL.

D/5 VEHICLE/EQUIPMENT FUELING
NOT TO SCALE



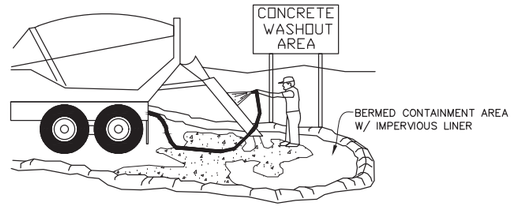
NOTES:
1. DIRT AND OTHER CONSTRUCTION RELATED MATERIALS PLACED IN THE STREET OR ON OTHER IMPERVIOUS SURFACES MUST BE CONTAINED WITH SANDBAGS OR OTHER MEASURES TO PREVENT TRANSPORT TO THE STORM DRAIN SYSTEM.
2. ANY CONSTRUCTION MATERIAL STORED OR STOCKPILED ON-SITE SHALL BE PROTECTED FROM BEING TRANSPORTED BY THE FORCE OF WIND OR WATER
3. FIBER ROLLS MAY BE SUBSTITUTED FOR SAND BAGS.

E/5 MATERIAL STORAGE
NOT TO SCALE



NOTES:
1. SOIL/SLOPE STABILIZATION PRACTICES SHALL BE DESIGNED TO PRESERVE EXISTING VEGETATION WHERE FEASIBLE AND TO REVEGETATE OPEN AREAS AS SOON AS FEASIBLE AFTER GRADING. THESE CONTROL PRACTICES SHALL INCLUDE TEMPORARY SEEDING, PERMANENT SEEDING, MULCHING, SOD STABILIZATION, VEGETATIVE BUFFER STRIPS, PROTECTION OF TREES, OR OTHER SOIL STABILIZATION PRACTICES.
2. SOIL STABILIZATION SHALL BE IMPLEMENTED ON ALL INACTIVE DISTURBED AREAS FROM NOVEMBER 1 THRU APRIL 15 AND ON ALL DISTURBED AREAS DURING A RAIN EVEN OR POTENTIAL RAIN.
3. STABILIZATION PRACTICES SHALL CONTROL/PREVENT EROSION FROM THE FORCES OF WIND AND WATER.
4. STABILIZATION PRACTICES SHALL BE IMPLEMENTED IN CONJUNCTION WITH SEDIMENT TRAPPING/FILTERING PRACTICES AND PRACTICES TO REDUCE THE TRACKING OF SEDIMENT ONTO PAVED ROADS.
5. WHEN USING STRAW MULCHING, THE MINIMUM APPLICATION SHALL BE 2 TONS/ACRE. MULCH MUST BE ANCHORED IMMEDIATELY TO MINIMIZE LOSS BY WIND OR WATER.
6. WHEN USING HYDROSEEDING/MULCHING, THE MINIMUM APPLICATION OF WOOD FIBER SHALL BE 1,500 LBS/ACRE, THAT DOES NOT CONTAIN MORE THAN 50% NEWSPRINT.

F/5 EROSION CONTROL



NOTES:
1. EXCESS AND WASTE CONCRETE SHALL NOT BE WASHED INTO THE STREET OR INTO A DRAINAGE SYSTEM.
2. FOR WASHOUT OF CONCRETE AND MORTAR PRODUCTS, A DESIGNATED CONTAINMENT FACILITY OF SUFFICIENT CAPACITY TO RETAIN LIQUID AND SOLID WASTE SHALL BE PROVIDED ON SITE.
3. SLURRY FROM CONCRETE AND ASPHALT SAW CUTTING SHALL BE VACUUMED OR CONTAINED,DRIED, PICKED UP AND DISPOSED OF PROPERLY.

G/5 CONCRETE WASTE MANAGEMENT
NOT TO SCALE

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DATE
REVISIONS

JOHE RANCH
ACCESS ROADS AND
CULVERT IMPROVEMENT PLANS
KERN COUNTY, CALIFORNIA

JOB No.:	15-654
DWG NO.:	15-654BM
DATE:	08/25/2015
DRAWN BY:	TTP
CHECKED BY:	MKV
SHEET	5
OF	9 SHEETS

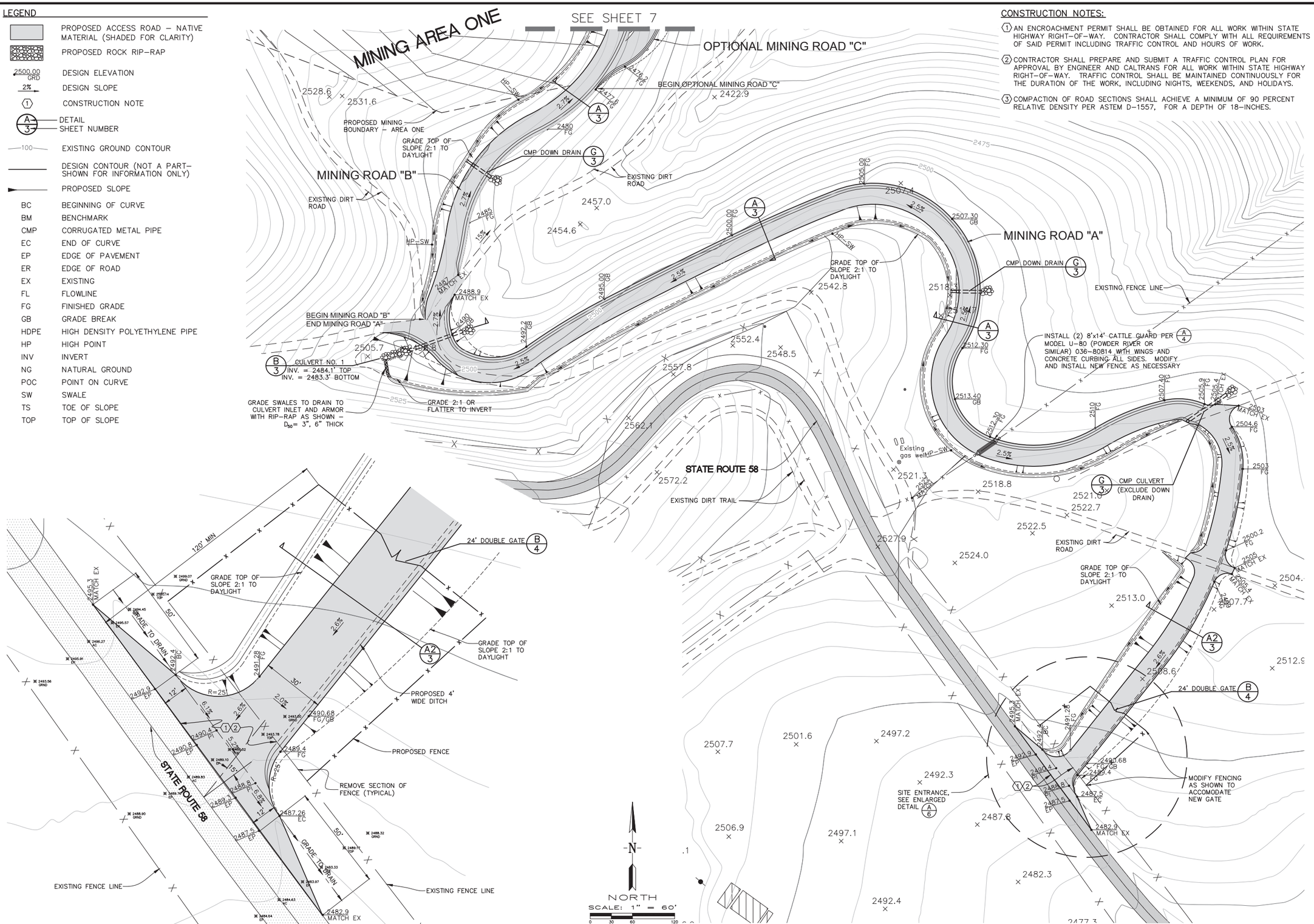
LEGEND

- PROPOSED ACCESS ROAD – NATIVE MATERIAL (SHADED FOR CLARITY)
- PROPOSED ROCK RIP–RAP
- 2500.00 GRD — DESIGN ELEVATION
- 2% — DESIGN SLOPE
- (1) — CONSTRUCTION NOTE
- A/3 — DETAIL / SHEET NUMBER
- 100 — EXISTING GROUND CONTOUR
- DESIGN CONTOUR (NOT A PART–SHOWN FOR INFORMATION ONLY)
- PROPOSED SLOPE

BC	BEGINNING OF CURVE
BM	BENCHMARK
CMP	CORRUGATED METAL PIPE
EC	END OF CURVE
EP	EDGE OF PAVEMENT
ER	EDGE OF ROAD
EX	EXISTING
FL	FLOWLINE
FG	FINISHED GRADE
GB	GRADE BREAK
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HP	HIGH POINT
INV	INVERT
NG	NATURAL GROUND
POC	POINT ON CURVE
SW	SWALE
TS	TOE OF SLOPE
TOP	TOP OF SLOPE

CONSTRUCTION NOTES:

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3. COMPACTION OF ROAD SECTIONS SHALL ACHIEVE A MINIMUM OF 90 PERCENT RELATIVE DENSITY PER ASTEM D–1557, FOR A DEPTH OF 18–INCHES.



A/6 SITE ENTRANCE – ENLARGED DETAIL
SCALE = 1" = 20'

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	OF 9 SHEETS

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- 2% — DESIGN SLOPE
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- A/3 — DETAIL / SHEET NUMBER
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- DESIGN CONTOUR (NOT A PART–SHOWN FOR INFORMATION ONLY)
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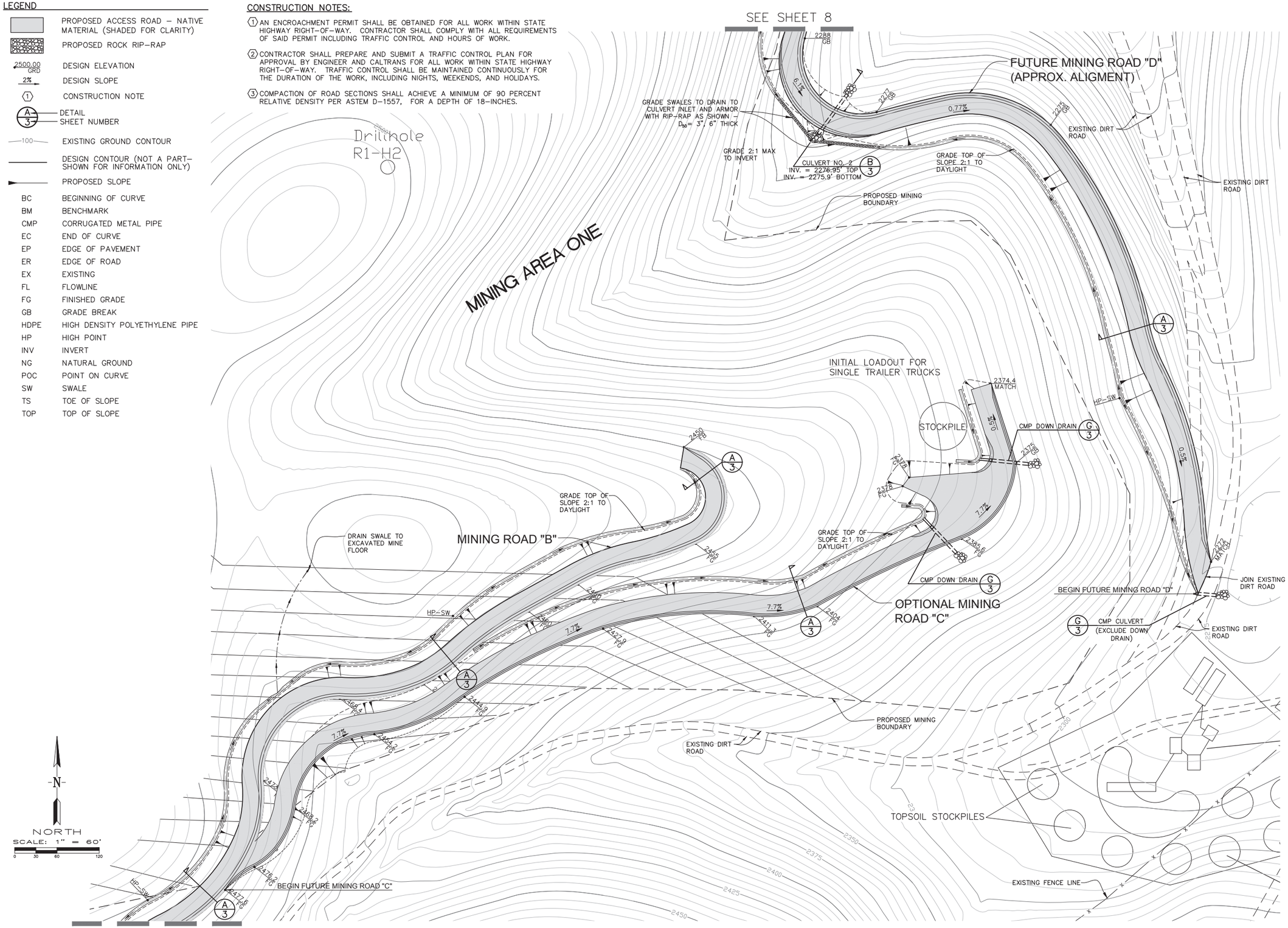
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SHEET	7
	OF 9 SHEETS

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LEGEND

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	PROPOSED ROCK RIP–RAP
2500.00 GRD	DESIGN ELEVATION
2%	DESIGN SLOPE
(1)	CONSTRUCTION NOTE
A/3	DETAIL / SHEET NUMBER
100	EXISTING GROUND CONTOUR
	DESIGN CONTOUR (NOT A PART– SHOWN FOR INFORMATION ONLY)
	PROPOSED SLOPE
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BM	BENCHMARK
CMP	CORRUGATED METAL PIPE
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NG	NATURAL GROUND
POC	POINT ON CURVE
SW	SWALE
TS	TOE OF SLOPE
TOP	TOP OF SLOPE

SEE SHEET 9

2316.20 GRADE
2317.80 GRADE
0.5%
GRADE TOP OF SLOPE 2:1 TO DAYLIGHT
A/3
2315 GRADE
24.50 GB
24.50 GB
0.5%
10%
DOWNDRAIN E/3
GRADE SWALES TO DRAIN TO CULVERT INLET AND ARMOR WITH RIP–RAP AS SHOWN – D_{50}= 3", 6" THICK
CULVERT NO. 3 B/3
INV. = 2295.0' TOP
INV. = 2293.8' BOTTOM
PROPOSED MINING BOUNDARY – AREA ONE
10%
GRADE TOP OF SLOPE 2:1 TO DAYLIGHT
2375 MATCH
2321 TOP
2320 GB
CMP DOWN DRAIN G/3
EXISTING DIRT ROAD
FUTURE MINING ROAD "D" (APPROX. ALIGMENT)
A/3
CMP DOWN DRAIN G/3
2295 GB
HP–SW
0.5%
1.35%
PROPOSED MINING BOUNDARY – AREA ONE
MINING AREA ONE
GRADE TOP OF SLOPE 2:1 TO DAYLIGHT
HP–SW
A/3
2288 GB
5.1%
2277 GB
GRADE SWALES TO DRAIN TO CULVERT INLET AND ARMOR WITH RIP–RAP AS SHOWN – D_{50}= 3", 6" THICK
GRADE 2:1 MAX TO INVERT
CULVERT NO. 2 B/3
INV. = 2276.95' TOP
INV. = 2275.9' BOTTOM
SEE SHEET 7

NORTH
SCALE: 1" = 60'
0 30 60 120

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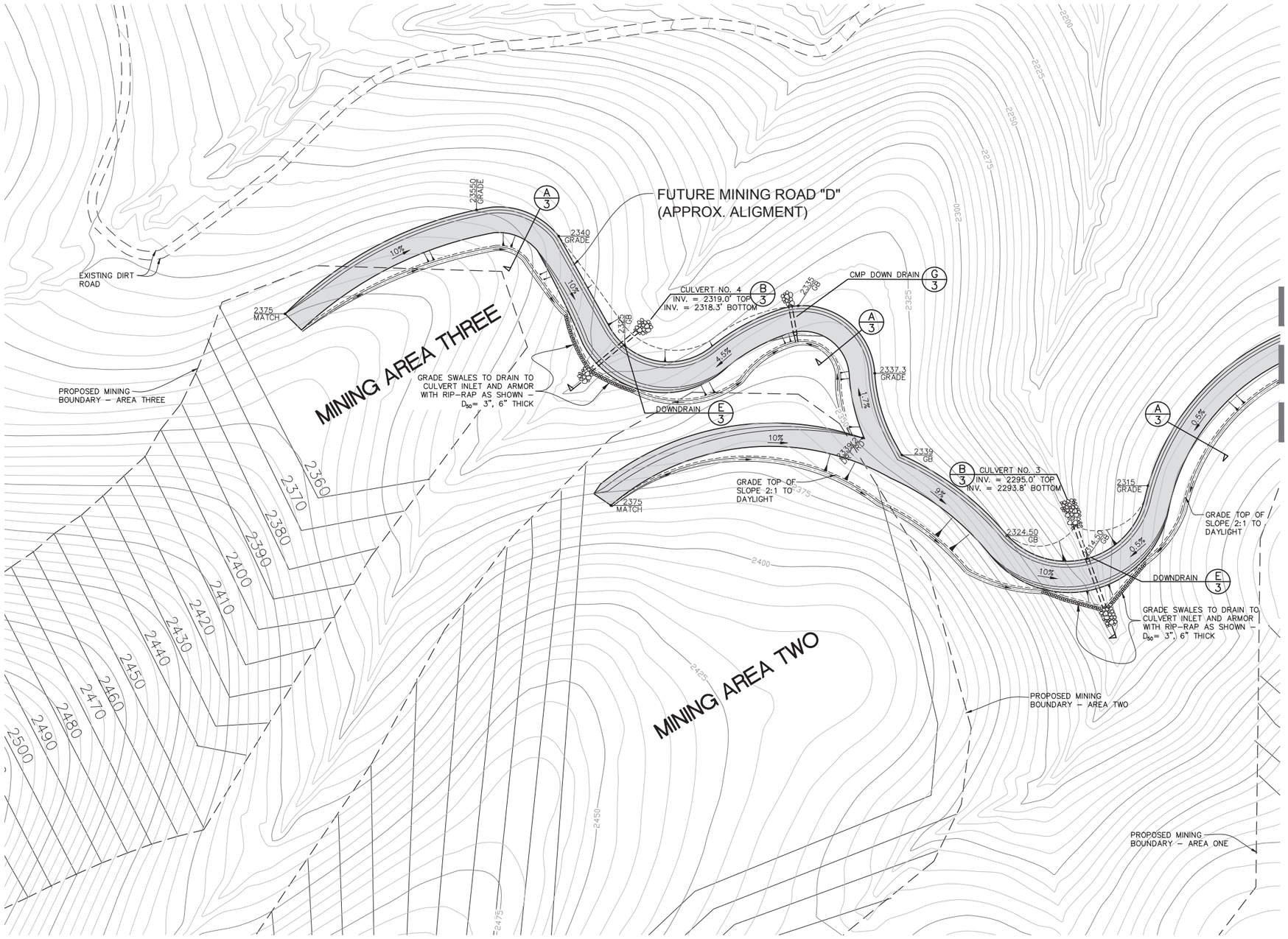
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LEGEND

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	PROPOSED ROCK RIP-RAP
2500.00 GRD	DESIGN ELEVATION
2%	DESIGN SLOPE
1	CONSTRUCTION NOTE
A/3	DETAIL / SHEET NUMBER
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NORTH
SCALE: 1" = 60'
0 30 60 120

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APPENDIX “B”:
Hydrology Calculations

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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA A - EXISTING CONDITIONS
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
8.40	6	0.82
Rainfall data for year 2		
8.40	24	1.37
Rainfall data for year 100		
8.40	6	2.34
Rainfall data for year 100		
8.40	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	8.40	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
8.40	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
++
Watercourse length = 1240.00(Ft.)
Length from concentration point to centroid = 605.00(Ft.)
Elevation difference along watercourse = 270.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 8.40(Ac.)
Catchment Lag time = 0.064 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 130.8252
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 8.40(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.230(In)
30-minute factor = 1.000 Adjusted rainfall = 0.515(In)
1-hour factor = 1.000 Adjusted rainfall = 0.704(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 101.59 (CFS))

1	24.970	25.366
2	80.335	56.245
3	94.485	14.374
4	98.300	3.876
5	100.000	1.726

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.52	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.93	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010

46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.55	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006

103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.68	1.68	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.85	1.85	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005

160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.98	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.17	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004

217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.33	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003

274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006
29	0.0037	0.0031	0.0006
30	0.0037	0.0031	0.0006
31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006
33	0.0038	0.0032	0.0006
34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006

37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006
40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008
86	0.0048	0.0040	0.0008
87	0.0049	0.0041	0.0008
88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008
90	0.0049	0.0041	0.0008
91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008

94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008
97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0063	0.0012
142	0.0075	0.0063	0.0012
143	0.0077	0.0064	0.0013
144	0.0077	0.0065	0.0013
145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013
147	0.0081	0.0067	0.0013
148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014

151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014
154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0095	0.0019
168	0.0116	0.0097	0.0019
169	0.0120	0.0100	0.0020
170	0.0122	0.0102	0.0020
171	0.0127	0.0106	0.0021
172	0.0129	0.0108	0.0021
173	0.0134	0.0112	0.0022
174	0.0137	0.0115	0.0023
175	0.0143	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0154	0.0129	0.0025
178	0.0158	0.0132	0.0026
179	0.0167	0.0140	0.0028
180	0.0173	0.0144	0.0028
181	0.0184	0.0154	0.0030
182	0.0191	0.0160	0.0031
183	0.0207	0.0173	0.0034
184	0.0216	0.0180	0.0035
185	0.0270	0.0226	0.0044
186	0.0284	0.0237	0.0047
187	0.0319	0.0267	0.0052
188	0.0342	0.0286	0.0056
189	0.0406	0.0339	0.0067
190	0.0453	0.0379	0.0075
191	0.0629	0.0472*	0.0157
192	0.0842	0.0472*	0.0370
193	0.2300	0.0472*	0.1829
194	0.0521	0.0436	0.0086
195	0.0370	0.0309	0.0061
196	0.0300	0.0251	0.0049
197	0.0226	0.0189	0.0037
198	0.0198	0.0166	0.0033
199	0.0178	0.0149	0.0029
200	0.0163	0.0136	0.0027
201	0.0150	0.0126	0.0025
202	0.0140	0.0117	0.0023
203	0.0132	0.0110	0.0022
204	0.0124	0.0104	0.0020
205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018

208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016
211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0013
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0070	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0066	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007
257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007
259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007
261	0.0042	0.0035	0.0007
262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007

265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006
268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4664	1.8872	0.5792

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 11.11(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0004	0.05	Q	|	|	|	|
0+15	0.0008	0.05	Q	|	|	|	|
0+20	0.0012	0.06	Q	|	|	|	|
0+25	0.0016	0.06	Q	|	|	|	|
0+30	0.0020	0.06	Q	|	|	|	|
0+35	0.0023	0.06	Q	|	|	|	|
0+40	0.0027	0.06	Q	|	|	|	|
0+45	0.0031	0.06	Q	|	|	|	|
0+50	0.0035	0.06	Q	|	|	|	|
0+55	0.0039	0.06	Q	|	|	|	|
1+ 0	0.0043	0.06	Q	|	|	|	|
1+ 5	0.0047	0.06	Q	|	|	|	|
1+10	0.0051	0.06	Q	|	|	|	|
1+15	0.0056	0.06	Q	|	|	|	|
1+20	0.0060	0.06	Q	|	|	|	|

1+25	0.0064	0.06	Q				
1+30	0.0068	0.06	Q				
1+35	0.0072	0.06	Q				
1+40	0.0076	0.06	Q				
1+45	0.0080	0.06	Q				
1+50	0.0084	0.06	Q				
1+55	0.0089	0.06	Q				
2+ 0	0.0093	0.06	Q				
2+ 5	0.0097	0.06	Q				
2+10	0.0101	0.06	Q				
2+15	0.0105	0.06	QV				
2+20	0.0110	0.06	QV				
2+25	0.0114	0.06	QV				
2+30	0.0118	0.06	QV				
2+35	0.0122	0.06	QV				
2+40	0.0127	0.06	QV				
2+45	0.0131	0.06	QV				
2+50	0.0135	0.06	QV				
2+55	0.0140	0.06	QV				
3+ 0	0.0144	0.06	QV				
3+ 5	0.0149	0.06	QV				
3+10	0.0153	0.06	QV				
3+15	0.0157	0.06	QV				
3+20	0.0162	0.06	QV				
3+25	0.0166	0.06	QV				
3+30	0.0171	0.07	QV				
3+35	0.0175	0.07	QV				
3+40	0.0180	0.07	QV				
3+45	0.0184	0.07	QV				
3+50	0.0189	0.07	QV				
3+55	0.0193	0.07	QV				
4+ 0	0.0198	0.07	QV				
4+ 5	0.0203	0.07	Q V				
4+10	0.0207	0.07	Q V				
4+15	0.0212	0.07	Q V				
4+20	0.0217	0.07	Q V				
4+25	0.0221	0.07	Q V				
4+30	0.0226	0.07	Q V				
4+35	0.0231	0.07	Q V				
4+40	0.0235	0.07	Q V				
4+45	0.0240	0.07	Q V				
4+50	0.0245	0.07	Q V				
4+55	0.0250	0.07	Q V				
5+ 0	0.0255	0.07	Q V				
5+ 5	0.0260	0.07	Q V				
5+10	0.0264	0.07	Q V				
5+15	0.0269	0.07	Q V				
5+20	0.0274	0.07	Q V				
5+25	0.0279	0.07	Q V				
5+30	0.0284	0.07	Q V				
5+35	0.0289	0.07	Q V				
5+40	0.0294	0.07	Q V				
5+45	0.0299	0.07	Q V				
5+50	0.0304	0.07	Q V				
5+55	0.0309	0.07	Q V				
6+ 0	0.0315	0.07	Q V				
6+ 5	0.0320	0.07	Q V				

6+10	0.0325	0.08	Q	V				
6+15	0.0330	0.08	Q	V				
6+20	0.0335	0.08	Q	V				
6+25	0.0341	0.08	Q	V				
6+30	0.0346	0.08	Q	V				
6+35	0.0351	0.08	Q	V				
6+40	0.0356	0.08	Q	V				
6+45	0.0362	0.08	Q	V				
6+50	0.0367	0.08	Q	V				
6+55	0.0373	0.08	Q	V				
7+ 0	0.0378	0.08	Q	V				
7+ 5	0.0384	0.08	Q	V				
7+10	0.0389	0.08	Q	V				
7+15	0.0395	0.08	Q	V				
7+20	0.0400	0.08	Q	V				
7+25	0.0406	0.08	Q	V				
7+30	0.0411	0.08	Q	V				
7+35	0.0417	0.08	Q	V				
7+40	0.0423	0.08	Q	V				
7+45	0.0429	0.08	Q	V				
7+50	0.0434	0.08	Q	V				
7+55	0.0440	0.08	Q	V				
8+ 0	0.0446	0.08	Q	V				
8+ 5	0.0452	0.09	Q	V				
8+10	0.0458	0.09	Q	V				
8+15	0.0464	0.09	Q	V				
8+20	0.0470	0.09	Q	V				
8+25	0.0476	0.09	Q	V				
8+30	0.0482	0.09	Q	V				
8+35	0.0488	0.09	Q	V				
8+40	0.0494	0.09	Q	V				
8+45	0.0500	0.09	Q	V				
8+50	0.0507	0.09	Q	V				
8+55	0.0513	0.09	Q	V				
9+ 0	0.0519	0.09	Q	V				
9+ 5	0.0526	0.09	Q	V				
9+10	0.0532	0.09	Q	V				
9+15	0.0538	0.09	Q	V				
9+20	0.0545	0.09	Q	V				
9+25	0.0551	0.10	Q	V				
9+30	0.0558	0.10	Q	V				
9+35	0.0565	0.10	Q	V				
9+40	0.0571	0.10	Q	V				
9+45	0.0578	0.10	Q	V				
9+50	0.0585	0.10	Q	V				
9+55	0.0592	0.10	Q	V				
10+ 0	0.0599	0.10	Q	V				
10+ 5	0.0606	0.10	Q	V				
10+10	0.0613	0.10	Q	V				
10+15	0.0620	0.10	Q	V				
10+20	0.0627	0.10	Q	V				
10+25	0.0634	0.11	Q	V				
10+30	0.0642	0.11	Q	V				
10+35	0.0649	0.11	Q	V				
10+40	0.0657	0.11	Q	V				
10+45	0.0664	0.11	Q	V				
10+50	0.0672	0.11	Q	V				

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10+55       0.0679      0.11  Q     V   |          |          |          |
11+ 0       0.0687      0.11  Q     V   |          |          |          |
11+ 5       0.0695      0.11  Q     V   |          |          |          |
11+10       0.0703      0.11  Q     V   |          |          |          |
11+15       0.0711      0.12  Q      V  |          |          |          |
11+20       0.0719      0.12  Q      V  |          |          |          |
11+25       0.0727      0.12  Q      V  |          |          |          |
11+30       0.0735      0.12  Q      V  |          |          |          |
11+35       0.0743      0.12  Q      V  |          |          |          |
11+40       0.0752      0.12  Q      V  |          |          |          |
11+45       0.0760      0.12  Q      V  |          |          |          |
11+50       0.0769      0.12  Q      V  |          |          |          |
11+55       0.0777      0.13  Q      V  |          |          |          |
12+ 0       0.0786      0.13  Q      V  |          |          |          |
12+ 5       0.0795      0.13  Q      V  |          |          |          |
12+10       0.0804      0.13  Q      V  |          |          |          |
12+15       0.0813      0.13  Q       V |          |          |          |
12+20       0.0823      0.13  Q       V |          |          |          |
12+25       0.0832      0.14  Q       V |          |          |          |
12+30       0.0841      0.14  Q       V |          |          |          |
12+35       0.0851      0.14  Q       V |          |          |          |
12+40       0.0861      0.14  Q       V |          |          |          |
12+45       0.0871      0.14  Q       V |          |          |          |
12+50       0.0881      0.15  Q       V |          |          |          |
12+55       0.0891      0.15  Q       V |          |          |          |
13+ 0       0.0901      0.15  Q       V |          |          |          |
13+ 5       0.0912      0.15  Q        V|          |          |          |
13+10       0.0923      0.16  Q        V|          |          |          |
13+15       0.0934      0.16  Q        V|          |          |          |
13+20       0.0945      0.16  Q        V|          |          |          |
13+25       0.0956      0.16  Q        V|          |          |          |
13+30       0.0968      0.17  Q        V|          |          |          |
13+35       0.0979      0.17  Q        V|          |          |          |
13+40       0.0991      0.17  Q        V|          |          |          |
13+45       0.1004      0.18  Q        V|          |          |          |
13+50       0.1016      0.18  Q         V          |          |          |
13+55       0.1029      0.19  Q         V          |          |          |
14+ 0       0.1042      0.19  Q         V          |          |          |
14+ 5       0.1056      0.19  Q         V          |          |          |
14+10       0.1069      0.20  Q         V          |          |          |
14+15       0.1083      0.20  Q         V          |          |          |
14+20       0.1098      0.21  Q         V          |          |          |
14+25       0.1113      0.22  Q         V          |          |          |
14+30       0.1128      0.22  Q          |V         |          |          |
14+35       0.1144      0.23  Q          |V         |          |          |
14+40       0.1161      0.24  Q          |V         |          |          |
14+45       0.1177      0.25  Q          |V         |          |          |
14+50       0.1195      0.26  Q          |V         |          |          |
14+55       0.1213      0.27  Q          |V         |          |          |
15+ 0       0.1233      0.28  Q          | V        |          |          |
15+ 5       0.1253      0.29  Q          | V        |          |          |
15+10       0.1274      0.31  Q          | V        |          |          |
15+15       0.1296      0.32  Q          | V        |          |          |
15+20       0.1320      0.34  Q          |  V       |          |          |
15+25       0.1346      0.38  Q          |  V       |          |          |
15+30       0.1376      0.44  Q          |  V       |          |          |
15+35       0.1409      0.48  Q          |  V       |          |          |
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15+40       0.1445      0.53  |Q        |   V     |         |         |
15+45       0.1486      0.59  |Q        |   V     |         |         |
15+50       0.1532      0.67  |Q        |    V    |         |         |
15+55       0.1597      0.95  |Q        |    V    |         |         |
16+ 0       0.1733      1.97  |  Q      |      V  |         |         |
16+ 5       0.2214      6.99  |         |  Q      |V        |         |
16+10       0.2979     11.11  |         |         | Q      V|         |
16+15       0.3215      3.44  |     Q   |         |         |V        |
16+20       0.3309      1.36  | Q       |         |         | V       |
16+25       0.3365      0.81  |Q        |         |         |  V      |
16+30       0.3393      0.40  Q         |         |         |  V      |
16+35       0.3416      0.34  Q         |         |         |  V      |
16+40       0.3437      0.30  Q         |         |         |  V      |
16+45       0.3456      0.27  Q         |         |         |   V     |
16+50       0.3473      0.25  Q         |         |         |   V     |
16+55       0.3490      0.24  Q         |         |         |   V     |
17+ 0       0.3505      0.22  Q         |         |         |   V     |
17+ 5       0.3519      0.21  Q         |         |         |   V     |
17+10       0.3533      0.20  Q         |         |         |   V     |
17+15       0.3546      0.19  Q         |         |         |   V     |
17+20       0.3558      0.18  Q         |         |         |    V    |
17+25       0.3570      0.17  Q         |         |         |    V    |
17+30       0.3582      0.17  Q         |         |         |    V    |
17+35       0.3593      0.16  Q         |         |         |    V    |
17+40       0.3603      0.15  Q         |         |         |    V    |
17+45       0.3614      0.15  Q         |         |         |    V    |
17+50       0.3624      0.15  Q         |         |         |    V    |
17+55       0.3633      0.14  Q         |         |         |    V    |
18+ 0       0.3643      0.14  Q         |         |         |    V    |
18+ 5       0.3652      0.13  Q         |         |         |     V   |
18+10       0.3661      0.13  Q         |         |         |     V   |
18+15       0.3670      0.13  Q         |         |         |     V   |
18+20       0.3678      0.12  Q         |         |         |     V   |
18+25       0.3687      0.12  Q         |         |         |     V   |
18+30       0.3695      0.12  Q         |         |         |     V   |
18+35       0.3703      0.12  Q         |         |         |     V   |
18+40       0.3711      0.11  Q         |         |         |     V   |
18+45       0.3718      0.11  Q         |         |         |     V   |
18+50       0.3726      0.11  Q         |         |         |     V   |
18+55       0.3733      0.11  Q         |         |         |     V   |
19+ 0       0.3740      0.11  Q         |         |         |     V   |
19+ 5       0.3748      0.10  Q         |         |         |     V   |
19+10       0.3755      0.10  Q         |         |         |      V  |
19+15       0.3762      0.10  Q         |         |         |      V  |
19+20       0.3768      0.10  Q         |         |         |      V  |
19+25       0.3775      0.10  Q         |         |         |      V  |
19+30       0.3782      0.10  Q         |         |         |      V  |
19+35       0.3788      0.09  Q         |         |         |      V  |
19+40       0.3795      0.09  Q         |         |         |      V  |
19+45       0.3801      0.09  Q         |         |         |      V  |
19+50       0.3807      0.09  Q         |         |         |      V  |
19+55       0.3813      0.09  Q         |         |         |      V  |
20+ 0       0.3819      0.09  Q         |         |         |      V  |
20+ 5       0.3825      0.09  Q         |         |         |      V  |
20+10       0.3831      0.09  Q         |         |         |      V  |
20+15       0.3837      0.08  Q         |         |         |      V  |
20+20       0.3843      0.08  Q         |         |         |      V  |
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20+25	0.3848	0.08	Q	|	|	|	V |
20+30	0.3854	0.08	Q	|	|	|	V |
20+35	0.3860	0.08	Q	|	|	|	V |
20+40	0.3865	0.08	Q	|	|	|	V |
20+45	0.3871	0.08	Q	|	|	|	V |
20+50	0.3876	0.08	Q	|	|	|	V |
20+55	0.3881	0.08	Q	|	|	|	V |
21+ 0	0.3887	0.08	Q	|	|	|	V |
21+ 5	0.3892	0.08	Q	|	|	|	V |
21+10	0.3897	0.07	Q	|	|	|	V |
21+15	0.3902	0.07	Q	|	|	|	V |
21+20	0.3907	0.07	Q	|	|	|	V |
21+25	0.3912	0.07	Q	|	|	|	V |
21+30	0.3917	0.07	Q	|	|	|	V |
21+35	0.3922	0.07	Q	|	|	|	V |
21+40	0.3927	0.07	Q	|	|	|	V |
21+45	0.3932	0.07	Q	|	|	|	V |
21+50	0.3936	0.07	Q	|	|	|	V |
21+55	0.3941	0.07	Q	|	|	|	V |
22+ 0	0.3946	0.07	Q	|	|	|	V |
22+ 5	0.3951	0.07	Q	|	|	|	V |
22+10	0.3955	0.07	Q	|	|	|	V|
22+15	0.3960	0.07	Q	|	|	|	V|
22+20	0.3964	0.07	Q	|	|	|	V|
22+25	0.3969	0.07	Q	|	|	|	V|
22+30	0.3973	0.06	Q	|	|	|	V|
22+35	0.3978	0.06	Q	|	|	|	V|
22+40	0.3982	0.06	Q	|	|	|	V|
22+45	0.3986	0.06	Q	|	|	|	V|
22+50	0.3991	0.06	Q	|	|	|	V|
22+55	0.3995	0.06	Q	|	|	|	V|
23+ 0	0.3999	0.06	Q	|	|	|	V|
23+ 5	0.4004	0.06	Q	|	|	|	V|
23+10	0.4008	0.06	Q	|	|	|	V|
23+15	0.4012	0.06	Q	|	|	|	V|
23+20	0.4016	0.06	Q	|	|	|	V|
23+25	0.4020	0.06	Q	|	|	|	V|
23+30	0.4024	0.06	Q	|	|	|	V|
23+35	0.4028	0.06	Q	|	|	|	V|
23+40	0.4033	0.06	Q	|	|	|	V|
23+45	0.4037	0.06	Q	|	|	|	V|
23+50	0.4041	0.06	Q	|	|	|	V|
23+55	0.4044	0.06	Q	|	|	|	V|
24+ 0	0.4048	0.06	Q	|	|	|	V|
24+ 5	0.4051	0.04	Q	|	|	|	V|
24+10	0.4052	0.01	Q	|	|	|	V|
24+15	0.4052	0.00	Q	|	|	|	V|
24+20	0.4052	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA A
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
8.40	6	0.82
Rainfall data for year 2		
8.40	24	1.37
Rainfall data for year 100		
8.40	6	2.34
Rainfall data for year 100		
8.40	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	8.40	1.000	0.272	1.000	0.272

Area-averaged adjusted loss rate Fm (In/Hr) = 0.272

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
8.40	1.000	86.0	1.63	0.493

Area-averaged catchment yield fraction, Y = 0.493
Area-averaged low loss fraction, Yb = 0.507
++
Watercourse length = 1240.00(Ft.)
Length from concentration point to centroid = 605.00(Ft.)
Elevation difference along watercourse = 270.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 8.40(Ac.)
Catchment Lag time = 0.064 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 130.8252
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.272(In/Hr)
Average low loss rate fraction (Yb) = 0.507 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 8.40(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall =	0.230(In)
30-minute factor = 1.000	Adjusted rainfall =	0.515(In)
1-hour factor = 1.000	Adjusted rainfall =	0.704(In)
3-hour factor = 1.000	Adjusted rainfall =	1.086(In)
6-hour factor = 1.000	Adjusted rainfall =	1.427(In)
24-hour factor = 1.000	Adjusted rainfall =	2.466(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 101.59 (CFS))

1	24.970	25.366
2	80.335	56.245
3	94.485	14.374
4	98.300	3.876
5	100.000	1.726

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.52	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.93	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010

46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.55	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006

103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.68	1.68	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.85	1.85	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005

160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.98	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.17	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004

217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.33	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003

274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0017	0.0017
2	0.0034	0.0017	0.0017
3	0.0034	0.0017	0.0017
4	0.0034	0.0017	0.0017
5	0.0034	0.0017	0.0017
6	0.0034	0.0017	0.0017
7	0.0034	0.0017	0.0017
8	0.0035	0.0018	0.0017
9	0.0035	0.0018	0.0017
10	0.0035	0.0018	0.0017
11	0.0035	0.0018	0.0017
12	0.0035	0.0018	0.0017
13	0.0035	0.0018	0.0017
14	0.0035	0.0018	0.0017
15	0.0035	0.0018	0.0017
16	0.0035	0.0018	0.0017
17	0.0036	0.0018	0.0018
18	0.0036	0.0018	0.0018
19	0.0036	0.0018	0.0018
20	0.0036	0.0018	0.0018
21	0.0036	0.0018	0.0018
22	0.0036	0.0018	0.0018
23	0.0036	0.0018	0.0018
24	0.0036	0.0019	0.0018
25	0.0037	0.0019	0.0018
26	0.0037	0.0019	0.0018
27	0.0037	0.0019	0.0018
28	0.0037	0.0019	0.0018
29	0.0037	0.0019	0.0018
30	0.0037	0.0019	0.0018
31	0.0037	0.0019	0.0018
32	0.0038	0.0019	0.0019
33	0.0038	0.0019	0.0019
34	0.0038	0.0019	0.0019
35	0.0038	0.0019	0.0019
36	0.0038	0.0019	0.0019

37	0.0038	0.0019	0.0019
38	0.0038	0.0019	0.0019
39	0.0039	0.0020	0.0019
40	0.0039	0.0020	0.0019
41	0.0039	0.0020	0.0019
42	0.0039	0.0020	0.0019
43	0.0039	0.0020	0.0019
44	0.0039	0.0020	0.0019
45	0.0040	0.0020	0.0020
46	0.0040	0.0020	0.0020
47	0.0040	0.0020	0.0020
48	0.0040	0.0020	0.0020
49	0.0040	0.0020	0.0020
50	0.0040	0.0020	0.0020
51	0.0041	0.0021	0.0020
52	0.0041	0.0021	0.0020
53	0.0041	0.0021	0.0020
54	0.0041	0.0021	0.0020
55	0.0041	0.0021	0.0020
56	0.0041	0.0021	0.0020
57	0.0042	0.0021	0.0021
58	0.0042	0.0021	0.0021
59	0.0042	0.0021	0.0021
60	0.0042	0.0021	0.0021
61	0.0042	0.0022	0.0021
62	0.0043	0.0022	0.0021
63	0.0043	0.0022	0.0021
64	0.0043	0.0022	0.0021
65	0.0043	0.0022	0.0021
66	0.0043	0.0022	0.0021
67	0.0044	0.0022	0.0022
68	0.0044	0.0022	0.0022
69	0.0044	0.0022	0.0022
70	0.0044	0.0022	0.0022
71	0.0045	0.0023	0.0022
72	0.0045	0.0023	0.0022
73	0.0045	0.0023	0.0022
74	0.0045	0.0023	0.0022
75	0.0045	0.0023	0.0022
76	0.0046	0.0023	0.0022
77	0.0046	0.0023	0.0023
78	0.0046	0.0023	0.0023
79	0.0046	0.0024	0.0023
80	0.0047	0.0024	0.0023
81	0.0047	0.0024	0.0023
82	0.0047	0.0024	0.0023
83	0.0047	0.0024	0.0023
84	0.0048	0.0024	0.0023
85	0.0048	0.0024	0.0024
86	0.0048	0.0024	0.0024
87	0.0049	0.0025	0.0024
88	0.0049	0.0025	0.0024
89	0.0049	0.0025	0.0024
90	0.0049	0.0025	0.0024
91	0.0050	0.0025	0.0024
92	0.0050	0.0025	0.0025
93	0.0050	0.0025	0.0025

94	0.0050	0.0026	0.0025
95	0.0051	0.0026	0.0025
96	0.0051	0.0026	0.0025
97	0.0052	0.0026	0.0025
98	0.0052	0.0026	0.0026
99	0.0052	0.0026	0.0026
100	0.0052	0.0027	0.0026
101	0.0053	0.0027	0.0026
102	0.0053	0.0027	0.0026
103	0.0054	0.0027	0.0026
104	0.0054	0.0027	0.0027
105	0.0054	0.0028	0.0027
106	0.0055	0.0028	0.0027
107	0.0055	0.0028	0.0027
108	0.0055	0.0028	0.0027
109	0.0056	0.0028	0.0028
110	0.0056	0.0028	0.0028
111	0.0057	0.0029	0.0028
112	0.0057	0.0029	0.0028
113	0.0058	0.0029	0.0028
114	0.0058	0.0029	0.0029
115	0.0058	0.0030	0.0029
116	0.0059	0.0030	0.0029
117	0.0059	0.0030	0.0029
118	0.0060	0.0030	0.0029
119	0.0060	0.0031	0.0030
120	0.0061	0.0031	0.0030
121	0.0061	0.0031	0.0030
122	0.0062	0.0031	0.0030
123	0.0062	0.0032	0.0031
124	0.0063	0.0032	0.0031
125	0.0064	0.0032	0.0031
126	0.0064	0.0032	0.0032
127	0.0065	0.0033	0.0032
128	0.0065	0.0033	0.0032
129	0.0066	0.0033	0.0033
130	0.0066	0.0034	0.0033
131	0.0067	0.0034	0.0033
132	0.0068	0.0034	0.0033
133	0.0069	0.0035	0.0034
134	0.0069	0.0035	0.0034
135	0.0070	0.0035	0.0035
136	0.0070	0.0036	0.0035
137	0.0071	0.0036	0.0035
138	0.0072	0.0037	0.0036
139	0.0073	0.0037	0.0036
140	0.0074	0.0037	0.0036
141	0.0075	0.0038	0.0037
142	0.0075	0.0038	0.0037
143	0.0077	0.0039	0.0038
144	0.0077	0.0039	0.0038
145	0.0079	0.0040	0.0039
146	0.0079	0.0040	0.0039
147	0.0081	0.0041	0.0040
148	0.0081	0.0041	0.0040
149	0.0083	0.0042	0.0041
150	0.0084	0.0042	0.0041

151	0.0085	0.0043	0.0042
152	0.0086	0.0044	0.0042
153	0.0088	0.0045	0.0043
154	0.0089	0.0045	0.0044
155	0.0091	0.0046	0.0045
156	0.0092	0.0046	0.0045
157	0.0094	0.0047	0.0046
158	0.0095	0.0048	0.0047
159	0.0097	0.0049	0.0048
160	0.0098	0.0050	0.0048
161	0.0101	0.0051	0.0050
162	0.0102	0.0052	0.0050
163	0.0105	0.0053	0.0052
164	0.0106	0.0054	0.0052
165	0.0109	0.0055	0.0054
166	0.0111	0.0056	0.0055
167	0.0114	0.0058	0.0056
168	0.0116	0.0059	0.0057
169	0.0120	0.0061	0.0059
170	0.0122	0.0062	0.0060
171	0.0127	0.0064	0.0062
172	0.0129	0.0065	0.0064
173	0.0134	0.0068	0.0066
174	0.0137	0.0070	0.0068
175	0.0143	0.0073	0.0071
176	0.0147	0.0074	0.0072
177	0.0154	0.0078	0.0076
178	0.0158	0.0080	0.0078
179	0.0167	0.0085	0.0083
180	0.0173	0.0087	0.0085
181	0.0184	0.0093	0.0091
182	0.0191	0.0097	0.0094
183	0.0207	0.0105	0.0102
184	0.0216	0.0109	0.0106
185	0.0270	0.0137	0.0133
186	0.0284	0.0144	0.0140
187	0.0319	0.0162	0.0157
188	0.0342	0.0173	0.0169
189	0.0406	0.0206	0.0200
190	0.0453	0.0227*	0.0227
191	0.0629	0.0227*	0.0402
192	0.0842	0.0227*	0.0615
193	0.2300	0.0227*	0.2074
194	0.0521	0.0227*	0.0295
195	0.0370	0.0188	0.0182
196	0.0300	0.0152	0.0148
197	0.0226	0.0115	0.0111
198	0.0198	0.0101	0.0098
199	0.0178	0.0090	0.0088
200	0.0163	0.0082	0.0080
201	0.0150	0.0076	0.0074
202	0.0140	0.0071	0.0069
203	0.0132	0.0067	0.0065
204	0.0124	0.0063	0.0061
205	0.0118	0.0060	0.0058
206	0.0113	0.0057	0.0055
207	0.0108	0.0055	0.0053

208	0.0103	0.0052	0.0051
209	0.0099	0.0050	0.0049
210	0.0096	0.0049	0.0047
211	0.0093	0.0047	0.0046
212	0.0090	0.0045	0.0044
213	0.0087	0.0044	0.0043
214	0.0084	0.0043	0.0042
215	0.0082	0.0042	0.0040
216	0.0080	0.0041	0.0039
217	0.0078	0.0039	0.0038
218	0.0076	0.0039	0.0037
219	0.0074	0.0038	0.0037
220	0.0073	0.0037	0.0036
221	0.0071	0.0036	0.0035
222	0.0070	0.0035	0.0034
223	0.0068	0.0035	0.0034
224	0.0067	0.0034	0.0033
225	0.0066	0.0033	0.0032
226	0.0064	0.0033	0.0032
227	0.0063	0.0032	0.0031
228	0.0062	0.0031	0.0031
229	0.0061	0.0031	0.0030
230	0.0060	0.0030	0.0030
231	0.0059	0.0030	0.0029
232	0.0058	0.0029	0.0029
233	0.0057	0.0029	0.0028
234	0.0056	0.0029	0.0028
235	0.0056	0.0028	0.0027
236	0.0055	0.0028	0.0027
237	0.0054	0.0027	0.0027
238	0.0053	0.0027	0.0026
239	0.0053	0.0027	0.0026
240	0.0052	0.0026	0.0026
241	0.0051	0.0026	0.0025
242	0.0051	0.0026	0.0025
243	0.0050	0.0025	0.0025
244	0.0049	0.0025	0.0024
245	0.0049	0.0025	0.0024
246	0.0048	0.0024	0.0024
247	0.0048	0.0024	0.0024
248	0.0047	0.0024	0.0023
249	0.0047	0.0024	0.0023
250	0.0046	0.0023	0.0023
251	0.0046	0.0023	0.0023
252	0.0045	0.0023	0.0022
253	0.0045	0.0023	0.0022
254	0.0044	0.0023	0.0022
255	0.0044	0.0022	0.0022
256	0.0044	0.0022	0.0021
257	0.0043	0.0022	0.0021
258	0.0043	0.0022	0.0021
259	0.0042	0.0021	0.0021
260	0.0042	0.0021	0.0021
261	0.0042	0.0021	0.0020
262	0.0041	0.0021	0.0020
263	0.0041	0.0021	0.0020
264	0.0040	0.0021	0.0020

265	0.0040	0.0020	0.0020
266	0.0040	0.0020	0.0020
267	0.0039	0.0020	0.0019
268	0.0039	0.0020	0.0019
269	0.0039	0.0020	0.0019
270	0.0039	0.0020	0.0019
271	0.0038	0.0019	0.0019
272	0.0038	0.0019	0.0019
273	0.0038	0.0019	0.0019
274	0.0037	0.0019	0.0018
275	0.0037	0.0019	0.0018
276	0.0037	0.0019	0.0018
277	0.0037	0.0019	0.0018
278	0.0036	0.0018	0.0018
279	0.0036	0.0018	0.0018
280	0.0036	0.0018	0.0018
281	0.0036	0.0018	0.0018
282	0.0035	0.0018	0.0017
283	0.0035	0.0018	0.0017
284	0.0035	0.0018	0.0017
285	0.0035	0.0018	0.0017
286	0.0034	0.0017	0.0017
287	0.0034	0.0017	0.0017
288	0.0034	0.0017	0.0017
	2.4664	1.1230	1.3433

Total soil rain loss = 1.12(In)
Total effective rainfall = 1.34(In)
Peak flow rate in flood hydrograph = 13.49(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

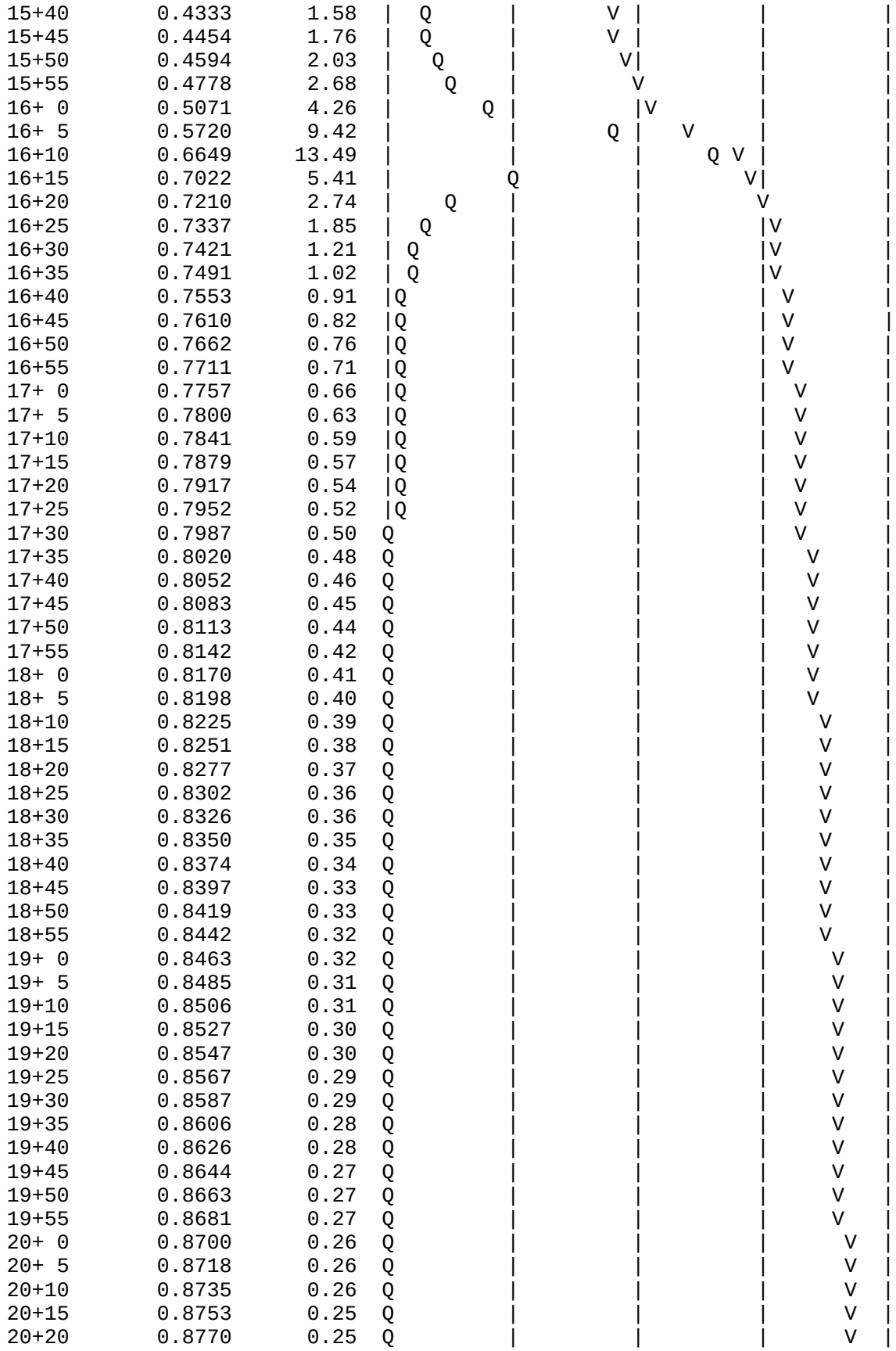
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0003	0.04	Q	|	|	|	|
0+10	0.0012	0.14	Q	|	|	|	|
0+15	0.0023	0.16	Q	|	|	|	|
0+20	0.0035	0.17	Q	|	|	|	|
0+25	0.0047	0.17	Q	|	|	|	|
0+30	0.0058	0.17	Q	|	|	|	|
0+35	0.0070	0.17	Q	|	|	|	|
0+40	0.0082	0.17	Q	|	|	|	|
0+45	0.0094	0.17	Q	|	|	|	|
0+50	0.0106	0.17	Q	|	|	|	|
0+55	0.0118	0.17	Q	|	|	|	|
1+ 0	0.0130	0.17	Q	|	|	|	|
1+ 5	0.0142	0.18	Q	|	|	|	|
1+10	0.0154	0.18	Q	|	|	|	|
1+15	0.0167	0.18	Q	|	|	|	|
1+20	0.0179	0.18	Q	|	|	|	|

1+25	0.0191	0.18	Q	|	|	|	|
1+30	0.0203	0.18	Q	|	|	|	|
1+35	0.0216	0.18	Q	|	|	|	|
1+40	0.0228	0.18	Q	|	|	|	|
1+45	0.0240	0.18	QV	|	|	|	|
1+50	0.0253	0.18	QV	|	|	|	|
1+55	0.0265	0.18	QV	|	|	|	|
2+ 0	0.0278	0.18	QV	|	|	|	|
2+ 5	0.0291	0.18	QV	|	|	|	|
2+10	0.0303	0.18	QV	|	|	|	|
2+15	0.0316	0.18	QV	|	|	|	|
2+20	0.0329	0.18	QV	|	|	|	|
2+25	0.0341	0.19	QV	|	|	|	|
2+30	0.0354	0.19	QV	|	|	|	|
2+35	0.0367	0.19	QV	|	|	|	|
2+40	0.0380	0.19	QV	|	|	|	|
2+45	0.0393	0.19	QV	|	|	|	|
2+50	0.0406	0.19	QV	|	|	|	|
2+55	0.0419	0.19	QV	|	|	|	|
3+ 0	0.0432	0.19	QV	|	|	|	|
3+ 5	0.0445	0.19	QV	|	|	|	|
3+10	0.0459	0.19	QV	|	|	|	|
3+15	0.0472	0.19	Q V	|	|	|	|
3+20	0.0485	0.19	Q V	|	|	|	|
3+25	0.0499	0.19	Q V	|	|	|	|
3+30	0.0512	0.20	Q V	|	|	|	|
3+35	0.0525	0.20	Q V	|	|	|	|
3+40	0.0539	0.20	Q V	|	|	|	|
3+45	0.0553	0.20	Q V	|	|	|	|
3+50	0.0566	0.20	Q V	|	|	|	|
3+55	0.0580	0.20	Q V	|	|	|	|
4+ 0	0.0594	0.20	Q V	|	|	|	|
4+ 5	0.0608	0.20	Q V	|	|	|	|
4+10	0.0621	0.20	Q V	|	|	|	|
4+15	0.0635	0.20	Q V	|	|	|	|
4+20	0.0649	0.20	Q V	|	|	|	|
4+25	0.0663	0.20	Q V	|	|	|	|
4+30	0.0678	0.21	Q V	|	|	|	|
4+35	0.0692	0.21	Q V	|	|	|	|
4+40	0.0706	0.21	Q V	|	|	|	|
4+45	0.0720	0.21	Q V	|	|	|	|
4+50	0.0735	0.21	Q V	|	|	|	|
4+55	0.0749	0.21	Q V	|	|	|	|
5+ 0	0.0764	0.21	Q V	|	|	|	|
5+ 5	0.0778	0.21	Q V	|	|	|	|
5+10	0.0793	0.21	Q V	|	|	|	|
5+15	0.0808	0.21	Q V	|	|	|	|
5+20	0.0822	0.21	Q V	|	|	|	|
5+25	0.0837	0.22	Q V	|	|	|	|
5+30	0.0852	0.22	Q V	|	|	|	|
5+35	0.0867	0.22	Q V	|	|	|	|
5+40	0.0882	0.22	Q V	|	|	|	|
5+45	0.0897	0.22	Q V	|	|	|	|
5+50	0.0912	0.22	Q V	|	|	|	|
5+55	0.0928	0.22	Q V	|	|	|	|
6+ 0	0.0943	0.22	Q V	|	|	|	|
6+ 5	0.0958	0.22	Q V	|	|	|	|

6+10	0.0974	0.23	Q	V				
6+15	0.0990	0.23	Q	V				
6+20	0.1005	0.23	Q	V				
6+25	0.1021	0.23	Q	V				
6+30	0.1037	0.23	Q	V				
6+35	0.1053	0.23	Q	V				
6+40	0.1069	0.23	Q	V				
6+45	0.1085	0.23	Q	V				
6+50	0.1101	0.23	Q	V				
6+55	0.1117	0.24	Q	V				
7+ 0	0.1133	0.24	Q	V				
7+ 5	0.1150	0.24	Q	V				
7+10	0.1166	0.24	Q	V				
7+15	0.1183	0.24	Q	V				
7+20	0.1200	0.24	Q	V				
7+25	0.1217	0.24	Q	V				
7+30	0.1234	0.25	Q	V				
7+35	0.1251	0.25	Q	V				
7+40	0.1268	0.25	Q	V				
7+45	0.1285	0.25	Q	V				
7+50	0.1302	0.25	Q	V				
7+55	0.1320	0.25	Q	V				
8+ 0	0.1337	0.25	Q	V				
8+ 5	0.1355	0.26	Q	V				
8+10	0.1372	0.26	Q	V				
8+15	0.1390	0.26	Q	V				
8+20	0.1408	0.26	Q	V				
8+25	0.1426	0.26	Q	V				
8+30	0.1445	0.26	Q	V				
8+35	0.1463	0.27	Q	V				
8+40	0.1481	0.27	Q	V				
8+45	0.1500	0.27	Q	V				
8+50	0.1519	0.27	Q	V				
8+55	0.1538	0.27	Q	V				
9+ 0	0.1557	0.28	Q	V				
9+ 5	0.1576	0.28	Q	V				
9+10	0.1595	0.28	Q	V				
9+15	0.1614	0.28	Q	V				
9+20	0.1634	0.28	Q	V				
9+25	0.1653	0.29	Q	V				
9+30	0.1673	0.29	Q	V				
9+35	0.1693	0.29	Q	V				
9+40	0.1713	0.29	Q	V				
9+45	0.1734	0.29	Q	V				
9+50	0.1754	0.30	Q	V				
9+55	0.1775	0.30	Q	V				
10+ 0	0.1796	0.30	Q	V				
10+ 5	0.1817	0.30	Q	V				
10+10	0.1838	0.31	Q	V				
10+15	0.1859	0.31	Q	V				
10+20	0.1880	0.31	Q	V				
10+25	0.1902	0.31	Q	V				
10+30	0.1924	0.32	Q	V				
10+35	0.1946	0.32	Q	V				
10+40	0.1968	0.32	Q	V				
10+45	0.1991	0.33	Q	V				
10+50	0.2014	0.33	Q	V				

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10+55       0.2037      0.33  Q       V |          |          |          |
11+ 0       0.2060      0.34  Q       V |          |          |          |
11+ 5       0.2083      0.34  Q       V |          |          |          |
11+10       0.2107      0.34  Q       V |          |          |          |
11+15       0.2130      0.35  Q        V|          |          |          |
11+20       0.2155      0.35  Q        V|          |          |          |
11+25       0.2179      0.35  Q        V|          |          |          |
11+30       0.2204      0.36  Q        V|          |          |          |
11+35       0.2228      0.36  Q        V|          |          |          |
11+40       0.2254      0.37  Q        V|          |          |          |
11+45       0.2279      0.37  Q        V|          |          |          |
11+50       0.2305      0.37  Q        V|          |          |          |
11+55       0.2331      0.38  Q        V|          |          |          |
12+ 0       0.2357      0.38  Q         V          |          |          |
12+ 5       0.2384      0.39  Q         V          |          |          |
12+10       0.2411      0.39  Q         V          |          |          |
12+15       0.2438      0.40  Q         V          |          |          |
12+20       0.2466      0.40  Q         V          |          |          |
12+25       0.2494      0.41  Q         V          |          |          |
12+30       0.2523      0.41  Q         V          |          |          |
12+35       0.2552      0.42  Q         V          |          |          |
12+40       0.2581      0.43  Q         V          |          |          |
12+45       0.2611      0.43  Q          |V         |          |          |
12+50       0.2641      0.44  Q          |V         |          |          |
12+55       0.2672      0.45  Q          |V         |          |          |
13+ 0       0.2703      0.45  Q          |V         |          |          |
13+ 5       0.2734      0.46  Q          |V         |          |          |
13+10       0.2767      0.47  Q          |V         |          |          |
13+15       0.2799      0.48  Q          |V         |          |          |
13+20       0.2833      0.48  Q          | V        |          |          |
13+25       0.2867      0.49  Q          | V        |          |          |
13+30       0.2901      0.50  |Q         | V        |          |          |
13+35       0.2937      0.51  |Q         | V        |          |          |
13+40       0.2973      0.52  |Q         | V        |          |          |
13+45       0.3009      0.53  |Q         | V        |          |          |
13+50       0.3047      0.55  |Q         | V        |          |          |
13+55       0.3085      0.56  |Q         |  V       |          |          |
14+ 0       0.3124      0.57  |Q         |  V       |          |          |
14+ 5       0.3165      0.58  |Q         |  V       |          |          |
14+10       0.3206      0.60  |Q         |  V       |          |          |
14+15       0.3248      0.61  |Q         |  V       |          |          |
14+20       0.3292      0.63  |Q         |   V      |          |          |
14+25       0.3337      0.65  |Q         |   V      |          |          |
14+30       0.3383      0.67  |Q         |   V      |          |          |
14+35       0.3430      0.69  |Q         |   V      |          |          |
14+40       0.3479      0.71  |Q         |   V      |          |          |
14+45       0.3530      0.74  |Q         |    V     |          |          |
14+50       0.3583      0.77  |Q         |    V     |          |          |
14+55       0.3638      0.80  |Q         |    V     |          |          |
15+ 0       0.3696      0.83  |Q         |    V     |          |          |
15+ 5       0.3756      0.87  |Q         |    V     |          |          |
15+10       0.3819      0.92  |Q         |     V    |          |          |
15+15       0.3885      0.97  |Q         |     V    |          |          |
15+20       0.3956      1.03  | Q        |     V    |          |          |
15+25       0.4034      1.13  | Q        |      V   |          |          |
15+30       0.4125      1.31  | Q        |      V   |          |          |
15+35       0.4224      1.44  | Q        |      V   |          |          |
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  20+25       0.8787      0.25  Q          |          |          |       V  |
  20+30       0.8804      0.24  Q          |          |          |       V  |
  20+35       0.8821      0.24  Q          |          |          |       V  |
  20+40       0.8837      0.24  Q          |          |          |       V  |
  20+45       0.8853      0.24  Q          |          |          |       V  |
  20+50       0.8870      0.23  Q          |          |          |       V  |
  20+55       0.8886      0.23  Q          |          |          |       V  |
  21+ 0       0.8901      0.23  Q          |          |          |       V  |
  21+ 5       0.8917      0.23  Q          |          |          |       V  |
  21+10       0.8932      0.22  Q          |          |          |        V |
  21+15       0.8948      0.22  Q          |          |          |        V |
  21+20       0.8963      0.22  Q          |          |          |        V |
  21+25       0.8978      0.22  Q          |          |          |        V |
  21+30       0.8993      0.22  Q          |          |          |        V |
  21+35       0.9008      0.21  Q          |          |          |        V |
  21+40       0.9022      0.21  Q          |          |          |        V |
  21+45       0.9037      0.21  Q          |          |          |        V |
  21+50       0.9051      0.21  Q          |          |          |        V |
  21+55       0.9065      0.21  Q          |          |          |        V |
  22+ 0       0.9079      0.20  Q          |          |          |        V |
  22+ 5       0.9093      0.20  Q          |          |          |        V |
  22+10       0.9107      0.20  Q          |          |          |        V |
  22+15       0.9121      0.20  Q          |          |          |        V |
  22+20       0.9134      0.20  Q          |          |          |        V |
  22+25       0.9148      0.20  Q          |          |          |        V |
  22+30       0.9161      0.19  Q          |          |          |        V |
  22+35       0.9175      0.19  Q          |          |          |         V|
  22+40       0.9188      0.19  Q          |          |          |         V|
  22+45       0.9201      0.19  Q          |          |          |         V|
  22+50       0.9214      0.19  Q          |          |          |         V|
  22+55       0.9227      0.19  Q          |          |          |         V|
  23+ 0       0.9240      0.19  Q          |          |          |         V|
  23+ 5       0.9252      0.18  Q          |          |          |         V|
  23+10       0.9265      0.18  Q          |          |          |         V|
  23+15       0.9278      0.18  Q          |          |          |         V|
  23+20       0.9290      0.18  Q          |          |          |         V|
  23+25       0.9302      0.18  Q          |          |          |         V|
  23+30       0.9315      0.18  Q          |          |          |         V|
  23+35       0.9327      0.18  Q          |          |          |         V|
  23+40       0.9339      0.18  Q          |          |          |         V|
  23+45       0.9351      0.17  Q          |          |          |         V|
  23+50       0.9363      0.17  Q          |          |          |         V|
  23+55       0.9375      0.17  Q          |          |          |         V|
  24+ 0       0.9387      0.17  Q          |          |          |         V|
  24+ 5       0.9395      0.13  Q          |          |          |         V|
  24+10       0.9398      0.03  Q          |          |          |         V|
  24+15       0.9398      0.01  Q          |          |          |         V|
  24+20       0.9399      0.00  Q          |          |          |          V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA A - EXISTING CONDITIONS
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
8.40	6	0.82
Rainfall data for year 2		
8.40	24	1.37
Rainfall data for year 100		
8.40	6	2.34
Rainfall data for year 100		
8.40	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	8.40	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
8.40	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
++
Watercourse length = 1240.00(Ft.)
Length from concentration point to centroid = 605.00(Ft.)
Elevation difference along watercourse = 270.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 8.40(Ac.)
Catchment Lag time = 0.064 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 130.8252
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 8.40(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.336(In)
30-minute factor = 1.000 Adjusted rainfall = 0.753(In)
1-hour factor = 1.000 Adjusted rainfall = 1.029(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.553(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 101.59 (CFS))

1	24.970	25.366
2	80.335	56.245
3	94.485	14.374
4	98.300	3.876
5	100.000	1.726

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.042
12	1.03	1.03	1.03	0.040
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.21	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.26	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015

46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.80	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009

103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007

160	0.21	2.83	2.83	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.14	0.006
210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006

217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005

274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015
29	0.0053	0.0038	0.0015
30	0.0053	0.0038	0.0015
31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015
33	0.0054	0.0039	0.0015
34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015

37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015
40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019
86	0.0069	0.0050	0.0019
87	0.0069	0.0050	0.0019
88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019
90	0.0070	0.0051	0.0020
91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020

94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020
97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030
143	0.0110	0.0079	0.0030
144	0.0111	0.0080	0.0031
145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0031
147	0.0116	0.0083	0.0032
148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033

151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035
154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0176	0.0127	0.0049
171	0.0182	0.0132	0.0051
172	0.0186	0.0134	0.0052
173	0.0193	0.0140	0.0054
174	0.0197	0.0143	0.0055
175	0.0206	0.0149	0.0057
176	0.0211	0.0153	0.0059
177	0.0222	0.0160	0.0062
178	0.0228	0.0165	0.0063
179	0.0241	0.0174	0.0067
180	0.0249	0.0180	0.0069
181	0.0266	0.0192	0.0074
182	0.0275	0.0199	0.0076
183	0.0298	0.0215	0.0083
184	0.0311	0.0225	0.0086
185	0.0395	0.0285	0.0110
186	0.0415	0.0300	0.0115
187	0.0467	0.0337	0.0129
188	0.0500	0.0361	0.0139
189	0.0593	0.0429	0.0165
190	0.0663	0.0472*	0.0191
191	0.0919	0.0472*	0.0448
192	0.1231	0.0472*	0.0759
193	0.3363	0.0472*	0.2891
194	0.0762	0.0472*	0.0290
195	0.0541	0.0391	0.0150
196	0.0439	0.0317	0.0122
197	0.0326	0.0236	0.0091
198	0.0286	0.0207	0.0079
199	0.0257	0.0186	0.0071
200	0.0234	0.0169	0.0065
201	0.0216	0.0156	0.0060
202	0.0202	0.0146	0.0056
203	0.0189	0.0137	0.0053
204	0.0179	0.0129	0.0050
205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043

208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0137	0.0099	0.0038
211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0115	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017
257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017
259	0.0060	0.0044	0.0017
260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016
262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016

265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016
268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5526	2.3015	1.2511

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 18.29(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0010	0.11	Q	|	|	|	|
0+15	0.0019	0.13	Q	|	|	|	|
0+20	0.0028	0.13	Q	|	|	|	|
0+25	0.0037	0.14	Q	|	|	|	|
0+30	0.0047	0.14	Q	|	|	|	|
0+35	0.0056	0.14	Q	|	|	|	|
0+40	0.0066	0.14	Q	|	|	|	|
0+45	0.0075	0.14	Q	|	|	|	|
0+50	0.0085	0.14	Q	|	|	|	|
0+55	0.0095	0.14	Q	|	|	|	|
1+ 0	0.0104	0.14	Q	|	|	|	|
1+ 5	0.0114	0.14	Q	|	|	|	|
1+10	0.0124	0.14	Q	|	|	|	|
1+15	0.0133	0.14	Q	|	|	|	|
1+20	0.0143	0.14	Q	|	|	|	|

1+25	0.0153	0.14	Q	|	|	|	|
1+30	0.0163	0.14	Q	|	|	|	|
1+35	0.0173	0.14	Q	|	|	|	|
1+40	0.0183	0.14	Q	|	|	|	|
1+45	0.0193	0.14	Q	|	|	|	|
1+50	0.0203	0.15	Q	|	|	|	|
1+55	0.0213	0.15	Q	|	|	|	|
2+ 0	0.0223	0.15	QV	|	|	|	|
2+ 5	0.0233	0.15	QV	|	|	|	|
2+10	0.0243	0.15	QV	|	|	|	|
2+15	0.0253	0.15	QV	|	|	|	|
2+20	0.0263	0.15	QV	|	|	|	|
2+25	0.0274	0.15	QV	|	|	|	|
2+30	0.0284	0.15	QV	|	|	|	|
2+35	0.0294	0.15	QV	|	|	|	|
2+40	0.0304	0.15	QV	|	|	|	|
2+45	0.0315	0.15	QV	|	|	|	|
2+50	0.0325	0.15	QV	|	|	|	|
2+55	0.0336	0.15	QV	|	|	|	|
3+ 0	0.0346	0.15	QV	|	|	|	|
3+ 5	0.0357	0.15	QV	|	|	|	|
3+10	0.0368	0.15	QV	|	|	|	|
3+15	0.0378	0.15	QV	|	|	|	|
3+20	0.0389	0.16	QV	|	|	|	|
3+25	0.0400	0.16	QV	|	|	|	|
3+30	0.0410	0.16	QV	|	|	|	|
3+35	0.0421	0.16	QV	|	|	|	|
3+40	0.0432	0.16	QV	|	|	|	|
3+45	0.0443	0.16	Q V	|	|	|	|
3+50	0.0454	0.16	Q V	|	|	|	|
3+55	0.0465	0.16	Q V	|	|	|	|
4+ 0	0.0476	0.16	Q V	|	|	|	|
4+ 5	0.0487	0.16	Q V	|	|	|	|
4+10	0.0498	0.16	Q V	|	|	|	|
4+15	0.0509	0.16	Q V	|	|	|	|
4+20	0.0521	0.16	Q V	|	|	|	|
4+25	0.0532	0.16	Q V	|	|	|	|
4+30	0.0543	0.16	Q V	|	|	|	|
4+35	0.0555	0.17	Q V	|	|	|	|
4+40	0.0566	0.17	Q V	|	|	|	|
4+45	0.0577	0.17	Q V	|	|	|	|
4+50	0.0589	0.17	Q V	|	|	|	|
4+55	0.0601	0.17	Q V	|	|	|	|
5+ 0	0.0612	0.17	Q V	|	|	|	|
5+ 5	0.0624	0.17	Q V	|	|	|	|
5+10	0.0636	0.17	Q V	|	|	|	|
5+15	0.0647	0.17	Q V	|	|	|	|
5+20	0.0659	0.17	Q V	|	|	|	|
5+25	0.0671	0.17	Q V	|	|	|	|
5+30	0.0683	0.17	Q V	|	|	|	|
5+35	0.0695	0.17	Q V	|	|	|	|
5+40	0.0707	0.18	Q V	|	|	|	|
5+45	0.0719	0.18	Q V	|	|	|	|
5+50	0.0732	0.18	Q V	|	|	|	|
5+55	0.0744	0.18	Q V	|	|	|	|
6+ 0	0.0756	0.18	Q V	|	|	|	|
6+ 5	0.0769	0.18	Q V	|	|	|	|

6+10	0.0781	0.18	Q	V				
6+15	0.0793	0.18	Q	V				
6+20	0.0806	0.18	Q	V				
6+25	0.0819	0.18	Q	V				
6+30	0.0831	0.18	Q	V				
6+35	0.0844	0.19	Q	V				
6+40	0.0857	0.19	Q	V				
6+45	0.0870	0.19	Q	V				
6+50	0.0883	0.19	Q	V				
6+55	0.0896	0.19	Q	V				
7+ 0	0.0909	0.19	Q	V				
7+ 5	0.0922	0.19	Q	V				
7+10	0.0936	0.19	Q	V				
7+15	0.0949	0.19	Q	V				
7+20	0.0962	0.19	Q	V				
7+25	0.0976	0.20	Q	V				
7+30	0.0989	0.20	Q	V				
7+35	0.1003	0.20	Q	V				
7+40	0.1017	0.20	Q	V				
7+45	0.1031	0.20	Q	V				
7+50	0.1045	0.20	Q	V				
7+55	0.1059	0.20	Q	V				
8+ 0	0.1073	0.20	Q	V				
8+ 5	0.1087	0.21	Q	V				
8+10	0.1101	0.21	Q	V				
8+15	0.1115	0.21	Q	V				
8+20	0.1130	0.21	Q	V				
8+25	0.1144	0.21	Q	V				
8+30	0.1159	0.21	Q	V				
8+35	0.1174	0.21	Q	V				
8+40	0.1189	0.22	Q	V				
8+45	0.1204	0.22	Q	V				
8+50	0.1219	0.22	Q	V				
8+55	0.1234	0.22	Q	V				
9+ 0	0.1249	0.22	Q	V				
9+ 5	0.1264	0.22	Q	V				
9+10	0.1280	0.22	Q	V				
9+15	0.1295	0.23	Q	V				
9+20	0.1311	0.23	Q	V				
9+25	0.1327	0.23	Q	V				
9+30	0.1343	0.23	Q	V				
9+35	0.1359	0.23	Q	V				
9+40	0.1375	0.24	Q	V				
9+45	0.1391	0.24	Q	V				
9+50	0.1408	0.24	Q	V				
9+55	0.1425	0.24	Q	V				
10+ 0	0.1441	0.24	Q	V				
10+ 5	0.1458	0.24	Q	V				
10+10	0.1475	0.25	Q	V				
10+15	0.1492	0.25	Q	V				
10+20	0.1510	0.25	Q	V				
10+25	0.1527	0.25	Q	V				
10+30	0.1545	0.26	Q	V				
10+35	0.1562	0.26	Q	V				
10+40	0.1580	0.26	Q	V				
10+45	0.1598	0.26	Q	V				
10+50	0.1617	0.27	Q	V				

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10+55       0.1635      0.27  Q      V  |          |          |          |
11+ 0       0.1654      0.27  Q      V  |          |          |          |
11+ 5       0.1673      0.27  Q      V  |          |          |          |
11+10       0.1692      0.28  Q      V  |          |          |          |
11+15       0.1711      0.28  Q      V  |          |          |          |
11+20       0.1730      0.28  Q      V  |          |          |          |
11+25       0.1750      0.28  Q      V  |          |          |          |
11+30       0.1770      0.29  Q       V |          |          |          |
11+35       0.1790      0.29  Q       V |          |          |          |
11+40       0.1810      0.29  Q       V |          |          |          |
11+45       0.1831      0.30  Q       V |          |          |          |
11+50       0.1851      0.30  Q       V |          |          |          |
11+55       0.1872      0.30  Q       V |          |          |          |
12+ 0       0.1894      0.31  Q       V |          |          |          |
12+ 5       0.1915      0.31  Q       V |          |          |          |
12+10       0.1937      0.32  Q       V |          |          |          |
12+15       0.1959      0.32  Q       V |          |          |          |
12+20       0.1981      0.32  Q        V|          |          |          |
12+25       0.2004      0.33  Q        V|          |          |          |
12+30       0.2027      0.33  Q        V|          |          |          |
12+35       0.2050      0.34  Q        V|          |          |          |
12+40       0.2074      0.34  Q        V|          |          |          |
12+45       0.2098      0.35  Q        V|          |          |          |
12+50       0.2122      0.35  Q        V|          |          |          |
12+55       0.2147      0.36  Q        V|          |          |          |
13+ 0       0.2172      0.37  Q        V|          |          |          |
13+ 5       0.2198      0.37  Q         V          |          |          |
13+10       0.2224      0.38  Q         V          |          |          |
13+15       0.2250      0.38  Q         V          |          |          |
13+20       0.2277      0.39  Q         V          |          |          |
13+25       0.2305      0.40  Q         V          |          |          |
13+30       0.2333      0.41  Q         V          |          |          |
13+35       0.2361      0.41  Q         V          |          |          |
13+40       0.2390      0.42  Q         V          |          |          |
13+45       0.2420      0.43  Q         |V         |          |          |
13+50       0.2450      0.44  Q         |V         |          |          |
13+55       0.2481      0.45  Q         |V         |          |          |
14+ 0       0.2513      0.46  Q         |V         |          |          |
14+ 5       0.2545      0.47  Q         |V         |          |          |
14+10       0.2579      0.48  Q         |V         |          |          |
14+15       0.2613      0.50  Q         |V         |          |          |
14+20       0.2648      0.51  |Q        | V         |          |          |
14+25       0.2684      0.53  |Q        | V         |          |          |
14+30       0.2722      0.54  |Q        | V         |          |          |
14+35       0.2760      0.56  |Q        | V         |          |          |
14+40       0.2800      0.58  |Q        | V         |          |          |
14+45       0.2841      0.60  |Q        | V         |          |          |
14+50       0.2884      0.62  |Q        |  V        |          |          |
14+55       0.2929      0.65  |Q        |  V        |          |          |
15+ 0       0.2975      0.68  |Q        |  V        |          |          |
15+ 5       0.3024      0.71  |Q        |  V        |          |          |
15+10       0.3075      0.74  |Q        |   V       |          |          |
15+15       0.3129      0.78  |Q        |   V       |          |          |
15+20       0.3187      0.83  |Q        |   V       |          |          |
15+25       0.3251      0.93  |Q        |   V       |          |          |
15+30       0.3325      1.08  | Q       |    V      |          |          |
15+35       0.3406      1.18  | Q       |    V      |          |          |
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15+40	0.3496	1.30	Q	V			
15+45	0.3596	1.45	Q	V			
15+50	0.3711	1.68	Q	V			
15+55	0.3885	2.52	Q	V			
16+ 0	0.4216	4.81	Q	V			
16+ 5	0.5067	12.35			VQ		
16+10	0.6327	18.29			V	Q	
16+15	0.6777	6.54		Q	V		
16+20	0.6971	2.82	Q		V		
16+25	0.7091	1.74	Q		V		
16+30	0.7160	0.99	Q		V		
16+35	0.7217	0.83	Q		V		
16+40	0.7268	0.74	Q		V		
16+45	0.7314	0.67	Q		V		
16+50	0.7356	0.61	Q		V		
16+55	0.7395	0.57	Q		V		
17+ 0	0.7432	0.54	Q		V		
17+ 5	0.7467	0.51	Q		V		
17+10	0.7500	0.48	Q		V		
17+15	0.7532	0.46	Q		V		
17+20	0.7562	0.44	Q		V		
17+25	0.7590	0.42	Q		V		
17+30	0.7618	0.40	Q		V		
17+35	0.7645	0.39	Q		V		
17+40	0.7671	0.37	Q		V		
17+45	0.7696	0.36	Q		V		
17+50	0.7720	0.35	Q		V		
17+55	0.7744	0.34	Q		V		
18+ 0	0.7766	0.33	Q		V		
18+ 5	0.7789	0.32	Q		V		
18+10	0.7810	0.31	Q		V		
18+15	0.7831	0.31	Q		V		
18+20	0.7852	0.30	Q		V		
18+25	0.7872	0.29	Q		V		
18+30	0.7892	0.29	Q		V		
18+35	0.7911	0.28	Q		V		
18+40	0.7930	0.27	Q		V		
18+45	0.7949	0.27	Q		V		
18+50	0.7967	0.26	Q		V		
18+55	0.7985	0.26	Q		V		
19+ 0	0.8002	0.25	Q		V		
19+ 5	0.8020	0.25	Q		V		
19+10	0.8037	0.25	Q		V		
19+15	0.8053	0.24	Q		V		
19+20	0.8070	0.24	Q		V		
19+25	0.8086	0.23	Q		V		
19+30	0.8102	0.23	Q		V		
19+35	0.8117	0.23	Q		V		
19+40	0.8133	0.22	Q		V		
19+45	0.8148	0.22	Q		V		
19+50	0.8163	0.22	Q		V		
19+55	0.8178	0.21	Q		V		
20+ 0	0.8192	0.21	Q		V		
20+ 5	0.8207	0.21	Q		V		
20+10	0.8221	0.21	Q		V		
20+15	0.8235	0.20	Q		V		
20+20	0.8249	0.20	Q		V		

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  20+25       0.8263      0.20  Q          |          |          |       V  |
  20+30       0.8276      0.20  Q          |          |          |       V  |
  20+35       0.8290      0.19  Q          |          |          |       V  |
  20+40       0.8303      0.19  Q          |          |          |       V  |
  20+45       0.8316      0.19  Q          |          |          |        V |
  20+50       0.8329      0.19  Q          |          |          |        V |
  20+55       0.8342      0.19  Q          |          |          |        V |
  21+ 0       0.8354      0.18  Q          |          |          |        V |
  21+ 5       0.8367      0.18  Q          |          |          |        V |
  21+10       0.8379      0.18  Q          |          |          |        V |
  21+15       0.8392      0.18  Q          |          |          |        V |
  21+20       0.8404      0.18  Q          |          |          |        V |
  21+25       0.8416      0.18  Q          |          |          |        V |
  21+30       0.8428      0.17  Q          |          |          |        V |
  21+35       0.8440      0.17  Q          |          |          |        V |
  21+40       0.8451      0.17  Q          |          |          |        V |
  21+45       0.8463      0.17  Q          |          |          |        V |
  21+50       0.8475      0.17  Q          |          |          |        V |
  21+55       0.8486      0.17  Q          |          |          |        V |
  22+ 0       0.8497      0.16  Q          |          |          |        V |
  22+ 5       0.8508      0.16  Q          |          |          |        V |
  22+10       0.8520      0.16  Q          |          |          |        V |
  22+15       0.8531      0.16  Q          |          |          |        V |
  22+20       0.8541      0.16  Q          |          |          |         V|
  22+25       0.8552      0.16  Q          |          |          |         V|
  22+30       0.8563      0.16  Q          |          |          |         V|
  22+35       0.8574      0.15  Q          |          |          |         V|
  22+40       0.8584      0.15  Q          |          |          |         V|
  22+45       0.8595      0.15  Q          |          |          |         V|
  22+50       0.8605      0.15  Q          |          |          |         V|
  22+55       0.8616      0.15  Q          |          |          |         V|
  23+ 0       0.8626      0.15  Q          |          |          |         V|
  23+ 5       0.8636      0.15  Q          |          |          |         V|
  23+10       0.8646      0.15  Q          |          |          |         V|
  23+15       0.8656      0.15  Q          |          |          |         V|
  23+20       0.8666      0.14  Q          |          |          |         V|
  23+25       0.8676      0.14  Q          |          |          |         V|
  23+30       0.8686      0.14  Q          |          |          |         V|
  23+35       0.8696      0.14  Q          |          |          |         V|
  23+40       0.8705      0.14  Q          |          |          |         V|
  23+45       0.8715      0.14  Q          |          |          |         V|
  23+50       0.8725      0.14  Q          |          |          |         V|
  23+55       0.8734      0.14  Q          |          |          |         V|
  24+ 0       0.8744      0.14  Q          |          |          |         V|
  24+ 5       0.8751      0.10  Q          |          |          |         V|
  24+10       0.8752      0.03  Q          |          |          |         V|
  24+15       0.8753      0.01  Q          |          |          |         V|
  24+20       0.8753      0.00  Q          |          |          |          V
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 07/23/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA A
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
8.40	6	0.82
Rainfall data for year 2		
8.40	24	1.37
Rainfall data for year 100		
8.40	6	2.34
Rainfall data for year 100		
8.40	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	8.40	1.000	0.272	1.000	0.272

Area-averaged adjusted loss rate Fm (In/Hr) = 0.272

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
8.40	1.000	86.0	1.63	0.604

Area-averaged catchment yield fraction, Y = 0.604
Area-averaged low loss fraction, Yb = 0.396
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Watercourse length = 1240.00(Ft.)
Length from concentration point to centroid = 605.00(Ft.)
Elevation difference along watercourse = 270.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 8.40(Ac.)
Catchment Lag time = 0.064 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 130.8252
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.272(In/Hr)
Average low loss rate fraction (Yb) = 0.396 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 8.40(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.336(In)
30-minute factor = 1.000 Adjusted rainfall = 0.753(In)
1-hour factor = 1.000 Adjusted rainfall = 1.029(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.553(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 101.59 (CFS))

1	24.970	25.366
2	80.335	56.245
3	94.485	14.374
4	98.300	3.876
5	100.000	1.726

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.042
12	1.03	1.03	1.03	0.040
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.21	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.26	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015

46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.80	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009

103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007

160	0.21	2.83	2.83	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.14	0.006
210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006

217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005

274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0019	0.0029
2	0.0048	0.0019	0.0029
3	0.0048	0.0019	0.0029
4	0.0049	0.0019	0.0029
5	0.0049	0.0019	0.0029
6	0.0049	0.0019	0.0030
7	0.0049	0.0019	0.0030
8	0.0049	0.0019	0.0030
9	0.0049	0.0020	0.0030
10	0.0050	0.0020	0.0030
11	0.0050	0.0020	0.0030
12	0.0050	0.0020	0.0030
13	0.0050	0.0020	0.0030
14	0.0050	0.0020	0.0030
15	0.0050	0.0020	0.0030
16	0.0051	0.0020	0.0031
17	0.0051	0.0020	0.0031
18	0.0051	0.0020	0.0031
19	0.0051	0.0020	0.0031
20	0.0051	0.0020	0.0031
21	0.0051	0.0020	0.0031
22	0.0052	0.0020	0.0031
23	0.0052	0.0021	0.0031
24	0.0052	0.0021	0.0031
25	0.0052	0.0021	0.0032
26	0.0052	0.0021	0.0032
27	0.0053	0.0021	0.0032
28	0.0053	0.0021	0.0032
29	0.0053	0.0021	0.0032
30	0.0053	0.0021	0.0032
31	0.0053	0.0021	0.0032
32	0.0054	0.0021	0.0032
33	0.0054	0.0021	0.0032
34	0.0054	0.0021	0.0033
35	0.0054	0.0021	0.0033
36	0.0054	0.0022	0.0033

37	0.0055	0.0022	0.0033
38	0.0055	0.0022	0.0033
39	0.0055	0.0022	0.0033
40	0.0055	0.0022	0.0033
41	0.0056	0.0022	0.0034
42	0.0056	0.0022	0.0034
43	0.0056	0.0022	0.0034
44	0.0056	0.0022	0.0034
45	0.0056	0.0022	0.0034
46	0.0057	0.0022	0.0034
47	0.0057	0.0023	0.0034
48	0.0057	0.0023	0.0034
49	0.0057	0.0023	0.0035
50	0.0058	0.0023	0.0035
51	0.0058	0.0023	0.0035
52	0.0058	0.0023	0.0035
53	0.0058	0.0023	0.0035
54	0.0059	0.0023	0.0035
55	0.0059	0.0023	0.0036
56	0.0059	0.0023	0.0036
57	0.0059	0.0024	0.0036
58	0.0060	0.0024	0.0036
59	0.0060	0.0024	0.0036
60	0.0060	0.0024	0.0036
61	0.0061	0.0024	0.0037
62	0.0061	0.0024	0.0037
63	0.0061	0.0024	0.0037
64	0.0061	0.0024	0.0037
65	0.0062	0.0024	0.0037
66	0.0062	0.0025	0.0037
67	0.0062	0.0025	0.0038
68	0.0062	0.0025	0.0038
69	0.0063	0.0025	0.0038
70	0.0063	0.0025	0.0038
71	0.0064	0.0025	0.0038
72	0.0064	0.0025	0.0038
73	0.0064	0.0025	0.0039
74	0.0064	0.0026	0.0039
75	0.0065	0.0026	0.0039
76	0.0065	0.0026	0.0039
77	0.0066	0.0026	0.0040
78	0.0066	0.0026	0.0040
79	0.0066	0.0026	0.0040
80	0.0066	0.0026	0.0040
81	0.0067	0.0027	0.0040
82	0.0067	0.0027	0.0041
83	0.0068	0.0027	0.0041
84	0.0068	0.0027	0.0041
85	0.0068	0.0027	0.0041
86	0.0069	0.0027	0.0041
87	0.0069	0.0027	0.0042
88	0.0070	0.0028	0.0042
89	0.0070	0.0028	0.0042
90	0.0070	0.0028	0.0042
91	0.0071	0.0028	0.0043
92	0.0071	0.0028	0.0043
93	0.0072	0.0028	0.0043

94	0.0072	0.0029	0.0043
95	0.0073	0.0029	0.0044
96	0.0073	0.0029	0.0044
97	0.0074	0.0029	0.0044
98	0.0074	0.0029	0.0045
99	0.0075	0.0030	0.0045
100	0.0075	0.0030	0.0045
101	0.0076	0.0030	0.0046
102	0.0076	0.0030	0.0046
103	0.0077	0.0030	0.0046
104	0.0077	0.0030	0.0046
105	0.0078	0.0031	0.0047
106	0.0078	0.0031	0.0047
107	0.0079	0.0031	0.0048
108	0.0079	0.0031	0.0048
109	0.0080	0.0032	0.0048
110	0.0080	0.0032	0.0048
111	0.0081	0.0032	0.0049
112	0.0081	0.0032	0.0049
113	0.0082	0.0033	0.0050
114	0.0083	0.0033	0.0050
115	0.0084	0.0033	0.0050
116	0.0084	0.0033	0.0051
117	0.0085	0.0034	0.0051
118	0.0085	0.0034	0.0052
119	0.0086	0.0034	0.0052
120	0.0087	0.0034	0.0052
121	0.0088	0.0035	0.0053
122	0.0088	0.0035	0.0053
123	0.0089	0.0035	0.0054
124	0.0090	0.0036	0.0054
125	0.0091	0.0036	0.0055
126	0.0091	0.0036	0.0055
127	0.0093	0.0037	0.0056
128	0.0093	0.0037	0.0056
129	0.0094	0.0037	0.0057
130	0.0095	0.0038	0.0057
131	0.0096	0.0038	0.0058
132	0.0097	0.0038	0.0058
133	0.0098	0.0039	0.0059
134	0.0099	0.0039	0.0060
135	0.0100	0.0040	0.0060
136	0.0101	0.0040	0.0061
137	0.0102	0.0041	0.0062
138	0.0103	0.0041	0.0062
139	0.0105	0.0041	0.0063
140	0.0105	0.0042	0.0064
141	0.0107	0.0042	0.0065
142	0.0108	0.0043	0.0065
143	0.0110	0.0043	0.0066
144	0.0111	0.0044	0.0067
145	0.0113	0.0045	0.0068
146	0.0114	0.0045	0.0069
147	0.0116	0.0046	0.0070
148	0.0117	0.0046	0.0070
149	0.0119	0.0047	0.0072
150	0.0120	0.0047	0.0072

151	0.0122	0.0048	0.0074
152	0.0123	0.0049	0.0074
153	0.0126	0.0050	0.0076
154	0.0127	0.0050	0.0077
155	0.0130	0.0051	0.0078
156	0.0131	0.0052	0.0079
157	0.0134	0.0053	0.0081
158	0.0136	0.0054	0.0082
159	0.0139	0.0055	0.0084
160	0.0141	0.0056	0.0085
161	0.0144	0.0057	0.0087
162	0.0146	0.0058	0.0088
163	0.0150	0.0060	0.0091
164	0.0152	0.0060	0.0092
165	0.0157	0.0062	0.0095
166	0.0159	0.0063	0.0096
167	0.0164	0.0065	0.0099
168	0.0167	0.0066	0.0101
169	0.0173	0.0068	0.0104
170	0.0176	0.0070	0.0106
171	0.0182	0.0072	0.0110
172	0.0186	0.0074	0.0112
173	0.0193	0.0077	0.0117
174	0.0197	0.0078	0.0119
175	0.0206	0.0082	0.0125
176	0.0211	0.0084	0.0128
177	0.0222	0.0088	0.0134
178	0.0228	0.0090	0.0138
179	0.0241	0.0096	0.0146
180	0.0249	0.0099	0.0150
181	0.0266	0.0105	0.0160
182	0.0275	0.0109	0.0166
183	0.0298	0.0118	0.0180
184	0.0311	0.0123	0.0188
185	0.0395	0.0157	0.0239
186	0.0415	0.0165	0.0251
187	0.0467	0.0185	0.0282
188	0.0500	0.0198	0.0302
189	0.0593	0.0227*	0.0367
190	0.0663	0.0227*	0.0436
191	0.0919	0.0227*	0.0693
192	0.1231	0.0227*	0.1004
193	0.3363	0.0227*	0.3136
194	0.0762	0.0227*	0.0535
195	0.0541	0.0214	0.0327
196	0.0439	0.0174	0.0265
197	0.0326	0.0129	0.0197
198	0.0286	0.0113	0.0173
199	0.0257	0.0102	0.0155
200	0.0234	0.0093	0.0142
201	0.0216	0.0086	0.0131
202	0.0202	0.0080	0.0122
203	0.0189	0.0075	0.0114
204	0.0179	0.0071	0.0108
205	0.0170	0.0067	0.0102
206	0.0162	0.0064	0.0098
207	0.0155	0.0061	0.0093

208	0.0148	0.0059	0.0090
209	0.0143	0.0057	0.0086
210	0.0137	0.0054	0.0083
211	0.0133	0.0053	0.0080
212	0.0129	0.0051	0.0078
213	0.0125	0.0049	0.0075
214	0.0121	0.0048	0.0073
215	0.0118	0.0047	0.0071
216	0.0115	0.0045	0.0069
217	0.0112	0.0044	0.0067
218	0.0109	0.0043	0.0066
219	0.0106	0.0042	0.0064
220	0.0104	0.0041	0.0063
221	0.0102	0.0040	0.0061
222	0.0099	0.0039	0.0060
223	0.0097	0.0039	0.0059
224	0.0096	0.0038	0.0058
225	0.0094	0.0037	0.0057
226	0.0092	0.0036	0.0056
227	0.0090	0.0036	0.0055
228	0.0089	0.0035	0.0054
229	0.0087	0.0035	0.0053
230	0.0086	0.0034	0.0052
231	0.0084	0.0033	0.0051
232	0.0083	0.0033	0.0050
233	0.0082	0.0032	0.0049
234	0.0081	0.0032	0.0049
235	0.0079	0.0031	0.0048
236	0.0078	0.0031	0.0047
237	0.0077	0.0031	0.0047
238	0.0076	0.0030	0.0046
239	0.0075	0.0030	0.0045
240	0.0074	0.0029	0.0045
241	0.0073	0.0029	0.0044
242	0.0072	0.0029	0.0044
243	0.0071	0.0028	0.0043
244	0.0071	0.0028	0.0043
245	0.0070	0.0028	0.0042
246	0.0069	0.0027	0.0042
247	0.0068	0.0027	0.0041
248	0.0067	0.0027	0.0041
249	0.0067	0.0026	0.0040
250	0.0066	0.0026	0.0040
251	0.0065	0.0026	0.0039
252	0.0065	0.0026	0.0039
253	0.0064	0.0025	0.0039
254	0.0063	0.0025	0.0038
255	0.0063	0.0025	0.0038
256	0.0062	0.0025	0.0037
257	0.0061	0.0024	0.0037
258	0.0061	0.0024	0.0037
259	0.0060	0.0024	0.0036
260	0.0060	0.0024	0.0036
261	0.0059	0.0023	0.0036
262	0.0059	0.0023	0.0035
263	0.0058	0.0023	0.0035
264	0.0058	0.0023	0.0035

265	0.0057	0.0023	0.0035
266	0.0057	0.0022	0.0034
267	0.0056	0.0022	0.0034
268	0.0056	0.0022	0.0034
269	0.0055	0.0022	0.0033
270	0.0055	0.0022	0.0033
271	0.0055	0.0022	0.0033
272	0.0054	0.0021	0.0033
273	0.0054	0.0021	0.0032
274	0.0053	0.0021	0.0032
275	0.0053	0.0021	0.0032
276	0.0052	0.0021	0.0032
277	0.0052	0.0021	0.0031
278	0.0052	0.0020	0.0031
279	0.0051	0.0020	0.0031
280	0.0051	0.0020	0.0031
281	0.0051	0.0020	0.0031
282	0.0050	0.0020	0.0030
283	0.0050	0.0020	0.0030
284	0.0050	0.0020	0.0030
285	0.0049	0.0020	0.0030
286	0.0049	0.0019	0.0030
287	0.0049	0.0019	0.0029
288	0.0048	0.0019	0.0029
	3.5526	1.2452	2.3074

Total soil rain loss = 1.25(In)
Total effective rainfall = 2.31(In)
Peak flow rate in flood hydrograph = 20.78(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

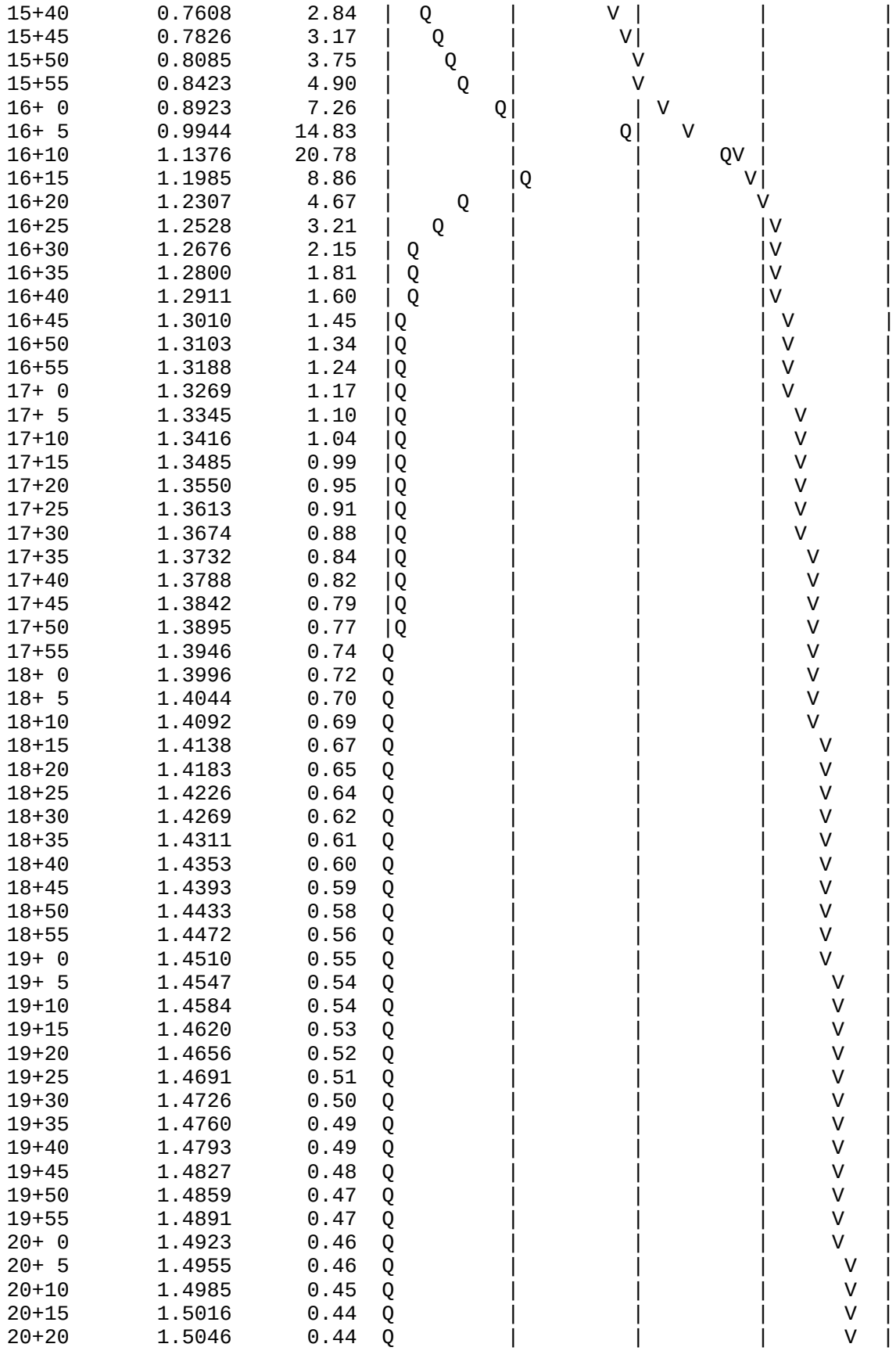
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0005	0.07	Q				
0+10	0.0021	0.24	Q				
0+15	0.0041	0.28	Q				
0+20	0.0061	0.29	Q				
0+25	0.0081	0.30	Q				
0+30	0.0102	0.30	Q				
0+35	0.0123	0.30	Q				
0+40	0.0143	0.30	Q				
0+45	0.0164	0.30	Q				
0+50	0.0185	0.30	Q				
0+55	0.0206	0.30	Q				
1+ 0	0.0227	0.30	Q				
1+ 5	0.0248	0.31	Q				
1+10	0.0269	0.31	Q				
1+15	0.0290	0.31	Q				
1+20	0.0312	0.31	Q				

1+25	0.0333	0.31	Q	|	|	|	|
1+30	0.0354	0.31	Q	|	|	|	|
1+35	0.0376	0.31	Q	|	|	|	|
1+40	0.0397	0.31	Q	|	|	|	|
1+45	0.0419	0.31	QV	|	|	|	|
1+50	0.0441	0.32	QV	|	|	|	|
1+55	0.0463	0.32	QV	|	|	|	|
2+ 0	0.0485	0.32	QV	|	|	|	|
2+ 5	0.0507	0.32	QV	|	|	|	|
2+10	0.0529	0.32	QV	|	|	|	|
2+15	0.0551	0.32	QV	|	|	|	|
2+20	0.0573	0.32	QV	|	|	|	|
2+25	0.0595	0.32	QV	|	|	|	|
2+30	0.0618	0.32	QV	|	|	|	|
2+35	0.0640	0.33	QV	|	|	|	|
2+40	0.0663	0.33	QV	|	|	|	|
2+45	0.0685	0.33	QV	|	|	|	|
2+50	0.0708	0.33	QV	|	|	|	|
2+55	0.0731	0.33	QV	|	|	|	|
3+ 0	0.0754	0.33	QV	|	|	|	|
3+ 5	0.0777	0.33	QV	|	|	|	|
3+10	0.0800	0.34	QV	|	|	|	|
3+15	0.0823	0.34	Q V	|	|	|	|
3+20	0.0846	0.34	Q V	|	|	|	|
3+25	0.0870	0.34	Q V	|	|	|	|
3+30	0.0893	0.34	Q V	|	|	|	|
3+35	0.0917	0.34	Q V	|	|	|	|
3+40	0.0940	0.34	Q V	|	|	|	|
3+45	0.0964	0.34	Q V	|	|	|	|
3+50	0.0988	0.35	Q V	|	|	|	|
3+55	0.1012	0.35	Q V	|	|	|	|
4+ 0	0.1036	0.35	Q V	|	|	|	|
4+ 5	0.1060	0.35	Q V	|	|	|	|
4+10	0.1084	0.35	Q V	|	|	|	|
4+15	0.1108	0.35	Q V	|	|	|	|
4+20	0.1133	0.35	Q V	|	|	|	|
4+25	0.1157	0.36	Q V	|	|	|	|
4+30	0.1182	0.36	Q V	|	|	|	|
4+35	0.1207	0.36	Q V	|	|	|	|
4+40	0.1232	0.36	Q V	|	|	|	|
4+45	0.1257	0.36	Q V	|	|	|	|
4+50	0.1282	0.36	Q V	|	|	|	|
4+55	0.1307	0.37	Q V	|	|	|	|
5+ 0	0.1332	0.37	Q V	|	|	|	|
5+ 5	0.1358	0.37	Q V	|	|	|	|
5+10	0.1383	0.37	Q V	|	|	|	|
5+15	0.1409	0.37	Q V	|	|	|	|
5+20	0.1435	0.37	Q V	|	|	|	|
5+25	0.1461	0.38	Q V	|	|	|	|
5+30	0.1487	0.38	Q V	|	|	|	|
5+35	0.1513	0.38	Q V	|	|	|	|
5+40	0.1539	0.38	Q V	|	|	|	|
5+45	0.1565	0.38	Q V	|	|	|	|
5+50	0.1592	0.39	Q V	|	|	|	|
5+55	0.1619	0.39	Q V	|	|	|	|
6+ 0	0.1646	0.39	Q V	|	|	|	|
6+ 5	0.1672	0.39	Q V	|	|	|	|

6+10	0.1700	0.39	Q	V	|	|	|	|
6+15	0.1727	0.40	Q	V	|	|	|	|
6+20	0.1754	0.40	Q	V	|	|	|	|
6+25	0.1782	0.40	Q	V	|	|	|	|
6+30	0.1809	0.40	Q	V	|	|	|	|
6+35	0.1837	0.40	Q	V	|	|	|	|
6+40	0.1865	0.41	Q	V	|	|	|	|
6+45	0.1893	0.41	Q	V	|	|	|	|
6+50	0.1921	0.41	Q	V	|	|	|	|
6+55	0.1950	0.41	Q	V	|	|	|	|
7+ 0	0.1978	0.41	Q	V	|	|	|	|
7+ 5	0.2007	0.42	Q	V	|	|	|	|
7+10	0.2036	0.42	Q	V	|	|	|	|
7+15	0.2065	0.42	Q	V	|	|	|	|
7+20	0.2094	0.42	Q	V	|	|	|	|
7+25	0.2124	0.43	Q	V	|	|	|	|
7+30	0.2153	0.43	Q	V	|	|	|	|
7+35	0.2183	0.43	Q	V	|	|	|	|
7+40	0.2213	0.43	Q	V	|	|	|	|
7+45	0.2243	0.44	Q	V	|	|	|	|
7+50	0.2273	0.44	Q	V	|	|	|	|
7+55	0.2304	0.44	Q	V	|	|	|	|
8+ 0	0.2334	0.45	Q	V	|	|	|	|
8+ 5	0.2365	0.45	Q	V	|	|	|	|
8+10	0.2396	0.45	Q	V	|	|	|	|
8+15	0.2427	0.45	Q	V	|	|	|	|
8+20	0.2459	0.46	Q	V	|	|	|	|
8+25	0.2490	0.46	Q	V	|	|	|	|
8+30	0.2522	0.46	Q	V	|	|	|	|
8+35	0.2554	0.47	Q	V	|	|	|	|
8+40	0.2587	0.47	Q	V	|	|	|	|
8+45	0.2619	0.47	Q	V	|	|	|	|
8+50	0.2652	0.48	Q	V	|	|	|	|
8+55	0.2685	0.48	Q	V	|	|	|	|
9+ 0	0.2718	0.48	Q	V	|	|	|	|
9+ 5	0.2752	0.49	Q	V	|	|	|	|
9+10	0.2785	0.49	Q	V	|	|	|	|
9+15	0.2819	0.49	Q	V	|	|	|	|
9+20	0.2853	0.50	Q	V	|	|	|	|
9+25	0.2888	0.50	Q	V	|	|	|	|
9+30	0.2922	0.50	Q	V	|	|	|	|
9+35	0.2957	0.51	Q	V	|	|	|	|
9+40	0.2993	0.51	Q	V	|	|	|	|
9+45	0.3028	0.52	Q	V	|	|	|	|
9+50	0.3064	0.52	Q	V	|	|	|	|
9+55	0.3100	0.52	Q	V	|	|	|	|
10+ 0	0.3137	0.53	Q	V	|	|	|	|
10+ 5	0.3173	0.53	Q	V	|	|	|	|
10+10	0.3210	0.54	Q	V	|	|	|	|
10+15	0.3248	0.54	Q	V	|	|	|	|
10+20	0.3285	0.55	Q	V	|	|	|	|
10+25	0.3323	0.55	Q	V	|	|	|	|
10+30	0.3362	0.56	Q	V	|	|	|	|
10+35	0.3400	0.56	Q	V	|	|	|	|
10+40	0.3439	0.57	Q	V	|	|	|	|
10+45	0.3479	0.57	Q	V	|	|	|	|
10+50	0.3518	0.58	Q	V	|	|	|	|

```
10+55       0.3559      0.58  Q       V |         |         |         |
11+ 0       0.3599      0.59  Q       V |         |         |         |
11+ 5       0.3640      0.59  Q        V|         |         |         |
11+10       0.3681      0.60  Q        V|         |         |         |
11+15       0.3723      0.61  Q        V|         |         |         |
11+20       0.3765      0.61  Q        V|         |         |         |
11+25       0.3808      0.62  Q        V|         |         |         |
11+30       0.3851      0.63  Q        V|         |         |         |
11+35       0.3895      0.63  Q        V|         |         |         |
11+40       0.3939      0.64  Q        V|         |         |         |
11+45       0.3984      0.65  Q        V|         |         |         |
11+50       0.4029      0.66  Q        V|         |         |         |
11+55       0.4075      0.66  Q         V         |         |         |
12+ 0       0.4121      0.67  Q         V         |         |         |
12+ 5       0.4168      0.68  Q         V         |         |         |
12+10       0.4215      0.69  Q         V         |         |         |
12+15       0.4263      0.70  Q         V         |         |         |
12+20       0.4312      0.71  Q         V         |         |         |
12+25       0.4361      0.72  Q         V         |         |         |
12+30       0.4411      0.73  Q         V         |         |         |
12+35       0.4462      0.74  Q         |V        |         |         |
12+40       0.4513      0.75  Q         |V        |         |         |
12+45       0.4566      0.76  |Q        |V        |         |         |
12+50       0.4619      0.77  |Q        |V        |         |         |
12+55       0.4673      0.78  |Q        |V        |         |         |
13+ 0       0.4727      0.80  |Q        |V        |         |         |
13+ 5       0.4783      0.81  |Q        |V        |         |         |
13+10       0.4840      0.82  |Q        |V        |         |         |
13+15       0.4897      0.84  |Q        | V       |         |         |
13+20       0.4956      0.85  |Q        | V       |         |         |
13+25       0.5015      0.87  |Q        | V       |         |         |
13+30       0.5076      0.88  |Q        | V       |         |         |
13+35       0.5138      0.90  |Q        | V       |         |         |
13+40       0.5202      0.92  |Q        | V       |         |         |
13+45       0.5266      0.94  |Q        |  V      |         |         |
13+50       0.5332      0.96  |Q        |  V      |         |         |
13+55       0.5400      0.98  |Q        |  V      |         |         |
14+ 0       0.5469      1.00  |Q        |  V      |         |         |
14+ 5       0.5539      1.03  |Q        |  V      |         |         |
14+10       0.5612      1.06  |Q        |  V      |         |         |
14+15       0.5687      1.08  |Q        |   V     |         |         |
14+20       0.5763      1.11  |Q        |   V     |         |         |
14+25       0.5842      1.14  |Q        |   V     |         |         |
14+30       0.5923      1.18  |Q        |   V     |         |         |
14+35       0.6007      1.22  |Q        |   V     |         |         |
14+40       0.6094      1.26  |Q        |    V    |         |         |
14+45       0.6184      1.30  |Q        |    V    |         |         |
14+50       0.6277      1.36  |Q        |    V    |         |         |
14+55       0.6374      1.41  |Q        |    V    |         |         |
15+ 0       0.6475      1.47  |Q        |     V   |         |         |
15+ 5       0.6581      1.54  | Q       |     V   |         |         |
15+10       0.6693      1.62  | Q       |     V   |         |         |
15+15       0.6810      1.71  | Q       |     V   |         |         |
15+20       0.6935      1.82  | Q       |      V  |         |         |
15+25       0.7074      2.01  | Q       |      V  |         |         |
15+30       0.7236      2.35  |  Q      |      V  |         |         |
15+35       0.7413      2.57  |  Q      |       V |         |         |
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20+25	1.5076	0.43	Q	|	|	|	V |
20+30	1.5106	0.43	Q	|	|	|	V |
20+35	1.5135	0.42	Q	|	|	|	V |
20+40	1.5164	0.42	Q	|	|	|	V |
20+45	1.5192	0.41	Q	|	|	|	V |
20+50	1.5220	0.41	Q	|	|	|	V |
20+55	1.5248	0.40	Q	|	|	|	V |
21+ 0	1.5276	0.40	Q	|	|	|	V |
21+ 5	1.5303	0.40	Q	|	|	|	V |
21+10	1.5330	0.39	Q	|	|	|	V |
21+15	1.5357	0.39	Q	|	|	|	V |
21+20	1.5383	0.38	Q	|	|	|	V |
21+25	1.5410	0.38	Q	|	|	|	V |
21+30	1.5435	0.38	Q	|	|	|	V |
21+35	1.5461	0.37	Q	|	|	|	V |
21+40	1.5487	0.37	Q	|	|	|	V |
21+45	1.5512	0.37	Q	|	|	|	V |
21+50	1.5537	0.36	Q	|	|	|	V |
21+55	1.5562	0.36	Q	|	|	|	V |
22+ 0	1.5586	0.36	Q	|	|	|	V |
22+ 5	1.5611	0.35	Q	|	|	|	V |
22+10	1.5635	0.35	Q	|	|	|	V |
22+15	1.5659	0.35	Q	|	|	|	V |
22+20	1.5683	0.35	Q	|	|	|	V |
22+25	1.5706	0.34	Q	|	|	|	V |
22+30	1.5730	0.34	Q	|	|	|	V |
22+35	1.5753	0.34	Q	|	|	|	V|
22+40	1.5776	0.33	Q	|	|	|	V|
22+45	1.5799	0.33	Q	|	|	|	V|
22+50	1.5822	0.33	Q	|	|	|	V|
22+55	1.5844	0.33	Q	|	|	|	V|
23+ 0	1.5866	0.32	Q	|	|	|	V|
23+ 5	1.5889	0.32	Q	|	|	|	V|
23+10	1.5911	0.32	Q	|	|	|	V|
23+15	1.5932	0.32	Q	|	|	|	V|
23+20	1.5954	0.32	Q	|	|	|	V|
23+25	1.5976	0.31	Q	|	|	|	V|
23+30	1.5997	0.31	Q	|	|	|	V|
23+35	1.6018	0.31	Q	|	|	|	V|
23+40	1.6040	0.31	Q	|	|	|	V|
23+45	1.6060	0.30	Q	|	|	|	V|
23+50	1.6081	0.30	Q	|	|	|	V|
23+55	1.6102	0.30	Q	|	|	|	V|
24+ 0	1.6123	0.30	Q	|	|	|	V|
24+ 5	1.6138	0.22	Q	|	|	|	V|
24+10	1.6142	0.06	Q	|	|	|	V|
24+15	1.6143	0.02	Q	|	|	|	V|
24+20	1.6143	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA A - EXISTING CONDITIONS
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
8.40	6	0.82
Rainfall data for year 2		
8.40	24	1.37
Rainfall data for year 100		
8.40	6	2.34
Rainfall data for year 100		
8.40	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	8.40	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
8.40	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 1240.00(Ft.)
Length from concentration point to centroid = 605.00(Ft.)
Elevation difference along watercourse = 270.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 8.40(Ac.)
Catchment Lag time = 0.064 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 130.8252
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 8.40(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.384(In)
30-minute factor = 1.000 Adjusted rainfall = 0.860(In)
1-hour factor = 1.000 Adjusted rainfall = 1.175(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 101.59 (CFS))

1	24.970	25.366
2	80.335	56.245
3	94.485	14.374
4	98.300	3.876
5	100.000	1.726

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.384
2	3.15	0.52	0.52	0.141
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017

46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010

103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.73	2.73	0.010
107	0.31	2.74	2.74	0.010
108	0.31	2.75	2.75	0.010
109	0.30	2.76	2.76	0.010
110	0.30	2.77	2.77	0.010
111	0.30	2.78	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.94	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.17	3.17	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008

160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.31	3.31	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.42	3.42	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007

217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.74	3.74	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006

274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019
29	0.0061	0.0041	0.0019
30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020
33	0.0062	0.0042	0.0020
34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020

37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020
40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025
86	0.0079	0.0054	0.0025
87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026
90	0.0081	0.0055	0.0026
91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026

94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027
97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039
143	0.0125	0.0085	0.0040
144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041
147	0.0129	0.0088	0.0041
148	0.0130	0.0088	0.0042
149	0.0132	0.0090	0.0042
150	0.0134	0.0091	0.0043

151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045
154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0155	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0161	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0193	0.0131	0.0062
170	0.0197	0.0134	0.0063
171	0.0204	0.0139	0.0065
172	0.0208	0.0141	0.0067
173	0.0217	0.0147	0.0069
174	0.0221	0.0150	0.0071
175	0.0231	0.0157	0.0074
176	0.0237	0.0161	0.0076
177	0.0249	0.0169	0.0080
178	0.0256	0.0174	0.0082
179	0.0271	0.0184	0.0087
180	0.0279	0.0190	0.0089
181	0.0299	0.0203	0.0096
182	0.0310	0.0211	0.0099
183	0.0335	0.0228	0.0107
184	0.0350	0.0238	0.0112
185	0.0451	0.0307	0.0144
186	0.0474	0.0322	0.0152
187	0.0533	0.0362	0.0170
188	0.0571	0.0388	0.0183
189	0.0677	0.0461	0.0217
190	0.0757	0.0472*	0.0285
191	0.1050	0.0472*	0.0578
192	0.1405	0.0472*	0.0934
193	0.3839	0.0472*	0.3367
194	0.0870	0.0472*	0.0398
195	0.0618	0.0420	0.0198
196	0.0501	0.0341	0.0160
197	0.0367	0.0250	0.0118
198	0.0322	0.0219	0.0103
199	0.0289	0.0196	0.0092
200	0.0263	0.0179	0.0084
201	0.0243	0.0165	0.0078
202	0.0226	0.0154	0.0072
203	0.0212	0.0144	0.0068
204	0.0200	0.0136	0.0064
205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055

208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049
211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023
257	0.0071	0.0048	0.0023
258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022
261	0.0068	0.0046	0.0022
262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021

265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021
268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0399	2.4445	1.5955

Total soil rain loss = 2.44(In)
Total effective rainfall = 1.60(In)
Peak flow rate in flood hydrograph = 21.57(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0003	0.04	Q	|	|	|	|
0+10	0.0013	0.14	Q	|	|	|	|
0+15	0.0025	0.17	Q	|	|	|	|
0+20	0.0037	0.18	Q	|	|	|	|
0+25	0.0050	0.18	Q	|	|	|	|
0+30	0.0062	0.18	Q	|	|	|	|
0+35	0.0075	0.18	Q	|	|	|	|
0+40	0.0087	0.18	Q	|	|	|	|
0+45	0.0100	0.18	Q	|	|	|	|
0+50	0.0113	0.18	Q	|	|	|	|
0+55	0.0125	0.18	Q	|	|	|	|
1+ 0	0.0138	0.19	Q	|	|	|	|
1+ 5	0.0151	0.19	Q	|	|	|	|
1+10	0.0164	0.19	Q	|	|	|	|
1+15	0.0177	0.19	Q	|	|	|	|
1+20	0.0190	0.19	Q	|	|	|	|

1+25	0.0203	0.19	Q	|	|	|	|
1+30	0.0216	0.19	Q	|	|	|	|
1+35	0.0229	0.19	Q	|	|	|	|
1+40	0.0242	0.19	Q	|	|	|	|
1+45	0.0255	0.19	Q	|	|	|	|
1+50	0.0268	0.19	Q	|	|	|	|
1+55	0.0282	0.19	QV	|	|	|	|
2+ 0	0.0295	0.19	QV	|	|	|	|
2+ 5	0.0308	0.19	QV	|	|	|	|
2+10	0.0322	0.19	QV	|	|	|	|
2+15	0.0335	0.20	QV	|	|	|	|
2+20	0.0349	0.20	QV	|	|	|	|
2+25	0.0362	0.20	QV	|	|	|	|
2+30	0.0376	0.20	QV	|	|	|	|
2+35	0.0390	0.20	QV	|	|	|	|
2+40	0.0403	0.20	QV	|	|	|	|
2+45	0.0417	0.20	QV	|	|	|	|
2+50	0.0431	0.20	QV	|	|	|	|
2+55	0.0445	0.20	QV	|	|	|	|
3+ 0	0.0459	0.20	QV	|	|	|	|
3+ 5	0.0473	0.20	QV	|	|	|	|
3+10	0.0487	0.20	QV	|	|	|	|
3+15	0.0501	0.20	QV	|	|	|	|
3+20	0.0515	0.21	QV	|	|	|	|
3+25	0.0529	0.21	QV	|	|	|	|
3+30	0.0543	0.21	QV	|	|	|	|
3+35	0.0558	0.21	QV	|	|	|	|
3+40	0.0572	0.21	Q V	|	|	|	|
3+45	0.0587	0.21	Q V	|	|	|	|
3+50	0.0601	0.21	Q V	|	|	|	|
3+55	0.0616	0.21	Q V	|	|	|	|
4+ 0	0.0630	0.21	Q V	|	|	|	|
4+ 5	0.0645	0.21	Q V	|	|	|	|
4+10	0.0660	0.21	Q V	|	|	|	|
4+15	0.0674	0.21	Q V	|	|	|	|
4+20	0.0689	0.22	Q V	|	|	|	|
4+25	0.0704	0.22	Q V	|	|	|	|
4+30	0.0719	0.22	Q V	|	|	|	|
4+35	0.0734	0.22	Q V	|	|	|	|
4+40	0.0749	0.22	Q V	|	|	|	|
4+45	0.0765	0.22	Q V	|	|	|	|
4+50	0.0780	0.22	Q V	|	|	|	|
4+55	0.0795	0.22	Q V	|	|	|	|
5+ 0	0.0811	0.22	Q V	|	|	|	|
5+ 5	0.0826	0.22	Q V	|	|	|	|
5+10	0.0842	0.23	Q V	|	|	|	|
5+15	0.0857	0.23	Q V	|	|	|	|
5+20	0.0873	0.23	Q V	|	|	|	|
5+25	0.0889	0.23	Q V	|	|	|	|
5+30	0.0904	0.23	Q V	|	|	|	|
5+35	0.0920	0.23	Q V	|	|	|	|
5+40	0.0936	0.23	Q V	|	|	|	|
5+45	0.0952	0.23	Q V	|	|	|	|
5+50	0.0969	0.23	Q V	|	|	|	|
5+55	0.0985	0.24	Q V	|	|	|	|
6+ 0	0.1001	0.24	Q V	|	|	|	|
6+ 5	0.1017	0.24	Q V	|	|	|	|

6+10	0.1034	0.24	Q	V				
6+15	0.1050	0.24	Q	V				
6+20	0.1067	0.24	Q	V				
6+25	0.1084	0.24	Q	V				
6+30	0.1101	0.24	Q	V				
6+35	0.1117	0.25	Q	V				
6+40	0.1134	0.25	Q	V				
6+45	0.1152	0.25	Q	V				
6+50	0.1169	0.25	Q	V				
6+55	0.1186	0.25	Q	V				
7+ 0	0.1203	0.25	Q	V				
7+ 5	0.1221	0.25	Q	V				
7+10	0.1238	0.25	Q	V				
7+15	0.1256	0.26	Q	V				
7+20	0.1274	0.26	Q	V				
7+25	0.1292	0.26	Q	V				
7+30	0.1310	0.26	Q	V				
7+35	0.1328	0.26	Q	V				
7+40	0.1346	0.26	Q	V				
7+45	0.1364	0.27	Q	V				
7+50	0.1382	0.27	Q	V				
7+55	0.1401	0.27	Q	V				
8+ 0	0.1420	0.27	Q	V				
8+ 5	0.1438	0.27	Q	V				
8+10	0.1457	0.27	Q	V				
8+15	0.1476	0.28	Q	V				
8+20	0.1495	0.28	Q	V				
8+25	0.1514	0.28	Q	V				
8+30	0.1534	0.28	Q	V				
8+35	0.1553	0.28	Q	V				
8+40	0.1573	0.28	Q	V				
8+45	0.1592	0.29	Q	V				
8+50	0.1612	0.29	Q	V				
8+55	0.1632	0.29	Q	V				
9+ 0	0.1653	0.29	Q	V				
9+ 5	0.1673	0.29	Q	V				
9+10	0.1693	0.30	Q	V				
9+15	0.1714	0.30	Q	V				
9+20	0.1735	0.30	Q	V				
9+25	0.1755	0.30	Q	V				
9+30	0.1777	0.31	Q	V				
9+35	0.1798	0.31	Q	V				
9+40	0.1819	0.31	Q	V				
9+45	0.1841	0.31	Q	V				
9+50	0.1862	0.32	Q	V				
9+55	0.1884	0.32	Q	V				
10+ 0	0.1906	0.32	Q	V				
10+ 5	0.1929	0.32	Q	V				
10+10	0.1951	0.33	Q	V				
10+15	0.1974	0.33	Q	V				
10+20	0.1997	0.33	Q	V				
10+25	0.2020	0.33	Q	V				
10+30	0.2043	0.34	Q	V				
10+35	0.2066	0.34	Q	V				
10+40	0.2090	0.34	Q	V				
10+45	0.2114	0.35	Q	V				
10+50	0.2138	0.35	Q	V				

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10+55       0.2162      0.35  Q      V  |          |          |          |
11+ 0       0.2187      0.36  Q      V  |          |          |          |
11+ 5       0.2212      0.36  Q      V  |          |          |          |
11+10       0.2237      0.36  Q       V |          |          |          |
11+15       0.2262      0.37  Q       V |          |          |          |
11+20       0.2288      0.37  Q       V |          |          |          |
11+25       0.2314      0.38  Q       V |          |          |          |
11+30       0.2340      0.38  Q       V |          |          |          |
11+35       0.2366      0.38  Q       V |          |          |          |
11+40       0.2393      0.39  Q       V |          |          |          |
11+45       0.2420      0.39  Q       V |          |          |          |
11+50       0.2447      0.40  Q       V |          |          |          |
11+55       0.2475      0.40  Q       V |          |          |          |
12+ 0       0.2503      0.41  Q       V |          |          |          |
12+ 5       0.2531      0.41  Q        V|          |          |          |
12+10       0.2559      0.41  Q        V|          |          |          |
12+15       0.2588      0.41  Q        V|          |          |          |
12+20       0.2617      0.42  Q        V|          |          |          |
12+25       0.2646      0.42  Q        V|          |          |          |
12+30       0.2675      0.43  Q        V|          |          |          |
12+35       0.2705      0.44  Q        V|          |          |          |
12+40       0.2736      0.44  Q        V|          |          |          |
12+45       0.2767      0.45  Q        V|          |          |          |
12+50       0.2798      0.46  Q         V          |          |          |
12+55       0.2830      0.46  Q         V          |          |          |
13+ 0       0.2862      0.47  Q         V          |          |          |
13+ 5       0.2895      0.48  Q         V          |          |          |
13+10       0.2929      0.49  Q         V          |          |          |
13+15       0.2963      0.49  Q         V          |          |          |
13+20       0.2997      0.50  Q         V          |          |          |
13+25       0.3033      0.51  Q         V          |          |          |
13+30       0.3069      0.52  Q         V          |          |          |
13+35       0.3106      0.53  Q          |V         |          |          |
13+40       0.3143      0.54  Q          |V         |          |          |
13+45       0.3181      0.56  Q          |V         |          |          |
13+50       0.3221      0.57  Q          |V         |          |          |
13+55       0.3261      0.58  Q          |V         |          |          |
14+ 0       0.3301      0.60  Q          |V         |          |          |
14+ 5       0.3343      0.61  Q          |V         |          |          |
14+10       0.3387      0.63  Q          | V        |          |          |
14+15       0.3431      0.64  Q          | V        |          |          |
14+20       0.3476      0.66  Q          | V        |          |          |
14+25       0.3523      0.68  Q          | V        |          |          |
14+30       0.3571      0.70  Q          | V        |          |          |
14+35       0.3621      0.72  Q          | V        |          |          |
14+40       0.3673      0.75  Q          |  V       |          |          |
14+45       0.3726      0.77  |Q         |  V       |          |          |
14+50       0.3781      0.81  |Q         |  V       |          |          |
14+55       0.3839      0.84  |Q         |  V       |          |          |
15+ 0       0.3899      0.88  |Q         |  V       |          |          |
15+ 5       0.3962      0.92  |Q         |   V      |          |          |
15+10       0.4029      0.97  |Q         |   V      |          |          |
15+15       0.4099      1.02  |Q         |   V      |          |          |
15+20       0.4174      1.08  |Q         |   V      |          |          |
15+25       0.4257      1.21  |Q         |    V     |          |          |
15+30       0.4354      1.42  |Q         |    V     |          |          |
15+35       0.4461      1.56  | Q        |    V     |          |          |
```

15+40	0.4579	1.72	Q		V			
15+45	0.4711	1.91	Q		V			
15+50	0.4869	2.30	Q		V			
15+55	0.5108	3.48	Q		V			
16+ 0	0.5532	6.14	Q		V			
16+ 5	0.6549	14.77			Q	V		
16+10	0.8034	21.57				Q		
16+15	0.8588	8.04		Q			V	
16+20	0.8833	3.56	Q				V	
16+25	0.8986	2.22	Q				V	
16+30	0.9075	1.30	Q				V	
16+35	0.9150	1.08	Q				V	
16+40	0.9215	0.95	Q				V	
16+45	0.9275	0.86	Q				V	
16+50	0.9330	0.80	Q				V	
16+55	0.9381	0.74	Q				V	
17+ 0	0.9428	0.69	Q				V	
17+ 5	0.9473	0.65	Q				V	
17+10	0.9516	0.62	Q				V	
17+15	0.9557	0.59	Q				V	
17+20	0.9595	0.56	Q				V	
17+25	0.9633	0.54	Q				V	
17+30	0.9668	0.52	Q				V	
17+35	0.9703	0.50	Q				V	
17+40	0.9736	0.48	Q				V	
17+45	0.9768	0.47	Q				V	
17+50	0.9799	0.45	Q				V	
17+55	0.9830	0.44	Q				V	
18+ 0	0.9859	0.43	Q				V	
18+ 5	0.9888	0.42	Q				V	
18+10	0.9916	0.41	Q				V	
18+15	0.9944	0.40	Q				V	
18+20	0.9971	0.40	Q				V	
18+25	0.9998	0.39	Q				V	
18+30	1.0024	0.38	Q				V	
18+35	1.0049	0.37	Q				V	
18+40	1.0074	0.36	Q				V	
18+45	1.0099	0.36	Q				V	
18+50	1.0123	0.35	Q				V	
18+55	1.0146	0.34	Q				V	
19+ 0	1.0170	0.34	Q				V	
19+ 5	1.0192	0.33	Q				V	
19+10	1.0215	0.32	Q				V	
19+15	1.0237	0.32	Q				V	
19+20	1.0258	0.31	Q				V	
19+25	1.0280	0.31	Q				V	
19+30	1.0301	0.30	Q				V	
19+35	1.0321	0.30	Q				V	
19+40	1.0342	0.30	Q				V	
19+45	1.0362	0.29	Q				V	
19+50	1.0382	0.29	Q				V	
19+55	1.0401	0.28	Q				V	
20+ 0	1.0420	0.28	Q				V	
20+ 5	1.0440	0.28	Q				V	
20+10	1.0458	0.27	Q				V	
20+15	1.0477	0.27	Q				V	
20+20	1.0495	0.27	Q				V	

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  20+25       1.0513      0.26  Q          |          |          |       V  |
  20+30       1.0531      0.26  Q          |          |          |       V  |
  20+35       1.0549      0.26  Q          |          |          |       V  |
  20+40       1.0566      0.25  Q          |          |          |       V  |
  20+45       1.0584      0.25  Q          |          |          |       V  |
  20+50       1.0601      0.25  Q          |          |          |       V  |
  20+55       1.0618      0.25  Q          |          |          |        V |
  21+ 0       1.0635      0.24  Q          |          |          |        V |
  21+ 5       1.0651      0.24  Q          |          |          |        V |
  21+10       1.0668      0.24  Q          |          |          |        V |
  21+15       1.0684      0.24  Q          |          |          |        V |
  21+20       1.0700      0.23  Q          |          |          |        V |
  21+25       1.0716      0.23  Q          |          |          |        V |
  21+30       1.0732      0.23  Q          |          |          |        V |
  21+35       1.0747      0.23  Q          |          |          |        V |
  21+40       1.0763      0.23  Q          |          |          |        V |
  21+45       1.0778      0.22  Q          |          |          |        V |
  21+50       1.0793      0.22  Q          |          |          |        V |
  21+55       1.0809      0.22  Q          |          |          |        V |
  22+ 0       1.0824      0.22  Q          |          |          |        V |
  22+ 5       1.0838      0.22  Q          |          |          |        V |
  22+10       1.0853      0.21  Q          |          |          |        V |
  22+15       1.0868      0.21  Q          |          |          |        V |
  22+20       1.0882      0.21  Q          |          |          |        V |
  22+25       1.0896      0.21  Q          |          |          |         V|
  22+30       1.0911      0.21  Q          |          |          |         V|
  22+35       1.0925      0.21  Q          |          |          |         V|
  22+40       1.0939      0.20  Q          |          |          |         V|
  22+45       1.0953      0.20  Q          |          |          |         V|
  22+50       1.0967      0.20  Q          |          |          |         V|
  22+55       1.0980      0.20  Q          |          |          |         V|
  23+ 0       1.0994      0.20  Q          |          |          |         V|
  23+ 5       1.1007      0.20  Q          |          |          |         V|
  23+10       1.1021      0.19  Q          |          |          |         V|
  23+15       1.1034      0.19  Q          |          |          |         V|
  23+20       1.1047      0.19  Q          |          |          |         V|
  23+25       1.1060      0.19  Q          |          |          |         V|
  23+30       1.1073      0.19  Q          |          |          |         V|
  23+35       1.1086      0.19  Q          |          |          |         V|
  23+40       1.1099      0.19  Q          |          |          |         V|
  23+45       1.1112      0.19  Q          |          |          |         V|
  23+50       1.1125      0.18  Q          |          |          |         V|
  23+55       1.1137      0.18  Q          |          |          |         V|
  24+ 0       1.1150      0.18  Q          |          |          |         V|
  24+ 5       1.1159      0.14  Q          |          |          |         V|
  24+10       1.1162      0.04  Q          |          |          |         V|
  24+15       1.1162      0.01  Q          |          |          |         V|
  24+20       1.1162      0.00  Q          |          |          |          V
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA A
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
8.40	6	0.82
Rainfall data for year 2		
8.40	24	1.37
Rainfall data for year 100		
8.40	6	2.34
Rainfall data for year 100		
8.40	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
86.0	8.40	1.000	0.272	1.000	0.272

Area-averaged adjusted loss rate Fm (In/Hr) = 0.272

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
8.40	1.000	86.0	1.63	0.639

Area-averaged catchment yield fraction, Y = 0.639
Area-averaged low loss fraction, Yb = 0.361
++
Watercourse length = 1240.00(Ft.)
Length from concentration point to centroid = 605.00(Ft.)
Elevation difference along watercourse = 270.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 8.40(Ac.)
Catchment Lag time = 0.064 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 130.8252
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.272(In/Hr)
Average low loss rate fraction (Yb) = 0.361 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 8.40(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.384(In)
30-minute factor = 1.000 Adjusted rainfall = 0.860(In)
1-hour factor = 1.000 Adjusted rainfall = 1.175(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 101.59 (CFS))

1	24.970	25.366
2	80.335	56.245
3	94.485	14.374
4	98.300	3.876
5	100.000	1.726

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.384
2	3.15	0.52	0.52	0.141
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017

46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010

103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.73	2.73	0.010
107	0.31	2.74	2.74	0.010
108	0.31	2.75	2.75	0.010
109	0.30	2.76	2.76	0.010
110	0.30	2.77	2.77	0.010
111	0.30	2.78	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.94	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.17	3.17	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008

160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.31	3.31	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.42	3.42	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007

217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.74	3.74	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006

274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0020	0.0035
2	0.0055	0.0020	0.0035
3	0.0056	0.0020	0.0036
4	0.0056	0.0020	0.0036
5	0.0056	0.0020	0.0036
6	0.0056	0.0020	0.0036
7	0.0056	0.0020	0.0036
8	0.0057	0.0020	0.0036
9	0.0057	0.0020	0.0036
10	0.0057	0.0021	0.0036
11	0.0057	0.0021	0.0037
12	0.0057	0.0021	0.0037
13	0.0058	0.0021	0.0037
14	0.0058	0.0021	0.0037
15	0.0058	0.0021	0.0037
16	0.0058	0.0021	0.0037
17	0.0058	0.0021	0.0037
18	0.0058	0.0021	0.0037
19	0.0059	0.0021	0.0038
20	0.0059	0.0021	0.0038
21	0.0059	0.0021	0.0038
22	0.0059	0.0021	0.0038
23	0.0060	0.0021	0.0038
24	0.0060	0.0022	0.0038
25	0.0060	0.0022	0.0038
26	0.0060	0.0022	0.0038
27	0.0060	0.0022	0.0039
28	0.0061	0.0022	0.0039
29	0.0061	0.0022	0.0039
30	0.0061	0.0022	0.0039
31	0.0061	0.0022	0.0039
32	0.0061	0.0022	0.0039
33	0.0062	0.0022	0.0040
34	0.0062	0.0022	0.0040
35	0.0062	0.0022	0.0040
36	0.0062	0.0023	0.0040

37	0.0063	0.0023	0.0040
38	0.0063	0.0023	0.0040
39	0.0063	0.0023	0.0040
40	0.0063	0.0023	0.0041
41	0.0064	0.0023	0.0041
42	0.0064	0.0023	0.0041
43	0.0064	0.0023	0.0041
44	0.0064	0.0023	0.0041
45	0.0065	0.0023	0.0041
46	0.0065	0.0023	0.0042
47	0.0065	0.0024	0.0042
48	0.0066	0.0024	0.0042
49	0.0066	0.0024	0.0042
50	0.0066	0.0024	0.0042
51	0.0066	0.0024	0.0042
52	0.0067	0.0024	0.0043
53	0.0067	0.0024	0.0043
54	0.0067	0.0024	0.0043
55	0.0068	0.0024	0.0043
56	0.0068	0.0024	0.0043
57	0.0068	0.0025	0.0044
58	0.0068	0.0025	0.0044
59	0.0069	0.0025	0.0044
60	0.0069	0.0025	0.0044
61	0.0069	0.0025	0.0044
62	0.0070	0.0025	0.0045
63	0.0070	0.0025	0.0045
64	0.0070	0.0025	0.0045
65	0.0071	0.0026	0.0045
66	0.0071	0.0026	0.0045
67	0.0071	0.0026	0.0046
68	0.0072	0.0026	0.0046
69	0.0072	0.0026	0.0046
70	0.0072	0.0026	0.0046
71	0.0073	0.0026	0.0047
72	0.0073	0.0026	0.0047
73	0.0074	0.0027	0.0047
74	0.0074	0.0027	0.0047
75	0.0074	0.0027	0.0048
76	0.0075	0.0027	0.0048
77	0.0075	0.0027	0.0048
78	0.0075	0.0027	0.0048
79	0.0076	0.0027	0.0049
80	0.0076	0.0027	0.0049
81	0.0077	0.0028	0.0049
82	0.0077	0.0028	0.0049
83	0.0078	0.0028	0.0050
84	0.0078	0.0028	0.0050
85	0.0078	0.0028	0.0050
86	0.0079	0.0028	0.0050
87	0.0079	0.0029	0.0051
88	0.0080	0.0029	0.0051
89	0.0080	0.0029	0.0051
90	0.0081	0.0029	0.0052
91	0.0081	0.0029	0.0052
92	0.0082	0.0029	0.0052
93	0.0082	0.0030	0.0053

94	0.0083	0.0030	0.0053
95	0.0083	0.0030	0.0053
96	0.0084	0.0030	0.0053
97	0.0084	0.0030	0.0054
98	0.0085	0.0031	0.0054
99	0.0085	0.0031	0.0055
100	0.0086	0.0031	0.0055
101	0.0086	0.0031	0.0055
102	0.0087	0.0031	0.0056
103	0.0088	0.0032	0.0056
104	0.0088	0.0032	0.0056
105	0.0089	0.0032	0.0057
106	0.0089	0.0032	0.0057
107	0.0090	0.0033	0.0058
108	0.0091	0.0033	0.0058
109	0.0091	0.0033	0.0058
110	0.0092	0.0033	0.0059
111	0.0093	0.0033	0.0059
112	0.0093	0.0034	0.0060
113	0.0094	0.0034	0.0060
114	0.0095	0.0034	0.0061
115	0.0096	0.0035	0.0061
116	0.0096	0.0035	0.0061
117	0.0097	0.0035	0.0062
118	0.0098	0.0035	0.0062
119	0.0099	0.0036	0.0063
120	0.0099	0.0036	0.0063
121	0.0100	0.0036	0.0064
122	0.0101	0.0036	0.0065
123	0.0102	0.0037	0.0065
124	0.0103	0.0037	0.0066
125	0.0104	0.0038	0.0066
126	0.0105	0.0038	0.0067
127	0.0106	0.0038	0.0068
128	0.0107	0.0038	0.0068
129	0.0108	0.0039	0.0069
130	0.0109	0.0039	0.0069
131	0.0110	0.0040	0.0070
132	0.0111	0.0040	0.0071
133	0.0112	0.0040	0.0072
134	0.0113	0.0041	0.0072
135	0.0115	0.0041	0.0073
136	0.0115	0.0042	0.0074
137	0.0117	0.0042	0.0075
138	0.0118	0.0043	0.0075
139	0.0120	0.0043	0.0076
140	0.0121	0.0043	0.0077
141	0.0122	0.0044	0.0078
142	0.0123	0.0045	0.0079
143	0.0125	0.0045	0.0080
144	0.0126	0.0046	0.0081
145	0.0126	0.0045	0.0080
146	0.0127	0.0046	0.0081
147	0.0129	0.0046	0.0082
148	0.0130	0.0047	0.0083
149	0.0132	0.0048	0.0085
150	0.0134	0.0048	0.0085

151	0.0136	0.0049	0.0087
152	0.0138	0.0050	0.0088
153	0.0141	0.0051	0.0090
154	0.0142	0.0051	0.0091
155	0.0145	0.0052	0.0093
156	0.0147	0.0053	0.0094
157	0.0150	0.0054	0.0096
158	0.0152	0.0055	0.0097
159	0.0155	0.0056	0.0099
160	0.0157	0.0057	0.0101
161	0.0161	0.0058	0.0103
162	0.0164	0.0059	0.0105
163	0.0168	0.0061	0.0107
164	0.0170	0.0061	0.0109
165	0.0175	0.0063	0.0112
166	0.0178	0.0064	0.0114
167	0.0184	0.0066	0.0117
168	0.0187	0.0067	0.0119
169	0.0193	0.0070	0.0124
170	0.0197	0.0071	0.0126
171	0.0204	0.0074	0.0130
172	0.0208	0.0075	0.0133
173	0.0217	0.0078	0.0138
174	0.0221	0.0080	0.0141
175	0.0231	0.0083	0.0148
176	0.0237	0.0085	0.0151
177	0.0249	0.0090	0.0159
178	0.0256	0.0092	0.0164
179	0.0271	0.0098	0.0173
180	0.0279	0.0101	0.0179
181	0.0299	0.0108	0.0191
182	0.0310	0.0112	0.0198
183	0.0335	0.0121	0.0214
184	0.0350	0.0126	0.0224
185	0.0451	0.0163	0.0288
186	0.0474	0.0171	0.0303
187	0.0533	0.0192	0.0341
188	0.0571	0.0206	0.0365
189	0.0677	0.0227*	0.0451
190	0.0757	0.0227*	0.0530
191	0.1050	0.0227*	0.0823
192	0.1405	0.0227*	0.1179
193	0.3839	0.0227*	0.3612
194	0.0870	0.0227*	0.0643
195	0.0618	0.0223	0.0395
196	0.0501	0.0181	0.0320
197	0.0367	0.0133	0.0235
198	0.0322	0.0116	0.0206
199	0.0289	0.0104	0.0184
200	0.0263	0.0095	0.0168
201	0.0243	0.0088	0.0155
202	0.0226	0.0082	0.0145
203	0.0212	0.0077	0.0136
204	0.0200	0.0072	0.0128
205	0.0190	0.0068	0.0121
206	0.0181	0.0065	0.0116
207	0.0173	0.0062	0.0111

208	0.0166	0.0060	0.0106
209	0.0159	0.0057	0.0102
210	0.0154	0.0055	0.0098
211	0.0148	0.0054	0.0095
212	0.0144	0.0052	0.0092
213	0.0139	0.0050	0.0089
214	0.0135	0.0049	0.0086
215	0.0131	0.0047	0.0084
216	0.0128	0.0046	0.0082
217	0.0127	0.0046	0.0081
218	0.0124	0.0045	0.0080
219	0.0121	0.0044	0.0078
220	0.0119	0.0043	0.0076
221	0.0116	0.0042	0.0074
222	0.0114	0.0041	0.0073
223	0.0111	0.0040	0.0071
224	0.0109	0.0039	0.0070
225	0.0107	0.0039	0.0069
226	0.0105	0.0038	0.0067
227	0.0103	0.0037	0.0066
228	0.0102	0.0037	0.0065
229	0.0100	0.0036	0.0064
230	0.0098	0.0035	0.0063
231	0.0097	0.0035	0.0062
232	0.0095	0.0034	0.0061
233	0.0094	0.0034	0.0060
234	0.0092	0.0033	0.0059
235	0.0091	0.0033	0.0058
236	0.0090	0.0032	0.0057
237	0.0088	0.0032	0.0057
238	0.0087	0.0031	0.0056
239	0.0086	0.0031	0.0055
240	0.0085	0.0031	0.0054
241	0.0084	0.0030	0.0054
242	0.0083	0.0030	0.0053
243	0.0082	0.0030	0.0052
244	0.0081	0.0029	0.0052
245	0.0080	0.0029	0.0051
246	0.0079	0.0029	0.0051
247	0.0078	0.0028	0.0050
248	0.0077	0.0028	0.0049
249	0.0076	0.0028	0.0049
250	0.0076	0.0027	0.0048
251	0.0075	0.0027	0.0048
252	0.0074	0.0027	0.0047
253	0.0073	0.0026	0.0047
254	0.0073	0.0026	0.0046
255	0.0072	0.0026	0.0046
256	0.0071	0.0026	0.0046
257	0.0071	0.0025	0.0045
258	0.0070	0.0025	0.0045
259	0.0069	0.0025	0.0044
260	0.0069	0.0025	0.0044
261	0.0068	0.0025	0.0043
262	0.0067	0.0024	0.0043
263	0.0067	0.0024	0.0043
264	0.0066	0.0024	0.0042

265	0.0066	0.0024	0.0042
266	0.0065	0.0024	0.0042
267	0.0065	0.0023	0.0041
268	0.0064	0.0023	0.0041
269	0.0064	0.0023	0.0041
270	0.0063	0.0023	0.0040
271	0.0063	0.0023	0.0040
272	0.0062	0.0022	0.0040
273	0.0062	0.0022	0.0039
274	0.0061	0.0022	0.0039
275	0.0061	0.0022	0.0039
276	0.0060	0.0022	0.0039
277	0.0060	0.0022	0.0038
278	0.0059	0.0021	0.0038
279	0.0059	0.0021	0.0038
280	0.0059	0.0021	0.0037
281	0.0058	0.0021	0.0037
282	0.0058	0.0021	0.0037
283	0.0057	0.0021	0.0037
284	0.0057	0.0021	0.0036
285	0.0057	0.0020	0.0036
286	0.0056	0.0020	0.0036
287	0.0056	0.0020	0.0036
288	0.0056	0.0020	0.0036
	4.0399	1.2832	2.7567

Total soil rain loss = 1.28(In)
Total effective rainfall = 2.76(In)
Peak flow rate in flood hydrograph = 24.05(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

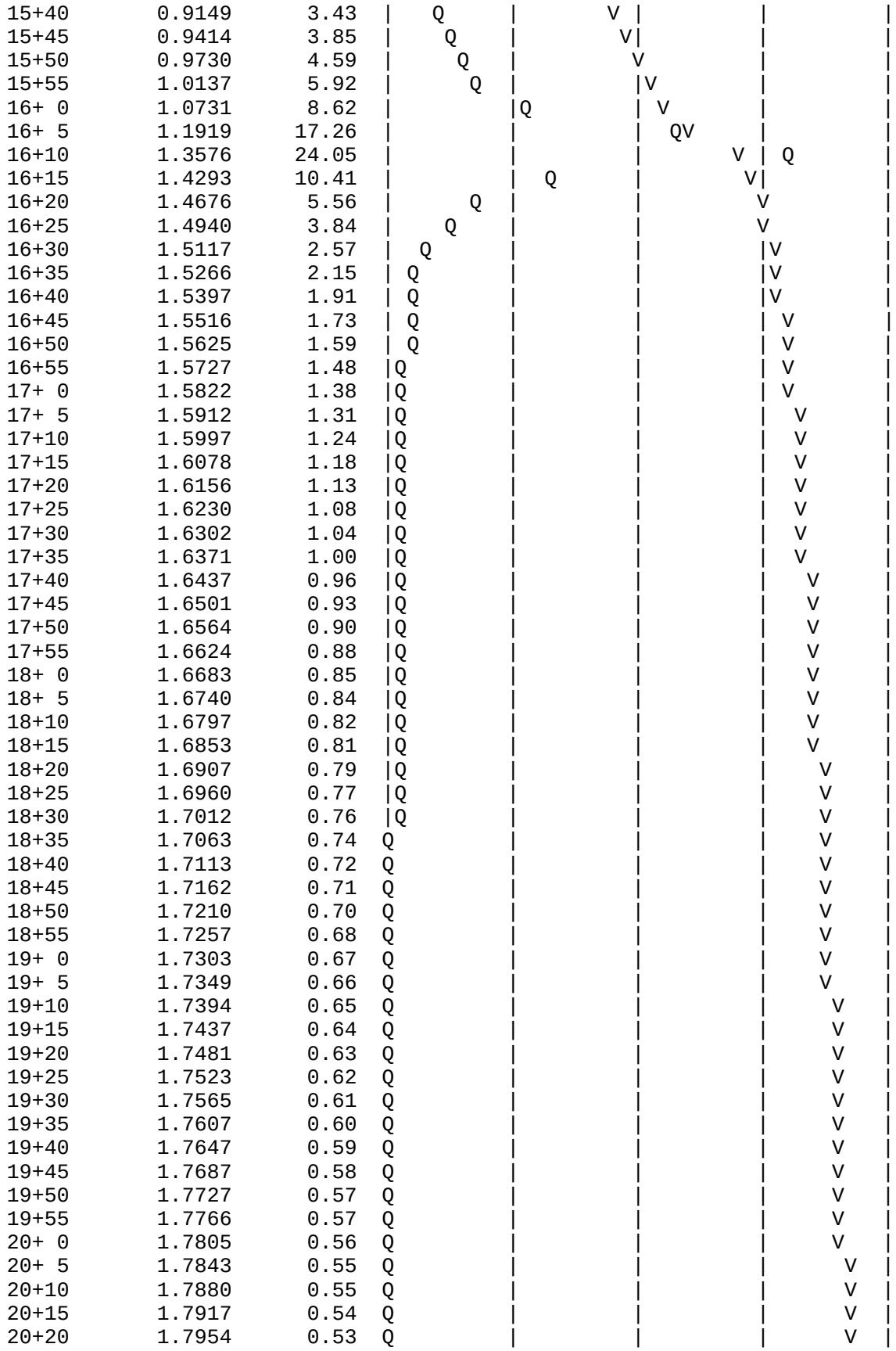
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0006	0.09	Q	|	|	|	|
0+10	0.0026	0.29	Q	|	|	|	|
0+15	0.0050	0.34	Q	|	|	|	|
0+20	0.0074	0.36	Q	|	|	|	|
0+25	0.0099	0.36	Q	|	|	|	|
0+30	0.0124	0.36	Q	|	|	|	|
0+35	0.0149	0.36	Q	|	|	|	|
0+40	0.0174	0.37	Q	|	|	|	|
0+45	0.0200	0.37	Q	|	|	|	|
0+50	0.0225	0.37	Q	|	|	|	|
0+55	0.0250	0.37	Q	|	|	|	|
1+ 0	0.0276	0.37	Q	|	|	|	|
1+ 5	0.0302	0.37	Q	|	|	|	|
1+10	0.0327	0.37	Q	|	|	|	|
1+15	0.0353	0.37	Q	|	|	|	|
1+20	0.0379	0.38	Q	|	|	|	|

1+25	0.0405	0.38	Q	|	|	|	|
1+30	0.0431	0.38	Q	|	|	|	|
1+35	0.0457	0.38	Q	|	|	|	|
1+40	0.0483	0.38	QV	|	|	|	|
1+45	0.0510	0.38	QV	|	|	|	|
1+50	0.0536	0.38	QV	|	|	|	|
1+55	0.0563	0.39	QV	|	|	|	|
2+ 0	0.0589	0.39	QV	|	|	|	|
2+ 5	0.0616	0.39	QV	|	|	|	|
2+10	0.0643	0.39	QV	|	|	|	|
2+15	0.0670	0.39	QV	|	|	|	|
2+20	0.0697	0.39	QV	|	|	|	|
2+25	0.0724	0.39	QV	|	|	|	|
2+30	0.0751	0.40	QV	|	|	|	|
2+35	0.0778	0.40	QV	|	|	|	|
2+40	0.0806	0.40	QV	|	|	|	|
2+45	0.0833	0.40	QV	|	|	|	|
2+50	0.0861	0.40	QV	|	|	|	|
2+55	0.0889	0.40	QV	|	|	|	|
3+ 0	0.0917	0.40	QV	|	|	|	|
3+ 5	0.0944	0.41	QV	|	|	|	|
3+10	0.0973	0.41	Q V	|	|	|	|
3+15	0.1001	0.41	Q V	|	|	|	|
3+20	0.1029	0.41	Q V	|	|	|	|
3+25	0.1057	0.41	Q V	|	|	|	|
3+30	0.1086	0.41	Q V	|	|	|	|
3+35	0.1114	0.42	Q V	|	|	|	|
3+40	0.1143	0.42	Q V	|	|	|	|
3+45	0.1172	0.42	Q V	|	|	|	|
3+50	0.1201	0.42	Q V	|	|	|	|
3+55	0.1230	0.42	Q V	|	|	|	|
4+ 0	0.1259	0.42	Q V	|	|	|	|
4+ 5	0.1288	0.43	Q V	|	|	|	|
4+10	0.1318	0.43	Q V	|	|	|	|
4+15	0.1348	0.43	Q V	|	|	|	|
4+20	0.1377	0.43	Q V	|	|	|	|
4+25	0.1407	0.43	Q V	|	|	|	|
4+30	0.1437	0.43	Q V	|	|	|	|
4+35	0.1467	0.44	Q V	|	|	|	|
4+40	0.1497	0.44	Q V	|	|	|	|
4+45	0.1528	0.44	Q V	|	|	|	|
4+50	0.1558	0.44	Q V	|	|	|	|
4+55	0.1589	0.44	Q V	|	|	|	|
5+ 0	0.1619	0.45	Q V	|	|	|	|
5+ 5	0.1650	0.45	Q V	|	|	|	|
5+10	0.1681	0.45	Q V	|	|	|	|
5+15	0.1713	0.45	Q V	|	|	|	|
5+20	0.1744	0.45	Q V	|	|	|	|
5+25	0.1775	0.46	Q V	|	|	|	|
5+30	0.1807	0.46	Q V	|	|	|	|
5+35	0.1839	0.46	Q V	|	|	|	|
5+40	0.1871	0.46	Q V	|	|	|	|
5+45	0.1903	0.47	Q V	|	|	|	|
5+50	0.1935	0.47	Q V	|	|	|	|
5+55	0.1967	0.47	Q V	|	|	|	|
6+ 0	0.2000	0.47	Q V	|	|	|	|
6+ 5	0.2033	0.48	Q V	|	|	|	|

6+10	0.2066	0.48	Q	V				
6+15	0.2099	0.48	Q	V				
6+20	0.2132	0.48	Q	V				
6+25	0.2165	0.48	Q	V				
6+30	0.2199	0.49	Q	V				
6+35	0.2233	0.49	Q	V				
6+40	0.2266	0.49	Q	V				
6+45	0.2301	0.50	Q	V				
6+50	0.2335	0.50	Q	V				
6+55	0.2369	0.50	Q	V				
7+ 0	0.2404	0.50	Q	V				
7+ 5	0.2439	0.51	Q	V				
7+10	0.2474	0.51	Q	V				
7+15	0.2509	0.51	Q	V				
7+20	0.2545	0.51	Q	V				
7+25	0.2580	0.52	Q	V				
7+30	0.2616	0.52	Q	V				
7+35	0.2652	0.52	Q	V				
7+40	0.2689	0.53	Q	V				
7+45	0.2725	0.53	Q	V				
7+50	0.2762	0.53	Q	V				
7+55	0.2799	0.54	Q	V				
8+ 0	0.2836	0.54	Q	V				
8+ 5	0.2873	0.54	Q	V				
8+10	0.2911	0.55	Q	V				
8+15	0.2949	0.55	Q	V				
8+20	0.2987	0.55	Q	V				
8+25	0.3025	0.56	Q	V				
8+30	0.3064	0.56	Q	V				
8+35	0.3103	0.56	Q	V				
8+40	0.3142	0.57	Q	V				
8+45	0.3182	0.57	Q	V				
8+50	0.3221	0.58	Q	V				
8+55	0.3261	0.58	Q	V				
9+ 0	0.3301	0.58	Q	V				
9+ 5	0.3342	0.59	Q	V				
9+10	0.3383	0.59	Q	V				
9+15	0.3424	0.60	Q	V				
9+20	0.3465	0.60	Q	V				
9+25	0.3507	0.61	Q	V				
9+30	0.3549	0.61	Q	V				
9+35	0.3592	0.62	Q	V				
9+40	0.3634	0.62	Q	V				
9+45	0.3677	0.62	Q	V				
9+50	0.3721	0.63	Q	V				
9+55	0.3764	0.64	Q	V				
10+ 0	0.3809	0.64	Q	V				
10+ 5	0.3853	0.65	Q	V				
10+10	0.3898	0.65	Q	V				
10+15	0.3943	0.66	Q	V				
10+20	0.3989	0.66	Q	V				
10+25	0.4035	0.67	Q	V				
10+30	0.4081	0.67	Q	V				
10+35	0.4128	0.68	Q	V				
10+40	0.4175	0.69	Q	V				
10+45	0.4223	0.69	Q	V				
10+50	0.4271	0.70	Q	V				

```
10+55       0.4320      0.71  Q       V |         |         |         |
11+ 0       0.4369      0.71  Q        V|         |         |         |
11+ 5       0.4419      0.72  Q        V|         |         |         |
11+10       0.4469      0.73  Q        V|         |         |         |
11+15       0.4519      0.73  Q        V|         |         |         |
11+20       0.4570      0.74  Q        V|         |         |         |
11+25       0.4622      0.75  |Q       V|         |         |         |
11+30       0.4674      0.76  |Q       V|         |         |         |
11+35       0.4727      0.77  |Q       V|         |         |         |
11+40       0.4781      0.78  |Q       V|         |         |         |
11+45       0.4835      0.78  |Q        V         |         |         |
11+50       0.4889      0.79  |Q        V         |         |         |
11+55       0.4944      0.80  |Q        V         |         |         |
12+ 0       0.5000      0.81  |Q        V         |         |         |
12+ 5       0.5057      0.82  |Q        V         |         |         |
12+10       0.5113      0.82  |Q        V         |         |         |
12+15       0.5170      0.82  |Q        V         |         |         |
12+20       0.5227      0.84  |Q        V         |         |         |
12+25       0.5286      0.85  |Q        V         |         |         |
12+30       0.5345      0.86  |Q        |V        |         |         |
12+35       0.5405      0.87  |Q        |V        |         |         |
12+40       0.5466      0.88  |Q        |V        |         |         |
12+45       0.5527      0.90  |Q        |V        |         |         |
12+50       0.5590      0.91  |Q        |V        |         |         |
12+55       0.5654      0.92  |Q        |V        |         |         |
13+ 0       0.5718      0.94  |Q        |V        |         |         |
13+ 5       0.5784      0.95  |Q        |V        |         |         |
13+10       0.5851      0.97  |Q        | V       |         |         |
13+15       0.5919      0.99  |Q        | V       |         |         |
13+20       0.5988      1.01  |Q        | V       |         |         |
13+25       0.6059      1.02  |Q        | V       |         |         |
13+30       0.6131      1.05  |Q        | V       |         |         |
13+35       0.6204      1.07  |Q        | V       |         |         |
13+40       0.6279      1.09  |Q        |  V      |         |         |
13+45       0.6356      1.11  |Q        |  V      |         |         |
13+50       0.6434      1.14  |Q        |  V      |         |         |
13+55       0.6514      1.16  |Q        |  V      |         |         |
14+ 0       0.6596      1.19  |Q        |  V      |         |         |
14+ 5       0.6680      1.22  |Q        |  V      |         |         |
14+10       0.6766      1.25  |Q        |   V     |         |         |
14+15       0.6854      1.28  |Q        |   V     |         |         |
14+20       0.6945      1.32  |Q        |   V     |         |         |
14+25       0.7038      1.36  |Q        |   V     |         |         |
14+30       0.7135      1.40  |Q        |   V     |         |         |
14+35       0.7234      1.44  |Q        |    V    |         |         |
14+40       0.7337      1.50  |Q        |    V    |         |         |
14+45       0.7444      1.55  | Q       |    V    |         |         |
14+50       0.7555      1.61  | Q       |    V    |         |         |
14+55       0.7670      1.67  | Q       |    V    |         |         |
15+ 0       0.7790      1.75  | Q       |     V   |         |         |
15+ 5       0.7916      1.83  | Q       |     V   |         |         |
15+10       0.8049      1.93  | Q       |     V   |         |         |
15+15       0.8189      2.03  | Q       |     V   |         |         |
15+20       0.8338      2.16  | Q       |      V  |         |         |
15+25       0.8504      2.41  |  Q      |      V  |         |         |
15+30       0.8699      2.83  |  Q      |       V |         |         |
15+35       0.8913      3.11  |   Q     |       V |         |         |
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20+25	1.7990	0.53	Q	|	|	|	V |
20+30	1.8026	0.52	Q	|	|	|	V |
20+35	1.8061	0.51	Q	|	|	|	V |
20+40	1.8096	0.51	Q	|	|	|	V |
20+45	1.8131	0.50	Q	|	|	|	V |
20+50	1.8165	0.50	Q	|	|	|	V |
20+55	1.8199	0.49	Q	|	|	|	V |
21+ 0	1.8232	0.49	Q	|	|	|	V |
21+ 5	1.8265	0.48	Q	|	|	|	V |
21+10	1.8298	0.48	Q	|	|	|	V |
21+15	1.8331	0.47	Q	|	|	|	V |
21+20	1.8363	0.47	Q	|	|	|	V |
21+25	1.8395	0.46	Q	|	|	|	V |
21+30	1.8426	0.46	Q	|	|	|	V |
21+35	1.8458	0.45	Q	|	|	|	V |
21+40	1.8489	0.45	Q	|	|	|	V |
21+45	1.8519	0.45	Q	|	|	|	V |
21+50	1.8550	0.44	Q	|	|	|	V |
21+55	1.8580	0.44	Q	|	|	|	V |
22+ 0	1.8610	0.43	Q	|	|	|	V |
22+ 5	1.8639	0.43	Q	|	|	|	V |
22+10	1.8669	0.43	Q	|	|	|	V |
22+15	1.8698	0.42	Q	|	|	|	V |
22+20	1.8727	0.42	Q	|	|	|	V |
22+25	1.8755	0.42	Q	|	|	|	V |
22+30	1.8784	0.41	Q	|	|	|	V |
22+35	1.8812	0.41	Q	|	|	|	V|
22+40	1.8840	0.41	Q	|	|	|	V|
22+45	1.8868	0.40	Q	|	|	|	V|
22+50	1.8895	0.40	Q	|	|	|	V|
22+55	1.8923	0.40	Q	|	|	|	V|
23+ 0	1.8950	0.39	Q	|	|	|	V|
23+ 5	1.8977	0.39	Q	|	|	|	V|
23+10	1.9004	0.39	Q	|	|	|	V|
23+15	1.9030	0.39	Q	|	|	|	V|
23+20	1.9057	0.38	Q	|	|	|	V|
23+25	1.9083	0.38	Q	|	|	|	V|
23+30	1.9109	0.38	Q	|	|	|	V|
23+35	1.9135	0.38	Q	|	|	|	V|
23+40	1.9160	0.37	Q	|	|	|	V|
23+45	1.9186	0.37	Q	|	|	|	V|
23+50	1.9211	0.37	Q	|	|	|	V|
23+55	1.9236	0.37	Q	|	|	|	V|
24+ 0	1.9261	0.36	Q	|	|	|	V|
24+ 5	1.9280	0.27	Q	|	|	|	V|
24+10	1.9285	0.07	Q	|	|	|	V|
24+15	1.9286	0.02	Q	|	|	|	V|
24+20	1.9287	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA B
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2	52.40	6	0.82
Rainfall data for year 2	52.40	24	1.37
Rainfall data for year 100	52.40	6	2.34
Rainfall data for year 100	52.40	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	52.40	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
52.40	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
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Watercourse length = 4130.00(Ft.)
Length from concentration point to centroid = 1830.00(Ft.)
Elevation difference along watercourse = 770.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 52.40(Ac.)
Catchment Lag time = 0.158 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 52.8032
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 52.40(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.230(In)
30-minute factor = 0.998 Adjusted rainfall = 0.514(In)
1-hour factor = 0.998 Adjusted rainfall = 0.702(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 633.71 (CFS))

1	4.686	29.697
2	28.281	149.527
3	65.385	235.133
4	79.286	88.090
5	87.300	50.783
6	92.405	32.355
7	95.645	20.532
8	97.512	11.831
9	98.268	4.789
10	98.632	2.308
11	98.996	2.308
12	99.360	2.308
13	100.000	4.054

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.51	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.82	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.92	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012

38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.43	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.54	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007

95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.67	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.70	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.84	1.84	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005

152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.97	1.97	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.16	2.16	0.004
208	0.13	2.17	2.17	0.004

209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.29	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.32	2.32	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004

266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006

29	0.0037	0.0031	0.0006
30	0.0037	0.0031	0.0006
31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006
33	0.0038	0.0032	0.0006
34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006
37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006
40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008

86	0.0048	0.0040	0.0008
87	0.0049	0.0041	0.0008
88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008
90	0.0049	0.0041	0.0008
91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008
94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008
97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0062	0.0012
142	0.0075	0.0063	0.0012

143	0.0077	0.0064	0.0013
144	0.0077	0.0065	0.0013
145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013
147	0.0081	0.0067	0.0013
148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014
151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014
154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0096	0.0019
168	0.0116	0.0097	0.0019
169	0.0121	0.0101	0.0020
170	0.0123	0.0102	0.0020
171	0.0127	0.0106	0.0021
172	0.0130	0.0108	0.0021
173	0.0135	0.0113	0.0022
174	0.0138	0.0115	0.0023
175	0.0144	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0155	0.0129	0.0025
178	0.0159	0.0133	0.0026
179	0.0168	0.0140	0.0028
180	0.0173	0.0145	0.0028
181	0.0185	0.0154	0.0030
182	0.0191	0.0160	0.0031
183	0.0207	0.0173	0.0034
184	0.0216	0.0181	0.0036
185	0.0270	0.0225	0.0044
186	0.0284	0.0237	0.0047
187	0.0319	0.0266	0.0052
188	0.0341	0.0285	0.0056
189	0.0405	0.0338	0.0067
190	0.0453	0.0378	0.0074
191	0.0628	0.0472*	0.0156
192	0.0840	0.0472*	0.0369
193	0.2296	0.0472*	0.1824
194	0.0520	0.0435	0.0086
195	0.0369	0.0309	0.0061
196	0.0300	0.0250	0.0049
197	0.0226	0.0189	0.0037
198	0.0199	0.0166	0.0033
199	0.0179	0.0149	0.0029

200	0.0163	0.0136	0.0027
201	0.0151	0.0126	0.0025
202	0.0141	0.0117	0.0023
203	0.0132	0.0110	0.0022
204	0.0125	0.0104	0.0021
205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018
208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016
211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0014
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0069	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0065	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007

257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007
259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007
261	0.0042	0.0035	0.0007
262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007
265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006
268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4662	1.8876	0.5786

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 48.90(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

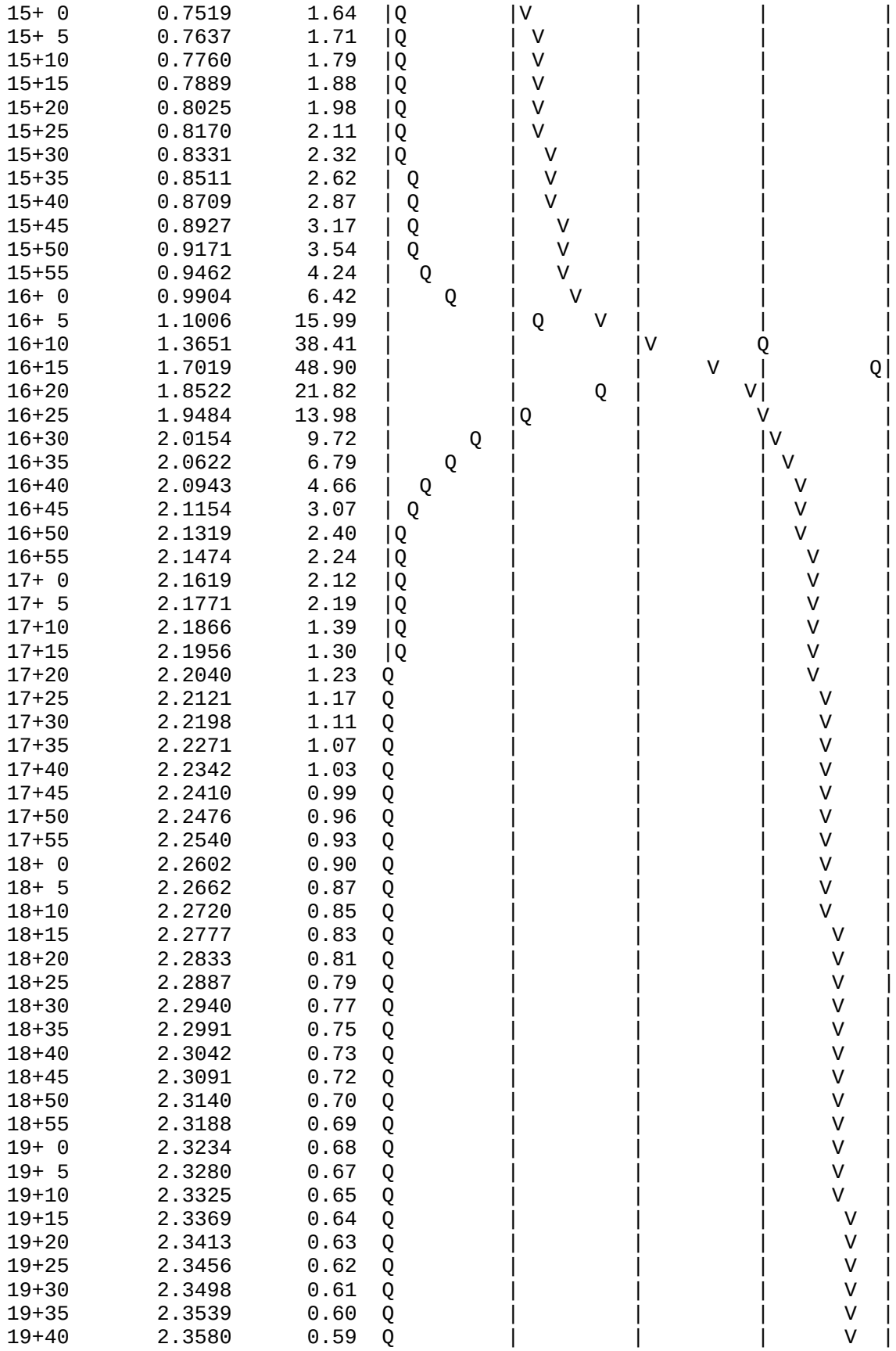
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0001	0.02	Q	|	|	|	|
0+10	0.0008	0.10	Q	|	|	|	|
0+15	0.0024	0.23	Q	|	|	|	|
0+20	0.0043	0.28	Q	|	|	|	|
0+25	0.0065	0.31	Q	|	|	|	|
0+30	0.0087	0.33	Q	|	|	|	|
0+35	0.0111	0.34	Q	|	|	|	|
0+40	0.0135	0.35	Q	|	|	|	|

0+45	0.0159	0.35	Q				
0+50	0.0183	0.35	Q				
0+55	0.0208	0.36	Q				
1+ 0	0.0233	0.36	Q				
1+ 5	0.0258	0.36	Q				
1+10	0.0283	0.36	Q				
1+15	0.0308	0.37	Q				
1+20	0.0333	0.37	Q				
1+25	0.0359	0.37	Q				
1+30	0.0384	0.37	Q				
1+35	0.0410	0.37	Q				
1+40	0.0435	0.37	Q				
1+45	0.0461	0.37	Q				
1+50	0.0487	0.37	Q				
1+55	0.0513	0.38	Q				
2+ 0	0.0539	0.38	Q				
2+ 5	0.0565	0.38	Q				
2+10	0.0591	0.38	Q				
2+15	0.0617	0.38	Q				
2+20	0.0643	0.38	QV				
2+25	0.0670	0.38	QV				
2+30	0.0696	0.39	QV				
2+35	0.0723	0.39	QV				
2+40	0.0750	0.39	QV				
2+45	0.0777	0.39	QV				
2+50	0.0804	0.39	QV				
2+55	0.0831	0.39	QV				
3+ 0	0.0858	0.39	QV				
3+ 5	0.0885	0.40	QV				
3+10	0.0912	0.40	QV				
3+15	0.0940	0.40	QV				
3+20	0.0967	0.40	QV				
3+25	0.0995	0.40	QV				
3+30	0.1023	0.40	QV				
3+35	0.1051	0.41	QV				
3+40	0.1079	0.41	QV				
3+45	0.1107	0.41	QV				
3+50	0.1135	0.41	QV				
3+55	0.1163	0.41	QV				
4+ 0	0.1192	0.41	QV				
4+ 5	0.1221	0.42	QV				
4+10	0.1249	0.42	QV				
4+15	0.1278	0.42	Q V				
4+20	0.1307	0.42	Q V				
4+25	0.1336	0.42	Q V				
4+30	0.1365	0.42	Q V				
4+35	0.1395	0.43	Q V				
4+40	0.1424	0.43	Q V				
4+45	0.1454	0.43	Q V				
4+50	0.1483	0.43	Q V				
4+55	0.1513	0.43	Q V				
5+ 0	0.1543	0.44	Q V				
5+ 5	0.1573	0.44	Q V				
5+10	0.1603	0.44	Q V				
5+15	0.1634	0.44	Q V				
5+20	0.1664	0.44	Q V				
5+25	0.1695	0.45	Q V				

5+30	0.1726	0.45	Q	V			
5+35	0.1757	0.45	Q	V			
5+40	0.1788	0.45	Q	V			
5+45	0.1819	0.45	Q	V			
5+50	0.1850	0.46	Q	V			
5+55	0.1882	0.46	Q	V			
6+ 0	0.1914	0.46	Q	V			
6+ 5	0.1946	0.46	Q	V			
6+10	0.1978	0.46	Q	V			
6+15	0.2010	0.47	Q	V			
6+20	0.2042	0.47	Q	V			
6+25	0.2075	0.47	Q	V			
6+30	0.2107	0.47	Q	V			
6+35	0.2140	0.48	Q	V			
6+40	0.2173	0.48	Q	V			
6+45	0.2206	0.48	Q	V			
6+50	0.2240	0.48	Q	V			
6+55	0.2273	0.49	Q	V			
7+ 0	0.2307	0.49	Q	V			
7+ 5	0.2341	0.49	Q	V			
7+10	0.2375	0.50	Q	V			
7+15	0.2409	0.50	Q	V			
7+20	0.2444	0.50	Q	V			
7+25	0.2478	0.50	Q	V			
7+30	0.2513	0.51	Q	V			
7+35	0.2548	0.51	Q	V			
7+40	0.2584	0.51	Q	V			
7+45	0.2619	0.52	Q	V			
7+50	0.2655	0.52	Q	V			
7+55	0.2691	0.52	Q	V			
8+ 0	0.2727	0.52	Q	V			
8+ 5	0.2763	0.53	Q	V			
8+10	0.2800	0.53	Q	V			
8+15	0.2837	0.53	Q	V			
8+20	0.2874	0.54	Q	V			
8+25	0.2911	0.54	Q	V			
8+30	0.2948	0.54	Q	V			
8+35	0.2986	0.55	Q	V			
8+40	0.3024	0.55	Q	V			
8+45	0.3062	0.56	Q	V			
8+50	0.3101	0.56	Q	V			
8+55	0.3140	0.56	Q	V			
9+ 0	0.3179	0.57	Q	V			
9+ 5	0.3218	0.57	Q	V			
9+10	0.3258	0.58	Q	V			
9+15	0.3298	0.58	Q	V			
9+20	0.3338	0.58	Q	V			
9+25	0.3378	0.59	Q	V			
9+30	0.3419	0.59	Q	V			
9+35	0.3460	0.60	Q	V			
9+40	0.3502	0.60	Q	V			
9+45	0.3543	0.61	Q	V			
9+50	0.3585	0.61	Q	V			
9+55	0.3628	0.62	Q	V			
10+ 0	0.3671	0.62	Q	V			
10+ 5	0.3714	0.63	Q	V			
10+10	0.3757	0.63	Q	V			

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10+15       0.3801      0.64  Q     V   |           |           |           |
10+20       0.3845      0.64  Q     V   |           |           |           |
10+25       0.3890      0.65  Q     V   |           |           |           |
10+30       0.3935      0.65  Q     V   |           |           |           |
10+35       0.3980      0.66  Q     V   |           |           |           |
10+40       0.4026      0.66  Q     V   |           |           |           |
10+45       0.4072      0.67  Q     V   |           |           |           |
10+50       0.4118      0.68  Q     V   |           |           |           |
10+55       0.4165      0.68  Q     V   |           |           |           |
11+ 0       0.4213      0.69  Q     V   |           |           |           |
11+ 5       0.4261      0.70  Q     V   |           |           |           |
11+10       0.4309      0.70  Q     V   |           |           |           |
11+15       0.4358      0.71  Q     V   |           |           |           |
11+20       0.4407      0.72  Q     V   |           |           |           |
11+25       0.4457      0.72  Q      V  |           |           |           |
11+30       0.4508      0.73  Q      V  |           |           |           |
11+35       0.4559      0.74  Q      V  |           |           |           |
11+40       0.4610      0.75  Q      V  |           |           |           |
11+45       0.4662      0.76  Q      V  |           |           |           |
11+50       0.4715      0.76  Q      V  |           |           |           |
11+55       0.4768      0.77  Q      V  |           |           |           |
12+ 0       0.4822      0.78  Q      V  |           |           |           |
12+ 5       0.4877      0.79  Q      V  |           |           |           |
12+10       0.4932      0.80  Q      V  |           |           |           |
12+15       0.4988      0.81  Q      V  |           |           |           |
12+20       0.5044      0.82  Q      V  |           |           |           |
12+25       0.5102      0.83  Q       V |           |           |           |
12+30       0.5160      0.84  Q       V |           |           |           |
12+35       0.5219      0.86  Q       V |           |           |           |
12+40       0.5279      0.87  Q       V |           |           |           |
12+45       0.5339      0.88  Q       V |           |           |           |
12+50       0.5401      0.89  Q       V |           |           |           |
12+55       0.5463      0.91  Q       V |           |           |           |
13+ 0       0.5527      0.92  Q       V |           |           |           |
13+ 5       0.5591      0.94  Q       V |           |           |           |
13+10       0.5656      0.95  Q       V |           |           |           |
13+15       0.5723      0.97  Q        V|           |           |           |
13+20       0.5790      0.98  Q        V|           |           |           |
13+25       0.5859      1.00  Q        V|           |           |           |
13+30       0.5929      1.02  Q        V|           |           |           |
13+35       0.6001      1.04  Q        V|           |           |           |
13+40       0.6074      1.06  Q        V|           |           |           |
13+45       0.6148      1.08  Q        V|           |           |           |
13+50       0.6223      1.10  Q        V|           |           |           |
13+55       0.6301      1.12  Q        V|           |           |           |
14+ 0       0.6380      1.15  Q         V           |           |           |
14+ 5       0.6461      1.18  Q         V           |           |           |
14+10       0.6544      1.20  Q         V           |           |           |
14+15       0.6629      1.24  Q         V           |           |           |
14+20       0.6716      1.27  |Q        V           |           |           |
14+25       0.6806      1.30  |Q        V           |           |           |
14+30       0.6898      1.34  |Q        V           |           |           |
14+35       0.6993      1.38  |Q         |V          |           |           |
14+40       0.7091      1.42  |Q         |V          |           |           |
14+45       0.7192      1.47  |Q         |V          |           |           |
14+50       0.7297      1.52  |Q         |V          |           |           |
14+55       0.7406      1.58  |Q         |V          |           |           |
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19+45	2.3620	0.58	Q	|	|	|	V |
19+50	2.3660	0.58	Q	|	|	|	V |
19+55	2.3699	0.57	Q	|	|	|	V |
20+ 0	2.3738	0.56	Q	|	|	|	V |
20+ 5	2.3776	0.55	Q	|	|	|	V |
20+10	2.3814	0.55	Q	|	|	|	V |
20+15	2.3851	0.54	Q	|	|	|	V |
20+20	2.3887	0.53	Q	|	|	|	V |
20+25	2.3923	0.53	Q	|	|	|	V |
20+30	2.3959	0.52	Q	|	|	|	V |
20+35	2.3995	0.51	Q	|	|	|	V |
20+40	2.4029	0.51	Q	|	|	|	V |
20+45	2.4064	0.50	Q	|	|	|	V |
20+50	2.4098	0.50	Q	|	|	|	V |
20+55	2.4132	0.49	Q	|	|	|	V |
21+ 0	2.4165	0.48	Q	|	|	|	V |
21+ 5	2.4198	0.48	Q	|	|	|	V |
21+10	2.4231	0.47	Q	|	|	|	V |
21+15	2.4263	0.47	Q	|	|	|	V |
21+20	2.4295	0.47	Q	|	|	|	V |
21+25	2.4327	0.46	Q	|	|	|	V |
21+30	2.4359	0.46	Q	|	|	|	V |
21+35	2.4390	0.45	Q	|	|	|	V |
21+40	2.4421	0.45	Q	|	|	|	V |
21+45	2.4451	0.44	Q	|	|	|	V |
21+50	2.4481	0.44	Q	|	|	|	V |
21+55	2.4511	0.44	Q	|	|	|	V |
22+ 0	2.4541	0.43	Q	|	|	|	V |
22+ 5	2.4571	0.43	Q	|	|	|	V |
22+10	2.4600	0.42	Q	|	|	|	V |
22+15	2.4629	0.42	Q	|	|	|	V|
22+20	2.4657	0.42	Q	|	|	|	V|
22+25	2.4686	0.41	Q	|	|	|	V|
22+30	2.4714	0.41	Q	|	|	|	V|
22+35	2.4742	0.41	Q	|	|	|	V|
22+40	2.4770	0.40	Q	|	|	|	V|
22+45	2.4798	0.40	Q	|	|	|	V|
22+50	2.4825	0.40	Q	|	|	|	V|
22+55	2.4852	0.39	Q	|	|	|	V|
23+ 0	2.4879	0.39	Q	|	|	|	V|
23+ 5	2.4906	0.39	Q	|	|	|	V|
23+10	2.4932	0.39	Q	|	|	|	V|
23+15	2.4959	0.38	Q	|	|	|	V|
23+20	2.4985	0.38	Q	|	|	|	V|
23+25	2.5011	0.38	Q	|	|	|	V|
23+30	2.5037	0.37	Q	|	|	|	V|
23+35	2.5062	0.37	Q	|	|	|	V|
23+40	2.5088	0.37	Q	|	|	|	V|
23+45	2.5113	0.37	Q	|	|	|	V|
23+50	2.5138	0.36	Q	|	|	|	V|
23+55	2.5163	0.36	Q	|	|	|	V|
24+ 0	2.5188	0.36	Q	|	|	|	V|
24+ 5	2.5211	0.34	Q	|	|	|	V|
24+10	2.5229	0.26	Q	|	|	|	V|
24+15	2.5238	0.12	Q	|	|	|	V|
24+20	2.5243	0.07	Q	|	|	|	V|
24+25	2.5246	0.05	Q	|	|	|	V|

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   24+30       2.5248      0.03  Q          |          |          |        V|
   24+35       2.5249      0.02  Q          |          |          |        V|
   24+40       2.5249      0.01  Q          |          |          |        V|
   24+45       2.5250      0.01  Q          |          |          |        V|
   24+50       2.5250      0.00  Q          |          |          |        V|
   24+55       2.5250      0.00  Q          |          |          |        V|
   25+ 0       2.5251      0.00  Q          |          |          |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/10/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA B
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
52.00	6	0.82
Rainfall data for year 2		
52.00	24	1.37
Rainfall data for year 100		
52.00	6	2.34
Rainfall data for year 100		
52.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	52.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
52.00	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
++
Watercourse length = 4130.00(Ft.)
Length from concentration point to centroid = 1830.00(Ft.)
Elevation difference along watercourse = 770.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 52.00(Ac.)
Catchment Lag time = 0.158 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 52.8032
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 52.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.336(In)
30-minute factor = 0.998 Adjusted rainfall = 0.752(In)
1-hour factor = 0.998 Adjusted rainfall = 1.027(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.552(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 628.88 (CFS))

1	4.686	29.470
2	28.281	148.385
3	65.385	233.338
4	79.286	87.418
5	87.300	50.395
6	92.405	32.108
7	95.645	20.375
8	97.512	11.741
9	98.268	4.752
10	98.632	2.290
11	98.996	2.290
12	99.360	2.290
13	100.000	4.023

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.041
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.25	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.024
23	0.69	1.33	1.32	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017

38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.79	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.03	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010

95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007

152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.82	2.82	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006

209	0.18	3.13	3.13	0.006
210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005

266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015

29	0.0053	0.0038	0.0015
30	0.0053	0.0038	0.0015
31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015
33	0.0054	0.0039	0.0015
34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015
37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015
40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019

86	0.0069	0.0050	0.0019
87	0.0069	0.0050	0.0019
88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019
90	0.0070	0.0051	0.0020
91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020
94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020
97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030

143	0.0110	0.0079	0.0030
144	0.0111	0.0080	0.0031
145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0032
147	0.0116	0.0084	0.0032
148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033
151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035
154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0176	0.0127	0.0049
171	0.0183	0.0132	0.0051
172	0.0186	0.0135	0.0052
173	0.0194	0.0140	0.0054
174	0.0198	0.0143	0.0055
175	0.0207	0.0150	0.0057
176	0.0212	0.0153	0.0059
177	0.0223	0.0161	0.0062
178	0.0229	0.0165	0.0063
179	0.0242	0.0175	0.0067
180	0.0249	0.0180	0.0069
181	0.0266	0.0193	0.0074
182	0.0276	0.0200	0.0077
183	0.0299	0.0216	0.0083
184	0.0312	0.0225	0.0087
185	0.0394	0.0285	0.0109
186	0.0414	0.0299	0.0115
187	0.0466	0.0336	0.0129
188	0.0499	0.0360	0.0138
189	0.0592	0.0428	0.0164
190	0.0662	0.0472*	0.0190
191	0.0918	0.0472*	0.0446
192	0.1228	0.0472*	0.0757
193	0.3356	0.0472*	0.2884
194	0.0760	0.0472*	0.0289
195	0.0540	0.0390	0.0150
196	0.0438	0.0316	0.0122
197	0.0327	0.0236	0.0091
198	0.0287	0.0207	0.0080
199	0.0258	0.0186	0.0071

200	0.0235	0.0170	0.0065
201	0.0217	0.0157	0.0060
202	0.0202	0.0146	0.0056
203	0.0190	0.0137	0.0053
204	0.0179	0.0130	0.0050
205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043
208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0138	0.0099	0.0038
211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0115	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017

257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017
259	0.0060	0.0044	0.0017
260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016
262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016
265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016
268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5523	2.3023	1.2500

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 82.16(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

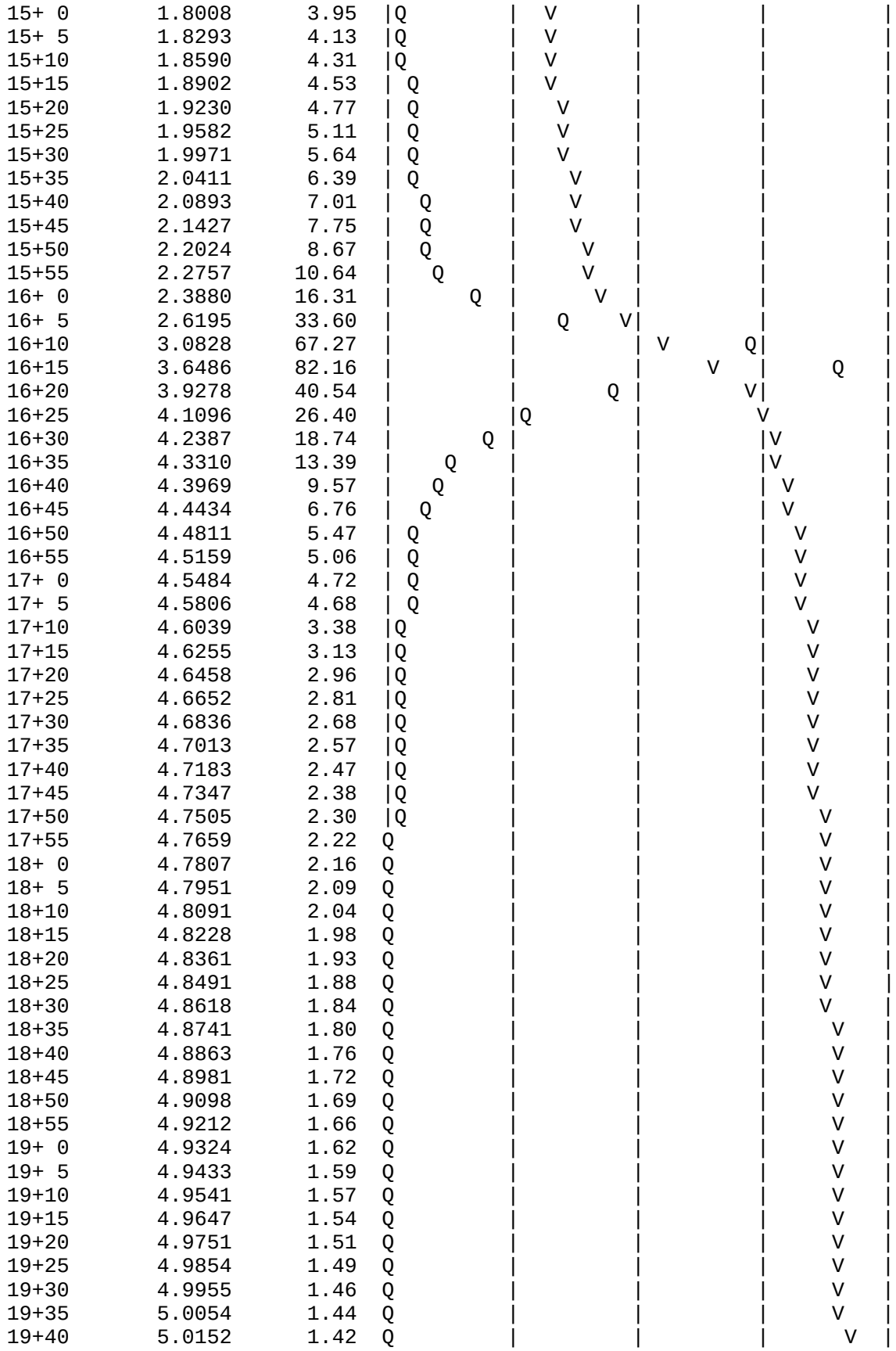
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	22.5	45.0	67.5	90.0
0+ 5	0.0003	0.04	Q				
0+10	0.0019	0.24	Q				
0+15	0.0057	0.55	Q				
0+20	0.0103	0.67	Q				
0+25	0.0154	0.74	Q				
0+30	0.0208	0.78	Q				
0+35	0.0264	0.81	Q				
0+40	0.0321	0.83	Q				

0+45	0.0379	0.84	Q	|	|	|	|
0+50	0.0437	0.85	Q	|	|	|	|
0+55	0.0496	0.85	Q	|	|	|	|
1+ 0	0.0555	0.86	Q	|	|	|	|
1+ 5	0.0614	0.87	Q	|	|	|	|
1+10	0.0674	0.87	Q	|	|	|	|
1+15	0.0734	0.87	Q	|	|	|	|
1+20	0.0795	0.87	Q	|	|	|	|
1+25	0.0855	0.88	Q	|	|	|	|
1+30	0.0916	0.88	Q	|	|	|	|
1+35	0.0977	0.88	Q	|	|	|	|
1+40	0.1038	0.89	Q	|	|	|	|
1+45	0.1099	0.89	Q	|	|	|	|
1+50	0.1160	0.89	Q	|	|	|	|
1+55	0.1222	0.90	Q	|	|	|	|
2+ 0	0.1284	0.90	Q	|	|	|	|
2+ 5	0.1346	0.90	Q	|	|	|	|
2+10	0.1409	0.91	QV	|	|	|	|
2+15	0.1471	0.91	QV	|	|	|	|
2+20	0.1534	0.91	QV	|	|	|	|
2+25	0.1597	0.92	QV	|	|	|	|
2+30	0.1660	0.92	QV	|	|	|	|
2+35	0.1724	0.92	QV	|	|	|	|
2+40	0.1788	0.93	QV	|	|	|	|
2+45	0.1852	0.93	QV	|	|	|	|
2+50	0.1916	0.93	QV	|	|	|	|
2+55	0.1981	0.94	QV	|	|	|	|
3+ 0	0.2045	0.94	QV	|	|	|	|
3+ 5	0.2110	0.94	QV	|	|	|	|
3+10	0.2176	0.95	QV	|	|	|	|
3+15	0.2241	0.95	QV	|	|	|	|
3+20	0.2307	0.95	QV	|	|	|	|
3+25	0.2373	0.96	QV	|	|	|	|
3+30	0.2439	0.96	QV	|	|	|	|
3+35	0.2506	0.97	QV	|	|	|	|
3+40	0.2572	0.97	QV	|	|	|	|
3+45	0.2640	0.97	QV	|	|	|	|
3+50	0.2707	0.98	QV	|	|	|	|
3+55	0.2775	0.98	Q V	|	|	|	|
4+ 0	0.2842	0.99	Q V	|	|	|	|
4+ 5	0.2911	0.99	Q V	|	|	|	|
4+10	0.2979	0.99	Q V	|	|	|	|
4+15	0.3048	1.00	Q V	|	|	|	|
4+20	0.3117	1.00	Q V	|	|	|	|
4+25	0.3186	1.01	Q V	|	|	|	|
4+30	0.3256	1.01	Q V	|	|	|	|
4+35	0.3326	1.02	Q V	|	|	|	|
4+40	0.3396	1.02	Q V	|	|	|	|
4+45	0.3467	1.02	Q V	|	|	|	|
4+50	0.3538	1.03	Q V	|	|	|	|
4+55	0.3609	1.03	Q V	|	|	|	|
5+ 0	0.3680	1.04	Q V	|	|	|	|
5+ 5	0.3752	1.04	Q V	|	|	|	|
5+10	0.3825	1.05	Q V	|	|	|	|
5+15	0.3897	1.05	Q V	|	|	|	|
5+20	0.3970	1.06	Q V	|	|	|	|
5+25	0.4043	1.06	Q V	|	|	|	|

5+30	0.4117	1.07	Q	V				
5+35	0.4191	1.07	Q	V				
5+40	0.4265	1.08	Q	V				
5+45	0.4339	1.08	Q	V				
5+50	0.4414	1.09	Q	V				
5+55	0.4490	1.09	Q	V				
6+ 0	0.4565	1.10	Q	V				
6+ 5	0.4641	1.10	Q	V				
6+10	0.4718	1.11	Q	V				
6+15	0.4795	1.12	Q	V				
6+20	0.4872	1.12	Q	V				
6+25	0.4950	1.13	Q	V				
6+30	0.5028	1.13	Q	V				
6+35	0.5106	1.14	Q	V				
6+40	0.5185	1.14	Q	V				
6+45	0.5264	1.15	Q	V				
6+50	0.5344	1.16	Q	V				
6+55	0.5424	1.16	Q	V				
7+ 0	0.5505	1.17	Q	V				
7+ 5	0.5586	1.18	Q	V				
7+10	0.5667	1.18	Q	V				
7+15	0.5749	1.19	Q	V				
7+20	0.5831	1.20	Q	V				
7+25	0.5914	1.20	Q	V				
7+30	0.5998	1.21	Q	V				
7+35	0.6082	1.22	Q	V				
7+40	0.6166	1.22	Q	V				
7+45	0.6251	1.23	Q	V				
7+50	0.6336	1.24	Q	V				
7+55	0.6422	1.25	Q	V				
8+ 0	0.6508	1.25	Q	V				
8+ 5	0.6595	1.26	Q	V				
8+10	0.6683	1.27	Q	V				
8+15	0.6771	1.28	Q	V				
8+20	0.6859	1.29	Q	V				
8+25	0.6948	1.29	Q	V				
8+30	0.7038	1.30	Q	V				
8+35	0.7128	1.31	Q	V				
8+40	0.7219	1.32	Q	V				
8+45	0.7311	1.33	Q	V				
8+50	0.7403	1.34	Q	V				
8+55	0.7496	1.35	Q	V				
9+ 0	0.7589	1.36	Q	V				
9+ 5	0.7683	1.37	Q	V				
9+10	0.7778	1.38	Q	V				
9+15	0.7874	1.39	Q	V				
9+20	0.7970	1.40	Q	V				
9+25	0.8067	1.41	Q	V				
9+30	0.8164	1.42	Q	V				
9+35	0.8263	1.43	Q	V				
9+40	0.8362	1.44	Q	V				
9+45	0.8462	1.45	Q	V				
9+50	0.8562	1.46	Q	V				
9+55	0.8664	1.47	Q	V				
10+ 0	0.8766	1.48	Q	V				
10+ 5	0.8869	1.50	Q	V				
10+10	0.8973	1.51	Q	V				

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10+15       0.9078      1.52  Q     V   |          |          |          |
10+20       0.9184      1.53  Q     V   |          |          |          |
10+25       0.9290      1.55  Q     V   |          |          |          |
10+30       0.9398      1.56  Q     V   |          |          |          |
10+35       0.9506      1.58  Q      V  |          |          |          |
10+40       0.9616      1.59  Q      V  |          |          |          |
10+45       0.9726      1.61  Q      V  |          |          |          |
10+50       0.9838      1.62  Q      V  |          |          |          |
10+55       0.9951      1.64  Q      V  |          |          |          |
11+ 0       1.0064      1.65  Q      V  |          |          |          |
11+ 5       1.0179      1.67  Q      V  |          |          |          |
11+10       1.0295      1.68  Q      V  |          |          |          |
11+15       1.0412      1.70  Q      V  |          |          |          |
11+20       1.0530      1.72  Q      V  |          |          |          |
11+25       1.0650      1.74  Q      V  |          |          |          |
11+30       1.0771      1.75  Q      V  |          |          |          |
11+35       1.0893      1.77  Q       V |          |          |          |
11+40       1.1016      1.79  Q       V |          |          |          |
11+45       1.1141      1.81  Q       V |          |          |          |
11+50       1.1267      1.83  Q       V |          |          |          |
11+55       1.1395      1.86  Q       V |          |          |          |
12+ 0       1.1524      1.88  Q       V |          |          |          |
12+ 5       1.1655      1.90  Q       V |          |          |          |
12+10       1.1788      1.92  Q       V |          |          |          |
12+15       1.1922      1.95  Q       V |          |          |          |
12+20       1.2058      1.97  Q       V |          |          |          |
12+25       1.2195      2.00  Q        V|          |          |          |
12+30       1.2335      2.03  Q        V|          |          |          |
12+35       1.2476      2.05  Q        V|          |          |          |
12+40       1.2620      2.08  Q        V|          |          |          |
12+45       1.2765      2.11  Q        V|          |          |          |
12+50       1.2913      2.14  Q        V|          |          |          |
12+55       1.3063      2.18  Q        V|          |          |          |
13+ 0       1.3215      2.21  Q        V|          |          |          |
13+ 5       1.3370      2.25  Q        V|          |          |          |
13+10       1.3527      2.28  |Q       V|          |          |          |
13+15       1.3686      2.32  |Q        V          |          |          |
13+20       1.3849      2.36  |Q        V          |          |          |
13+25       1.4014      2.40  |Q        V          |          |          |
13+30       1.4183      2.44  |Q        V          |          |          |
13+35       1.4354      2.49  |Q        V          |          |          |
13+40       1.4529      2.54  |Q        V          |          |          |
13+45       1.4707      2.59  |Q        V          |          |          |
13+50       1.4889      2.64  |Q         |V         |          |          |
13+55       1.5076      2.70  |Q         |V         |          |          |
14+ 0       1.5266      2.76  |Q         |V         |          |          |
14+ 5       1.5460      2.83  |Q         |V         |          |          |
14+10       1.5660      2.89  |Q         |V         |          |          |
14+15       1.5864      2.97  |Q         |V         |          |          |
14+20       1.6075      3.05  |Q         |V         |          |          |
14+25       1.6291      3.14  |Q         | V        |          |          |
14+30       1.6513      3.22  |Q         | V        |          |          |
14+35       1.6742      3.32  |Q         | V        |          |          |
14+40       1.6978      3.43  |Q         | V        |          |          |
14+45       1.7222      3.54  |Q         | V        |          |          |
14+50       1.7474      3.66  |Q         | V        |          |          |
14+55       1.7736      3.81  |Q         |  V       |          |          |
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19+45	5.0248	1.40	Q	|	|	|	V |
19+50	5.0343	1.38	Q	|	|	|	V |
19+55	5.0437	1.36	Q	|	|	|	V |
20+ 0	5.0529	1.34	Q	|	|	|	V |
20+ 5	5.0620	1.32	Q	|	|	|	V |
20+10	5.0710	1.30	Q	|	|	|	V |
20+15	5.0799	1.29	Q	|	|	|	V |
20+20	5.0886	1.27	Q	|	|	|	V |
20+25	5.0973	1.26	Q	|	|	|	V |
20+30	5.1058	1.24	Q	|	|	|	V |
20+35	5.1143	1.23	Q	|	|	|	V |
20+40	5.1226	1.21	Q	|	|	|	V |
20+45	5.1309	1.20	Q	|	|	|	V |
20+50	5.1390	1.18	Q	|	|	|	V |
20+55	5.1471	1.17	Q	|	|	|	V |
21+ 0	5.1551	1.16	Q	|	|	|	V |
21+ 5	5.1630	1.15	Q	|	|	|	V |
21+10	5.1708	1.13	Q	|	|	|	V |
21+15	5.1785	1.12	Q	|	|	|	V |
21+20	5.1862	1.11	Q	|	|	|	V |
21+25	5.1937	1.10	Q	|	|	|	V |
21+30	5.2012	1.09	Q	|	|	|	V |
21+35	5.2087	1.08	Q	|	|	|	V |
21+40	5.2160	1.07	Q	|	|	|	V |
21+45	5.2233	1.06	Q	|	|	|	V |
21+50	5.2305	1.05	Q	|	|	|	V |
21+55	5.2377	1.04	Q	|	|	|	V |
22+ 0	5.2448	1.03	Q	|	|	|	V |
22+ 5	5.2518	1.02	Q	|	|	|	V |
22+10	5.2588	1.01	Q	|	|	|	V |
22+15	5.2657	1.00	Q	|	|	|	V |
22+20	5.2726	1.00	Q	|	|	|	V |
22+25	5.2794	0.99	Q	|	|	|	V|
22+30	5.2861	0.98	Q	|	|	|	V|
22+35	5.2928	0.97	Q	|	|	|	V|
22+40	5.2994	0.96	Q	|	|	|	V|
22+45	5.3060	0.96	Q	|	|	|	V|
22+50	5.3125	0.95	Q	|	|	|	V|
22+55	5.3190	0.94	Q	|	|	|	V|
23+ 0	5.3254	0.93	Q	|	|	|	V|
23+ 5	5.3318	0.93	Q	|	|	|	V|
23+10	5.3382	0.92	Q	|	|	|	V|
23+15	5.3445	0.91	Q	|	|	|	V|
23+20	5.3507	0.91	Q	|	|	|	V|
23+25	5.3569	0.90	Q	|	|	|	V|
23+30	5.3630	0.89	Q	|	|	|	V|
23+35	5.3692	0.89	Q	|	|	|	V|
23+40	5.3752	0.88	Q	|	|	|	V|
23+45	5.3813	0.88	Q	|	|	|	V|
23+50	5.3872	0.87	Q	|	|	|	V|
23+55	5.3932	0.86	Q	|	|	|	V|
24+ 0	5.3991	0.86	Q	|	|	|	V|
24+ 5	5.4047	0.81	Q	|	|	|	V|
24+10	5.4089	0.61	Q	|	|	|	V|
24+15	5.4109	0.29	Q	|	|	|	V|
24+20	5.4121	0.18	Q	|	|	|	V|
24+25	5.4129	0.11	Q	|	|	|	V|

24+30	5.4133	0.06	Q	|	|	|	V|
24+35	5.4136	0.04	Q	|	|	|	V|
24+40	5.4137	0.02	Q	|	|	|	V|
24+45	5.4138	0.01	Q	|	|	|	V|
24+50	5.4139	0.01	Q	|	|	|	V|
24+55	5.4140	0.01	Q	|	|	|	V|
25+ 0	5.4140	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA B
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
52.40	6	0.82
Rainfall data for year 2		
52.40	24	1.37
Rainfall data for year 100		
52.40	6	2.34
Rainfall data for year 100		
52.40	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	52.40	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
52.40	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 4130.00(Ft.)
Length from concentration point to centroid = 1830.00(Ft.)
Elevation difference along watercourse = 770.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 52.40(Ac.)
Catchment Lag time = 0.158 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 52.8032
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 52.40(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.383(In)
30-minute factor = 0.998 Adjusted rainfall = 0.858(In)
1-hour factor = 0.998 Adjusted rainfall = 1.172(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 633.71 (CFS))

1	4.686	29.697
2	28.281	149.527
3	65.385	235.133
4	79.286	88.090
5	87.300	50.783
6	92.405	32.355
7	95.645	20.532
8	97.512	11.831
9	98.268	4.789
10	98.632	2.308
11	98.996	2.308
12	99.360	2.308
13	100.000	4.054

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.383
2	3.15	0.52	0.52	0.140
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.71	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.24	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019

38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.36	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011

95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.72	2.72	0.010
107	0.31	2.73	2.73	0.010
108	0.31	2.75	2.74	0.010
109	0.30	2.75	2.75	0.010
110	0.30	2.76	2.76	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.93	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008

152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.16	3.16	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.30	3.30	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.41	3.41	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007

209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.73	3.73	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006

266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	3.99	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019

29	0.0061	0.0041	0.0019
30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020
33	0.0062	0.0042	0.0020
34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020
37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020
40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025

86	0.0079	0.0054	0.0025
87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026
90	0.0081	0.0055	0.0026
91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026
94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027
97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039

143	0.0125	0.0085	0.0040
144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041
147	0.0129	0.0088	0.0041
148	0.0130	0.0088	0.0042
149	0.0133	0.0090	0.0042
150	0.0134	0.0091	0.0043
151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045
154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0156	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0161	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0194	0.0132	0.0062
170	0.0197	0.0134	0.0063
171	0.0205	0.0139	0.0066
172	0.0209	0.0142	0.0067
173	0.0217	0.0148	0.0070
174	0.0222	0.0151	0.0071
175	0.0232	0.0158	0.0074
176	0.0238	0.0162	0.0076
177	0.0250	0.0170	0.0080
178	0.0257	0.0174	0.0082
179	0.0272	0.0185	0.0087
180	0.0280	0.0191	0.0090
181	0.0299	0.0204	0.0096
182	0.0310	0.0211	0.0099
183	0.0336	0.0229	0.0108
184	0.0351	0.0239	0.0112
185	0.0450	0.0306	0.0144
186	0.0473	0.0322	0.0151
187	0.0532	0.0362	0.0170
188	0.0570	0.0387	0.0182
189	0.0676	0.0460	0.0216
190	0.0755	0.0472*	0.0284
191	0.1048	0.0472*	0.0576
192	0.1402	0.0472*	0.0931
193	0.3831	0.0472*	0.3360
194	0.0868	0.0472*	0.0397
195	0.0616	0.0419	0.0197
196	0.0500	0.0340	0.0160
197	0.0368	0.0250	0.0118
198	0.0323	0.0219	0.0103
199	0.0289	0.0197	0.0093

200	0.0264	0.0179	0.0084
201	0.0244	0.0166	0.0078
202	0.0227	0.0154	0.0073
203	0.0213	0.0145	0.0068
204	0.0201	0.0137	0.0064
205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055
208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049
211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023

257	0.0071	0.0048	0.0023
258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022
261	0.0068	0.0046	0.0022
262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021
265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021
268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0396	2.4453	1.5943

Total soil rain loss = 2.45(In)
Total effective rainfall = 1.59(In)
Peak flow rate in flood hydrograph = 98.44(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

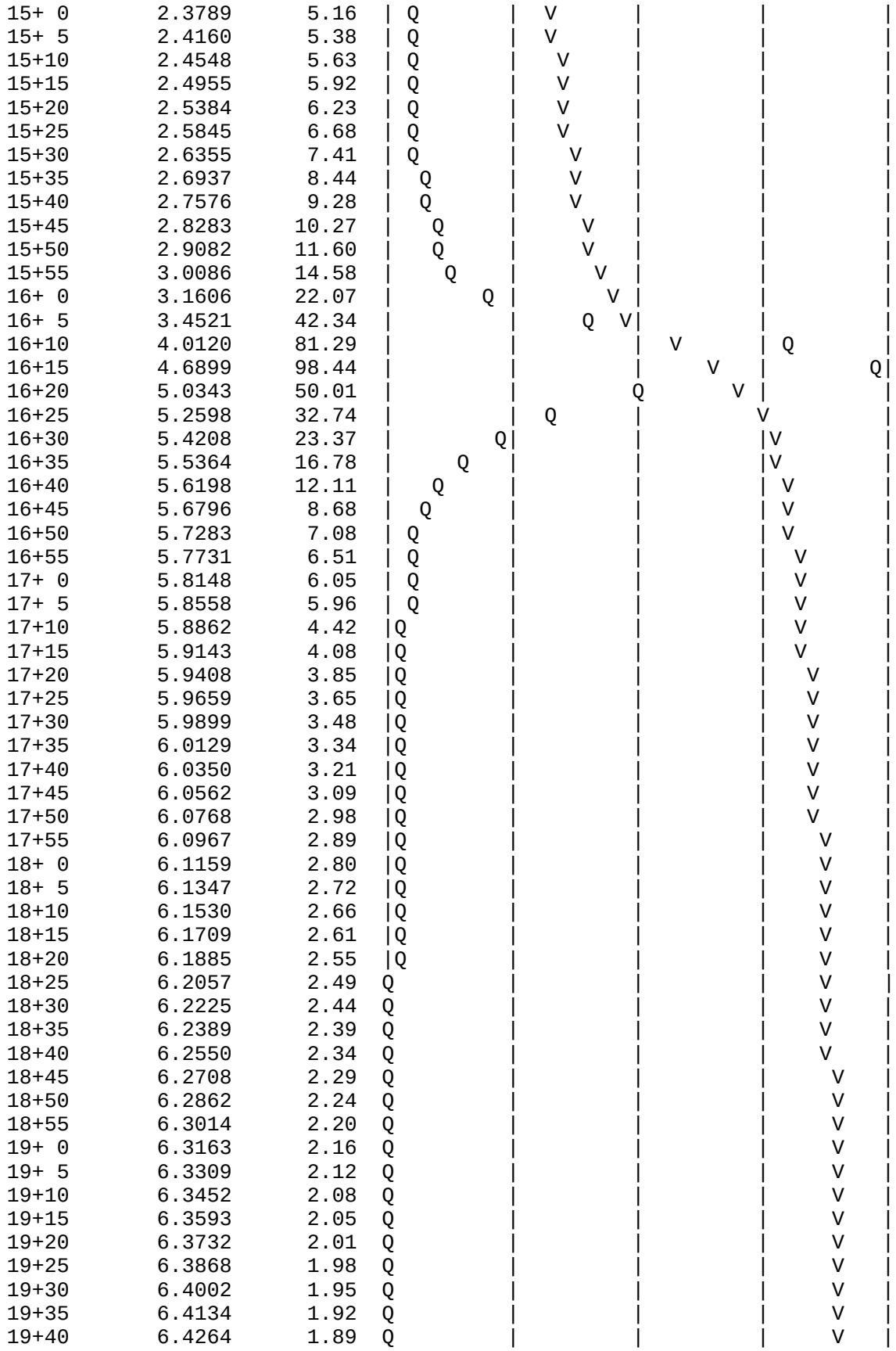
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	25.0	50.0	75.0	100.0
0+ 5	0.0004	0.05	Q	|	|	|	|
0+10	0.0025	0.32	Q	|	|	|	|
0+15	0.0076	0.73	Q	|	|	|	|
0+20	0.0138	0.89	Q	|	|	|	|
0+25	0.0205	0.99	Q	|	|	|	|
0+30	0.0277	1.05	Q	|	|	|	|
0+35	0.0352	1.09	Q	|	|	|	|
0+40	0.0429	1.11	Q	|	|	|	|

0+45	0.0506	1.12	Q	|	|	|	|
0+50	0.0584	1.13	Q	|	|	|	|
0+55	0.0662	1.14	Q	|	|	|	|
1+ 0	0.0741	1.15	Q	|	|	|	|
1+ 5	0.0820	1.16	Q	|	|	|	|
1+10	0.0900	1.16	Q	|	|	|	|
1+15	0.0980	1.16	Q	|	|	|	|
1+20	0.1061	1.17	Q	|	|	|	|
1+25	0.1142	1.17	Q	|	|	|	|
1+30	0.1222	1.18	Q	|	|	|	|
1+35	0.1304	1.18	Q	|	|	|	|
1+40	0.1385	1.18	Q	|	|	|	|
1+45	0.1467	1.19	Q	|	|	|	|
1+50	0.1549	1.19	Q	|	|	|	|
1+55	0.1632	1.20	Q	|	|	|	|
2+ 0	0.1714	1.20	Q	|	|	|	|
2+ 5	0.1797	1.20	QV	|	|	|	|
2+10	0.1880	1.21	QV	|	|	|	|
2+15	0.1964	1.21	QV	|	|	|	|
2+20	0.2048	1.22	QV	|	|	|	|
2+25	0.2132	1.22	QV	|	|	|	|
2+30	0.2217	1.23	QV	|	|	|	|
2+35	0.2301	1.23	QV	|	|	|	|
2+40	0.2386	1.24	QV	|	|	|	|
2+45	0.2472	1.24	QV	|	|	|	|
2+50	0.2558	1.24	QV	|	|	|	|
2+55	0.2644	1.25	QV	|	|	|	|
3+ 0	0.2730	1.25	QV	|	|	|	|
3+ 5	0.2817	1.26	QV	|	|	|	|
3+10	0.2904	1.26	QV	|	|	|	|
3+15	0.2991	1.27	QV	|	|	|	|
3+20	0.3079	1.27	QV	|	|	|	|
3+25	0.3167	1.28	QV	|	|	|	|
3+30	0.3256	1.28	QV	|	|	|	|
3+35	0.3344	1.29	QV	|	|	|	|
3+40	0.3433	1.29	QV	|	|	|	|
3+45	0.3523	1.30	Q V	|	|	|	|
3+50	0.3613	1.30	Q V	|	|	|	|
3+55	0.3703	1.31	Q V	|	|	|	|
4+ 0	0.3794	1.32	Q V	|	|	|	|
4+ 5	0.3885	1.32	Q V	|	|	|	|
4+10	0.3976	1.33	Q V	|	|	|	|
4+15	0.4068	1.33	Q V	|	|	|	|
4+20	0.4160	1.34	Q V	|	|	|	|
4+25	0.4252	1.34	Q V	|	|	|	|
4+30	0.4345	1.35	Q V	|	|	|	|
4+35	0.4439	1.35	Q V	|	|	|	|
4+40	0.4532	1.36	Q V	|	|	|	|
4+45	0.4626	1.37	Q V	|	|	|	|
4+50	0.4721	1.37	Q V	|	|	|	|
4+55	0.4816	1.38	Q V	|	|	|	|
5+ 0	0.4911	1.38	Q V	|	|	|	|
5+ 5	0.5007	1.39	Q V	|	|	|	|
5+10	0.5103	1.40	Q V	|	|	|	|
5+15	0.5200	1.40	Q V	|	|	|	|
5+20	0.5297	1.41	Q V	|	|	|	|
5+25	0.5395	1.42	Q V	|	|	|	|

5+30	0.5493	1.42	Q	V				
5+35	0.5591	1.43	Q	V				
5+40	0.5690	1.44	Q	V				
5+45	0.5790	1.44	Q	V				
5+50	0.5890	1.45	Q	V				
5+55	0.5990	1.46	Q	V				
6+ 0	0.6091	1.46	Q	V				
6+ 5	0.6192	1.47	Q	V				
6+10	0.6294	1.48	Q	V				
6+15	0.6397	1.49	Q	V				
6+20	0.6500	1.49	Q	V				
6+25	0.6603	1.50	Q	V				
6+30	0.6707	1.51	Q	V				
6+35	0.6812	1.52	Q	V				
6+40	0.6917	1.53	Q	V				
6+45	0.7022	1.53	Q	V				
6+50	0.7128	1.54	Q	V				
6+55	0.7235	1.55	Q	V				
7+ 0	0.7343	1.56	Q	V				
7+ 5	0.7451	1.57	Q	V				
7+10	0.7559	1.58	Q	V				
7+15	0.7668	1.59	Q	V				
7+20	0.7778	1.59	Q	V				
7+25	0.7888	1.60	Q	V				
7+30	0.7999	1.61	Q	V				
7+35	0.8111	1.62	Q	V				
7+40	0.8223	1.63	Q	V				
7+45	0.8336	1.64	Q	V				
7+50	0.8450	1.65	Q	V				
7+55	0.8564	1.66	Q	V				
8+ 0	0.8679	1.67	Q	V				
8+ 5	0.8795	1.68	Q	V				
8+10	0.8912	1.69	Q	V				
8+15	0.9029	1.70	Q	V				
8+20	0.9147	1.71	Q	V				
8+25	0.9266	1.72	Q	V				
8+30	0.9385	1.73	Q	V				
8+35	0.9505	1.75	Q	V				
8+40	0.9626	1.76	Q	V				
8+45	0.9748	1.77	Q	V				
8+50	0.9871	1.78	Q	V				
8+55	0.9994	1.79	Q	V				
9+ 0	1.0119	1.81	Q	V				
9+ 5	1.0244	1.82	Q	V				
9+10	1.0370	1.83	Q	V				
9+15	1.0497	1.84	Q	V				
9+20	1.0625	1.86	Q	V				
9+25	1.0754	1.87	Q	V				
9+30	1.0884	1.89	Q	V				
9+35	1.1015	1.90	Q	V				
9+40	1.1147	1.91	Q	V				
9+45	1.1280	1.93	Q	V				
9+50	1.1413	1.94	Q	V				
9+55	1.1548	1.96	Q	V				
10+ 0	1.1684	1.98	Q	V				
10+ 5	1.1822	1.99	Q	V				
10+10	1.1960	2.01	Q	V				

10+15	1.2099	2.02	Q	V	|	|	|
10+20	1.2240	2.04	Q	V	|	|	|
10+25	1.2382	2.06	Q	V	|	|	|
10+30	1.2525	2.08	Q	V	|	|	|
10+35	1.2669	2.10	Q	V	|	|	|
10+40	1.2815	2.11	Q	V	|	|	|
10+45	1.2962	2.13	Q	V	|	|	|
10+50	1.3110	2.15	Q	V	|	|	|
10+55	1.3260	2.17	Q	V	|	|	|
11+ 0	1.3411	2.19	Q	V	|	|	|
11+ 5	1.3563	2.22	Q	V	|	|	|
11+10	1.3718	2.24	Q	V	|	|	|
11+15	1.3873	2.26	Q	V	|	|	|
11+20	1.4030	2.28	Q	V	|	|	|
11+25	1.4189	2.31	Q	V	|	|	|
11+30	1.4350	2.33	Q	V	|	|	|
11+35	1.4512	2.36	Q	V	|	|	|
11+40	1.4676	2.38	Q	V	|	|	|
11+45	1.4842	2.41	Q	V	|	|	|
11+50	1.5010	2.44	Q	V	|	|	|
11+55	1.5179	2.46	Q	V	|	|	|
12+ 0	1.5351	2.49	Q	V	|	|	|
12+ 5	1.5525	2.52	|Q	V	|	|	|
12+10	1.5699	2.54	|Q	V	|	|	|
12+15	1.5875	2.55	|Q	V	|	|	|
12+20	1.6052	2.57	|Q	V	|	|	|
12+25	1.6231	2.60	|Q	V	|	|	|
12+30	1.6412	2.63	|Q	V	|	|	|
12+35	1.6595	2.67	|Q	V	|	|	|
12+40	1.6782	2.70	|Q	V	|	|	|
12+45	1.6970	2.74	|Q	V	|	|	|
12+50	1.7162	2.78	|Q	V	|	|	|
12+55	1.7356	2.82	|Q	V	|	|	|
13+ 0	1.7554	2.87	|Q	V	|	|	|
13+ 5	1.7754	2.91	|Q	V	|	|	|
13+10	1.7958	2.96	|Q	V	|	|	|
13+15	1.8166	3.01	|Q	V	|	|	|
13+20	1.8376	3.06	|Q	V	|	|	|
13+25	1.8591	3.12	|Q	V	|	|	|
13+30	1.8810	3.17	|Q	V	|	|	|
13+35	1.9033	3.24	|Q	V	|	|	|
13+40	1.9260	3.30	|Q	|V	|	|	|
13+45	1.9492	3.37	|Q	|V	|	|	|
13+50	1.9728	3.43	|Q	|V	|	|	|
13+55	1.9970	3.51	|Q	|V	|	|	|
14+ 0	2.0217	3.59	|Q	|V	|	|	|
14+ 5	2.0470	3.68	|Q	|V	|	|	|
14+10	2.0730	3.77	|Q	|V	|	|	|
14+15	2.0996	3.87	|Q	| V	|	|	|
14+20	2.1270	3.97	|Q	| V	|	|	|
14+25	2.1551	4.08	|Q	| V	|	|	|
14+30	2.1840	4.20	|Q	| V	|	|	|
14+35	2.2138	4.33	|Q	| V	|	|	|
14+40	2.2445	4.46	|Q	| V	|	|	|
14+45	2.2763	4.62	|Q	| V	|	|	|
14+50	2.3092	4.78	|Q	| V	|	|	|
14+55	2.3434	4.96	|Q	| V	|	|	|



19+45	6.4392	1.86	Q	|	|	|	V |
19+50	6.4519	1.83	Q	|	|	|	V |
19+55	6.4643	1.81	Q	|	|	|	V |
20+ 0	6.4766	1.78	Q	|	|	|	V |
20+ 5	6.4888	1.76	Q	|	|	|	V |
20+10	6.5007	1.74	Q	|	|	|	V |
20+15	6.5125	1.72	Q	|	|	|	V |
20+20	6.5242	1.69	Q	|	|	|	V |
20+25	6.5357	1.67	Q	|	|	|	V |
20+30	6.5471	1.65	Q	|	|	|	V |
20+35	6.5583	1.63	Q	|	|	|	V |
20+40	6.5695	1.61	Q	|	|	|	V |
20+45	6.5805	1.60	Q	|	|	|	V |
20+50	6.5913	1.58	Q	|	|	|	V |
20+55	6.6021	1.56	Q	|	|	|	V |
21+ 0	6.6127	1.54	Q	|	|	|	V |
21+ 5	6.6232	1.53	Q	|	|	|	V |
21+10	6.6336	1.51	Q	|	|	|	V |
21+15	6.6439	1.50	Q	|	|	|	V |
21+20	6.6541	1.48	Q	|	|	|	V |
21+25	6.6642	1.47	Q	|	|	|	V |
21+30	6.6742	1.45	Q	|	|	|	V |
21+35	6.6841	1.44	Q	|	|	|	V |
21+40	6.6940	1.42	Q	|	|	|	V |
21+45	6.7037	1.41	Q	|	|	|	V |
21+50	6.7133	1.40	Q	|	|	|	V |
21+55	6.7229	1.39	Q	|	|	|	V |
22+ 0	6.7323	1.37	Q	|	|	|	V |
22+ 5	6.7417	1.36	Q	|	|	|	V |
22+10	6.7510	1.35	Q	|	|	|	V |
22+15	6.7602	1.34	Q	|	|	|	V |
22+20	6.7694	1.33	Q	|	|	|	V |
22+25	6.7784	1.32	Q	|	|	|	V |
22+30	6.7874	1.31	Q	|	|	|	V|
22+35	6.7963	1.30	Q	|	|	|	V|
22+40	6.8052	1.28	Q	|	|	|	V|
22+45	6.8140	1.27	Q	|	|	|	V|
22+50	6.8227	1.27	Q	|	|	|	V|
22+55	6.8313	1.26	Q	|	|	|	V|
23+ 0	6.8399	1.25	Q	|	|	|	V|
23+ 5	6.8484	1.24	Q	|	|	|	V|
23+10	6.8569	1.23	Q	|	|	|	V|
23+15	6.8653	1.22	Q	|	|	|	V|
23+20	6.8736	1.21	Q	|	|	|	V|
23+25	6.8819	1.20	Q	|	|	|	V|
23+30	6.8901	1.19	Q	|	|	|	V|
23+35	6.8983	1.18	Q	|	|	|	V|
23+40	6.9064	1.18	Q	|	|	|	V|
23+45	6.9144	1.17	Q	|	|	|	V|
23+50	6.9224	1.16	Q	|	|	|	V|
23+55	6.9303	1.15	Q	|	|	|	V|
24+ 0	6.9382	1.15	Q	|	|	|	V|
24+ 5	6.9457	1.09	Q	|	|	|	V|
24+10	6.9513	0.81	Q	|	|	|	V|
24+15	6.9540	0.39	Q	|	|	|	V|
24+20	6.9556	0.24	Q	|	|	|	V|
24+25	6.9566	0.14	Q	|	|	|	V|

```
   24+30       6.9572      0.09  Q          |          |          |         V|
   24+35       6.9576      0.05  Q          |          |          |         V|
   24+40       6.9578      0.03  Q          |          |          |         V|
   24+45       6.9579      0.02  Q          |          |          |         V|
   24+50       6.9580      0.02  Q          |          |          |         V|
   24+55       6.9581      0.01  Q          |          |          |         V|
   25+ 0       6.9581      0.01  Q          |          |          |          V
---------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA C - EXISTING CONDITIONS
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
34.00	6	0.82
Rainfall data for year 2		
34.00	24	1.37
Rainfall data for year 100		
34.00	6	2.34
Rainfall data for year 100		
34.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	34.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
34.00	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
++
Watercourse length = 3425.00(Ft.)
Length from concentration point to centroid = 1790.00(Ft.)
Elevation difference along watercourse = 870.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 34.00(Ac.)
Catchment Lag time = 0.137 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 60.6342
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 34.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.230(In)
30-minute factor = 0.998 Adjusted rainfall = 0.515(In)
1-hour factor = 0.998 Adjusted rainfall = 0.703(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 411.19 (CFS))

1	5.723	23.530
2	38.031	132.849
3	71.554	137.842
4	83.842	50.524
5	90.907	29.053
6	95.161	17.489
7	97.444	9.390
8	98.309	3.555
9	98.727	1.719
10	99.145	1.719
11	100.000	3.516

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.51	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.92	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011

40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.54	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007

97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.67	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.84	1.84	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005

154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.97	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.16	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004

211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.32	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004

268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006
29	0.0037	0.0031	0.0006
30	0.0037	0.0031	0.0006

31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006
33	0.0038	0.0032	0.0006
34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006
37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006
40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008
86	0.0048	0.0040	0.0008
87	0.0049	0.0041	0.0008

88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008
90	0.0049	0.0041	0.0008
91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008
94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008
97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0062	0.0012
142	0.0075	0.0063	0.0012
143	0.0077	0.0064	0.0013
144	0.0077	0.0065	0.0013

145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013
147	0.0081	0.0067	0.0013
148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014
151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014
154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0095	0.0019
168	0.0116	0.0097	0.0019
169	0.0120	0.0101	0.0020
170	0.0122	0.0102	0.0020
171	0.0127	0.0106	0.0021
172	0.0129	0.0108	0.0021
173	0.0135	0.0112	0.0022
174	0.0137	0.0115	0.0023
175	0.0144	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0154	0.0129	0.0025
178	0.0159	0.0132	0.0026
179	0.0168	0.0140	0.0028
180	0.0173	0.0144	0.0028
181	0.0185	0.0154	0.0030
182	0.0191	0.0160	0.0031
183	0.0207	0.0173	0.0034
184	0.0216	0.0180	0.0036
185	0.0270	0.0226	0.0044
186	0.0284	0.0237	0.0047
187	0.0319	0.0266	0.0052
188	0.0342	0.0285	0.0056
189	0.0405	0.0339	0.0067
190	0.0453	0.0378	0.0074
191	0.0628	0.0472*	0.0157
192	0.0841	0.0472*	0.0369
193	0.2298	0.0472*	0.1826
194	0.0521	0.0435	0.0086
195	0.0370	0.0309	0.0061
196	0.0300	0.0251	0.0049
197	0.0226	0.0189	0.0037
198	0.0199	0.0166	0.0033
199	0.0178	0.0149	0.0029
200	0.0163	0.0136	0.0027
201	0.0151	0.0126	0.0025

202	0.0140	0.0117	0.0023
203	0.0132	0.0110	0.0022
204	0.0125	0.0104	0.0020
205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018
208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016
211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0013
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0070	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0066	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007
257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007

259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007
261	0.0042	0.0035	0.0007
262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007
265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006
268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4663	1.8874	0.5788

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 30.78(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

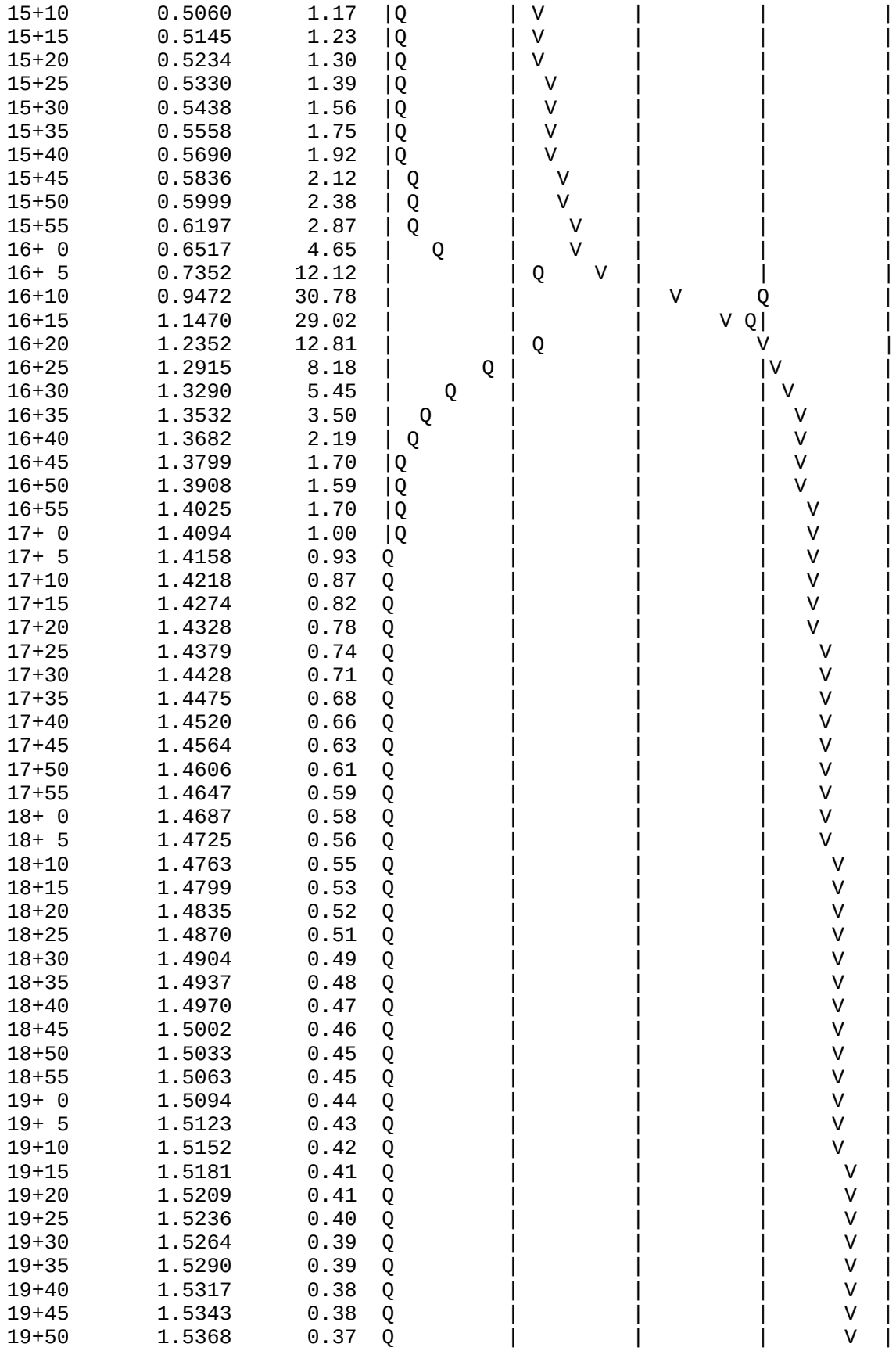
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0001	0.01	Q				
0+10	0.0007	0.09	Q				
0+15	0.0018	0.16	Q				
0+20	0.0031	0.19	Q				
0+25	0.0046	0.21	Q				
0+30	0.0061	0.22	Q				
0+35	0.0077	0.23	Q				
0+40	0.0092	0.23	Q				
0+45	0.0108	0.23	Q				
0+50	0.0124	0.23	Q				

0+55	0.0140	0.23	Q				
1+ 0	0.0156	0.24	Q				
1+ 5	0.0173	0.24	Q				
1+10	0.0189	0.24	Q				
1+15	0.0205	0.24	Q				
1+20	0.0222	0.24	Q				
1+25	0.0238	0.24	Q				
1+30	0.0255	0.24	Q				
1+35	0.0271	0.24	Q				
1+40	0.0288	0.24	Q				
1+45	0.0305	0.24	Q				
1+50	0.0321	0.24	Q				
1+55	0.0338	0.24	Q				
2+ 0	0.0355	0.25	Q				
2+ 5	0.0372	0.25	Q				
2+10	0.0389	0.25	Q				
2+15	0.0406	0.25	Q				
2+20	0.0423	0.25	QV				
2+25	0.0440	0.25	QV				
2+30	0.0458	0.25	QV				
2+35	0.0475	0.25	QV				
2+40	0.0492	0.25	QV				
2+45	0.0510	0.25	QV				
2+50	0.0527	0.25	QV				
2+55	0.0545	0.26	QV				
3+ 0	0.0562	0.26	QV				
3+ 5	0.0580	0.26	QV				
3+10	0.0598	0.26	QV				
3+15	0.0616	0.26	QV				
3+20	0.0634	0.26	QV				
3+25	0.0652	0.26	QV				
3+30	0.0670	0.26	QV				
3+35	0.0688	0.26	QV				
3+40	0.0706	0.26	QV				
3+45	0.0724	0.27	QV				
3+50	0.0743	0.27	QV				
3+55	0.0761	0.27	QV				
4+ 0	0.0779	0.27	QV				
4+ 5	0.0798	0.27	QV				
4+10	0.0817	0.27	QV				
4+15	0.0835	0.27	Q V				
4+20	0.0854	0.27	Q V				
4+25	0.0873	0.27	Q V				
4+30	0.0892	0.28	Q V				
4+35	0.0911	0.28	Q V				
4+40	0.0930	0.28	Q V				
4+45	0.0949	0.28	Q V				
4+50	0.0969	0.28	Q V				
4+55	0.0988	0.28	Q V				
5+ 0	0.1008	0.28	Q V				
5+ 5	0.1027	0.28	Q V				
5+10	0.1047	0.29	Q V				
5+15	0.1067	0.29	Q V				
5+20	0.1086	0.29	Q V				
5+25	0.1106	0.29	Q V				
5+30	0.1126	0.29	Q V				
5+35	0.1146	0.29	Q V				

5+40	0.1167	0.29	Q V	|	|	|	|
5+45	0.1187	0.29	Q V	|	|	|	|
5+50	0.1207	0.30	Q V	|	|	|	|
5+55	0.1228	0.30	Q V	|	|	|	|
6+ 0	0.1248	0.30	Q V	|	|	|	|
6+ 5	0.1269	0.30	Q V	|	|	|	|
6+10	0.1290	0.30	Q V	|	|	|	|
6+15	0.1311	0.30	Q V	|	|	|	|
6+20	0.1332	0.31	Q V	|	|	|	|
6+25	0.1353	0.31	Q V	|	|	|	|
6+30	0.1374	0.31	Q V	|	|	|	|
6+35	0.1396	0.31	Q V	|	|	|	|
6+40	0.1417	0.31	Q V	|	|	|	|
6+45	0.1439	0.31	Q V	|	|	|	|
6+50	0.1460	0.31	Q V	|	|	|	|
6+55	0.1482	0.32	Q V	|	|	|	|
7+ 0	0.1504	0.32	Q V	|	|	|	|
7+ 5	0.1526	0.32	Q V	|	|	|	|
7+10	0.1548	0.32	Q V	|	|	|	|
7+15	0.1571	0.32	Q V	|	|	|	|
7+20	0.1593	0.33	Q V	|	|	|	|
7+25	0.1615	0.33	Q V	|	|	|	|
7+30	0.1638	0.33	Q V	|	|	|	|
7+35	0.1661	0.33	Q V	|	|	|	|
7+40	0.1684	0.33	Q V	|	|	|	|
7+45	0.1707	0.34	Q V	|	|	|	|
7+50	0.1730	0.34	Q V	|	|	|	|
7+55	0.1754	0.34	Q V	|	|	|	|
8+ 0	0.1777	0.34	Q V	|	|	|	|
8+ 5	0.1801	0.34	Q V	|	|	|	|
8+10	0.1824	0.35	Q V	|	|	|	|
8+15	0.1848	0.35	Q V	|	|	|	|
8+20	0.1872	0.35	Q V	|	|	|	|
8+25	0.1897	0.35	Q V	|	|	|	|
8+30	0.1921	0.35	Q V	|	|	|	|
8+35	0.1946	0.36	Q V	|	|	|	|
8+40	0.1970	0.36	Q V	|	|	|	|
8+45	0.1995	0.36	Q V	|	|	|	|
8+50	0.2020	0.36	Q V	|	|	|	|
8+55	0.2046	0.37	Q V	|	|	|	|
9+ 0	0.2071	0.37	Q V	|	|	|	|
9+ 5	0.2097	0.37	Q V	|	|	|	|
9+10	0.2122	0.37	Q V	|	|	|	|
9+15	0.2148	0.38	Q V	|	|	|	|
9+20	0.2174	0.38	Q V	|	|	|	|
9+25	0.2201	0.38	Q V	|	|	|	|
9+30	0.2227	0.39	Q V	|	|	|	|
9+35	0.2254	0.39	Q V	|	|	|	|
9+40	0.2281	0.39	Q V	|	|	|	|
9+45	0.2308	0.39	Q V	|	|	|	|
9+50	0.2335	0.40	Q V	|	|	|	|
9+55	0.2363	0.40	Q V	|	|	|	|
10+ 0	0.2391	0.40	Q V	|	|	|	|
10+ 5	0.2419	0.41	Q V	|	|	|	|
10+10	0.2447	0.41	Q V	|	|	|	|
10+15	0.2476	0.41	Q V	|	|	|	|
10+20	0.2504	0.42	Q V	|	|	|	|

```
10+25       0.2533      0.42  Q     V   |           |           |           |
10+30       0.2563      0.42  Q     V   |           |           |           |
10+35       0.2592      0.43  Q     V   |           |           |           |
10+40       0.2622      0.43  Q     V   |           |           |           |
10+45       0.2652      0.44  Q     V   |           |           |           |
10+50       0.2682      0.44  Q     V   |           |           |           |
10+55       0.2713      0.44  Q     V   |           |           |           |
11+ 0       0.2744      0.45  Q     V   |           |           |           |
11+ 5       0.2775      0.45  Q     V   |           |           |           |
11+10       0.2806      0.46  Q     V   |           |           |           |
11+15       0.2838      0.46  Q     V   |           |           |           |
11+20       0.2870      0.47  Q      V  |           |           |           |
11+25       0.2903      0.47  Q      V  |           |           |           |
11+30       0.2936      0.48  Q      V  |           |           |           |
11+35       0.2969      0.48  Q      V  |           |           |           |
11+40       0.3002      0.49  Q      V  |           |           |           |
11+45       0.3036      0.49  Q      V  |           |           |           |
11+50       0.3070      0.50  Q      V  |           |           |           |
11+55       0.3105      0.50  Q      V  |           |           |           |
12+ 0       0.3140      0.51  Q      V  |           |           |           |
12+ 5       0.3176      0.52  Q      V  |           |           |           |
12+10       0.3212      0.52  Q      V  |           |           |           |
12+15       0.3248      0.53  Q      V  |           |           |           |
12+20       0.3285      0.54  Q       V |           |           |           |
12+25       0.3323      0.54  Q       V |           |           |           |
12+30       0.3360      0.55  Q       V |           |           |           |
12+35       0.3399      0.56  Q       V |           |           |           |
12+40       0.3438      0.57  Q       V |           |           |           |
12+45       0.3477      0.57  Q       V |           |           |           |
12+50       0.3517      0.58  Q       V |           |           |           |
12+55       0.3558      0.59  Q       V |           |           |           |
13+ 0       0.3599      0.60  Q       V |           |           |           |
13+ 5       0.3641      0.61  Q       V |           |           |           |
13+10       0.3684      0.62  Q       V |           |           |           |
13+15       0.3727      0.63  Q        V|           |           |           |
13+20       0.3771      0.64  Q        V|           |           |           |
13+25       0.3816      0.65  Q        V|           |           |           |
13+30       0.3862      0.66  Q        V|           |           |           |
13+35       0.3909      0.68  Q        V|           |           |           |
13+40       0.3956      0.69  Q        V|           |           |           |
13+45       0.4005      0.70  Q        V|           |           |           |
13+50       0.4054      0.72  Q        V|           |           |           |
13+55       0.4105      0.73  Q         V           |           |           |
14+ 0       0.4156      0.75  Q         V           |           |           |
14+ 5       0.4209      0.77  Q         V           |           |           |
14+10       0.4263      0.79  Q         V           |           |           |
14+15       0.4319      0.81  Q         V           |           |           |
14+20       0.4376      0.83  Q         V           |           |           |
14+25       0.4435      0.85  Q         V           |           |           |
14+30       0.4495      0.88  Q         V           |           |           |
14+35       0.4557      0.90  Q         |V          |           |           |
14+40       0.4621      0.93  Q         |V          |           |           |
14+45       0.4687      0.96  Q         |V          |           |           |
14+50       0.4756      1.00  Q         |V          |           |           |
14+55       0.4827      1.03  |Q        |V          |           |           |
15+ 0       0.4901      1.08  |Q        |V          |           |           |
15+ 5       0.4979      1.12  |Q        | V         |           |           |
```



19+55	1.5394	0.37	Q	|	|	|	V |
20+ 0	1.5419	0.36	Q	|	|	|	V |
20+ 5	1.5443	0.36	Q	|	|	|	V |
20+10	1.5467	0.35	Q	|	|	|	V |
20+15	1.5491	0.35	Q	|	|	|	V |
20+20	1.5515	0.34	Q	|	|	|	V |
20+25	1.5538	0.34	Q	|	|	|	V |
20+30	1.5562	0.34	Q	|	|	|	V |
20+35	1.5584	0.33	Q	|	|	|	V |
20+40	1.5607	0.33	Q	|	|	|	V |
20+45	1.5629	0.32	Q	|	|	|	V |
20+50	1.5651	0.32	Q	|	|	|	V |
20+55	1.5673	0.32	Q	|	|	|	V |
21+ 0	1.5695	0.31	Q	|	|	|	V |
21+ 5	1.5716	0.31	Q	|	|	|	V |
21+10	1.5737	0.31	Q	|	|	|	V |
21+15	1.5758	0.30	Q	|	|	|	V |
21+20	1.5779	0.30	Q	|	|	|	V |
21+25	1.5799	0.30	Q	|	|	|	V |
21+30	1.5820	0.30	Q	|	|	|	V |
21+35	1.5840	0.29	Q	|	|	|	V |
21+40	1.5860	0.29	Q	|	|	|	V |
21+45	1.5880	0.29	Q	|	|	|	V |
21+50	1.5899	0.28	Q	|	|	|	V |
21+55	1.5919	0.28	Q	|	|	|	V |
22+ 0	1.5938	0.28	Q	|	|	|	V |
22+ 5	1.5957	0.28	Q	|	|	|	V |
22+10	1.5976	0.27	Q	|	|	|	V |
22+15	1.5994	0.27	Q	|	|	|	V|
22+20	1.6013	0.27	Q	|	|	|	V|
22+25	1.6031	0.27	Q	|	|	|	V|
22+30	1.6050	0.27	Q	|	|	|	V|
22+35	1.6068	0.26	Q	|	|	|	V|
22+40	1.6086	0.26	Q	|	|	|	V|
22+45	1.6104	0.26	Q	|	|	|	V|
22+50	1.6121	0.26	Q	|	|	|	V|
22+55	1.6139	0.26	Q	|	|	|	V|
23+ 0	1.6156	0.25	Q	|	|	|	V|
23+ 5	1.6174	0.25	Q	|	|	|	V|
23+10	1.6191	0.25	Q	|	|	|	V|
23+15	1.6208	0.25	Q	|	|	|	V|
23+20	1.6225	0.25	Q	|	|	|	V|
23+25	1.6242	0.24	Q	|	|	|	V|
23+30	1.6259	0.24	Q	|	|	|	V|
23+35	1.6275	0.24	Q	|	|	|	V|
23+40	1.6292	0.24	Q	|	|	|	V|
23+45	1.6308	0.24	Q	|	|	|	V|
23+50	1.6324	0.24	Q	|	|	|	V|
23+55	1.6340	0.23	Q	|	|	|	V|
24+ 0	1.6356	0.23	Q	|	|	|	V|
24+ 5	1.6372	0.22	Q	|	|	|	V|
24+10	1.6381	0.14	Q	|	|	|	V|
24+15	1.6386	0.07	Q	|	|	|	V|
24+20	1.6388	0.04	Q	|	|	|	V|
24+25	1.6390	0.02	Q	|	|	|	V|
24+30	1.6391	0.01	Q	|	|	|	V|
24+35	1.6391	0.01	Q	|	|	|	V|

```
   24+40       1.6391      0.00  Q         |         |         |        V|
   24+45       1.6392      0.00  Q         |         |         |        V|
   24+50       1.6392      0.00  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA C
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
34.10	6	0.82
Rainfall data for year 2		
34.10	24	1.37
Rainfall data for year 100		
34.10	6	2.34
Rainfall data for year 100		
34.10	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
79.0	34.10	1.000	0.398	1.000	0.398

Area-averaged adjusted loss rate Fm (In/Hr) = 0.398

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
34.10	1.000	79.0	2.66	0.330

Area-averaged catchment yield fraction, Y = 0.330
Area-averaged low loss fraction, Yb = 0.670
++
Watercourse length = 3425.00(Ft.)
Length from concentration point to centroid = 1790.00(Ft.)
Elevation difference along watercourse = 870.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 34.10(Ac.)
Catchment Lag time = 0.137 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 60.6342
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.398(In/Hr)
Average low loss rate fraction (Yb) = 0.670 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 34.10(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.230(In)
30-minute factor = 0.998 Adjusted rainfall = 0.515(In)
1-hour factor = 0.998 Adjusted rainfall = 0.703(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 412.40 (CFS))

1	5.723	23.599
2	38.031	133.240
3	71.554	138.248
4	83.842	50.673
5	90.907	29.139
6	95.161	17.540
7	97.444	9.418
8	98.309	3.565
9	98.727	1.725
10	99.145	1.725
11	100.000	3.526

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.51	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.92	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011

40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.54	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007

97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.67	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.84	1.84	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005

154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.97	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.16	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004

211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.32	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004

268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0023	0.0011
2	0.0034	0.0023	0.0011
3	0.0034	0.0023	0.0011
4	0.0034	0.0023	0.0011
5	0.0034	0.0023	0.0011
6	0.0034	0.0023	0.0011
7	0.0034	0.0023	0.0011
8	0.0035	0.0023	0.0011
9	0.0035	0.0023	0.0011
10	0.0035	0.0023	0.0011
11	0.0035	0.0023	0.0012
12	0.0035	0.0023	0.0012
13	0.0035	0.0024	0.0012
14	0.0035	0.0024	0.0012
15	0.0035	0.0024	0.0012
16	0.0035	0.0024	0.0012
17	0.0036	0.0024	0.0012
18	0.0036	0.0024	0.0012
19	0.0036	0.0024	0.0012
20	0.0036	0.0024	0.0012
21	0.0036	0.0024	0.0012
22	0.0036	0.0024	0.0012
23	0.0036	0.0024	0.0012
24	0.0036	0.0024	0.0012
25	0.0037	0.0025	0.0012
26	0.0037	0.0025	0.0012
27	0.0037	0.0025	0.0012
28	0.0037	0.0025	0.0012
29	0.0037	0.0025	0.0012
30	0.0037	0.0025	0.0012

31	0.0037	0.0025	0.0012
32	0.0038	0.0025	0.0012
33	0.0038	0.0025	0.0012
34	0.0038	0.0025	0.0013
35	0.0038	0.0025	0.0013
36	0.0038	0.0026	0.0013
37	0.0038	0.0026	0.0013
38	0.0038	0.0026	0.0013
39	0.0039	0.0026	0.0013
40	0.0039	0.0026	0.0013
41	0.0039	0.0026	0.0013
42	0.0039	0.0026	0.0013
43	0.0039	0.0026	0.0013
44	0.0039	0.0026	0.0013
45	0.0040	0.0027	0.0013
46	0.0040	0.0027	0.0013
47	0.0040	0.0027	0.0013
48	0.0040	0.0027	0.0013
49	0.0040	0.0027	0.0013
50	0.0040	0.0027	0.0013
51	0.0041	0.0027	0.0013
52	0.0041	0.0027	0.0013
53	0.0041	0.0027	0.0014
54	0.0041	0.0028	0.0014
55	0.0041	0.0028	0.0014
56	0.0041	0.0028	0.0014
57	0.0042	0.0028	0.0014
58	0.0042	0.0028	0.0014
59	0.0042	0.0028	0.0014
60	0.0042	0.0028	0.0014
61	0.0042	0.0028	0.0014
62	0.0043	0.0029	0.0014
63	0.0043	0.0029	0.0014
64	0.0043	0.0029	0.0014
65	0.0043	0.0029	0.0014
66	0.0043	0.0029	0.0014
67	0.0044	0.0029	0.0014
68	0.0044	0.0029	0.0014
69	0.0044	0.0030	0.0015
70	0.0044	0.0030	0.0015
71	0.0045	0.0030	0.0015
72	0.0045	0.0030	0.0015
73	0.0045	0.0030	0.0015
74	0.0045	0.0030	0.0015
75	0.0045	0.0030	0.0015
76	0.0046	0.0031	0.0015
77	0.0046	0.0031	0.0015
78	0.0046	0.0031	0.0015
79	0.0046	0.0031	0.0015
80	0.0047	0.0031	0.0015
81	0.0047	0.0031	0.0016
82	0.0047	0.0032	0.0016
83	0.0047	0.0032	0.0016
84	0.0048	0.0032	0.0016
85	0.0048	0.0032	0.0016
86	0.0048	0.0032	0.0016
87	0.0049	0.0032	0.0016

88	0.0049	0.0033	0.0016
89	0.0049	0.0033	0.0016
90	0.0049	0.0033	0.0016
91	0.0050	0.0033	0.0016
92	0.0050	0.0033	0.0016
93	0.0050	0.0034	0.0017
94	0.0050	0.0034	0.0017
95	0.0051	0.0034	0.0017
96	0.0051	0.0034	0.0017
97	0.0052	0.0034	0.0017
98	0.0052	0.0035	0.0017
99	0.0052	0.0035	0.0017
100	0.0052	0.0035	0.0017
101	0.0053	0.0035	0.0017
102	0.0053	0.0036	0.0018
103	0.0054	0.0036	0.0018
104	0.0054	0.0036	0.0018
105	0.0054	0.0036	0.0018
106	0.0055	0.0037	0.0018
107	0.0055	0.0037	0.0018
108	0.0055	0.0037	0.0018
109	0.0056	0.0037	0.0018
110	0.0056	0.0038	0.0019
111	0.0057	0.0038	0.0019
112	0.0057	0.0038	0.0019
113	0.0058	0.0039	0.0019
114	0.0058	0.0039	0.0019
115	0.0058	0.0039	0.0019
116	0.0059	0.0039	0.0019
117	0.0059	0.0040	0.0020
118	0.0060	0.0040	0.0020
119	0.0060	0.0040	0.0020
120	0.0061	0.0041	0.0020
121	0.0061	0.0041	0.0020
122	0.0062	0.0041	0.0020
123	0.0062	0.0042	0.0021
124	0.0063	0.0042	0.0021
125	0.0064	0.0043	0.0021
126	0.0064	0.0043	0.0021
127	0.0065	0.0043	0.0021
128	0.0065	0.0044	0.0022
129	0.0066	0.0044	0.0022
130	0.0066	0.0044	0.0022
131	0.0067	0.0045	0.0022
132	0.0068	0.0045	0.0022
133	0.0069	0.0046	0.0023
134	0.0069	0.0046	0.0023
135	0.0070	0.0047	0.0023
136	0.0070	0.0047	0.0023
137	0.0071	0.0048	0.0024
138	0.0072	0.0048	0.0024
139	0.0073	0.0049	0.0024
140	0.0074	0.0049	0.0024
141	0.0075	0.0050	0.0025
142	0.0075	0.0050	0.0025
143	0.0077	0.0051	0.0025
144	0.0077	0.0052	0.0026

145	0.0079	0.0053	0.0026
146	0.0079	0.0053	0.0026
147	0.0081	0.0054	0.0027
148	0.0081	0.0054	0.0027
149	0.0083	0.0055	0.0027
150	0.0084	0.0056	0.0028
151	0.0085	0.0057	0.0028
152	0.0086	0.0058	0.0028
153	0.0088	0.0059	0.0029
154	0.0089	0.0059	0.0029
155	0.0091	0.0061	0.0030
156	0.0092	0.0061	0.0030
157	0.0094	0.0063	0.0031
158	0.0095	0.0063	0.0031
159	0.0097	0.0065	0.0032
160	0.0098	0.0066	0.0032
161	0.0101	0.0067	0.0033
162	0.0102	0.0068	0.0034
163	0.0105	0.0070	0.0035
164	0.0106	0.0071	0.0035
165	0.0109	0.0073	0.0036
166	0.0111	0.0074	0.0037
167	0.0114	0.0077	0.0038
168	0.0116	0.0078	0.0038
169	0.0120	0.0081	0.0040
170	0.0122	0.0082	0.0040
171	0.0127	0.0085	0.0042
172	0.0129	0.0087	0.0043
173	0.0135	0.0090	0.0044
174	0.0137	0.0092	0.0045
175	0.0144	0.0096	0.0047
176	0.0147	0.0098	0.0049
177	0.0154	0.0103	0.0051
178	0.0159	0.0106	0.0052
179	0.0168	0.0112	0.0055
180	0.0173	0.0116	0.0057
181	0.0185	0.0124	0.0061
182	0.0191	0.0128	0.0063
183	0.0207	0.0138	0.0068
184	0.0216	0.0145	0.0071
185	0.0270	0.0181	0.0089
186	0.0284	0.0190	0.0094
187	0.0319	0.0213	0.0105
188	0.0342	0.0229	0.0113
189	0.0405	0.0271	0.0134
190	0.0453	0.0303	0.0150
191	0.0628	0.0332*	0.0297
192	0.0841	0.0332*	0.0509
193	0.2298	0.0332*	0.1966
194	0.0521	0.0332*	0.0189
195	0.0370	0.0247	0.0122
196	0.0300	0.0201	0.0099
197	0.0226	0.0151	0.0075
198	0.0199	0.0133	0.0066
199	0.0178	0.0119	0.0059
200	0.0163	0.0109	0.0054
201	0.0151	0.0101	0.0050

202	0.0140	0.0094	0.0046
203	0.0132	0.0088	0.0044
204	0.0125	0.0083	0.0041
205	0.0118	0.0079	0.0039
206	0.0113	0.0075	0.0037
207	0.0108	0.0072	0.0036
208	0.0103	0.0069	0.0034
209	0.0099	0.0067	0.0033
210	0.0096	0.0064	0.0032
211	0.0093	0.0062	0.0031
212	0.0090	0.0060	0.0030
213	0.0087	0.0058	0.0029
214	0.0084	0.0057	0.0028
215	0.0082	0.0055	0.0027
216	0.0080	0.0054	0.0026
217	0.0078	0.0052	0.0026
218	0.0076	0.0051	0.0025
219	0.0074	0.0050	0.0025
220	0.0073	0.0049	0.0024
221	0.0071	0.0048	0.0023
222	0.0070	0.0047	0.0023
223	0.0068	0.0046	0.0023
224	0.0067	0.0045	0.0022
225	0.0066	0.0044	0.0022
226	0.0064	0.0043	0.0021
227	0.0063	0.0042	0.0021
228	0.0062	0.0042	0.0021
229	0.0061	0.0041	0.0020
230	0.0060	0.0040	0.0020
231	0.0059	0.0040	0.0020
232	0.0058	0.0039	0.0019
233	0.0057	0.0038	0.0019
234	0.0056	0.0038	0.0019
235	0.0056	0.0037	0.0018
236	0.0055	0.0037	0.0018
237	0.0054	0.0036	0.0018
238	0.0053	0.0036	0.0018
239	0.0053	0.0035	0.0017
240	0.0052	0.0035	0.0017
241	0.0051	0.0034	0.0017
242	0.0051	0.0034	0.0017
243	0.0050	0.0034	0.0017
244	0.0049	0.0033	0.0016
245	0.0049	0.0033	0.0016
246	0.0048	0.0032	0.0016
247	0.0048	0.0032	0.0016
248	0.0047	0.0032	0.0016
249	0.0047	0.0031	0.0015
250	0.0046	0.0031	0.0015
251	0.0046	0.0031	0.0015
252	0.0045	0.0030	0.0015
253	0.0045	0.0030	0.0015
254	0.0044	0.0030	0.0015
255	0.0044	0.0029	0.0015
256	0.0044	0.0029	0.0014
257	0.0043	0.0029	0.0014

258	0.0043	0.0029	0.0014
259	0.0042	0.0028	0.0014
260	0.0042	0.0028	0.0014
261	0.0042	0.0028	0.0014
262	0.0041	0.0028	0.0014
263	0.0041	0.0027	0.0013
264	0.0040	0.0027	0.0013
265	0.0040	0.0027	0.0013
266	0.0040	0.0027	0.0013
267	0.0039	0.0026	0.0013
268	0.0039	0.0026	0.0013
269	0.0039	0.0026	0.0013
270	0.0039	0.0026	0.0013
271	0.0038	0.0026	0.0013
272	0.0038	0.0025	0.0013
273	0.0038	0.0025	0.0012
274	0.0037	0.0025	0.0012
275	0.0037	0.0025	0.0012
276	0.0037	0.0025	0.0012
277	0.0037	0.0024	0.0012
278	0.0036	0.0024	0.0012
279	0.0036	0.0024	0.0012
280	0.0036	0.0024	0.0012
281	0.0036	0.0024	0.0012
282	0.0035	0.0024	0.0012
283	0.0035	0.0023	0.0012
284	0.0035	0.0023	0.0012
285	0.0035	0.0023	0.0011
286	0.0034	0.0023	0.0011
287	0.0034	0.0023	0.0011
288	0.0034	0.0023	0.0011
	2.4663	1.4969	0.9694

Total soil rain loss = 1.50(In)
Total effective rainfall = 0.97(In)
Peak flow rate in flood hydrograph = 36.06(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

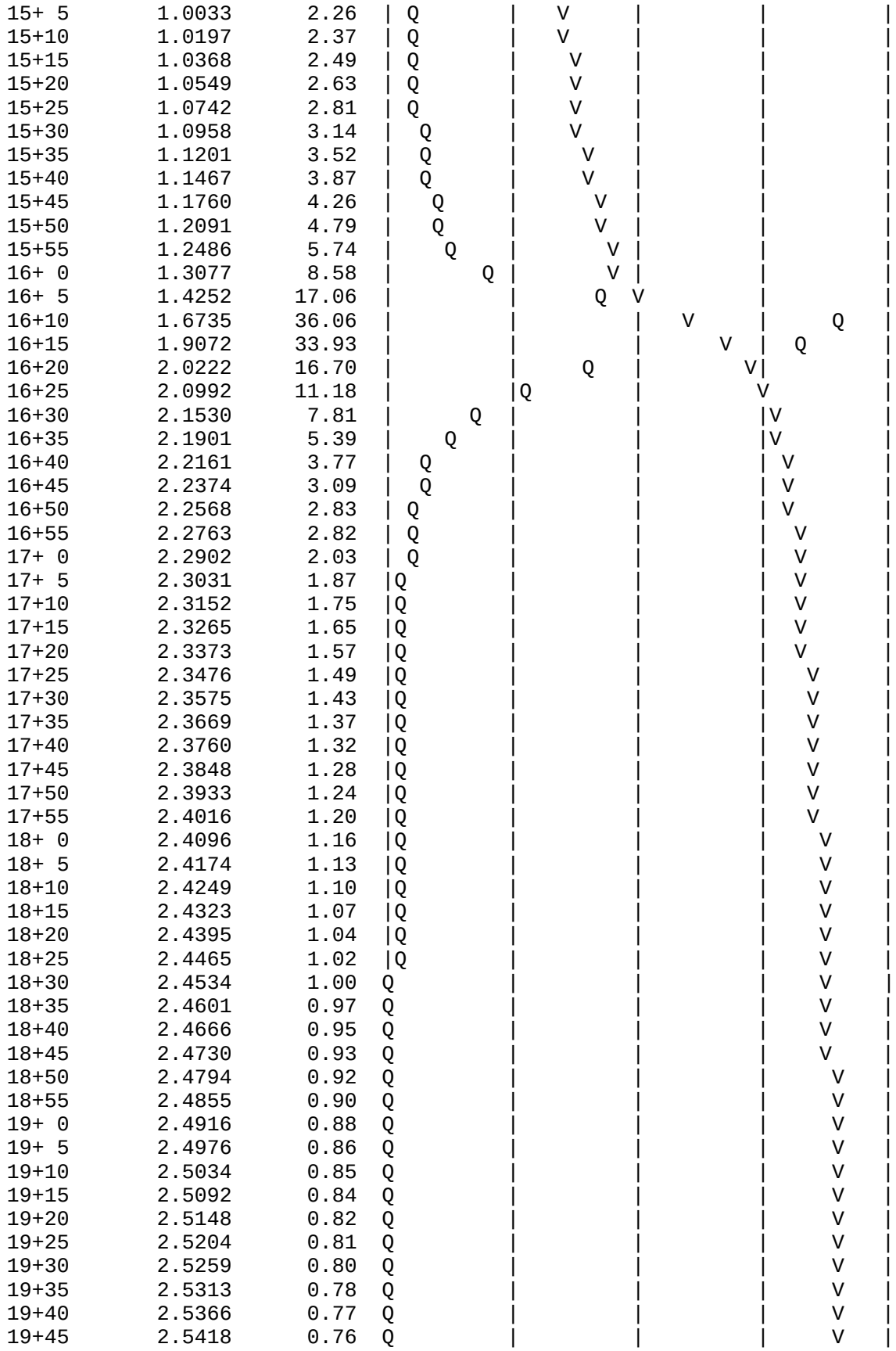
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0014	0.18	Q	|	|	|	|
0+15	0.0037	0.33	Q	|	|	|	|
0+20	0.0063	0.39	Q	|	|	|	|
0+25	0.0092	0.42	Q	|	|	|	|
0+30	0.0123	0.44	Q	|	|	|	|
0+35	0.0154	0.45	Q	|	|	|	|
0+40	0.0186	0.46	Q	|	|	|	|
0+45	0.0218	0.46	Q	|	|	|	|

0+50	0.0250	0.47	Q	|	|	|	|
0+55	0.0282	0.47	Q	|	|	|	|
1+ 0	0.0315	0.47	Q	|	|	|	|
1+ 5	0.0348	0.48	Q	|	|	|	|
1+10	0.0381	0.48	Q	|	|	|	|
1+15	0.0414	0.48	Q	|	|	|	|
1+20	0.0447	0.48	Q	|	|	|	|
1+25	0.0480	0.48	Q	|	|	|	|
1+30	0.0513	0.48	Q	|	|	|	|
1+35	0.0547	0.49	Q	|	|	|	|
1+40	0.0580	0.49	Q	|	|	|	|
1+45	0.0614	0.49	Q	|	|	|	|
1+50	0.0648	0.49	Q	|	|	|	|
1+55	0.0682	0.49	Q	|	|	|	|
2+ 0	0.0716	0.49	QV	|	|	|	|
2+ 5	0.0750	0.50	QV	|	|	|	|
2+10	0.0784	0.50	QV	|	|	|	|
2+15	0.0818	0.50	QV	|	|	|	|
2+20	0.0853	0.50	QV	|	|	|	|
2+25	0.0887	0.50	QV	|	|	|	|
2+30	0.0922	0.50	QV	|	|	|	|
2+35	0.0957	0.51	QV	|	|	|	|
2+40	0.0992	0.51	QV	|	|	|	|
2+45	0.1027	0.51	QV	|	|	|	|
2+50	0.1062	0.51	QV	|	|	|	|
2+55	0.1098	0.51	QV	|	|	|	|
3+ 0	0.1133	0.52	QV	|	|	|	|
3+ 5	0.1169	0.52	QV	|	|	|	|
3+10	0.1205	0.52	QV	|	|	|	|
3+15	0.1241	0.52	QV	|	|	|	|
3+20	0.1277	0.52	QV	|	|	|	|
3+25	0.1313	0.53	QV	|	|	|	|
3+30	0.1350	0.53	QV	|	|	|	|
3+35	0.1386	0.53	Q V	|	|	|	|
3+40	0.1423	0.53	Q V	|	|	|	|
3+45	0.1460	0.53	Q V	|	|	|	|
3+50	0.1497	0.54	Q V	|	|	|	|
3+55	0.1534	0.54	Q V	|	|	|	|
4+ 0	0.1571	0.54	Q V	|	|	|	|
4+ 5	0.1608	0.54	Q V	|	|	|	|
4+10	0.1646	0.55	Q V	|	|	|	|
4+15	0.1684	0.55	Q V	|	|	|	|
4+20	0.1722	0.55	Q V	|	|	|	|
4+25	0.1760	0.55	Q V	|	|	|	|
4+30	0.1798	0.55	Q V	|	|	|	|
4+35	0.1836	0.56	Q V	|	|	|	|
4+40	0.1875	0.56	Q V	|	|	|	|
4+45	0.1913	0.56	Q V	|	|	|	|
4+50	0.1952	0.56	Q V	|	|	|	|
4+55	0.1991	0.57	Q V	|	|	|	|
5+ 0	0.2031	0.57	Q V	|	|	|	|
5+ 5	0.2070	0.57	Q V	|	|	|	|
5+10	0.2110	0.57	Q V	|	|	|	|
5+15	0.2149	0.58	Q V	|	|	|	|
5+20	0.2189	0.58	Q V	|	|	|	|
5+25	0.2230	0.58	Q V	|	|	|	|
5+30	0.2270	0.59	Q V	|	|	|	|

5+35	0.2310	0.59	Q	V				
5+40	0.2351	0.59	Q	V				
5+45	0.2392	0.59	Q	V				
5+50	0.2433	0.60	Q	V				
5+55	0.2474	0.60	Q	V				
6+ 0	0.2516	0.60	Q	V				
6+ 5	0.2558	0.61	Q	V				
6+10	0.2600	0.61	Q	V				
6+15	0.2642	0.61	Q	V				
6+20	0.2684	0.61	Q	V				
6+25	0.2727	0.62	Q	V				
6+30	0.2770	0.62	Q	V				
6+35	0.2813	0.62	Q	V				
6+40	0.2856	0.63	Q	V				
6+45	0.2899	0.63	Q	V				
6+50	0.2943	0.63	Q	V				
6+55	0.2987	0.64	Q	V				
7+ 0	0.3031	0.64	Q	V				
7+ 5	0.3075	0.64	Q	V				
7+10	0.3120	0.65	Q	V				
7+15	0.3165	0.65	Q	V				
7+20	0.3210	0.66	Q	V				
7+25	0.3256	0.66	Q	V				
7+30	0.3301	0.66	Q	V				
7+35	0.3347	0.67	Q	V				
7+40	0.3394	0.67	Q	V				
7+45	0.3440	0.68	Q	V				
7+50	0.3487	0.68	Q	V				
7+55	0.3534	0.68	Q	V				
8+ 0	0.3581	0.69	Q	V				
8+ 5	0.3629	0.69	Q	V				
8+10	0.3677	0.70	Q	V				
8+15	0.3725	0.70	Q	V				
8+20	0.3774	0.70	Q	V				
8+25	0.3822	0.71	Q	V				
8+30	0.3872	0.71	Q	V				
8+35	0.3921	0.72	Q	V				
8+40	0.3971	0.72	Q	V				
8+45	0.4021	0.73	Q	V				
8+50	0.4072	0.73	Q	V				
8+55	0.4122	0.74	Q	V				
9+ 0	0.4174	0.74	Q	V				
9+ 5	0.4225	0.75	Q	V				
9+10	0.4277	0.75	Q	V				
9+15	0.4329	0.76	Q	V				
9+20	0.4382	0.76	Q	V				
9+25	0.4435	0.77	Q	V				
9+30	0.4489	0.78	Q	V				
9+35	0.4542	0.78	Q	V				
9+40	0.4597	0.79	Q	V				
9+45	0.4651	0.79	Q	V				
9+50	0.4707	0.80	Q	V				
9+55	0.4762	0.81	Q	V				
10+ 0	0.4818	0.81	Q	V				
10+ 5	0.4875	0.82	Q	V				
10+10	0.4932	0.83	Q	V				
10+15	0.4989	0.83	Q	V				

```
10+20       0.5047      0.84  Q      V  |          |          |          |
10+25       0.5105      0.85  Q      V  |          |          |          |
10+30       0.5164      0.86  Q      V  |          |          |          |
10+35       0.5224      0.86  Q      V  |          |          |          |
10+40       0.5284      0.87  Q      V  |          |          |          |
10+45       0.5344      0.88  Q      V  |          |          |          |
10+50       0.5405      0.89  Q      V  |          |          |          |
10+55       0.5467      0.90  Q      V  |          |          |          |
11+ 0       0.5529      0.90  Q       V |          |          |          |
11+ 5       0.5592      0.91  Q       V |          |          |          |
11+10       0.5655      0.92  Q       V |          |          |          |
11+15       0.5720      0.93  Q       V |          |          |          |
11+20       0.5784      0.94  Q       V |          |          |          |
11+25       0.5850      0.95  Q       V |          |          |          |
11+30       0.5916      0.96  Q       V |          |          |          |
11+35       0.5983      0.97  Q       V |          |          |          |
11+40       0.6050      0.98  Q       V |          |          |          |
11+45       0.6119      0.99  Q       V |          |          |          |
11+50       0.6188      1.00  |Q      V |          |          |          |
11+55       0.6258      1.02  |Q       V|          |          |          |
12+ 0       0.6329      1.03  |Q       V|          |          |          |
12+ 5       0.6400      1.04  |Q       V|          |          |          |
12+10       0.6473      1.05  |Q       V|          |          |          |
12+15       0.6546      1.07  |Q       V|          |          |          |
12+20       0.6620      1.08  |Q       V|          |          |          |
12+25       0.6696      1.09  |Q       V|          |          |          |
12+30       0.6772      1.11  |Q       V|          |          |          |
12+35       0.6850      1.12  |Q       V|          |          |          |
12+40       0.6928      1.14  |Q        V          |          |          |
12+45       0.7008      1.16  |Q        V          |          |          |
12+50       0.7088      1.17  |Q        V          |          |          |
12+55       0.7170      1.19  |Q        V          |          |          |
13+ 0       0.7254      1.21  |Q        V          |          |          |
13+ 5       0.7338      1.23  |Q        V          |          |          |
13+10       0.7424      1.25  |Q        V          |          |          |
13+15       0.7512      1.27  |Q        V          |          |          |
13+20       0.7601      1.29  |Q        |V         |          |          |
13+25       0.7691      1.31  |Q        |V         |          |          |
13+30       0.7783      1.34  |Q        |V         |          |          |
13+35       0.7877      1.36  |Q        |V         |          |          |
13+40       0.7973      1.39  |Q        |V         |          |          |
13+45       0.8070      1.42  |Q        |V         |          |          |
13+50       0.8170      1.45  |Q        |V         |          |          |
13+55       0.8272      1.48  |Q        | V        |          |          |
14+ 0       0.8376      1.51  |Q        | V        |          |          |
14+ 5       0.8483      1.55  |Q        | V        |          |          |
14+10       0.8592      1.59  |Q        | V        |          |          |
14+15       0.8704      1.63  |Q        | V        |          |          |
14+20       0.8819      1.67  |Q        | V        |          |          |
14+25       0.8937      1.72  |Q        | V        |          |          |
14+30       0.9059      1.77  |Q        |  V       |          |          |
14+35       0.9184      1.82  |Q        |  V       |          |          |
14+40       0.9313      1.88  |Q        |  V       |          |          |
14+45       0.9447      1.94  |Q        |  V       |          |          |
14+50       0.9585      2.01  | Q       |  V       |          |          |
14+55       0.9728      2.08  | Q       |   V      |          |          |
15+ 0       0.9878      2.17  | Q       |   V      |          |          |
```



19+50	2.5470	0.75	Q	|	|	|	V |
19+55	2.5521	0.74	Q	|	|	|	V |
20+ 0	2.5571	0.73	Q	|	|	|	V |
20+ 5	2.5621	0.72	Q	|	|	|	V |
20+10	2.5669	0.71	Q	|	|	|	V |
20+15	2.5718	0.70	Q	|	|	|	V |
20+20	2.5765	0.69	Q	|	|	|	V |
20+25	2.5813	0.68	Q	|	|	|	V |
20+30	2.5859	0.68	Q	|	|	|	V |
20+35	2.5905	0.67	Q	|	|	|	V |
20+40	2.5951	0.66	Q	|	|	|	V |
20+45	2.5996	0.65	Q	|	|	|	V |
20+50	2.6040	0.65	Q	|	|	|	V |
20+55	2.6084	0.64	Q	|	|	|	V |
21+ 0	2.6128	0.63	Q	|	|	|	V |
21+ 5	2.6171	0.63	Q	|	|	|	V |
21+10	2.6213	0.62	Q	|	|	|	V |
21+15	2.6255	0.61	Q	|	|	|	V |
21+20	2.6297	0.61	Q	|	|	|	V |
21+25	2.6339	0.60	Q	|	|	|	V |
21+30	2.6379	0.59	Q	|	|	|	V |
21+35	2.6420	0.59	Q	|	|	|	V |
21+40	2.6460	0.58	Q	|	|	|	V |
21+45	2.6500	0.58	Q	|	|	|	V |
21+50	2.6539	0.57	Q	|	|	|	V |
21+55	2.6579	0.57	Q	|	|	|	V |
22+ 0	2.6617	0.56	Q	|	|	|	V |
22+ 5	2.6656	0.56	Q	|	|	|	V |
22+10	2.6694	0.55	Q	|	|	|	V |
22+15	2.6732	0.55	Q	|	|	|	V |
22+20	2.6769	0.54	Q	|	|	|	V |
22+25	2.6806	0.54	Q	|	|	|	V |
22+30	2.6843	0.53	Q	|	|	|	V |
22+35	2.6880	0.53	Q	|	|	|	V|
22+40	2.6916	0.53	Q	|	|	|	V|
22+45	2.6952	0.52	Q	|	|	|	V|
22+50	2.6988	0.52	Q	|	|	|	V|
22+55	2.7023	0.51	Q	|	|	|	V|
23+ 0	2.7058	0.51	Q	|	|	|	V|
23+ 5	2.7093	0.51	Q	|	|	|	V|
23+10	2.7128	0.50	Q	|	|	|	V|
23+15	2.7162	0.50	Q	|	|	|	V|
23+20	2.7196	0.50	Q	|	|	|	V|
23+25	2.7230	0.49	Q	|	|	|	V|
23+30	2.7264	0.49	Q	|	|	|	V|
23+35	2.7297	0.49	Q	|	|	|	V|
23+40	2.7330	0.48	Q	|	|	|	V|
23+45	2.7363	0.48	Q	|	|	|	V|
23+50	2.7396	0.48	Q	|	|	|	V|
23+55	2.7429	0.47	Q	|	|	|	V|
24+ 0	2.7461	0.47	Q	|	|	|	V|
24+ 5	2.7491	0.44	Q	|	|	|	V|
24+10	2.7511	0.29	Q	|	|	|	V|
24+15	2.7520	0.13	Q	|	|	|	V|
24+20	2.7526	0.08	Q	|	|	|	V|
24+25	2.7529	0.04	Q	|	|	|	V|
24+30	2.7530	0.02	Q	|	|	|	V|

```
   24+35       2.7531      0.01  Q         |         |         |        V|
   24+40       2.7531      0.01  Q         |         |         |        V|
   24+45       2.7532      0.01  Q         |         |         |        V|
   24+50       2.7532      0.00  Q         |         |         |        V|
-------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA C - EXISTING CONDITIONS
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
34.00	6	0.82
Rainfall data for year 2		
34.00	24	1.37
Rainfall data for year 100		
34.00	6	2.34
Rainfall data for year 100		
34.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	34.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
34.00	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
++
Watercourse length = 3425.00(Ft.)
Length from concentration point to centroid = 1790.00(Ft.)
Elevation difference along watercourse = 870.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 34.00(Ac.)
Catchment Lag time = 0.137 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 60.6342
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 34.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.336(In)
30-minute factor = 0.998 Adjusted rainfall = 0.752(In)
1-hour factor = 0.998 Adjusted rainfall = 1.028(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.552(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 411.19 (CFS))

1	5.723	23.530
2	38.031	132.849
3	71.554	137.842
4	83.842	50.524
5	90.907	29.053
6	95.161	17.489
7	97.444	9.390
8	98.309	3.555
9	98.727	1.719
10	99.145	1.719
11	100.000	3.516

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.041
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.25	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016

40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.79	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009

97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007

154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.82	2.82	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.13	0.006
210	0.18	3.14	3.14	0.006

211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005

268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015
29	0.0053	0.0038	0.0015
30	0.0053	0.0038	0.0015

31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015
33	0.0054	0.0039	0.0015
34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015
37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015
40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019
86	0.0069	0.0050	0.0019
87	0.0069	0.0050	0.0019

88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019
90	0.0070	0.0051	0.0020
91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020
94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020
97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030
143	0.0110	0.0079	0.0030
144	0.0111	0.0080	0.0031

145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0031
147	0.0116	0.0083	0.0032
148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033
151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035
154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0176	0.0127	0.0049
171	0.0183	0.0132	0.0051
172	0.0186	0.0134	0.0052
173	0.0194	0.0140	0.0054
174	0.0198	0.0143	0.0055
175	0.0207	0.0149	0.0057
176	0.0212	0.0153	0.0059
177	0.0222	0.0161	0.0062
178	0.0228	0.0165	0.0063
179	0.0242	0.0175	0.0067
180	0.0249	0.0180	0.0069
181	0.0266	0.0192	0.0074
182	0.0276	0.0199	0.0077
183	0.0298	0.0216	0.0083
184	0.0312	0.0225	0.0086
185	0.0395	0.0285	0.0109
186	0.0415	0.0300	0.0115
187	0.0466	0.0337	0.0129
188	0.0499	0.0361	0.0139
189	0.0593	0.0428	0.0164
190	0.0662	0.0472*	0.0190
191	0.0918	0.0472*	0.0447
192	0.1229	0.0472*	0.0758
193	0.3359	0.0472*	0.2887
194	0.0761	0.0472*	0.0289
195	0.0540	0.0390	0.0150
196	0.0438	0.0317	0.0122
197	0.0327	0.0236	0.0091
198	0.0287	0.0207	0.0080
199	0.0257	0.0186	0.0071
200	0.0235	0.0170	0.0065
201	0.0217	0.0157	0.0060

202	0.0202	0.0146	0.0056
203	0.0190	0.0137	0.0053
204	0.0179	0.0129	0.0050
205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043
208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0138	0.0099	0.0038
211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0115	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017
257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017

259	0.0060	0.0044	0.0017
260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016
262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016
265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016
268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5525	2.3020	1.2505

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 52.82(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

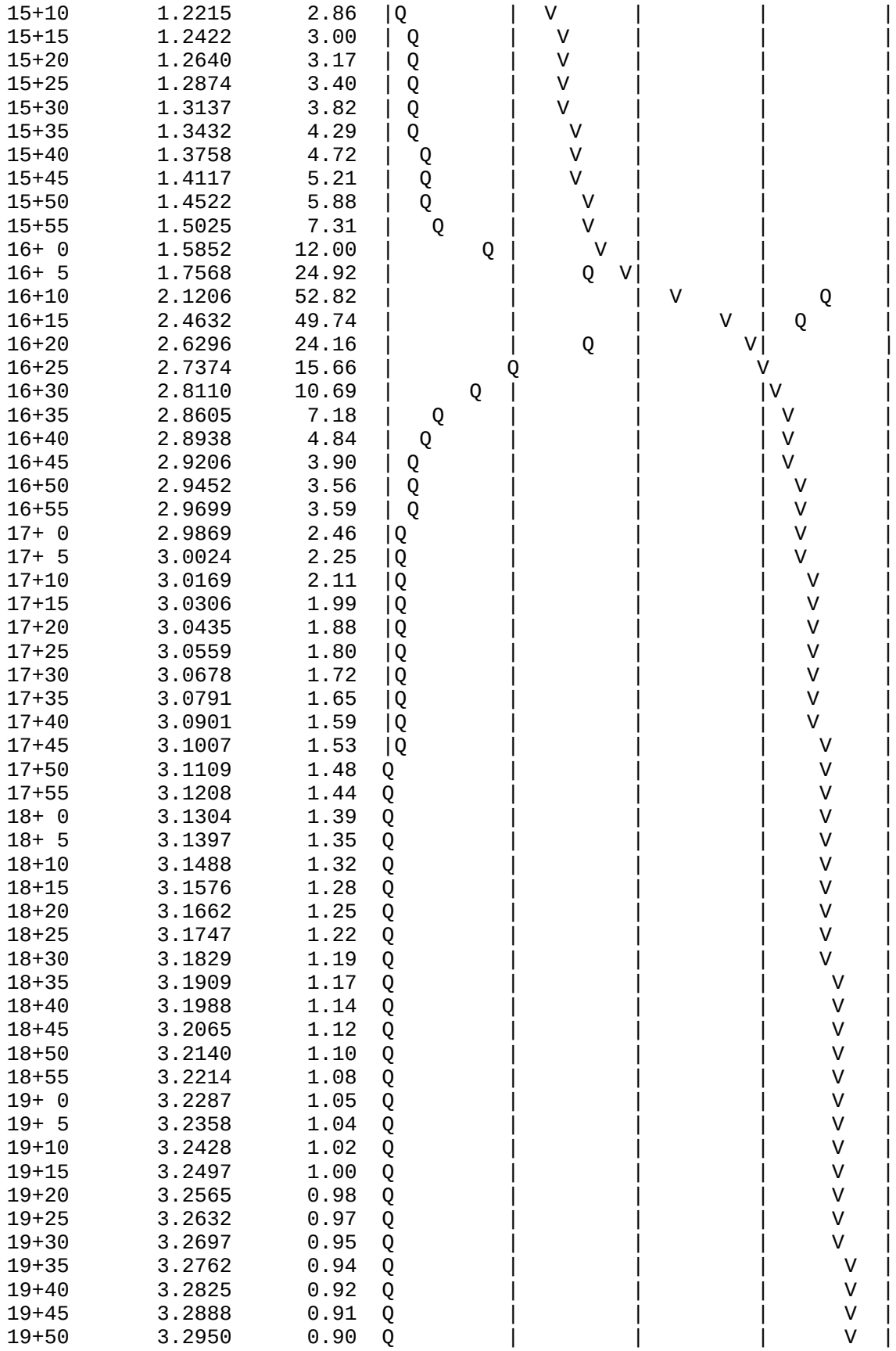
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0017	0.21	Q	|	|	|	|
0+15	0.0044	0.39	Q	|	|	|	|
0+20	0.0075	0.46	Q	|	|	|	|
0+25	0.0110	0.50	Q	|	|	|	|
0+30	0.0146	0.53	Q	|	|	|	|
0+35	0.0184	0.54	Q	|	|	|	|
0+40	0.0222	0.55	Q	|	|	|	|
0+45	0.0260	0.55	Q	|	|	|	|
0+50	0.0298	0.56	Q	|	|	|	|

0+55	0.0337	0.56	Q	|	|	|	|
1+ 0	0.0376	0.56	Q	|	|	|	|
1+ 5	0.0415	0.57	Q	|	|	|	|
1+10	0.0454	0.57	Q	|	|	|	|
1+15	0.0493	0.57	Q	|	|	|	|
1+20	0.0533	0.57	Q	|	|	|	|
1+25	0.0572	0.57	Q	|	|	|	|
1+30	0.0612	0.58	Q	|	|	|	|
1+35	0.0652	0.58	Q	|	|	|	|
1+40	0.0692	0.58	Q	|	|	|	|
1+45	0.0732	0.58	Q	|	|	|	|
1+50	0.0772	0.58	Q	|	|	|	|
1+55	0.0812	0.59	Q	|	|	|	|
2+ 0	0.0853	0.59	Q	|	|	|	|
2+ 5	0.0894	0.59	QV	|	|	|	|
2+10	0.0934	0.59	QV	|	|	|	|
2+15	0.0975	0.60	QV	|	|	|	|
2+20	0.1017	0.60	QV	|	|	|	|
2+25	0.1058	0.60	QV	|	|	|	|
2+30	0.1099	0.60	QV	|	|	|	|
2+35	0.1141	0.60	QV	|	|	|	|
2+40	0.1183	0.61	QV	|	|	|	|
2+45	0.1225	0.61	QV	|	|	|	|
2+50	0.1267	0.61	QV	|	|	|	|
2+55	0.1309	0.61	QV	|	|	|	|
3+ 0	0.1351	0.62	QV	|	|	|	|
3+ 5	0.1394	0.62	QV	|	|	|	|
3+10	0.1437	0.62	QV	|	|	|	|
3+15	0.1479	0.62	QV	|	|	|	|
3+20	0.1522	0.63	QV	|	|	|	|
3+25	0.1566	0.63	QV	|	|	|	|
3+30	0.1609	0.63	QV	|	|	|	|
3+35	0.1653	0.63	QV	|	|	|	|
3+40	0.1696	0.64	QV	|	|	|	|
3+45	0.1740	0.64	QV	|	|	|	|
3+50	0.1784	0.64	Q V	|	|	|	|
3+55	0.1829	0.64	Q V	|	|	|	|
4+ 0	0.1873	0.65	Q V	|	|	|	|
4+ 5	0.1918	0.65	Q V	|	|	|	|
4+10	0.1963	0.65	Q V	|	|	|	|
4+15	0.2008	0.65	Q V	|	|	|	|
4+20	0.2053	0.66	Q V	|	|	|	|
4+25	0.2098	0.66	Q V	|	|	|	|
4+30	0.2144	0.66	Q V	|	|	|	|
4+35	0.2190	0.67	Q V	|	|	|	|
4+40	0.2236	0.67	Q V	|	|	|	|
4+45	0.2282	0.67	Q V	|	|	|	|
4+50	0.2328	0.67	Q V	|	|	|	|
4+55	0.2375	0.68	Q V	|	|	|	|
5+ 0	0.2422	0.68	Q V	|	|	|	|
5+ 5	0.2469	0.68	Q V	|	|	|	|
5+10	0.2516	0.69	Q V	|	|	|	|
5+15	0.2564	0.69	Q V	|	|	|	|
5+20	0.2611	0.69	Q V	|	|	|	|
5+25	0.2659	0.70	Q V	|	|	|	|
5+30	0.2707	0.70	Q V	|	|	|	|
5+35	0.2756	0.70	Q V	|	|	|	|

5+40	0.2804	0.71	Q	V				
5+45	0.2853	0.71	Q	V				
5+50	0.2902	0.71	Q	V				
5+55	0.2952	0.72	Q	V				
6+ 0	0.3001	0.72	Q	V				
6+ 5	0.3051	0.72	Q	V				
6+10	0.3101	0.73	Q	V				
6+15	0.3152	0.73	Q	V				
6+20	0.3202	0.73	Q	V				
6+25	0.3253	0.74	Q	V				
6+30	0.3304	0.74	Q	V				
6+35	0.3355	0.75	Q	V				
6+40	0.3407	0.75	Q	V				
6+45	0.3459	0.75	Q	V				
6+50	0.3511	0.76	Q	V				
6+55	0.3564	0.76	Q	V				
7+ 0	0.3617	0.77	Q	V				
7+ 5	0.3670	0.77	Q	V				
7+10	0.3723	0.77	Q	V				
7+15	0.3777	0.78	Q	V				
7+20	0.3831	0.78	Q	V				
7+25	0.3885	0.79	Q	V				
7+30	0.3940	0.79	Q	V				
7+35	0.3994	0.80	Q	V				
7+40	0.4050	0.80	Q	V				
7+45	0.4105	0.81	Q	V				
7+50	0.4161	0.81	Q	V				
7+55	0.4217	0.82	Q	V				
8+ 0	0.4274	0.82	Q	V				
8+ 5	0.4331	0.83	Q	V				
8+10	0.4388	0.83	Q	V				
8+15	0.4446	0.84	Q	V				
8+20	0.4504	0.84	Q	V				
8+25	0.4562	0.85	Q	V				
8+30	0.4621	0.85	Q	V				
8+35	0.4680	0.86	Q	V				
8+40	0.4740	0.87	Q	V				
8+45	0.4800	0.87	Q	V				
8+50	0.4860	0.88	Q	V				
8+55	0.4921	0.88	Q	V				
9+ 0	0.4982	0.89	Q	V				
9+ 5	0.5044	0.90	Q	V				
9+10	0.5106	0.90	Q	V				
9+15	0.5169	0.91	Q	V				
9+20	0.5232	0.92	Q	V				
9+25	0.5295	0.92	Q	V				
9+30	0.5359	0.93	Q	V				
9+35	0.5424	0.94	Q	V				
9+40	0.5489	0.94	Q	V				
9+45	0.5554	0.95	Q	V				
9+50	0.5620	0.96	Q	V				
9+55	0.5687	0.97	Q	V				
10+ 0	0.5754	0.97	Q	V				
10+ 5	0.5821	0.98	Q	V				
10+10	0.5889	0.99	Q	V				
10+15	0.5958	1.00	Q	V				
10+20	0.6027	1.01	Q	V				

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10+25       0.6097      1.02  Q     V   |          |          |          |
10+30       0.6168      1.02  Q     V   |          |          |          |
10+35       0.6239      1.03  Q      V  |          |          |          |
10+40       0.6311      1.04  Q      V  |          |          |          |
10+45       0.6383      1.05  Q      V  |          |          |          |
10+50       0.6456      1.06  Q      V  |          |          |          |
10+55       0.6530      1.07  Q      V  |          |          |          |
11+ 0       0.6605      1.08  Q      V  |          |          |          |
11+ 5       0.6680      1.09  Q      V  |          |          |          |
11+10       0.6756      1.10  Q      V  |          |          |          |
11+15       0.6833      1.12  Q      V  |          |          |          |
11+20       0.6911      1.13  Q      V  |          |          |          |
11+25       0.6989      1.14  Q      V  |          |          |          |
11+30       0.7068      1.15  Q      V  |          |          |          |
11+35       0.7149      1.16  Q       V |          |          |          |
11+40       0.7230      1.18  Q       V |          |          |          |
11+45       0.7311      1.19  Q       V |          |          |          |
11+50       0.7394      1.20  Q       V |          |          |          |
11+55       0.7478      1.22  Q       V |          |          |          |
12+ 0       0.7563      1.23  Q       V |          |          |          |
12+ 5       0.7649      1.25  Q       V |          |          |          |
12+10       0.7736      1.26  Q       V |          |          |          |
12+15       0.7824      1.28  Q       V |          |          |          |
12+20       0.7913      1.30  Q       V |          |          |          |
12+25       0.8003      1.31  Q        V|          |          |          |
12+30       0.8095      1.33  Q        V|          |          |          |
12+35       0.8188      1.35  Q        V|          |          |          |
12+40       0.8282      1.37  Q        V|          |          |          |
12+45       0.8378      1.39  Q        V|          |          |          |
12+50       0.8475      1.41  Q        V|          |          |          |
12+55       0.8573      1.43  Q        V|          |          |          |
13+ 0       0.8673      1.45  Q        V|          |          |          |
13+ 5       0.8775      1.47  Q        V|          |          |          |
13+10       0.8878      1.50  Q         V          |          |          |
13+15       0.8983      1.52  |Q        V          |          |          |
13+20       0.9090      1.55  |Q        V          |          |          |
13+25       0.9198      1.58  |Q        V          |          |          |
13+30       0.9309      1.61  |Q        V          |          |          |
13+35       0.9422      1.64  |Q        V          |          |          |
13+40       0.9537      1.67  |Q        V          |          |          |
13+45       0.9654      1.70  |Q        V          |          |          |
13+50       0.9774      1.74  |Q         |V         |          |          |
13+55       0.9897      1.78  |Q         |V         |          |          |
14+ 0       1.0022      1.82  |Q         |V         |          |          |
14+ 5       1.0150      1.86  |Q         |V         |          |          |
14+10       1.0281      1.91  |Q         |V         |          |          |
14+15       1.0416      1.96  |Q         |V         |          |          |
14+20       1.0554      2.01  |Q         |V         |          |          |
14+25       1.0697      2.07  |Q         | V        |          |          |
14+30       1.0843      2.13  |Q         | V        |          |          |
14+35       1.0994      2.19  |Q         | V        |          |          |
14+40       1.1150      2.26  |Q         | V        |          |          |
14+45       1.1310      2.34  |Q         | V        |          |          |
14+50       1.1477      2.42  |Q         | V        |          |          |
14+55       1.1650      2.51  |Q         |  V       |          |          |
15+ 0       1.1830      2.61  |Q         |  V       |          |          |
15+ 5       1.2018      2.73  |Q         |  V       |          |          |
```



19+55	3.3011	0.88	Q	|	|	|	V |
20+ 0	3.3071	0.87	Q	|	|	|	V |
20+ 5	3.3130	0.86	Q	|	|	|	V |
20+10	3.3189	0.85	Q	|	|	|	V |
20+15	3.3246	0.84	Q	|	|	|	V |
20+20	3.3303	0.83	Q	|	|	|	V |
20+25	3.3360	0.82	Q	|	|	|	V |
20+30	3.3415	0.81	Q	|	|	|	V |
20+35	3.3470	0.80	Q	|	|	|	V |
20+40	3.3525	0.79	Q	|	|	|	V |
20+45	3.3578	0.78	Q	|	|	|	V |
20+50	3.3631	0.77	Q	|	|	|	V |
20+55	3.3684	0.76	Q	|	|	|	V |
21+ 0	3.3736	0.75	Q	|	|	|	V |
21+ 5	3.3787	0.75	Q	|	|	|	V |
21+10	3.3838	0.74	Q	|	|	|	V |
21+15	3.3889	0.73	Q	|	|	|	V |
21+20	3.3939	0.72	Q	|	|	|	V |
21+25	3.3988	0.72	Q	|	|	|	V |
21+30	3.4037	0.71	Q	|	|	|	V |
21+35	3.4085	0.70	Q	|	|	|	V |
21+40	3.4133	0.70	Q	|	|	|	V |
21+45	3.4181	0.69	Q	|	|	|	V |
21+50	3.4228	0.68	Q	|	|	|	V |
21+55	3.4275	0.68	Q	|	|	|	V |
22+ 0	3.4321	0.67	Q	|	|	|	V |
22+ 5	3.4367	0.67	Q	|	|	|	V |
22+10	3.4412	0.66	Q	|	|	|	V |
22+15	3.4457	0.65	Q	|	|	|	V |
22+20	3.4502	0.65	Q	|	|	|	V |
22+25	3.4546	0.64	Q	|	|	|	V|
22+30	3.4590	0.64	Q	|	|	|	V|
22+35	3.4634	0.63	Q	|	|	|	V|
22+40	3.4677	0.63	Q	|	|	|	V|
22+45	3.4720	0.62	Q	|	|	|	V|
22+50	3.4762	0.62	Q	|	|	|	V|
22+55	3.4805	0.61	Q	|	|	|	V|
23+ 0	3.4847	0.61	Q	|	|	|	V|
23+ 5	3.4888	0.60	Q	|	|	|	V|
23+10	3.4930	0.60	Q	|	|	|	V|
23+15	3.4971	0.60	Q	|	|	|	V|
23+20	3.5011	0.59	Q	|	|	|	V|
23+25	3.5052	0.59	Q	|	|	|	V|
23+30	3.5092	0.58	Q	|	|	|	V|
23+35	3.5132	0.58	Q	|	|	|	V|
23+40	3.5171	0.57	Q	|	|	|	V|
23+45	3.5211	0.57	Q	|	|	|	V|
23+50	3.5250	0.57	Q	|	|	|	V|
23+55	3.5289	0.56	Q	|	|	|	V|
24+ 0	3.5327	0.56	Q	|	|	|	V|
24+ 5	3.5363	0.52	Q	|	|	|	V|
24+10	3.5387	0.34	Q	|	|	|	V|
24+15	3.5398	0.16	Q	|	|	|	V|
24+20	3.5404	0.09	Q	|	|	|	V|
24+25	3.5407	0.05	Q	|	|	|	V|
24+30	3.5409	0.03	Q	|	|	|	V|
24+35	3.5410	0.01	Q	|	|	|	V|

```
   24+40       3.5411      0.01  Q         |         |         |        V|
   24+45       3.5411      0.01  Q         |         |         |        V|
   24+50       3.5412      0.00  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 07/23/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA C
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
34.00	6	0.82
Rainfall data for year 2		
34.00	24	1.37
Rainfall data for year 100		
34.00	6	2.34
Rainfall data for year 100		
34.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
79.0	34.00	1.000	0.398	1.000	0.398

Area-averaged adjusted loss rate Fm (In/Hr) = 0.398

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
34.00	1.000	79.0	2.66	0.452

Area-averaged catchment yield fraction, Y = 0.452
Area-averaged low loss fraction, Yb = 0.548
++
Watercourse length = 3425.00(Ft.)
Length from concentration point to centroid = 1790.00(Ft.)
Elevation difference along watercourse = 870.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 34.00(Ac.)
Catchment Lag time = 0.137 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 60.6342
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.398(In/Hr)
Average low loss rate fraction (Yb) = 0.548 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 34.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.336(In)
30-minute factor = 0.998 Adjusted rainfall = 0.752(In)
1-hour factor = 0.998 Adjusted rainfall = 1.028(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.552(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 411.19 (CFS))

1	5.723	23.530
2	38.031	132.849
3	71.554	137.842
4	83.842	50.524
5	90.907	29.053
6	95.161	17.489
7	97.444	9.390
8	98.309	3.555
9	98.727	1.719
10	99.145	1.719
11	100.000	3.516

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.041
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.25	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016

40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.79	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009

97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007

154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.82	2.82	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.13	0.006
210	0.18	3.14	3.14	0.006

211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005

268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0026	0.0022
2	0.0048	0.0026	0.0022
3	0.0048	0.0027	0.0022
4	0.0049	0.0027	0.0022
5	0.0049	0.0027	0.0022
6	0.0049	0.0027	0.0022
7	0.0049	0.0027	0.0022
8	0.0049	0.0027	0.0022
9	0.0049	0.0027	0.0022
10	0.0050	0.0027	0.0022
11	0.0050	0.0027	0.0023
12	0.0050	0.0027	0.0023
13	0.0050	0.0027	0.0023
14	0.0050	0.0027	0.0023
15	0.0050	0.0028	0.0023
16	0.0051	0.0028	0.0023
17	0.0051	0.0028	0.0023
18	0.0051	0.0028	0.0023
19	0.0051	0.0028	0.0023
20	0.0051	0.0028	0.0023
21	0.0051	0.0028	0.0023
22	0.0052	0.0028	0.0023
23	0.0052	0.0028	0.0023
24	0.0052	0.0028	0.0024
25	0.0052	0.0029	0.0024
26	0.0052	0.0029	0.0024
27	0.0053	0.0029	0.0024
28	0.0053	0.0029	0.0024
29	0.0053	0.0029	0.0024
30	0.0053	0.0029	0.0024

31	0.0053	0.0029	0.0024
32	0.0054	0.0029	0.0024
33	0.0054	0.0029	0.0024
34	0.0054	0.0030	0.0024
35	0.0054	0.0030	0.0025
36	0.0054	0.0030	0.0025
37	0.0055	0.0030	0.0025
38	0.0055	0.0030	0.0025
39	0.0055	0.0030	0.0025
40	0.0055	0.0030	0.0025
41	0.0056	0.0030	0.0025
42	0.0056	0.0030	0.0025
43	0.0056	0.0031	0.0025
44	0.0056	0.0031	0.0025
45	0.0056	0.0031	0.0026
46	0.0057	0.0031	0.0026
47	0.0057	0.0031	0.0026
48	0.0057	0.0031	0.0026
49	0.0057	0.0031	0.0026
50	0.0058	0.0032	0.0026
51	0.0058	0.0032	0.0026
52	0.0058	0.0032	0.0026
53	0.0058	0.0032	0.0026
54	0.0059	0.0032	0.0026
55	0.0059	0.0032	0.0027
56	0.0059	0.0032	0.0027
57	0.0059	0.0033	0.0027
58	0.0060	0.0033	0.0027
59	0.0060	0.0033	0.0027
60	0.0060	0.0033	0.0027
61	0.0061	0.0033	0.0027
62	0.0061	0.0033	0.0027
63	0.0061	0.0033	0.0028
64	0.0061	0.0034	0.0028
65	0.0062	0.0034	0.0028
66	0.0062	0.0034	0.0028
67	0.0062	0.0034	0.0028
68	0.0062	0.0034	0.0028
69	0.0063	0.0034	0.0028
70	0.0063	0.0035	0.0029
71	0.0064	0.0035	0.0029
72	0.0064	0.0035	0.0029
73	0.0064	0.0035	0.0029
74	0.0064	0.0035	0.0029
75	0.0065	0.0036	0.0029
76	0.0065	0.0036	0.0029
77	0.0066	0.0036	0.0030
78	0.0066	0.0036	0.0030
79	0.0066	0.0036	0.0030
80	0.0066	0.0036	0.0030
81	0.0067	0.0037	0.0030
82	0.0067	0.0037	0.0030
83	0.0068	0.0037	0.0031
84	0.0068	0.0037	0.0031
85	0.0068	0.0037	0.0031
86	0.0069	0.0038	0.0031
87	0.0069	0.0038	0.0031

88	0.0070	0.0038	0.0031
89	0.0070	0.0038	0.0032
90	0.0070	0.0039	0.0032
91	0.0071	0.0039	0.0032
92	0.0071	0.0039	0.0032
93	0.0072	0.0039	0.0032
94	0.0072	0.0039	0.0033
95	0.0073	0.0040	0.0033
96	0.0073	0.0040	0.0033
97	0.0074	0.0040	0.0033
98	0.0074	0.0040	0.0033
99	0.0075	0.0041	0.0034
100	0.0075	0.0041	0.0034
101	0.0076	0.0041	0.0034
102	0.0076	0.0042	0.0034
103	0.0077	0.0042	0.0035
104	0.0077	0.0042	0.0035
105	0.0078	0.0042	0.0035
106	0.0078	0.0043	0.0035
107	0.0079	0.0043	0.0036
108	0.0079	0.0043	0.0036
109	0.0080	0.0044	0.0036
110	0.0080	0.0044	0.0036
111	0.0081	0.0044	0.0037
112	0.0081	0.0045	0.0037
113	0.0082	0.0045	0.0037
114	0.0083	0.0045	0.0037
115	0.0084	0.0046	0.0038
116	0.0084	0.0046	0.0038
117	0.0085	0.0046	0.0038
118	0.0085	0.0047	0.0039
119	0.0086	0.0047	0.0039
120	0.0087	0.0048	0.0039
121	0.0088	0.0048	0.0040
122	0.0088	0.0048	0.0040
123	0.0089	0.0049	0.0040
124	0.0090	0.0049	0.0041
125	0.0091	0.0050	0.0041
126	0.0091	0.0050	0.0041
127	0.0093	0.0051	0.0042
128	0.0093	0.0051	0.0042
129	0.0094	0.0052	0.0043
130	0.0095	0.0052	0.0043
131	0.0096	0.0053	0.0043
132	0.0097	0.0053	0.0044
133	0.0098	0.0054	0.0044
134	0.0099	0.0054	0.0045
135	0.0100	0.0055	0.0045
136	0.0101	0.0055	0.0046
137	0.0102	0.0056	0.0046
138	0.0103	0.0056	0.0047
139	0.0105	0.0057	0.0047
140	0.0105	0.0058	0.0048
141	0.0107	0.0059	0.0048
142	0.0108	0.0059	0.0049
143	0.0110	0.0060	0.0050
144	0.0111	0.0061	0.0050

145	0.0113	0.0062	0.0051
146	0.0114	0.0062	0.0051
147	0.0116	0.0063	0.0052
148	0.0117	0.0064	0.0053
149	0.0119	0.0065	0.0054
150	0.0120	0.0066	0.0054
151	0.0122	0.0067	0.0055
152	0.0123	0.0068	0.0056
153	0.0126	0.0069	0.0057
154	0.0127	0.0070	0.0058
155	0.0130	0.0071	0.0059
156	0.0131	0.0072	0.0059
157	0.0134	0.0074	0.0061
158	0.0136	0.0074	0.0061
159	0.0139	0.0076	0.0063
160	0.0141	0.0077	0.0064
161	0.0144	0.0079	0.0065
162	0.0146	0.0080	0.0066
163	0.0150	0.0082	0.0068
164	0.0152	0.0083	0.0069
165	0.0157	0.0086	0.0071
166	0.0159	0.0087	0.0072
167	0.0164	0.0090	0.0074
168	0.0167	0.0091	0.0075
169	0.0173	0.0095	0.0078
170	0.0176	0.0096	0.0080
171	0.0183	0.0100	0.0083
172	0.0186	0.0102	0.0084
173	0.0194	0.0106	0.0088
174	0.0198	0.0108	0.0089
175	0.0207	0.0113	0.0094
176	0.0212	0.0116	0.0096
177	0.0222	0.0122	0.0101
178	0.0228	0.0125	0.0103
179	0.0242	0.0132	0.0109
180	0.0249	0.0136	0.0113
181	0.0266	0.0146	0.0120
182	0.0276	0.0151	0.0125
183	0.0298	0.0163	0.0135
184	0.0312	0.0171	0.0141
185	0.0395	0.0216	0.0178
186	0.0415	0.0227	0.0188
187	0.0466	0.0255	0.0211
188	0.0499	0.0273	0.0226
189	0.0593	0.0324	0.0268
190	0.0662	0.0332*	0.0330
191	0.0918	0.0332*	0.0587
192	0.1229	0.0332*	0.0898
193	0.3359	0.0332*	0.3027
194	0.0761	0.0332*	0.0429
195	0.0540	0.0296	0.0244
196	0.0438	0.0240	0.0198
197	0.0327	0.0179	0.0148
198	0.0287	0.0157	0.0130
199	0.0257	0.0141	0.0116
200	0.0235	0.0129	0.0106
201	0.0217	0.0119	0.0098

202	0.0202	0.0111	0.0091
203	0.0190	0.0104	0.0086
204	0.0179	0.0098	0.0081
205	0.0170	0.0093	0.0077
206	0.0162	0.0089	0.0073
207	0.0155	0.0085	0.0070
208	0.0148	0.0081	0.0067
209	0.0143	0.0078	0.0065
210	0.0138	0.0075	0.0062
211	0.0133	0.0073	0.0060
212	0.0129	0.0070	0.0058
213	0.0125	0.0068	0.0056
214	0.0121	0.0066	0.0055
215	0.0118	0.0064	0.0053
216	0.0115	0.0063	0.0052
217	0.0112	0.0061	0.0050
218	0.0109	0.0060	0.0049
219	0.0106	0.0058	0.0048
220	0.0104	0.0057	0.0047
221	0.0102	0.0056	0.0046
222	0.0099	0.0054	0.0045
223	0.0097	0.0053	0.0044
224	0.0096	0.0052	0.0043
225	0.0094	0.0051	0.0042
226	0.0092	0.0050	0.0042
227	0.0090	0.0049	0.0041
228	0.0089	0.0049	0.0040
229	0.0087	0.0048	0.0039
230	0.0086	0.0047	0.0039
231	0.0084	0.0046	0.0038
232	0.0083	0.0046	0.0038
233	0.0082	0.0045	0.0037
234	0.0081	0.0044	0.0036
235	0.0079	0.0044	0.0036
236	0.0078	0.0043	0.0035
237	0.0077	0.0042	0.0035
238	0.0076	0.0042	0.0034
239	0.0075	0.0041	0.0034
240	0.0074	0.0041	0.0034
241	0.0073	0.0040	0.0033
242	0.0072	0.0040	0.0033
243	0.0071	0.0039	0.0032
244	0.0071	0.0039	0.0032
245	0.0070	0.0038	0.0032
246	0.0069	0.0038	0.0031
247	0.0068	0.0037	0.0031
248	0.0067	0.0037	0.0031
249	0.0067	0.0037	0.0030
250	0.0066	0.0036	0.0030
251	0.0065	0.0036	0.0030
252	0.0065	0.0035	0.0029
253	0.0064	0.0035	0.0029
254	0.0063	0.0035	0.0029
255	0.0063	0.0034	0.0028
256	0.0062	0.0034	0.0028
257	0.0061	0.0034	0.0028

258	0.0061	0.0033	0.0028
259	0.0060	0.0033	0.0027
260	0.0060	0.0033	0.0027
261	0.0059	0.0032	0.0027
262	0.0059	0.0032	0.0027
263	0.0058	0.0032	0.0026
264	0.0058	0.0032	0.0026
265	0.0057	0.0031	0.0026
266	0.0057	0.0031	0.0026
267	0.0056	0.0031	0.0025
268	0.0056	0.0031	0.0025
269	0.0055	0.0030	0.0025
270	0.0055	0.0030	0.0025
271	0.0055	0.0030	0.0025
272	0.0054	0.0030	0.0024
273	0.0054	0.0029	0.0024
274	0.0053	0.0029	0.0024
275	0.0053	0.0029	0.0024
276	0.0052	0.0029	0.0024
277	0.0052	0.0029	0.0024
278	0.0052	0.0028	0.0023
279	0.0051	0.0028	0.0023
280	0.0051	0.0028	0.0023
281	0.0051	0.0028	0.0023
282	0.0050	0.0028	0.0023
283	0.0050	0.0027	0.0023
284	0.0050	0.0027	0.0022
285	0.0049	0.0027	0.0022
286	0.0049	0.0027	0.0022
287	0.0049	0.0027	0.0022
288	0.0048	0.0026	0.0022
	3.5525	1.7319	1.8206

Total soil rain loss = 1.73(In)
Total effective rainfall = 1.82(In)
Peak flow rate in flood hydrograph = 58.39(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

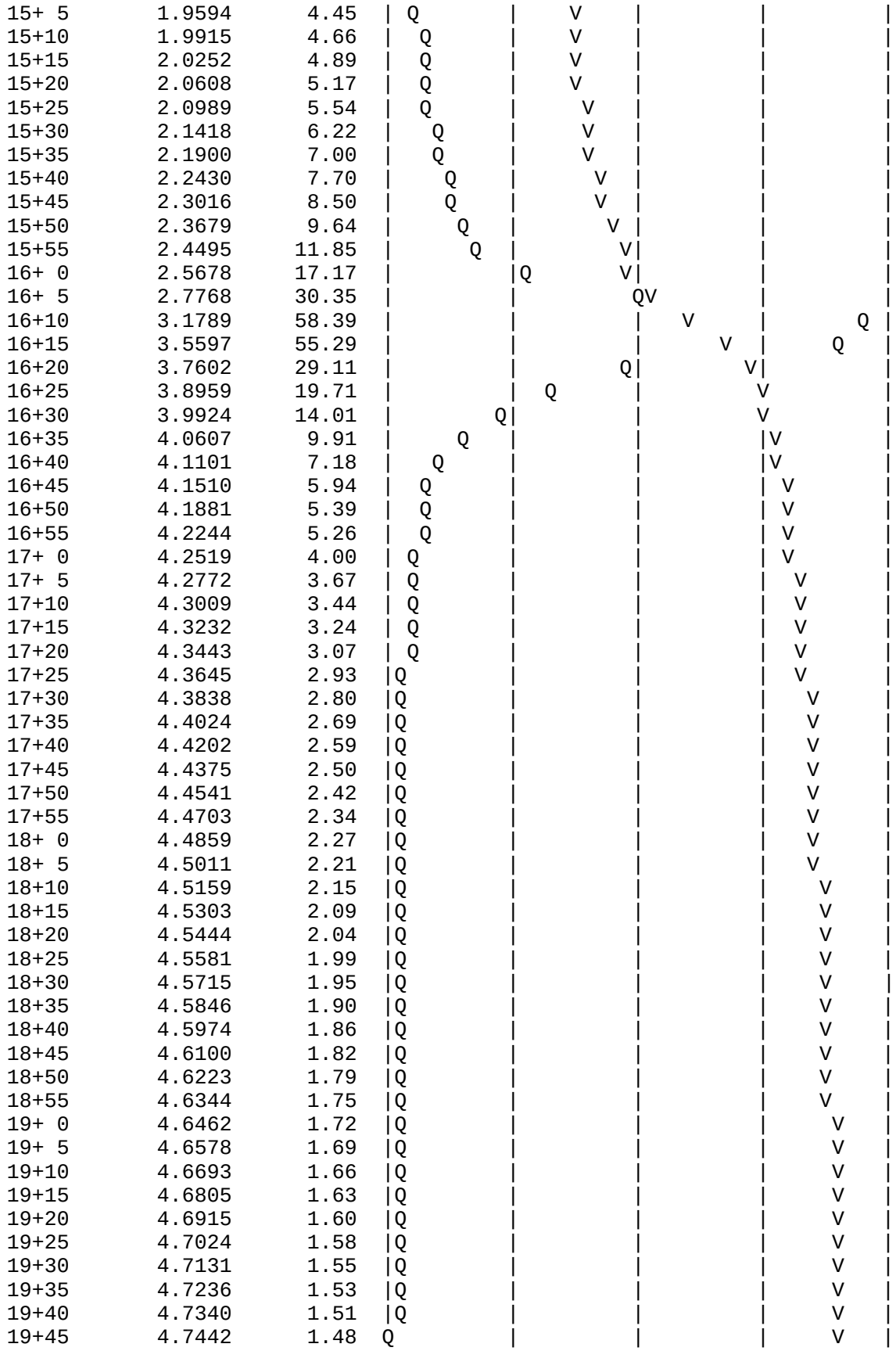
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0004	0.05	Q	|	|	|	|
0+10	0.0027	0.34	Q	|	|	|	|
0+15	0.0071	0.64	Q	|	|	|	|
0+20	0.0123	0.75	Q	|	|	|	|
0+25	0.0180	0.82	Q	|	|	|	|
0+30	0.0239	0.86	Q	|	|	|	|
0+35	0.0300	0.88	Q	|	|	|	|
0+40	0.0361	0.89	Q	|	|	|	|
0+45	0.0423	0.90	Q	|	|	|	|

0+50	0.0486	0.91	Q	|	|	|	|
0+55	0.0549	0.92	Q	|	|	|	|
1+ 0	0.0612	0.92	Q	|	|	|	|
1+ 5	0.0676	0.92	Q	|	|	|	|
1+10	0.0740	0.93	Q	|	|	|	|
1+15	0.0804	0.93	Q	|	|	|	|
1+20	0.0868	0.93	Q	|	|	|	|
1+25	0.0933	0.94	Q	|	|	|	|
1+30	0.0997	0.94	Q	|	|	|	|
1+35	0.1062	0.94	Q	|	|	|	|
1+40	0.1128	0.95	Q	|	|	|	|
1+45	0.1193	0.95	Q	|	|	|	|
1+50	0.1259	0.95	Q	|	|	|	|
1+55	0.1325	0.96	QV	|	|	|	|
2+ 0	0.1391	0.96	QV	|	|	|	|
2+ 5	0.1457	0.96	QV	|	|	|	|
2+10	0.1524	0.97	QV	|	|	|	|
2+15	0.1590	0.97	QV	|	|	|	|
2+20	0.1657	0.97	QV	|	|	|	|
2+25	0.1725	0.98	QV	|	|	|	|
2+30	0.1792	0.98	QV	|	|	|	|
2+35	0.1860	0.98	QV	|	|	|	|
2+40	0.1928	0.99	QV	|	|	|	|
2+45	0.1997	0.99	QV	|	|	|	|
2+50	0.2065	1.00	QV	|	|	|	|
2+55	0.2134	1.00	QV	|	|	|	|
3+ 0	0.2203	1.00	QV	|	|	|	|
3+ 5	0.2272	1.01	QV	|	|	|	|
3+10	0.2342	1.01	QV	|	|	|	|
3+15	0.2412	1.02	QV	|	|	|	|
3+20	0.2482	1.02	QV	|	|	|	|
3+25	0.2553	1.02	QV	|	|	|	|
3+30	0.2623	1.03	Q V	|	|	|	|
3+35	0.2694	1.03	Q V	|	|	|	|
3+40	0.2766	1.04	Q V	|	|	|	|
3+45	0.2837	1.04	Q V	|	|	|	|
3+50	0.2909	1.04	Q V	|	|	|	|
3+55	0.2982	1.05	Q V	|	|	|	|
4+ 0	0.3054	1.05	Q V	|	|	|	|
4+ 5	0.3127	1.06	Q V	|	|	|	|
4+10	0.3200	1.06	Q V	|	|	|	|
4+15	0.3273	1.07	Q V	|	|	|	|
4+20	0.3347	1.07	Q V	|	|	|	|
4+25	0.3421	1.08	Q V	|	|	|	|
4+30	0.3495	1.08	Q V	|	|	|	|
4+35	0.3570	1.08	Q V	|	|	|	|
4+40	0.3645	1.09	Q V	|	|	|	|
4+45	0.3721	1.09	Q V	|	|	|	|
4+50	0.3796	1.10	Q V	|	|	|	|
4+55	0.3872	1.10	Q V	|	|	|	|
5+ 0	0.3949	1.11	Q V	|	|	|	|
5+ 5	0.4025	1.11	Q V	|	|	|	|
5+10	0.4102	1.12	Q V	|	|	|	|
5+15	0.4180	1.12	Q V	|	|	|	|
5+20	0.4258	1.13	Q V	|	|	|	|
5+25	0.4336	1.13	Q V	|	|	|	|
5+30	0.4414	1.14	Q V	|	|	|	|

5+35	0.4493	1.15	Q	V				
5+40	0.4572	1.15	Q	V				
5+45	0.4652	1.16	Q	V				
5+50	0.4732	1.16	Q	V				
5+55	0.4813	1.17	Q	V				
6+ 0	0.4893	1.17	Q	V				
6+ 5	0.4975	1.18	Q	V				
6+10	0.5056	1.19	Q	V				
6+15	0.5138	1.19	Q	V				
6+20	0.5221	1.20	Q	V				
6+25	0.5304	1.20	Q	V				
6+30	0.5387	1.21	Q	V				
6+35	0.5471	1.22	Q	V				
6+40	0.5555	1.22	Q	V				
6+45	0.5640	1.23	Q	V				
6+50	0.5725	1.24	Q	V				
6+55	0.5810	1.24	Q	V				
7+ 0	0.5896	1.25	Q	V				
7+ 5	0.5983	1.26	Q	V				
7+10	0.6070	1.26	Q	V				
7+15	0.6157	1.27	Q	V				
7+20	0.6245	1.28	Q	V				
7+25	0.6334	1.29	Q	V				
7+30	0.6423	1.29	Q	V				
7+35	0.6512	1.30	Q	V				
7+40	0.6603	1.31	Q	V				
7+45	0.6693	1.32	Q	V				
7+50	0.6784	1.32	Q	V				
7+55	0.6876	1.33	Q	V				
8+ 0	0.6968	1.34	Q	V				
8+ 5	0.7061	1.35	Q	V				
8+10	0.7155	1.36	Q	V				
8+15	0.7249	1.37	Q	V				
8+20	0.7343	1.37	Q	V				
8+25	0.7438	1.38	Q	V				
8+30	0.7534	1.39	Q	V				
8+35	0.7631	1.40	Q	V				
8+40	0.7728	1.41	Q	V				
8+45	0.7826	1.42	Q	V				
8+50	0.7924	1.43	Q	V				
8+55	0.8023	1.44	Q	V				
9+ 0	0.8123	1.45	Q	V				
9+ 5	0.8224	1.46	Q	V				
9+10	0.8325	1.47	Q	V				
9+15	0.8427	1.48	Q	V				
9+20	0.8530	1.49	Q	V				
9+25	0.8633	1.50	|Q	V				
9+30	0.8738	1.51	|Q	V				
9+35	0.8843	1.53	|Q	V				
9+40	0.8949	1.54	|Q	V				
9+45	0.9055	1.55	|Q	V				
9+50	0.9163	1.56	|Q	V				
9+55	0.9271	1.57	|Q	V				
10+ 0	0.9381	1.59	|Q	V				
10+ 5	0.9491	1.60	|Q	V				
10+10	0.9602	1.61	|Q	V				
10+15	0.9714	1.63	|Q	V				

10+20	0.9827	1.64	|Q V |	|	|	|
10+25	0.9941	1.66	|Q V |	|	|	|
10+30	1.0056	1.67	|Q V |	|	|	|
10+35	1.0172	1.68	|Q V |	|	|	|
10+40	1.0289	1.70	|Q V |	|	|	|
10+45	1.0407	1.72	|Q V |	|	|	|
10+50	1.0527	1.73	|Q V |	|	|	|
10+55	1.0647	1.75	|Q V |	|	|	|
11+ 0	1.0769	1.77	|Q V |	|	|	|
11+ 5	1.0891	1.78	|Q V |	|	|	|
11+10	1.1015	1.80	|Q V |	|	|	|
11+15	1.1141	1.82	|Q V |	|	|	|
11+20	1.1267	1.84	|Q V |	|	|	|
11+25	1.1395	1.86	|Q V |	|	|	|
11+30	1.1524	1.88	|Q V |	|	|	|
11+35	1.1655	1.90	|Q V|	|	|	|
11+40	1.1787	1.92	|Q V|	|	|	|
11+45	1.1921	1.94	|Q V|	|	|	|
11+50	1.2056	1.96	|Q V|	|	|	|
11+55	1.2192	1.98	|Q V|	|	|	|
12+ 0	1.2331	2.01	|Q V|	|	|	|
12+ 5	1.2471	2.03	|Q V|	|	|	|
12+10	1.2612	2.06	|Q V|	|	|	|
12+15	1.2756	2.08	|Q V|	|	|	|
12+20	1.2901	2.11	|Q V	|	|	|
12+25	1.3049	2.14	|Q V	|	|	|
12+30	1.3198	2.17	|Q V	|	|	|
12+35	1.3349	2.20	|Q V	|	|	|
12+40	1.3503	2.23	|Q V	|	|	|
12+45	1.3659	2.26	|Q V	|	|	|
12+50	1.3817	2.30	|Q V	|	|	|
12+55	1.3977	2.33	|Q V	|	|	|
13+ 0	1.4140	2.37	|Q V	|	|	|
13+ 5	1.4306	2.40	|Q |V	|	|	|
13+10	1.4474	2.44	|Q |V	|	|	|
13+15	1.4645	2.49	|Q |V	|	|	|
13+20	1.4820	2.53	|Q |V	|	|	|
13+25	1.4997	2.57	|Q |V	|	|	|
13+30	1.5177	2.62	|Q |V	|	|	|
13+35	1.5361	2.67	|Q |V	|	|	|
13+40	1.5549	2.72	|Q | V	|	|	|
13+45	1.5740	2.78	|Q | V	|	|	|
13+50	1.5936	2.84	|Q | V	|	|	|
13+55	1.6135	2.90	|Q | V	|	|	|
14+ 0	1.6339	2.96	|Q | V	|	|	|
14+ 5	1.6548	3.03	| Q | V	|	|	|
14+10	1.6762	3.11	| Q | V	|	|	|
14+15	1.6982	3.19	| Q | V	|	|	|
14+20	1.7208	3.28	| Q | V	|	|	|
14+25	1.7440	3.37	| Q | V	|	|	|
14+30	1.7678	3.47	| Q | V	|	|	|
14+35	1.7924	3.57	| Q | V	|	|	|
14+40	1.8178	3.69	| Q | V	|	|	|
14+45	1.8440	3.81	| Q | V	|	|	|
14+50	1.8712	3.95	| Q | V	|	|	|
14+55	1.8994	4.10	| Q | V	|	|	|
15+ 0	1.9288	4.26	| Q | V	|	|	|



19+50	4.7543	1.46	Q	|	|	|	V |
19+55	4.7642	1.44	Q	|	|	|	V |
20+ 0	4.7740	1.42	Q	|	|	|	V |
20+ 5	4.7837	1.40	Q	|	|	|	V |
20+10	4.7932	1.38	Q	|	|	|	V |
20+15	4.8026	1.37	Q	|	|	|	V |
20+20	4.8119	1.35	Q	|	|	|	V |
20+25	4.8211	1.33	Q	|	|	|	V |
20+30	4.8302	1.32	Q	|	|	|	V |
20+35	4.8391	1.30	Q	|	|	|	V |
20+40	4.8480	1.29	Q	|	|	|	V |
20+45	4.8567	1.27	Q	|	|	|	V |
20+50	4.8654	1.26	Q	|	|	|	V |
20+55	4.8740	1.24	Q	|	|	|	V |
21+ 0	4.8825	1.23	Q	|	|	|	V |
21+ 5	4.8908	1.22	Q	|	|	|	V |
21+10	4.8991	1.20	Q	|	|	|	V |
21+15	4.9074	1.19	Q	|	|	|	V |
21+20	4.9155	1.18	Q	|	|	|	V |
21+25	4.9235	1.17	Q	|	|	|	V |
21+30	4.9315	1.16	Q	|	|	|	V |
21+35	4.9394	1.15	Q	|	|	|	V |
21+40	4.9472	1.14	Q	|	|	|	V |
21+45	4.9550	1.13	Q	|	|	|	V |
21+50	4.9626	1.11	Q	|	|	|	V |
21+55	4.9703	1.10	Q	|	|	|	V |
22+ 0	4.9778	1.09	Q	|	|	|	V |
22+ 5	4.9853	1.09	Q	|	|	|	V |
22+10	4.9927	1.08	Q	|	|	|	V |
22+15	5.0000	1.07	Q	|	|	|	V |
22+20	5.0073	1.06	Q	|	|	|	V |
22+25	5.0145	1.05	Q	|	|	|	V |
22+30	5.0217	1.04	Q	|	|	|	V |
22+35	5.0288	1.03	Q	|	|	|	V|
22+40	5.0359	1.02	Q	|	|	|	V|
22+45	5.0429	1.02	Q	|	|	|	V|
22+50	5.0498	1.01	Q	|	|	|	V|
22+55	5.0567	1.00	Q	|	|	|	V|
23+ 0	5.0635	0.99	Q	|	|	|	V|
23+ 5	5.0703	0.99	Q	|	|	|	V|
23+10	5.0771	0.98	Q	|	|	|	V|
23+15	5.0837	0.97	Q	|	|	|	V|
23+20	5.0904	0.96	Q	|	|	|	V|
23+25	5.0970	0.96	Q	|	|	|	V|
23+30	5.1035	0.95	Q	|	|	|	V|
23+35	5.1100	0.94	Q	|	|	|	V|
23+40	5.1165	0.94	Q	|	|	|	V|
23+45	5.1229	0.93	Q	|	|	|	V|
23+50	5.1293	0.92	Q	|	|	|	V|
23+55	5.1356	0.92	Q	|	|	|	V|
24+ 0	5.1419	0.91	Q	|	|	|	V|
24+ 5	5.1478	0.86	Q	|	|	|	V|
24+10	5.1516	0.56	Q	|	|	|	V|
24+15	5.1534	0.26	Q	|	|	|	V|
24+20	5.1544	0.15	Q	|	|	|	V|
24+25	5.1550	0.08	Q	|	|	|	V|
24+30	5.1553	0.04	Q	|	|	|	V|

```
   24+35       5.1554      0.02  Q         |         |         |        V|
   24+40       5.1555      0.02  Q         |         |         |        V|
   24+45       5.1556      0.01  Q         |         |         |        V|
   24+50       5.1557      0.01  Q         |         |         |        V|
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA C - EXISTING CONDITIONS
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
34.00	6	0.82
Rainfall data for year 2		
34.00	24	1.37
Rainfall data for year 100		
34.00	6	2.34
Rainfall data for year 100		
34.00	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	34.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
34.00	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 3425.00(Ft.)
Length from concentration point to centroid = 1790.00(Ft.)
Elevation difference along watercourse = 870.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 34.00(Ac.)
Catchment Lag time = 0.137 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 60.6342
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 34.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.383(In)
30-minute factor = 0.998 Adjusted rainfall = 0.859(In)
1-hour factor = 0.998 Adjusted rainfall = 1.173(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 411.19 (CFS))

1	5.723	23.530
2	38.031	132.849
3	71.554	137.842
4	83.842	50.524
5	90.907	29.053
6	95.161	17.489
7	97.444	9.390
8	98.309	3.555
9	98.727	1.719
10	99.145	1.719
11	100.000	3.516

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.383
2	3.15	0.52	0.52	0.140
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018

40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011

96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.72	2.72	0.010
107	0.31	2.74	2.73	0.010
108	0.31	2.75	2.74	0.010
109	0.30	2.76	2.75	0.010
110	0.30	2.77	2.76	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.93	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008

153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.16	3.16	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.30	3.30	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.41	3.41	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007

210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.73	3.73	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006

267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019
29	0.0061	0.0041	0.0019

30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020
33	0.0062	0.0042	0.0020
34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020
37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020
40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025
86	0.0079	0.0054	0.0025

87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026
90	0.0081	0.0055	0.0026
91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026
94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027
97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039
143	0.0125	0.0085	0.0040

144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041
147	0.0129	0.0088	0.0041
148	0.0130	0.0088	0.0042
149	0.0132	0.0090	0.0042
150	0.0134	0.0091	0.0043
151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045
154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0155	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0161	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0194	0.0132	0.0062
170	0.0197	0.0134	0.0063
171	0.0204	0.0139	0.0065
172	0.0208	0.0142	0.0067
173	0.0217	0.0148	0.0069
174	0.0222	0.0151	0.0071
175	0.0232	0.0158	0.0074
176	0.0237	0.0161	0.0076
177	0.0250	0.0170	0.0080
178	0.0256	0.0174	0.0082
179	0.0271	0.0185	0.0087
180	0.0280	0.0190	0.0090
181	0.0299	0.0203	0.0096
182	0.0310	0.0211	0.0099
183	0.0336	0.0228	0.0107
184	0.0351	0.0239	0.0112
185	0.0450	0.0306	0.0144
186	0.0474	0.0322	0.0152
187	0.0532	0.0362	0.0170
188	0.0570	0.0388	0.0182
189	0.0676	0.0460	0.0216
190	0.0756	0.0472*	0.0284
191	0.1049	0.0472*	0.0577
192	0.1404	0.0472*	0.0932
193	0.3835	0.0472*	0.3363
194	0.0869	0.0472*	0.0397
195	0.0617	0.0419	0.0197
196	0.0500	0.0340	0.0160
197	0.0368	0.0250	0.0118
198	0.0322	0.0219	0.0103
199	0.0289	0.0197	0.0092
200	0.0264	0.0179	0.0084

201	0.0243	0.0165	0.0078
202	0.0227	0.0154	0.0072
203	0.0213	0.0145	0.0068
204	0.0201	0.0136	0.0064
205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055
208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049
211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023
257	0.0071	0.0048	0.0023

258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022
261	0.0068	0.0046	0.0022
262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021
265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021
268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0397	2.4449	1.5948

Total soil rain loss = 2.44(In)
Total effective rainfall = 1.59(In)
Peak flow rate in flood hydrograph = 62.90(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

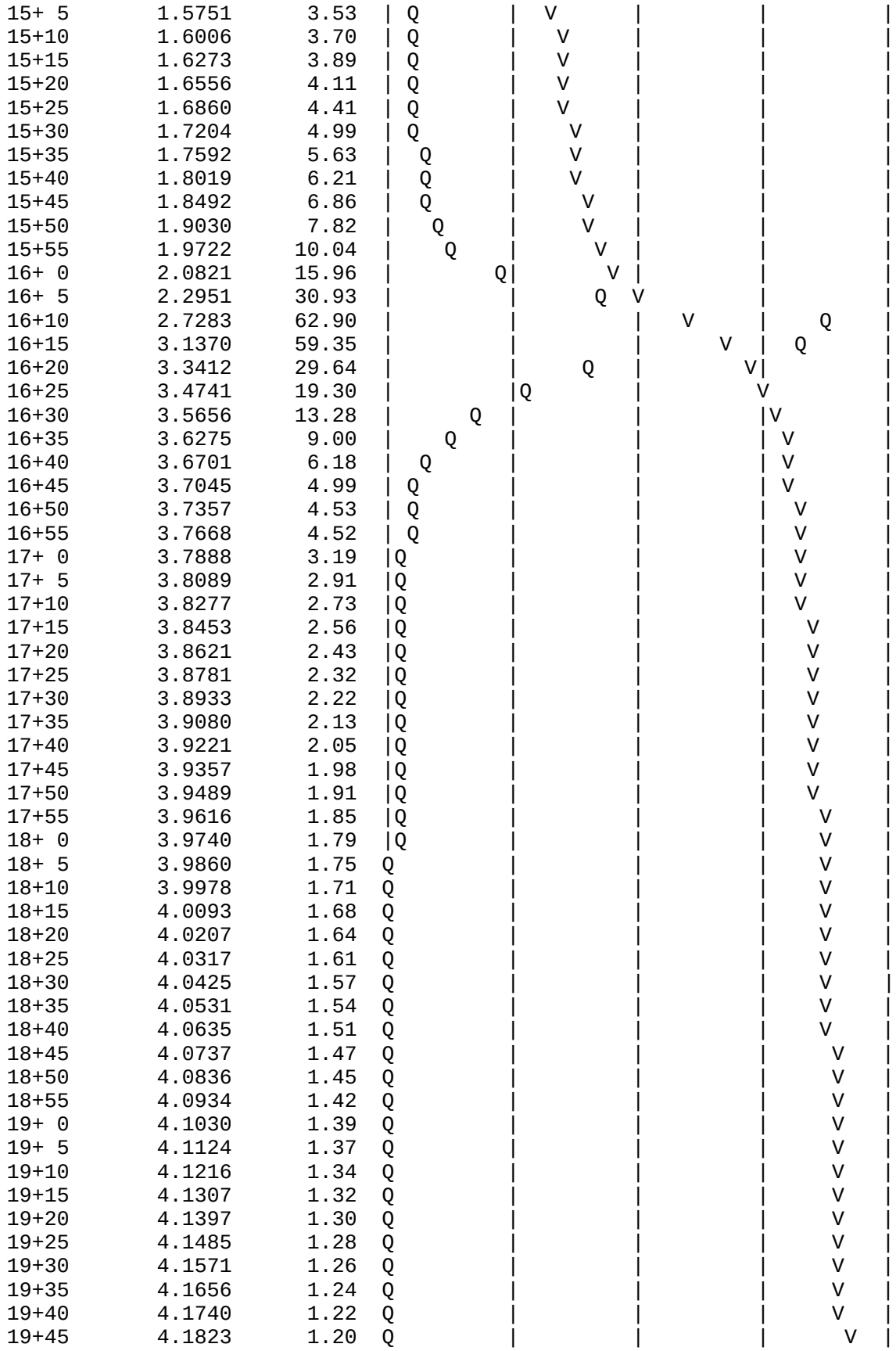
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0003	0.04	Q	|	|	|	|
0+10	0.0022	0.28	Q	|	|	|	|
0+15	0.0058	0.52	Q	|	|	|	|
0+20	0.0100	0.61	Q	|	|	|	|
0+25	0.0146	0.67	Q	|	|	|	|
0+30	0.0194	0.70	Q	|	|	|	|
0+35	0.0243	0.72	Q	|	|	|	|
0+40	0.0294	0.73	Q	|	|	|	|
0+45	0.0344	0.73	Q	|	|	|	|

0+50	0.0395	0.74	Q	|	|	|	|
0+55	0.0446	0.75	Q	|	|	|	|
1+ 0	0.0498	0.75	Q	|	|	|	|
1+ 5	0.0549	0.75	Q	|	|	|	|
1+10	0.0601	0.75	Q	|	|	|	|
1+15	0.0653	0.76	Q	|	|	|	|
1+20	0.0706	0.76	Q	|	|	|	|
1+25	0.0758	0.76	Q	|	|	|	|
1+30	0.0811	0.76	Q	|	|	|	|
1+35	0.0863	0.77	Q	|	|	|	|
1+40	0.0916	0.77	Q	|	|	|	|
1+45	0.0969	0.77	Q	|	|	|	|
1+50	0.1023	0.77	Q	|	|	|	|
1+55	0.1076	0.78	Q	|	|	|	|
2+ 0	0.1130	0.78	QV	|	|	|	|
2+ 5	0.1184	0.78	QV	|	|	|	|
2+10	0.1238	0.79	QV	|	|	|	|
2+15	0.1292	0.79	QV	|	|	|	|
2+20	0.1347	0.79	QV	|	|	|	|
2+25	0.1401	0.79	QV	|	|	|	|
2+30	0.1456	0.80	QV	|	|	|	|
2+35	0.1511	0.80	QV	|	|	|	|
2+40	0.1567	0.80	QV	|	|	|	|
2+45	0.1622	0.81	QV	|	|	|	|
2+50	0.1678	0.81	QV	|	|	|	|
2+55	0.1734	0.81	QV	|	|	|	|
3+ 0	0.1790	0.81	QV	|	|	|	|
3+ 5	0.1846	0.82	QV	|	|	|	|
3+10	0.1903	0.82	QV	|	|	|	|
3+15	0.1960	0.82	QV	|	|	|	|
3+20	0.2017	0.83	QV	|	|	|	|
3+25	0.2074	0.83	QV	|	|	|	|
3+30	0.2131	0.83	QV	|	|	|	|
3+35	0.2189	0.84	QV	|	|	|	|
3+40	0.2247	0.84	QV	|	|	|	|
3+45	0.2305	0.84	Q V	|	|	|	|
3+50	0.2363	0.85	Q V	|	|	|	|
3+55	0.2422	0.85	Q V	|	|	|	|
4+ 0	0.2481	0.85	Q V	|	|	|	|
4+ 5	0.2540	0.86	Q V	|	|	|	|
4+10	0.2599	0.86	Q V	|	|	|	|
4+15	0.2659	0.87	Q V	|	|	|	|
4+20	0.2719	0.87	Q V	|	|	|	|
4+25	0.2779	0.87	Q V	|	|	|	|
4+30	0.2839	0.88	Q V	|	|	|	|
4+35	0.2900	0.88	Q V	|	|	|	|
4+40	0.2961	0.88	Q V	|	|	|	|
4+45	0.3022	0.89	Q V	|	|	|	|
4+50	0.3083	0.89	Q V	|	|	|	|
4+55	0.3145	0.90	Q V	|	|	|	|
5+ 0	0.3207	0.90	Q V	|	|	|	|
5+ 5	0.3269	0.90	Q V	|	|	|	|
5+10	0.3332	0.91	Q V	|	|	|	|
5+15	0.3395	0.91	Q V	|	|	|	|
5+20	0.3458	0.92	Q V	|	|	|	|
5+25	0.3521	0.92	Q V	|	|	|	|
5+30	0.3585	0.93	Q V	|	|	|	|

5+35	0.3649	0.93	Q	V				
5+40	0.3713	0.93	Q	V				
5+45	0.3778	0.94	Q	V				
5+50	0.3843	0.94	Q	V				
5+55	0.3908	0.95	Q	V				
6+ 0	0.3974	0.95	Q	V				
6+ 5	0.4040	0.96	Q	V				
6+10	0.4106	0.96	Q	V				
6+15	0.4172	0.97	Q	V				
6+20	0.4239	0.97	Q	V				
6+25	0.4307	0.98	Q	V				
6+30	0.4374	0.98	Q	V				
6+35	0.4442	0.99	Q	V				
6+40	0.4510	0.99	Q	V				
6+45	0.4579	1.00	Q	V				
6+50	0.4648	1.00	Q	V				
6+55	0.4717	1.01	Q	V				
7+ 0	0.4787	1.01	Q	V				
7+ 5	0.4857	1.02	Q	V				
7+10	0.4928	1.02	Q	V				
7+15	0.4999	1.03	Q	V				
7+20	0.5070	1.04	Q	V				
7+25	0.5142	1.04	Q	V				
7+30	0.5214	1.05	Q	V				
7+35	0.5287	1.05	Q	V				
7+40	0.5360	1.06	Q	V				
7+45	0.5433	1.07	Q	V				
7+50	0.5507	1.07	Q	V				
7+55	0.5582	1.08	Q	V				
8+ 0	0.5656	1.09	Q	V				
8+ 5	0.5732	1.09	Q	V				
8+10	0.5807	1.10	Q	V				
8+15	0.5884	1.11	Q	V				
8+20	0.5960	1.11	Q	V				
8+25	0.6037	1.12	Q	V				
8+30	0.6115	1.13	Q	V				
8+35	0.6193	1.14	Q	V				
8+40	0.6272	1.14	Q	V				
8+45	0.6351	1.15	Q	V				
8+50	0.6431	1.16	Q	V				
8+55	0.6511	1.17	Q	V				
9+ 0	0.6592	1.17	Q	V				
9+ 5	0.6674	1.18	Q	V				
9+10	0.6756	1.19	Q	V				
9+15	0.6838	1.20	Q	V				
9+20	0.6922	1.21	Q	V				
9+25	0.7005	1.22	Q	V				
9+30	0.7090	1.23	Q	V				
9+35	0.7175	1.24	Q	V				
9+40	0.7261	1.25	Q	V				
9+45	0.7347	1.25	Q	V				
9+50	0.7434	1.26	Q	V				
9+55	0.7522	1.27	Q	V				
10+ 0	0.7611	1.29	Q	V				
10+ 5	0.7700	1.30	Q	V				
10+10	0.7790	1.31	Q	V				
10+15	0.7880	1.32	Q	V				

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10+20       0.7972      1.33  Q      V  |          |          |          |
10+25       0.8064      1.34  Q      V  |          |          |          |
10+30       0.8157      1.35  Q      V  |          |          |          |
10+35       0.8251      1.36  Q      V  |          |          |          |
10+40       0.8346      1.38  Q      V  |          |          |          |
10+45       0.8442      1.39  Q      V  |          |          |          |
10+50       0.8538      1.40  Q      V  |          |          |          |
10+55       0.8636      1.41  Q      V  |          |          |          |
11+ 0       0.8734      1.43  Q      V  |          |          |          |
11+ 5       0.8833      1.44  Q      V  |          |          |          |
11+10       0.8934      1.46  Q      V  |          |          |          |
11+15       0.9035      1.47  Q       V |          |          |          |
11+20       0.9137      1.49  Q       V |          |          |          |
11+25       0.9241      1.50  Q       V |          |          |          |
11+30       0.9345      1.52  Q       V |          |          |          |
11+35       0.9451      1.53  Q       V |          |          |          |
11+40       0.9558      1.55  Q       V |          |          |          |
11+45       0.9666      1.57  Q       V |          |          |          |
11+50       0.9775      1.59  Q       V |          |          |          |
11+55       0.9885      1.60  Q       V |          |          |          |
12+ 0       0.9997      1.62  Q       V |          |          |          |
12+ 5       1.0110      1.64  Q       V |          |          |          |
12+10       1.0224      1.65  Q        V|          |          |          |
12+15       1.0338      1.66  Q        V|          |          |          |
12+20       1.0453      1.67  Q        V|          |          |          |
12+25       1.0570      1.69  Q        V|          |          |          |
12+30       1.0688      1.71  Q        V|          |          |          |
12+35       1.0807      1.74  Q        V|          |          |          |
12+40       1.0928      1.76  |Q       V|          |          |          |
12+45       1.1051      1.79  |Q       V|          |          |          |
12+50       1.1176      1.81  |Q       V|          |          |          |
12+55       1.1303      1.84  |Q        V          |          |          |
13+ 0       1.1432      1.87  |Q        V          |          |          |
13+ 5       1.1562      1.90  |Q        V          |          |          |
13+10       1.1695      1.93  |Q        V          |          |          |
13+15       1.1831      1.96  |Q        V          |          |          |
13+20       1.1968      2.00  |Q        V          |          |          |
13+25       1.2108      2.03  |Q        V          |          |          |
13+30       1.2251      2.07  |Q        V          |          |          |
13+35       1.2396      2.11  |Q        V          |          |          |
13+40       1.2545      2.15  |Q         |V         |          |          |
13+45       1.2696      2.20  |Q         |V         |          |          |
13+50       1.2851      2.24  |Q         |V         |          |          |
13+55       1.3009      2.29  |Q         |V         |          |          |
14+ 0       1.3170      2.35  |Q         |V         |          |          |
14+ 5       1.3335      2.40  |Q         |V         |          |          |
14+10       1.3505      2.46  |Q         |V         |          |          |
14+15       1.3679      2.53  |Q         | V        |          |          |
14+20       1.3858      2.60  |Q         | V        |          |          |
14+25       1.4041      2.67  |Q         | V        |          |          |
14+30       1.4231      2.75  |Q         | V        |          |          |
14+35       1.4426      2.83  |Q         | V        |          |          |
14+40       1.4627      2.92  |Q         | V        |          |          |
14+45       1.4835      3.02  |Q         |  V       |          |          |
14+50       1.5050      3.13  |Q         |  V       |          |          |
14+55       1.5274      3.25  |Q         |  V       |          |          |
15+ 0       1.5507      3.38  |Q         |  V       |          |          |
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19+50	4.1905	1.18	Q	|	|	|	V |
19+55	4.1985	1.17	Q	|	|	|	V |
20+ 0	4.2064	1.15	Q	|	|	|	V |
20+ 5	4.2143	1.14	Q	|	|	|	V |
20+10	4.2220	1.12	Q	|	|	|	V |
20+15	4.2296	1.11	Q	|	|	|	V |
20+20	4.2372	1.09	Q	|	|	|	V |
20+25	4.2446	1.08	Q	|	|	|	V |
20+30	4.2520	1.07	Q	|	|	|	V |
20+35	4.2592	1.06	Q	|	|	|	V |
20+40	4.2664	1.04	Q	|	|	|	V |
20+45	4.2735	1.03	Q	|	|	|	V |
20+50	4.2806	1.02	Q	|	|	|	V |
20+55	4.2875	1.01	Q	|	|	|	V |
21+ 0	4.2944	1.00	Q	|	|	|	V |
21+ 5	4.3012	0.99	Q	|	|	|	V |
21+10	4.3079	0.98	Q	|	|	|	V |
21+15	4.3146	0.97	Q	|	|	|	V |
21+20	4.3212	0.96	Q	|	|	|	V |
21+25	4.3277	0.95	Q	|	|	|	V |
21+30	4.3342	0.94	Q	|	|	|	V |
21+35	4.3406	0.93	Q	|	|	|	V |
21+40	4.3469	0.92	Q	|	|	|	V |
21+45	4.3532	0.91	Q	|	|	|	V |
21+50	4.3594	0.90	Q	|	|	|	V |
21+55	4.3656	0.90	Q	|	|	|	V |
22+ 0	4.3717	0.89	Q	|	|	|	V |
22+ 5	4.3778	0.88	Q	|	|	|	V |
22+10	4.3838	0.87	Q	|	|	|	V |
22+15	4.3898	0.87	Q	|	|	|	V |
22+20	4.3957	0.86	Q	|	|	|	V |
22+25	4.4016	0.85	Q	|	|	|	V |
22+30	4.4074	0.84	Q	|	|	|	V|
22+35	4.4132	0.84	Q	|	|	|	V|
22+40	4.4189	0.83	Q	|	|	|	V|
22+45	4.4246	0.83	Q	|	|	|	V|
22+50	4.4302	0.82	Q	|	|	|	V|
22+55	4.4358	0.81	Q	|	|	|	V|
23+ 0	4.4414	0.81	Q	|	|	|	V|
23+ 5	4.4469	0.80	Q	|	|	|	V|
23+10	4.4523	0.79	Q	|	|	|	V|
23+15	4.4578	0.79	Q	|	|	|	V|
23+20	4.4632	0.78	Q	|	|	|	V|
23+25	4.4685	0.78	Q	|	|	|	V|
23+30	4.4738	0.77	Q	|	|	|	V|
23+35	4.4791	0.77	Q	|	|	|	V|
23+40	4.4844	0.76	Q	|	|	|	V|
23+45	4.4896	0.76	Q	|	|	|	V|
23+50	4.4947	0.75	Q	|	|	|	V|
23+55	4.4999	0.75	Q	|	|	|	V|
24+ 0	4.5050	0.74	Q	|	|	|	V|
24+ 5	4.5098	0.70	Q	|	|	|	V|
24+10	4.5129	0.46	Q	|	|	|	V|
24+15	4.5144	0.21	Q	|	|	|	V|
24+20	4.5152	0.12	Q	|	|	|	V|
24+25	4.5156	0.07	Q	|	|	|	V|
24+30	4.5159	0.04	Q	|	|	|	V|

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   24+35       4.5160      0.02  Q         |         |         |        V|
   24+40       4.5161      0.01  Q         |         |         |        V|
   24+45       4.5162      0.01  Q         |         |         |        V|
   24+50       4.5162      0.01  Q         |         |         |         V
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U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA C
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
34.10	6	0.82
Rainfall data for year 2		
34.10	24	1.37
Rainfall data for year 100		
34.10	6	2.34
Rainfall data for year 100		
34.10	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
79.0	34.10	1.000	0.398	1.000	0.398

Area-averaged adjusted loss rate Fm (In/Hr) = 0.398

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
34.10	1.000	79.0	2.66	0.494

Area-averaged catchment yield fraction, Y = 0.494
Area-averaged low loss fraction, Yb = 0.506
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Watercourse length = 3425.00(Ft.)
Length from concentration point to centroid = 1790.00(Ft.)
Elevation difference along watercourse = 870.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 34.10(Ac.)
Catchment Lag time = 0.137 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 60.6342
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.398(In/Hr)
Average low loss rate fraction (Yb) = 0.506 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 34.10(Ac.) (Ref: fig. E-4)

5-minute factor = 0.998 Adjusted rainfall = 0.383(In)
30-minute factor = 0.998 Adjusted rainfall = 0.859(In)
1-hour factor = 0.998 Adjusted rainfall = 1.173(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 412.40 (CFS))

1	5.723	23.599
2	38.031	133.240
3	71.554	138.248
4	83.842	50.673
5	90.907	29.139
6	95.161	17.540
7	97.444	9.418
8	98.309	3.565
9	98.727	1.725
10	99.145	1.725
11	100.000	3.526

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.383
2	3.15	0.52	0.52	0.140
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018

40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011

97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.72	2.72	0.010
107	0.31	2.74	2.73	0.010
108	0.31	2.75	2.74	0.010
109	0.30	2.76	2.75	0.010
110	0.30	2.77	2.76	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.93	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008

154	0.25	3.16	3.16	0.008
155	0.25	3.16	3.16	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.30	3.30	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.41	3.41	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007

211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.73	3.73	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006

268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0028	0.0027
2	0.0055	0.0028	0.0027
3	0.0056	0.0028	0.0028
4	0.0056	0.0028	0.0028
5	0.0056	0.0028	0.0028
6	0.0056	0.0028	0.0028
7	0.0056	0.0029	0.0028
8	0.0057	0.0029	0.0028
9	0.0057	0.0029	0.0028
10	0.0057	0.0029	0.0028
11	0.0057	0.0029	0.0028
12	0.0057	0.0029	0.0028
13	0.0058	0.0029	0.0028
14	0.0058	0.0029	0.0028
15	0.0058	0.0029	0.0029
16	0.0058	0.0029	0.0029
17	0.0058	0.0030	0.0029
18	0.0058	0.0030	0.0029
19	0.0059	0.0030	0.0029
20	0.0059	0.0030	0.0029
21	0.0059	0.0030	0.0029
22	0.0059	0.0030	0.0029
23	0.0060	0.0030	0.0029
24	0.0060	0.0030	0.0029
25	0.0060	0.0030	0.0030
26	0.0060	0.0030	0.0030
27	0.0060	0.0031	0.0030
28	0.0061	0.0031	0.0030
29	0.0061	0.0031	0.0030
30	0.0061	0.0031	0.0030

31	0.0061	0.0031	0.0030
32	0.0061	0.0031	0.0030
33	0.0062	0.0031	0.0031
34	0.0062	0.0031	0.0031
35	0.0062	0.0032	0.0031
36	0.0062	0.0032	0.0031
37	0.0063	0.0032	0.0031
38	0.0063	0.0032	0.0031
39	0.0063	0.0032	0.0031
40	0.0063	0.0032	0.0031
41	0.0064	0.0032	0.0031
42	0.0064	0.0032	0.0032
43	0.0064	0.0033	0.0032
44	0.0064	0.0033	0.0032
45	0.0065	0.0033	0.0032
46	0.0065	0.0033	0.0032
47	0.0065	0.0033	0.0032
48	0.0066	0.0033	0.0032
49	0.0066	0.0033	0.0033
50	0.0066	0.0033	0.0033
51	0.0066	0.0034	0.0033
52	0.0067	0.0034	0.0033
53	0.0067	0.0034	0.0033
54	0.0067	0.0034	0.0033
55	0.0068	0.0034	0.0033
56	0.0068	0.0034	0.0033
57	0.0068	0.0035	0.0034
58	0.0068	0.0035	0.0034
59	0.0069	0.0035	0.0034
60	0.0069	0.0035	0.0034
61	0.0069	0.0035	0.0034
62	0.0070	0.0035	0.0034
63	0.0070	0.0035	0.0035
64	0.0070	0.0036	0.0035
65	0.0071	0.0036	0.0035
66	0.0071	0.0036	0.0035
67	0.0071	0.0036	0.0035
68	0.0072	0.0036	0.0035
69	0.0072	0.0036	0.0036
70	0.0072	0.0037	0.0036
71	0.0073	0.0037	0.0036
72	0.0073	0.0037	0.0036
73	0.0074	0.0037	0.0036
74	0.0074	0.0037	0.0036
75	0.0074	0.0038	0.0037
76	0.0075	0.0038	0.0037
77	0.0075	0.0038	0.0037
78	0.0075	0.0038	0.0037
79	0.0076	0.0038	0.0038
80	0.0076	0.0039	0.0038
81	0.0077	0.0039	0.0038
82	0.0077	0.0039	0.0038
83	0.0078	0.0039	0.0038
84	0.0078	0.0039	0.0038
85	0.0078	0.0040	0.0039
86	0.0079	0.0040	0.0039
87	0.0079	0.0040	0.0039

88	0.0080	0.0040	0.0039
89	0.0080	0.0041	0.0040
90	0.0081	0.0041	0.0040
91	0.0081	0.0041	0.0040
92	0.0082	0.0041	0.0040
93	0.0082	0.0042	0.0041
94	0.0083	0.0042	0.0041
95	0.0083	0.0042	0.0041
96	0.0084	0.0042	0.0041
97	0.0084	0.0043	0.0042
98	0.0085	0.0043	0.0042
99	0.0085	0.0043	0.0042
100	0.0086	0.0043	0.0042
101	0.0086	0.0044	0.0043
102	0.0087	0.0044	0.0043
103	0.0088	0.0044	0.0043
104	0.0088	0.0045	0.0044
105	0.0089	0.0045	0.0044
106	0.0089	0.0045	0.0044
107	0.0090	0.0046	0.0045
108	0.0091	0.0046	0.0045
109	0.0091	0.0046	0.0045
110	0.0092	0.0046	0.0045
111	0.0093	0.0047	0.0046
112	0.0093	0.0047	0.0046
113	0.0094	0.0048	0.0047
114	0.0095	0.0048	0.0047
115	0.0096	0.0048	0.0047
116	0.0096	0.0049	0.0047
117	0.0097	0.0049	0.0048
118	0.0098	0.0049	0.0048
119	0.0099	0.0050	0.0049
120	0.0099	0.0050	0.0049
121	0.0100	0.0051	0.0050
122	0.0101	0.0051	0.0050
123	0.0102	0.0052	0.0050
124	0.0103	0.0052	0.0051
125	0.0104	0.0053	0.0051
126	0.0105	0.0053	0.0052
127	0.0106	0.0054	0.0052
128	0.0107	0.0054	0.0053
129	0.0108	0.0055	0.0053
130	0.0109	0.0055	0.0054
131	0.0110	0.0056	0.0054
132	0.0111	0.0056	0.0055
133	0.0112	0.0057	0.0055
134	0.0113	0.0057	0.0056
135	0.0115	0.0058	0.0057
136	0.0115	0.0058	0.0057
137	0.0117	0.0059	0.0058
138	0.0118	0.0060	0.0058
139	0.0120	0.0061	0.0059
140	0.0121	0.0061	0.0060
141	0.0122	0.0062	0.0060
142	0.0123	0.0062	0.0061
143	0.0125	0.0063	0.0062
144	0.0126	0.0064	0.0062

145	0.0126	0.0064	0.0062
146	0.0127	0.0064	0.0063
147	0.0129	0.0065	0.0064
148	0.0130	0.0066	0.0064
149	0.0132	0.0067	0.0065
150	0.0134	0.0068	0.0066
151	0.0136	0.0069	0.0067
152	0.0138	0.0070	0.0068
153	0.0141	0.0071	0.0069
154	0.0142	0.0072	0.0070
155	0.0145	0.0073	0.0072
156	0.0147	0.0074	0.0072
157	0.0150	0.0076	0.0074
158	0.0152	0.0077	0.0075
159	0.0155	0.0079	0.0077
160	0.0157	0.0080	0.0078
161	0.0161	0.0082	0.0080
162	0.0164	0.0083	0.0081
163	0.0168	0.0085	0.0083
164	0.0170	0.0086	0.0084
165	0.0175	0.0089	0.0087
166	0.0178	0.0090	0.0088
167	0.0184	0.0093	0.0091
168	0.0187	0.0094	0.0092
169	0.0194	0.0098	0.0096
170	0.0197	0.0100	0.0097
171	0.0204	0.0103	0.0101
172	0.0208	0.0105	0.0103
173	0.0217	0.0110	0.0107
174	0.0222	0.0112	0.0110
175	0.0232	0.0117	0.0115
176	0.0237	0.0120	0.0117
177	0.0250	0.0126	0.0123
178	0.0256	0.0130	0.0127
179	0.0271	0.0137	0.0134
180	0.0280	0.0142	0.0138
181	0.0299	0.0151	0.0148
182	0.0310	0.0157	0.0153
183	0.0336	0.0170	0.0166
184	0.0351	0.0177	0.0173
185	0.0450	0.0228	0.0223
186	0.0474	0.0240	0.0234
187	0.0532	0.0269	0.0263
188	0.0570	0.0288	0.0282
189	0.0676	0.0332*	0.0345
190	0.0756	0.0332*	0.0424
191	0.1049	0.0332*	0.0717
192	0.1404	0.0332*	0.1072
193	0.3835	0.0332*	0.3503
194	0.0869	0.0332*	0.0537
195	0.0617	0.0312	0.0305
196	0.0500	0.0253	0.0247
197	0.0368	0.0186	0.0182
198	0.0322	0.0163	0.0159
199	0.0289	0.0146	0.0143
200	0.0264	0.0133	0.0130
201	0.0243	0.0123	0.0120

202	0.0227	0.0115	0.0112
203	0.0213	0.0108	0.0105
204	0.0201	0.0102	0.0099
205	0.0190	0.0096	0.0094
206	0.0181	0.0092	0.0089
207	0.0173	0.0087	0.0085
208	0.0166	0.0084	0.0082
209	0.0159	0.0081	0.0079
210	0.0154	0.0078	0.0076
211	0.0148	0.0075	0.0073
212	0.0144	0.0073	0.0071
213	0.0139	0.0070	0.0069
214	0.0135	0.0068	0.0067
215	0.0131	0.0066	0.0065
216	0.0128	0.0065	0.0063
217	0.0127	0.0065	0.0063
218	0.0124	0.0063	0.0061
219	0.0121	0.0061	0.0060
220	0.0119	0.0060	0.0059
221	0.0116	0.0059	0.0057
222	0.0114	0.0058	0.0056
223	0.0111	0.0056	0.0055
224	0.0109	0.0055	0.0054
225	0.0107	0.0054	0.0053
226	0.0105	0.0053	0.0052
227	0.0103	0.0052	0.0051
228	0.0102	0.0051	0.0050
229	0.0100	0.0051	0.0049
230	0.0098	0.0050	0.0049
231	0.0097	0.0049	0.0048
232	0.0095	0.0048	0.0047
233	0.0094	0.0047	0.0046
234	0.0092	0.0047	0.0046
235	0.0091	0.0046	0.0045
236	0.0090	0.0045	0.0044
237	0.0088	0.0045	0.0044
238	0.0087	0.0044	0.0043
239	0.0086	0.0044	0.0043
240	0.0085	0.0043	0.0042
241	0.0084	0.0042	0.0041
242	0.0083	0.0042	0.0041
243	0.0082	0.0041	0.0040
244	0.0081	0.0041	0.0040
245	0.0080	0.0040	0.0040
246	0.0079	0.0040	0.0039
247	0.0078	0.0040	0.0039
248	0.0077	0.0039	0.0038
249	0.0076	0.0039	0.0038
250	0.0076	0.0038	0.0037
251	0.0075	0.0038	0.0037
252	0.0074	0.0037	0.0037
253	0.0073	0.0037	0.0036
254	0.0073	0.0037	0.0036
255	0.0072	0.0036	0.0036
256	0.0071	0.0036	0.0035
257	0.0071	0.0036	0.0035
258	0.0070	0.0035	0.0035

259	0.0069	0.0035	0.0034
260	0.0069	0.0035	0.0034
261	0.0068	0.0034	0.0034
262	0.0067	0.0034	0.0033
263	0.0067	0.0034	0.0033
264	0.0066	0.0034	0.0033
265	0.0066	0.0033	0.0032
266	0.0065	0.0033	0.0032
267	0.0065	0.0033	0.0032
268	0.0064	0.0032	0.0032
269	0.0064	0.0032	0.0031
270	0.0063	0.0032	0.0031
271	0.0063	0.0032	0.0031
272	0.0062	0.0031	0.0031
273	0.0062	0.0031	0.0030
274	0.0061	0.0031	0.0030
275	0.0061	0.0031	0.0030
276	0.0060	0.0030	0.0030
277	0.0060	0.0030	0.0030
278	0.0059	0.0030	0.0029
279	0.0059	0.0030	0.0029
280	0.0059	0.0030	0.0029
281	0.0058	0.0029	0.0029
282	0.0058	0.0029	0.0029
283	0.0057	0.0029	0.0028
284	0.0057	0.0029	0.0028
285	0.0057	0.0029	0.0028
286	0.0056	0.0028	0.0028
287	0.0056	0.0028	0.0028
288	0.0056	0.0028	0.0027
	4.0397	1.8084	2.2314

Total soil rain loss = 1.81(In)
Total effective rainfall = 2.23(In)
Peak flow rate in flood hydrograph = 68.73(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

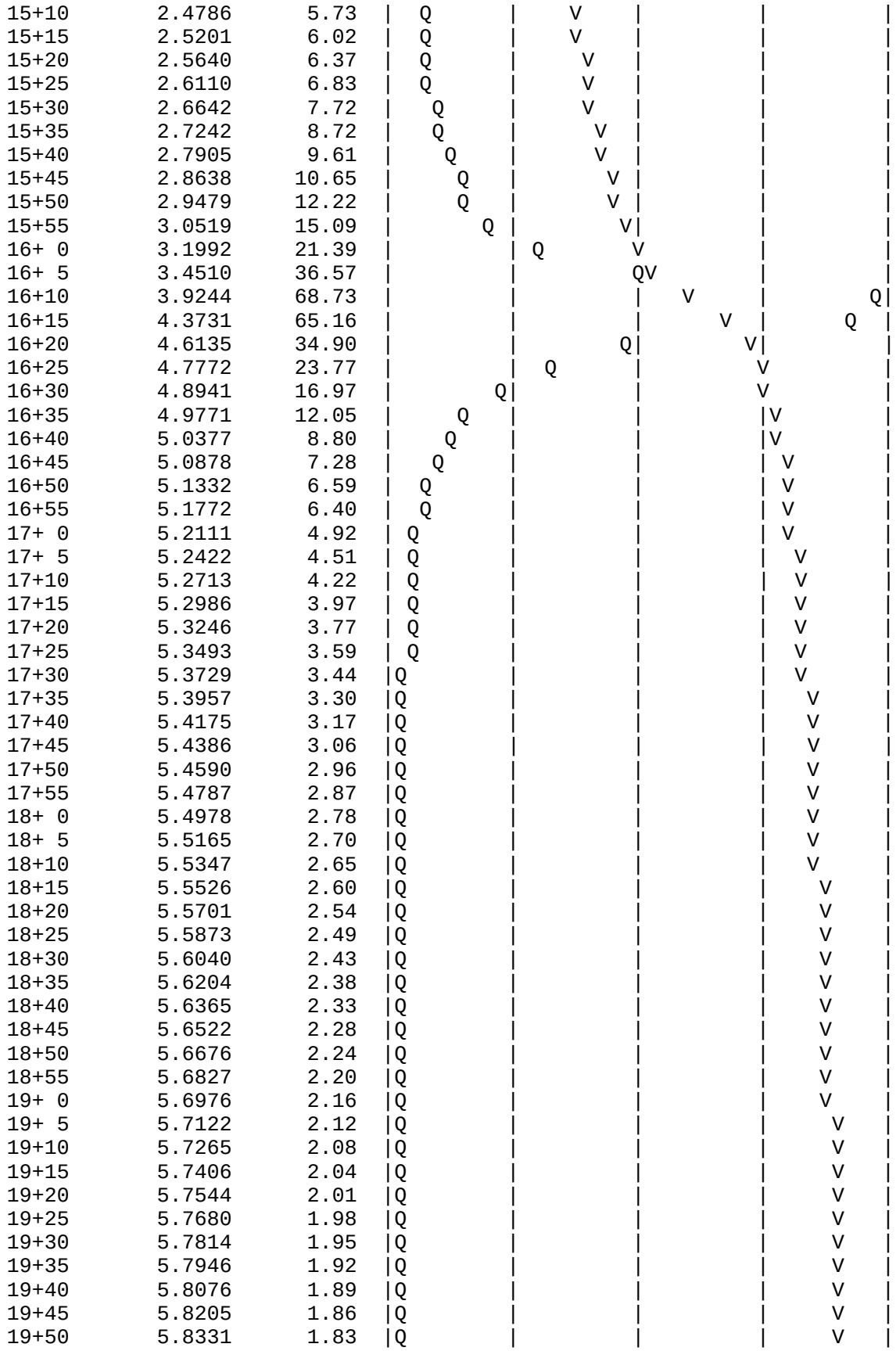
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0004	0.06	Q	|	|	|	|
0+10	0.0034	0.43	Q	|	|	|	|
0+15	0.0090	0.81	Q	|	|	|	|
0+20	0.0155	0.95	Q	|	|	|	|
0+25	0.0226	1.03	Q	|	|	|	|
0+30	0.0301	1.08	Q	|	|	|	|
0+35	0.0377	1.11	Q	|	|	|	|
0+40	0.0455	1.13	Q	|	|	|	|
0+45	0.0533	1.13	Q	|	|	|	|
0+50	0.0611	1.14	Q	|	|	|	|

0+55	0.0691	1.16	Q	|	|	|	|
1+ 0	0.0771	1.16	Q	|	|	|	|
1+ 5	0.0851	1.16	Q	|	|	|	|
1+10	0.0931	1.17	Q	|	|	|	|
1+15	0.1012	1.17	Q	|	|	|	|
1+20	0.1093	1.17	Q	|	|	|	|
1+25	0.1174	1.18	Q	|	|	|	|
1+30	0.1255	1.18	Q	|	|	|	|
1+35	0.1337	1.19	Q	|	|	|	|
1+40	0.1419	1.19	Q	|	|	|	|
1+45	0.1501	1.19	Q	|	|	|	|
1+50	0.1584	1.20	Q	|	|	|	|
1+55	0.1667	1.20	QV	|	|	|	|
2+ 0	0.1750	1.21	QV	|	|	|	|
2+ 5	0.1833	1.21	QV	|	|	|	|
2+10	0.1917	1.22	QV	|	|	|	|
2+15	0.2001	1.22	QV	|	|	|	|
2+20	0.2086	1.23	QV	|	|	|	|
2+25	0.2170	1.23	QV	|	|	|	|
2+30	0.2255	1.23	QV	|	|	|	|
2+35	0.2341	1.24	QV	|	|	|	|
2+40	0.2426	1.24	QV	|	|	|	|
2+45	0.2512	1.25	QV	|	|	|	|
2+50	0.2598	1.25	QV	|	|	|	|
2+55	0.2685	1.26	QV	|	|	|	|
3+ 0	0.2772	1.26	QV	|	|	|	|
3+ 5	0.2859	1.27	QV	|	|	|	|
3+10	0.2947	1.27	QV	|	|	|	|
3+15	0.3035	1.28	QV	|	|	|	|
3+20	0.3123	1.28	QV	|	|	|	|
3+25	0.3212	1.29	Q V	|	|	|	|
3+30	0.3301	1.29	Q V	|	|	|	|
3+35	0.3390	1.30	Q V	|	|	|	|
3+40	0.3480	1.30	Q V	|	|	|	|
3+45	0.3570	1.31	Q V	|	|	|	|
3+50	0.3660	1.31	Q V	|	|	|	|
3+55	0.3751	1.32	Q V	|	|	|	|
4+ 0	0.3842	1.32	Q V	|	|	|	|
4+ 5	0.3933	1.33	Q V	|	|	|	|
4+10	0.4025	1.33	Q V	|	|	|	|
4+15	0.4118	1.34	Q V	|	|	|	|
4+20	0.4210	1.35	Q V	|	|	|	|
4+25	0.4303	1.35	Q V	|	|	|	|
4+30	0.4397	1.36	Q V	|	|	|	|
4+35	0.4491	1.36	Q V	|	|	|	|
4+40	0.4585	1.37	Q V	|	|	|	|
4+45	0.4680	1.38	Q V	|	|	|	|
4+50	0.4775	1.38	Q V	|	|	|	|
4+55	0.4871	1.39	Q V	|	|	|	|
5+ 0	0.4967	1.39	Q V	|	|	|	|
5+ 5	0.5063	1.40	Q V	|	|	|	|
5+10	0.5160	1.41	Q V	|	|	|	|
5+15	0.5257	1.41	Q V	|	|	|	|
5+20	0.5355	1.42	Q V	|	|	|	|
5+25	0.5453	1.43	Q V	|	|	|	|
5+30	0.5552	1.43	Q V	|	|	|	|
5+35	0.5651	1.44	Q V	|	|	|	|

5+40	0.5750	1.45	Q	V	|	|	|	|
5+45	0.5850	1.45	Q	V	|	|	|	|
5+50	0.5951	1.46	Q	V	|	|	|	|
5+55	0.6052	1.47	Q	V	|	|	|	|
6+ 0	0.6154	1.47	Q	V	|	|	|	|
6+ 5	0.6256	1.48	Q	V	|	|	|	|
6+10	0.6358	1.49	Q	V	|	|	|	|
6+15	0.6461	1.50	Q	V	|	|	|	|
6+20	0.6565	1.50	Q	V	|	|	|	|
6+25	0.6669	1.51	Q	V	|	|	|	|
6+30	0.6774	1.52	Q	V	|	|	|	|
6+35	0.6879	1.53	Q	V	|	|	|	|
6+40	0.6985	1.54	Q	V	|	|	|	|
6+45	0.7091	1.54	Q	V	|	|	|	|
6+50	0.7198	1.55	Q	V	|	|	|	|
6+55	0.7306	1.56	Q	V	|	|	|	|
7+ 0	0.7414	1.57	Q	V	|	|	|	|
7+ 5	0.7522	1.58	Q	V	|	|	|	|
7+10	0.7632	1.59	Q	V	|	|	|	|
7+15	0.7741	1.60	Q	V	|	|	|	|
7+20	0.7852	1.60	Q	V	|	|	|	|
7+25	0.7963	1.61	Q	V	|	|	|	|
7+30	0.8075	1.62	Q	V	|	|	|	|
7+35	0.8187	1.63	Q	V	|	|	|	|
7+40	0.8300	1.64	Q	V	|	|	|	|
7+45	0.8414	1.65	Q	V	|	|	|	|
7+50	0.8528	1.66	Q	V	|	|	|	|
7+55	0.8644	1.67	Q	V	|	|	|	|
8+ 0	0.8759	1.68	Q	V	|	|	|	|
8+ 5	0.8876	1.69	Q	V	|	|	|	|
8+10	0.8993	1.70	Q	V	|	|	|	|
8+15	0.9111	1.71	Q	V	|	|	|	|
8+20	0.9230	1.72	Q	V	|	|	|	|
8+25	0.9350	1.74	Q	V	|	|	|	|
8+30	0.9470	1.75	Q	V	|	|	|	|
8+35	0.9591	1.76	|Q	V	|	|	|	|
8+40	0.9713	1.77	|Q	V	|	|	|	|
8+45	0.9836	1.78	|Q	V	|	|	|	|
8+50	0.9959	1.79	|Q	V	|	|	|	|
8+55	1.0083	1.81	|Q	V	|	|	|	|
9+ 0	1.0209	1.82	|Q	V	|	|	|	|
9+ 5	1.0335	1.83	|Q	V	|	|	|	|
9+10	1.0462	1.84	|Q	V	|	|	|	|
9+15	1.0590	1.86	|Q	V	|	|	|	|
9+20	1.0719	1.87	|Q	V	|	|	|	|
9+25	1.0849	1.89	|Q	V	|	|	|	|
9+30	1.0979	1.90	|Q	V	|	|	|	|
9+35	1.1111	1.91	|Q	V	|	|	|	|
9+40	1.1244	1.93	|Q	V	|	|	|	|
9+45	1.1378	1.94	|Q	V	|	|	|	|
9+50	1.1513	1.96	|Q	V	|	|	|	|
9+55	1.1649	1.97	|Q	V	|	|	|	|
10+ 0	1.1786	1.99	|Q	V	|	|	|	|
10+ 5	1.1924	2.01	|Q	V	|	|	|	|
10+10	1.2063	2.02	|Q	V	|	|	|	|
10+15	1.2204	2.04	|Q	V	|	|	|	|
10+20	1.2345	2.06	|Q	V	|	|	|	|

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10+25       1.2488      2.08  |Q     V  |          |          |          |
10+30       1.2633      2.09  |Q     V  |          |          |          |
10+35       1.2778      2.11  |Q      V |          |          |          |
10+40       1.2925      2.13  |Q      V |          |          |          |
10+45       1.3073      2.15  |Q      V |          |          |          |
10+50       1.3222      2.17  |Q      V |          |          |          |
10+55       1.3373      2.19  |Q      V |          |          |          |
11+ 0       1.3525      2.21  |Q      V |          |          |          |
11+ 5       1.3679      2.23  |Q      V |          |          |          |
11+10       1.3835      2.26  |Q      V |          |          |          |
11+15       1.3992      2.28  |Q      V |          |          |          |
11+20       1.4150      2.30  |Q      V |          |          |          |
11+25       1.4310      2.33  |Q       V|          |          |          |
11+30       1.4472      2.35  |Q       V|          |          |          |
11+35       1.4636      2.38  |Q       V|          |          |          |
11+40       1.4801      2.40  |Q       V|          |          |          |
11+45       1.4968      2.43  |Q       V|          |          |          |
11+50       1.5138      2.46  |Q       V|          |          |          |
11+55       1.5309      2.48  |Q       V|          |          |          |
12+ 0       1.5482      2.51  |Q       V|          |          |          |
12+ 5       1.5657      2.54  |Q       V|          |          |          |
12+10       1.5833      2.55  |Q       V|          |          |          |
12+15       1.6009      2.56  |Q        V          |          |          |
12+20       1.6188      2.59  |Q        V          |          |          |
12+25       1.6368      2.62  |Q        V          |          |          |
12+30       1.6551      2.65  |Q        V          |          |          |
12+35       1.6736      2.69  |Q        V          |          |          |
12+40       1.6924      2.73  |Q        V          |          |          |
12+45       1.7114      2.77  |Q        V          |          |          |
12+50       1.7308      2.81  |Q        V          |          |          |
12+55       1.7504      2.85  |Q         |V         |          |          |
13+ 0       1.7703      2.89  |Q         |V         |          |          |
13+ 5       1.7906      2.94  |Q         |V         |          |          |
13+10       1.8112      2.99  |Q         |V         |          |          |
13+15       1.8321      3.04  |Q         |V         |          |          |
13+20       1.8534      3.09  |Q         |V         |          |          |
13+25       1.8751      3.15  |Q         |V         |          |          |
13+30       1.8972      3.21  |Q         |V         |          |          |
13+35       1.9197      3.27  |Q         | V        |          |          |
13+40       1.9427      3.33  |Q         | V        |          |          |
13+45       1.9661      3.40  |Q         | V        |          |          |
13+50       1.9901      3.48  |Q         | V        |          |          |
13+55       2.0145      3.55  | Q        | V        |          |          |
14+ 0       2.0395      3.63  | Q        | V        |          |          |
14+ 5       2.0651      3.72  | Q        |  V       |          |          |
14+10       2.0914      3.81  | Q        |  V       |          |          |
14+15       2.1183      3.91  | Q        |  V       |          |          |
14+20       2.1460      4.02  | Q        |  V       |          |          |
14+25       2.1745      4.13  | Q        |  V       |          |          |
14+30       2.2038      4.25  | Q        |  V       |          |          |
14+35       2.2339      4.38  | Q        |   V      |          |          |
14+40       2.2651      4.53  | Q        |   V      |          |          |
14+45       2.2973      4.68  | Q        |   V      |          |          |
14+50       2.3307      4.85  | Q        |   V      |          |          |
14+55       2.3654      5.03  | Q        |   V      |          |          |
15+ 0       2.4015      5.24  | Q        |    V     |          |          |
15+ 5       2.4392      5.47  |  Q       |    V     |          |          |
```



19+55	5.8455	1.81	|Q	|	|	|	V |
20+ 0	5.8578	1.78	|Q	|	|	|	V |
20+ 5	5.8700	1.76	|Q	|	|	|	V |
20+10	5.8819	1.74	Q	|	|	|	V |
20+15	5.8937	1.72	Q	|	|	|	V |
20+20	5.9054	1.69	Q	|	|	|	V |
20+25	5.9169	1.67	Q	|	|	|	V |
20+30	5.9283	1.65	Q	|	|	|	V |
20+35	5.9396	1.63	Q	|	|	|	V |
20+40	5.9507	1.62	Q	|	|	|	V |
20+45	5.9617	1.60	Q	|	|	|	V |
20+50	5.9726	1.58	Q	|	|	|	V |
20+55	5.9834	1.56	Q	|	|	|	V |
21+ 0	5.9940	1.55	Q	|	|	|	V |
21+ 5	6.0045	1.53	Q	|	|	|	V |
21+10	6.0150	1.51	Q	|	|	|	V |
21+15	6.0253	1.50	Q	|	|	|	V |
21+20	6.0355	1.48	Q	|	|	|	V |
21+25	6.0456	1.47	Q	|	|	|	V |
21+30	6.0556	1.45	Q	|	|	|	V |
21+35	6.0655	1.44	Q	|	|	|	V |
21+40	6.0754	1.43	Q	|	|	|	V |
21+45	6.0851	1.41	Q	|	|	|	V |
21+50	6.0948	1.40	Q	|	|	|	V |
21+55	6.1043	1.39	Q	|	|	|	V |
22+ 0	6.1138	1.38	Q	|	|	|	V |
22+ 5	6.1232	1.36	Q	|	|	|	V |
22+10	6.1325	1.35	Q	|	|	|	V |
22+15	6.1418	1.34	Q	|	|	|	V |
22+20	6.1509	1.33	Q	|	|	|	V |
22+25	6.1600	1.32	Q	|	|	|	V |
22+30	6.1690	1.31	Q	|	|	|	V |
22+35	6.1779	1.30	Q	|	|	|	V |
22+40	6.1868	1.29	Q	|	|	|	V|
22+45	6.1956	1.28	Q	|	|	|	V|
22+50	6.2043	1.27	Q	|	|	|	V|
22+55	6.2130	1.26	Q	|	|	|	V|
23+ 0	6.2216	1.25	Q	|	|	|	V|
23+ 5	6.2301	1.24	Q	|	|	|	V|
23+10	6.2386	1.23	Q	|	|	|	V|
23+15	6.2470	1.22	Q	|	|	|	V|
23+20	6.2554	1.21	Q	|	|	|	V|
23+25	6.2637	1.20	Q	|	|	|	V|
23+30	6.2719	1.20	Q	|	|	|	V|
23+35	6.2801	1.19	Q	|	|	|	V|
23+40	6.2882	1.18	Q	|	|	|	V|
23+45	6.2963	1.17	Q	|	|	|	V|
23+50	6.3043	1.16	Q	|	|	|	V|
23+55	6.3123	1.16	Q	|	|	|	V|
24+ 0	6.3202	1.15	Q	|	|	|	V|
24+ 5	6.3276	1.08	Q	|	|	|	V|
24+10	6.3324	0.71	Q	|	|	|	V|
24+15	6.3347	0.32	Q	|	|	|	V|
24+20	6.3359	0.18	Q	|	|	|	V|
24+25	6.3367	0.10	Q	|	|	|	V|
24+30	6.3370	0.06	Q	|	|	|	V|
24+35	6.3372	0.03	Q	|	|	|	V|

```
   24+40       6.3374      0.02  Q         |         |         |        V|
   24+45       6.3375      0.01  Q         |         |         |        V|
   24+50       6.3375      0.01  Q         |         |         |         V
-------------------------------------------------------------------------
```

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA D
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
10.00	6	0.82
Rainfall data for year 2		
10.00	24	1.37
Rainfall data for year 100		
10.00	6	2.34
Rainfall data for year 100		
10.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	10.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
10.00	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
++
Watercourse length = 2225.00(Ft.)
Length from concentration point to centroid = 1305.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 10.00(Ac.)
Catchment Lag time = 0.110 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 75.6060
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 10.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.230(In)
30-minute factor = 1.000 Adjusted rainfall = 0.515(In)
1-hour factor = 1.000 Adjusted rainfall = 0.704(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 120.94 (CFS))

1	8.166	9.875
2	53.593	54.939
3	79.849	31.752
4	90.088	12.383
5	95.440	6.473
6	97.869	2.937
7	98.562	0.838
8	99.083	0.631
9	100.000	1.109

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.52	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.93	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011

42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.55	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007

99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.68	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.85	1.85	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005

156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.98	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.17	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004

213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.33	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004

270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006
29	0.0037	0.0031	0.0006
30	0.0037	0.0031	0.0006
31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006

33	0.0038	0.0032	0.0006
34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006
37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006
40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008
86	0.0048	0.0040	0.0008
87	0.0049	0.0041	0.0008
88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008

90	0.0049	0.0041	0.0008
91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008
94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008
97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0063	0.0012
142	0.0075	0.0063	0.0012
143	0.0077	0.0064	0.0013
144	0.0077	0.0065	0.0013
145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013

147	0.0081	0.0067	0.0013
148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014
151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014
154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0095	0.0019
168	0.0116	0.0097	0.0019
169	0.0120	0.0100	0.0020
170	0.0122	0.0102	0.0020
171	0.0127	0.0106	0.0021
172	0.0129	0.0108	0.0021
173	0.0134	0.0112	0.0022
174	0.0137	0.0115	0.0023
175	0.0143	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0154	0.0129	0.0025
178	0.0158	0.0132	0.0026
179	0.0167	0.0140	0.0028
180	0.0173	0.0144	0.0028
181	0.0184	0.0154	0.0030
182	0.0191	0.0160	0.0031
183	0.0207	0.0173	0.0034
184	0.0216	0.0180	0.0035
185	0.0270	0.0226	0.0044
186	0.0284	0.0237	0.0047
187	0.0319	0.0267	0.0052
188	0.0342	0.0286	0.0056
189	0.0406	0.0339	0.0067
190	0.0453	0.0379	0.0075
191	0.0629	0.0472*	0.0157
192	0.0842	0.0472*	0.0370
193	0.2300	0.0472*	0.1828
194	0.0521	0.0435	0.0086
195	0.0370	0.0309	0.0061
196	0.0300	0.0251	0.0049
197	0.0226	0.0189	0.0037
198	0.0198	0.0166	0.0033
199	0.0178	0.0149	0.0029
200	0.0163	0.0136	0.0027
201	0.0150	0.0126	0.0025
202	0.0140	0.0117	0.0023
203	0.0132	0.0110	0.0022

204	0.0124	0.0104	0.0020
205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018
208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016
211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0013
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0070	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0066	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007
257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007
259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007

261	0.0042	0.0035	0.0007
262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007
265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006
268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4664	1.8872	0.5792

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 11.58(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0000	0.01	Q	|	|	|	|
0+10	0.0003	0.04	Q	|	|	|	|
0+15	0.0007	0.05	Q	|	|	|	|
0+20	0.0011	0.06	Q	|	|	|	|
0+25	0.0015	0.06	Q	|	|	|	|
0+30	0.0020	0.07	Q	|	|	|	|
0+35	0.0024	0.07	Q	|	|	|	|
0+40	0.0029	0.07	Q	|	|	|	|
0+45	0.0034	0.07	Q	|	|	|	|
0+50	0.0039	0.07	Q	|	|	|	|
0+55	0.0043	0.07	Q	|	|	|	|
1+ 0	0.0048	0.07	Q	|	|	|	|

1+ 5	0.0053	0.07	Q				
1+10	0.0058	0.07	Q				
1+15	0.0062	0.07	Q				
1+20	0.0067	0.07	Q				
1+25	0.0072	0.07	Q				
1+30	0.0077	0.07	Q				
1+35	0.0082	0.07	Q				
1+40	0.0087	0.07	Q				
1+45	0.0092	0.07	Q				
1+50	0.0097	0.07	Q				
1+55	0.0102	0.07	Q				
2+ 0	0.0107	0.07	Q				
2+ 5	0.0112	0.07	Q				
2+10	0.0117	0.07	Q				
2+15	0.0122	0.07	QV				
2+20	0.0127	0.07	QV				
2+25	0.0132	0.07	QV				
2+30	0.0137	0.07	QV				
2+35	0.0142	0.07	QV				
2+40	0.0147	0.07	QV				
2+45	0.0152	0.07	QV				
2+50	0.0157	0.07	QV				
2+55	0.0162	0.08	QV				
3+ 0	0.0168	0.08	QV				
3+ 5	0.0173	0.08	QV				
3+10	0.0178	0.08	QV				
3+15	0.0183	0.08	QV				
3+20	0.0189	0.08	QV				
3+25	0.0194	0.08	QV				
3+30	0.0199	0.08	QV				
3+35	0.0205	0.08	QV				
3+40	0.0210	0.08	QV				
3+45	0.0215	0.08	QV				
3+50	0.0221	0.08	QV				
3+55	0.0226	0.08	QV				
4+ 0	0.0232	0.08	QV				
4+ 5	0.0237	0.08	QV				
4+10	0.0243	0.08	Q V				
4+15	0.0248	0.08	Q V				
4+20	0.0254	0.08	Q V				
4+25	0.0259	0.08	Q V				
4+30	0.0265	0.08	Q V				
4+35	0.0270	0.08	Q V				
4+40	0.0276	0.08	Q V				
4+45	0.0282	0.08	Q V				
4+50	0.0287	0.08	Q V				
4+55	0.0293	0.08	Q V				
5+ 0	0.0299	0.08	Q V				
5+ 5	0.0305	0.08	Q V				
5+10	0.0310	0.08	Q V				
5+15	0.0316	0.08	Q V				
5+20	0.0322	0.08	Q V				
5+25	0.0328	0.09	Q V				
5+30	0.0334	0.09	Q V				
5+35	0.0340	0.09	Q V				
5+40	0.0346	0.09	Q V				
5+45	0.0352	0.09	Q V				

5+50	0.0358	0.09	Q V	|	|	|	|
5+55	0.0364	0.09	Q V	|	|	|	|
6+ 0	0.0370	0.09	Q V	|	|	|	|
6+ 5	0.0376	0.09	Q V	|	|	|	|
6+10	0.0382	0.09	Q V	|	|	|	|
6+15	0.0388	0.09	Q V	|	|	|	|
6+20	0.0394	0.09	Q V	|	|	|	|
6+25	0.0401	0.09	Q V	|	|	|	|
6+30	0.0407	0.09	Q V	|	|	|	|
6+35	0.0413	0.09	Q V	|	|	|	|
6+40	0.0420	0.09	Q V	|	|	|	|
6+45	0.0426	0.09	Q V	|	|	|	|
6+50	0.0432	0.09	Q V	|	|	|	|
6+55	0.0439	0.09	Q V	|	|	|	|
7+ 0	0.0445	0.09	Q V	|	|	|	|
7+ 5	0.0452	0.09	Q V	|	|	|	|
7+10	0.0458	0.09	Q V	|	|	|	|
7+15	0.0465	0.10	Q V	|	|	|	|
7+20	0.0471	0.10	Q V	|	|	|	|
7+25	0.0478	0.10	Q V	|	|	|	|
7+30	0.0485	0.10	Q V	|	|	|	|
7+35	0.0491	0.10	Q V	|	|	|	|
7+40	0.0498	0.10	Q V	|	|	|	|
7+45	0.0505	0.10	Q V	|	|	|	|
7+50	0.0512	0.10	Q V	|	|	|	|
7+55	0.0519	0.10	Q V	|	|	|	|
8+ 0	0.0526	0.10	Q V	|	|	|	|
8+ 5	0.0533	0.10	Q V	|	|	|	|
8+10	0.0540	0.10	Q V	|	|	|	|
8+15	0.0547	0.10	Q V	|	|	|	|
8+20	0.0554	0.10	Q V	|	|	|	|
8+25	0.0561	0.10	Q V	|	|	|	|
8+30	0.0568	0.10	Q V	|	|	|	|
8+35	0.0575	0.11	Q V	|	|	|	|
8+40	0.0583	0.11	Q V	|	|	|	|
8+45	0.0590	0.11	Q V	|	|	|	|
8+50	0.0597	0.11	Q V	|	|	|	|
8+55	0.0605	0.11	Q V	|	|	|	|
9+ 0	0.0612	0.11	Q V	|	|	|	|
9+ 5	0.0620	0.11	Q V	|	|	|	|
9+10	0.0628	0.11	Q V	|	|	|	|
9+15	0.0635	0.11	Q V	|	|	|	|
9+20	0.0643	0.11	Q V	|	|	|	|
9+25	0.0651	0.11	Q V	|	|	|	|
9+30	0.0658	0.11	Q V	|	|	|	|
9+35	0.0666	0.11	Q V	|	|	|	|
9+40	0.0674	0.12	Q V	|	|	|	|
9+45	0.0682	0.12	Q V	|	|	|	|
9+50	0.0690	0.12	Q V	|	|	|	|
9+55	0.0699	0.12	Q V	|	|	|	|
10+ 0	0.0707	0.12	Q V	|	|	|	|
10+ 5	0.0715	0.12	Q V	|	|	|	|
10+10	0.0723	0.12	Q V	|	|	|	|
10+15	0.0732	0.12	Q V	|	|	|	|
10+20	0.0740	0.12	Q V	|	|	|	|
10+25	0.0749	0.12	Q V	|	|	|	|
10+30	0.0757	0.13	Q V	|	|	|	|

10+35	0.0766	0.13	Q	V	|	|	|	|
10+40	0.0775	0.13	Q	V	|	|	|	|
10+45	0.0784	0.13	Q	V	|	|	|	|
10+50	0.0793	0.13	Q	V	|	|	|	|
10+55	0.0802	0.13	Q	V	|	|	|	|
11+ 0	0.0811	0.13	Q	V	|	|	|	|
11+ 5	0.0820	0.13	Q	V	|	|	|	|
11+10	0.0829	0.14	Q	V	|	|	|	|
11+15	0.0839	0.14	Q	V	|	|	|	|
11+20	0.0848	0.14	Q	V	|	|	|	|
11+25	0.0858	0.14	Q	V	|	|	|	|
11+30	0.0868	0.14	Q	V	|	|	|	|
11+35	0.0877	0.14	Q	V	|	|	|	|
11+40	0.0887	0.14	Q	V	|	|	|	|
11+45	0.0897	0.15	Q	V	|	|	|	|
11+50	0.0907	0.15	Q	V	|	|	|	|
11+55	0.0918	0.15	Q	V	|	|	|	|
12+ 0	0.0928	0.15	Q	V	|	|	|	|
12+ 5	0.0939	0.15	Q	V	|	|	|	|
12+10	0.0949	0.15	Q	V	|	|	|	|
12+15	0.0960	0.16	Q	V	|	|	|	|
12+20	0.0971	0.16	Q	V	|	|	|	|
12+25	0.0982	0.16	Q	V	|	|	|	|
12+30	0.0993	0.16	Q	V	|	|	|	|
12+35	0.1005	0.16	Q	V	|	|	|	|
12+40	0.1016	0.17	Q	V	|	|	|	|
12+45	0.1028	0.17	Q	V	|	|	|	|
12+50	0.1040	0.17	Q	V	|	|	|	|
12+55	0.1052	0.17	Q	V	|	|	|	|
13+ 0	0.1064	0.18	Q	V	|	|	|	|
13+ 5	0.1076	0.18	Q	V	|	|	|	|
13+10	0.1089	0.18	Q	V	|	|	|	|
13+15	0.1102	0.19	Q	V	|	|	|	|
13+20	0.1115	0.19	Q	V	|	|	|	|
13+25	0.1128	0.19	Q	V	|	|	|	|
13+30	0.1142	0.20	Q	V	|	|	|	|
13+35	0.1156	0.20	Q	V	|	|	|	|
13+40	0.1170	0.20	Q	V	|	|	|	|
13+45	0.1184	0.21	Q	V	|	|	|	|
13+50	0.1199	0.21	Q	V	|	|	|	|
13+55	0.1214	0.22	Q	V	|	|	|	|
14+ 0	0.1229	0.22	Q	V	|	|	|	|
14+ 5	0.1245	0.23	Q	V	|	|	|	|
14+10	0.1261	0.23	Q	V	|	|	|	|
14+15	0.1277	0.24	Q	V	|	|	|	|
14+20	0.1294	0.25	Q	V	|	|	|	|
14+25	0.1312	0.25	Q	V	|	|	|	|
14+30	0.1330	0.26	Q	|	V	|	|	|
14+35	0.1348	0.27	Q	|	V	|	|	|
14+40	0.1367	0.28	Q	|	V	|	|	|
14+45	0.1387	0.29	Q	|	V	|	|	|
14+50	0.1407	0.30	Q	|	V	|	|	|
14+55	0.1429	0.31	Q	|	V	|	|	|
15+ 0	0.1451	0.32	Q	|	V	|	|	|
15+ 5	0.1474	0.33	Q	|	V	|	|	|
15+10	0.1498	0.35	Q	|	V	|	|	|
15+15	0.1523	0.37	Q	|	V	|	|	|

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15+20       0.1550      0.39  Q          | V        |          |          |
15+25       0.1579      0.42  Q          |  V       |          |          |
15+30       0.1612      0.48  Q          |  V       |          |          |
15+35       0.1649      0.53  |Q         |  V       |          |          |
15+40       0.1690      0.59  |Q         |   V      |          |          |
15+45       0.1734      0.65  |Q         |   V      |          |          |
15+50       0.1785      0.74  |Q         |   V      |          |          |
15+55       0.1847      0.90  |Q         |    V     |          |          |
16+ 0       0.1958      1.61  |  Q       |     V    |          |          |
16+ 5       0.2268      4.50  |        Q |       V  |          |          |
16+10       0.3066     11.58  |          |          |  Q V     |          |
16+15       0.3543      6.93  |          |  Q       |        V |          |
16+20       0.3765      3.22  |     Q    |          |          |V         |
16+25       0.3898      1.92  |  Q       |          |          | V        |
16+30       0.3974      1.11  | Q        |          |          | V        |
16+35       0.4019      0.65  |Q         |          |          |  V       |
16+40       0.4057      0.55  |Q         |          |          |  V       |
16+45       0.4095      0.56  |Q         |          |          |  V       |
16+50       0.4118      0.33  Q          |          |          |   V      |
16+55       0.4138      0.30  Q          |          |          |   V      |
17+ 0       0.4158      0.28  Q          |          |          |   V      |
17+ 5       0.4176      0.26  Q          |          |          |   V      |
17+10       0.4193      0.25  Q          |          |          |   V      |
17+15       0.4209      0.23  Q          |          |          |   V      |
17+20       0.4224      0.22  Q          |          |          |    V     |
17+25       0.4239      0.21  Q          |          |          |    V     |
17+30       0.4253      0.20  Q          |          |          |    V     |
17+35       0.4266      0.20  Q          |          |          |    V     |
17+40       0.4280      0.19  Q          |          |          |    V     |
17+45       0.4292      0.18  Q          |          |          |    V     |
17+50       0.4304      0.18  Q          |          |          |    V     |
17+55       0.4316      0.17  Q          |          |          |    V     |
18+ 0       0.4328      0.17  Q          |          |          |    V     |
18+ 5       0.4339      0.16  Q          |          |          |    V     |
18+10       0.4350      0.16  Q          |          |          |     V    |
18+15       0.4360      0.15  Q          |          |          |     V    |
18+20       0.4371      0.15  Q          |          |          |     V    |
18+25       0.4381      0.15  Q          |          |          |     V    |
18+30       0.4391      0.14  Q          |          |          |     V    |
18+35       0.4401      0.14  Q          |          |          |     V    |
18+40       0.4410      0.14  Q          |          |          |     V    |
18+45       0.4419      0.13  Q          |          |          |     V    |
18+50       0.4428      0.13  Q          |          |          |     V    |
18+55       0.4437      0.13  Q          |          |          |     V    |
19+ 0       0.4446      0.13  Q          |          |          |     V    |
19+ 5       0.4455      0.13  Q          |          |          |     V    |
19+10       0.4463      0.12  Q          |          |          |      V   |
19+15       0.4472      0.12  Q          |          |          |      V   |
19+20       0.4480      0.12  Q          |          |          |      V   |
19+25       0.4488      0.12  Q          |          |          |      V   |
19+30       0.4496      0.12  Q          |          |          |      V   |
19+35       0.4504      0.11  Q          |          |          |      V   |
19+40       0.4511      0.11  Q          |          |          |      V   |
19+45       0.4519      0.11  Q          |          |          |      V   |
19+50       0.4526      0.11  Q          |          |          |      V   |
19+55       0.4534      0.11  Q          |          |          |      V   |
20+ 0       0.4541      0.11  Q          |          |          |      V   |
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20+ 5	0.4548	0.10	Q	|	|	|	V |
20+10	0.4555	0.10	Q	|	|	|	V |
20+15	0.4562	0.10	Q	|	|	|	V |
20+20	0.4569	0.10	Q	|	|	|	V |
20+25	0.4576	0.10	Q	|	|	|	V |
20+30	0.4583	0.10	Q	|	|	|	V |
20+35	0.4590	0.10	Q	|	|	|	V |
20+40	0.4596	0.10	Q	|	|	|	V |
20+45	0.4603	0.09	Q	|	|	|	V |
20+50	0.4609	0.09	Q	|	|	|	V |
20+55	0.4616	0.09	Q	|	|	|	V |
21+ 0	0.4622	0.09	Q	|	|	|	V |
21+ 5	0.4628	0.09	Q	|	|	|	V |
21+10	0.4634	0.09	Q	|	|	|	V |
21+15	0.4640	0.09	Q	|	|	|	V |
21+20	0.4647	0.09	Q	|	|	|	V |
21+25	0.4653	0.09	Q	|	|	|	V |
21+30	0.4658	0.09	Q	|	|	|	V |
21+35	0.4664	0.09	Q	|	|	|	V |
21+40	0.4670	0.08	Q	|	|	|	V |
21+45	0.4676	0.08	Q	|	|	|	V |
21+50	0.4682	0.08	Q	|	|	|	V |
21+55	0.4687	0.08	Q	|	|	|	V |
22+ 0	0.4693	0.08	Q	|	|	|	V |
22+ 5	0.4699	0.08	Q	|	|	|	V |
22+10	0.4704	0.08	Q	|	|	|	V|
22+15	0.4710	0.08	Q	|	|	|	V|
22+20	0.4715	0.08	Q	|	|	|	V|
22+25	0.4721	0.08	Q	|	|	|	V|
22+30	0.4726	0.08	Q	|	|	|	V|
22+35	0.4731	0.08	Q	|	|	|	V|
22+40	0.4736	0.08	Q	|	|	|	V|
22+45	0.4742	0.08	Q	|	|	|	V|
22+50	0.4747	0.08	Q	|	|	|	V|
22+55	0.4752	0.07	Q	|	|	|	V|
23+ 0	0.4757	0.07	Q	|	|	|	V|
23+ 5	0.4762	0.07	Q	|	|	|	V|
23+10	0.4767	0.07	Q	|	|	|	V|
23+15	0.4772	0.07	Q	|	|	|	V|
23+20	0.4777	0.07	Q	|	|	|	V|
23+25	0.4782	0.07	Q	|	|	|	V|
23+30	0.4787	0.07	Q	|	|	|	V|
23+35	0.4792	0.07	Q	|	|	|	V|
23+40	0.4797	0.07	Q	|	|	|	V|
23+45	0.4802	0.07	Q	|	|	|	V|
23+50	0.4806	0.07	Q	|	|	|	V|
23+55	0.4811	0.07	Q	|	|	|	V|
24+ 0	0.4816	0.07	Q	|	|	|	V|
24+ 5	0.4820	0.06	Q	|	|	|	V|
24+10	0.4822	0.03	Q	|	|	|	V|
24+15	0.4823	0.01	Q	|	|	|	V|
24+20	0.4824	0.01	Q	|	|	|	V|
24+25	0.4824	0.00	Q	|	|	|	V|
24+30	0.4824	0.00	Q	|	|	|	V|
24+35	0.4824	0.00	Q	|	|	|	V|
24+40	0.4824	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 07/23/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA D
50-YEAR EVENT
HYDROLOGY STUDY

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
10.00	6	0.82
Rainfall data for year 2		
10.00	24	1.37
Rainfall data for year 100		
10.00	6	2.34
Rainfall data for year 100		
10.00	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	10.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
10.00	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
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Watercourse length = 2225.00(Ft.)
Length from concentration point to centroid = 1305.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 10.00(Ac.)
Catchment Lag time = 0.110 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 75.6060
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 10.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.336(In)
30-minute factor = 1.000 Adjusted rainfall = 0.753(In)
1-hour factor = 1.000 Adjusted rainfall = 1.029(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.553(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 120.94 (CFS))

1	8.166	9.875
2	53.593	54.939
3	79.849	31.752
4	90.088	12.383
5	95.440	6.473
6	97.869	2.937
7	98.562	0.838
8	99.083	0.631
9	100.000	1.109

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.042
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.26	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016

42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.80	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009

99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007

156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.83	2.83	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.14	0.006
210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006

213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005

270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015
29	0.0053	0.0038	0.0015
30	0.0053	0.0038	0.0015
31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015

33	0.0054	0.0039	0.0015
34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015
37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015
40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019
86	0.0069	0.0050	0.0019
87	0.0069	0.0050	0.0019
88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019

90	0.0070	0.0051	0.0020
91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020
94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020
97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030
143	0.0110	0.0079	0.0030
144	0.0111	0.0080	0.0031
145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0031

147	0.0116	0.0083	0.0032
148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033
151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035
154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0176	0.0127	0.0049
171	0.0182	0.0132	0.0051
172	0.0186	0.0134	0.0052
173	0.0193	0.0140	0.0054
174	0.0197	0.0143	0.0055
175	0.0206	0.0149	0.0057
176	0.0211	0.0153	0.0059
177	0.0222	0.0160	0.0062
178	0.0228	0.0165	0.0063
179	0.0241	0.0174	0.0067
180	0.0249	0.0180	0.0069
181	0.0266	0.0192	0.0074
182	0.0275	0.0199	0.0076
183	0.0298	0.0215	0.0083
184	0.0311	0.0225	0.0086
185	0.0395	0.0285	0.0110
186	0.0415	0.0300	0.0115
187	0.0467	0.0337	0.0129
188	0.0500	0.0361	0.0139
189	0.0593	0.0429	0.0165
190	0.0663	0.0472*	0.0191
191	0.0919	0.0472*	0.0448
192	0.1231	0.0472*	0.0759
193	0.3362	0.0472*	0.2891
194	0.0762	0.0472*	0.0290
195	0.0541	0.0391	0.0150
196	0.0439	0.0317	0.0122
197	0.0326	0.0236	0.0091
198	0.0286	0.0207	0.0079
199	0.0257	0.0186	0.0071
200	0.0234	0.0169	0.0065
201	0.0216	0.0156	0.0060
202	0.0202	0.0146	0.0056
203	0.0189	0.0137	0.0053

204	0.0179	0.0129	0.0050
205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043
208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0137	0.0099	0.0038
211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0115	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017
257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017
259	0.0060	0.0044	0.0017

260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016
262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016
265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016
268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5526	2.3016	1.2511

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 19.34(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

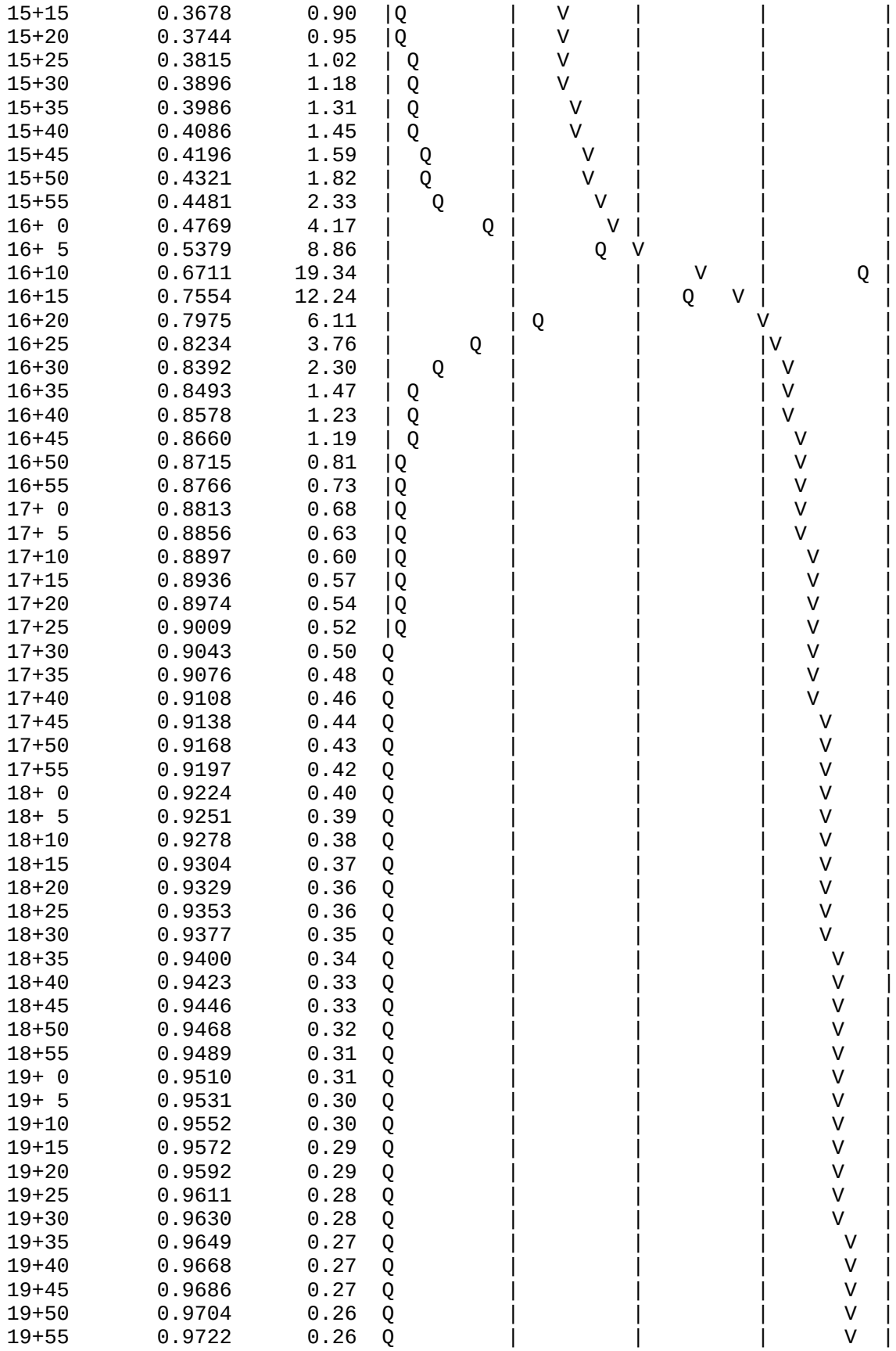
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0007	0.09	Q	|	|	|	|
0+15	0.0016	0.13	Q	|	|	|	|
0+20	0.0026	0.15	Q	|	|	|	|
0+25	0.0037	0.16	Q	|	|	|	|
0+30	0.0048	0.16	Q	|	|	|	|
0+35	0.0059	0.16	Q	|	|	|	|
0+40	0.0070	0.16	Q	|	|	|	|
0+45	0.0081	0.16	Q	|	|	|	|
0+50	0.0093	0.17	Q	|	|	|	|
0+55	0.0104	0.17	Q	|	|	|	|

1+ 0	0.0115	0.17	Q	|	|	|	|
1+ 5	0.0127	0.17	Q	|	|	|	|
1+10	0.0139	0.17	Q	|	|	|	|
1+15	0.0150	0.17	Q	|	|	|	|
1+20	0.0162	0.17	Q	|	|	|	|
1+25	0.0173	0.17	Q	|	|	|	|
1+30	0.0185	0.17	Q	|	|	|	|
1+35	0.0197	0.17	Q	|	|	|	|
1+40	0.0209	0.17	Q	|	|	|	|
1+45	0.0220	0.17	Q	|	|	|	|
1+50	0.0232	0.17	Q	|	|	|	|
1+55	0.0244	0.17	Q	|	|	|	|
2+ 0	0.0256	0.17	Q	|	|	|	|
2+ 5	0.0268	0.17	QV	|	|	|	|
2+10	0.0280	0.17	QV	|	|	|	|
2+15	0.0292	0.18	QV	|	|	|	|
2+20	0.0304	0.18	QV	|	|	|	|
2+25	0.0316	0.18	QV	|	|	|	|
2+30	0.0329	0.18	QV	|	|	|	|
2+35	0.0341	0.18	QV	|	|	|	|
2+40	0.0353	0.18	QV	|	|	|	|
2+45	0.0366	0.18	QV	|	|	|	|
2+50	0.0378	0.18	QV	|	|	|	|
2+55	0.0390	0.18	QV	|	|	|	|
3+ 0	0.0403	0.18	QV	|	|	|	|
3+ 5	0.0415	0.18	QV	|	|	|	|
3+10	0.0428	0.18	QV	|	|	|	|
3+15	0.0441	0.18	QV	|	|	|	|
3+20	0.0453	0.18	QV	|	|	|	|
3+25	0.0466	0.18	QV	|	|	|	|
3+30	0.0479	0.19	QV	|	|	|	|
3+35	0.0492	0.19	QV	|	|	|	|
3+40	0.0505	0.19	QV	|	|	|	|
3+45	0.0518	0.19	QV	|	|	|	|
3+50	0.0531	0.19	Q V	|	|	|	|
3+55	0.0544	0.19	Q V	|	|	|	|
4+ 0	0.0557	0.19	Q V	|	|	|	|
4+ 5	0.0570	0.19	Q V	|	|	|	|
4+10	0.0583	0.19	Q V	|	|	|	|
4+15	0.0596	0.19	Q V	|	|	|	|
4+20	0.0610	0.19	Q V	|	|	|	|
4+25	0.0623	0.19	Q V	|	|	|	|
4+30	0.0636	0.20	Q V	|	|	|	|
4+35	0.0650	0.20	Q V	|	|	|	|
4+40	0.0663	0.20	Q V	|	|	|	|
4+45	0.0677	0.20	Q V	|	|	|	|
4+50	0.0691	0.20	Q V	|	|	|	|
4+55	0.0705	0.20	Q V	|	|	|	|
5+ 0	0.0718	0.20	Q V	|	|	|	|
5+ 5	0.0732	0.20	Q V	|	|	|	|
5+10	0.0746	0.20	Q V	|	|	|	|
5+15	0.0760	0.20	Q V	|	|	|	|
5+20	0.0774	0.20	Q V	|	|	|	|
5+25	0.0788	0.21	Q V	|	|	|	|
5+30	0.0803	0.21	Q V	|	|	|	|
5+35	0.0817	0.21	Q V	|	|	|	|
5+40	0.0831	0.21	Q V	|	|	|	|

5+45	0.0845	0.21	Q	V				
5+50	0.0860	0.21	Q	V				
5+55	0.0875	0.21	Q	V				
6+ 0	0.0889	0.21	Q	V				
6+ 5	0.0904	0.21	Q	V				
6+10	0.0919	0.21	Q	V				
6+15	0.0933	0.22	Q	V				
6+20	0.0948	0.22	Q	V				
6+25	0.0963	0.22	Q	V				
6+30	0.0978	0.22	Q	V				
6+35	0.0994	0.22	Q	V				
6+40	0.1009	0.22	Q	V				
6+45	0.1024	0.22	Q	V				
6+50	0.1039	0.22	Q	V				
6+55	0.1055	0.22	Q	V				
7+ 0	0.1070	0.23	Q	V				
7+ 5	0.1086	0.23	Q	V				
7+10	0.1102	0.23	Q	V				
7+15	0.1118	0.23	Q	V				
7+20	0.1134	0.23	Q	V				
7+25	0.1150	0.23	Q	V				
7+30	0.1166	0.23	Q	V				
7+35	0.1182	0.24	Q	V				
7+40	0.1198	0.24	Q	V				
7+45	0.1215	0.24	Q	V				
7+50	0.1231	0.24	Q	V				
7+55	0.1248	0.24	Q	V				
8+ 0	0.1264	0.24	Q	V				
8+ 5	0.1281	0.24	Q	V				
8+10	0.1298	0.25	Q	V				
8+15	0.1315	0.25	Q	V				
8+20	0.1332	0.25	Q	V				
8+25	0.1349	0.25	Q	V				
8+30	0.1367	0.25	Q	V				
8+35	0.1384	0.25	Q	V				
8+40	0.1402	0.26	Q	V				
8+45	0.1419	0.26	Q	V				
8+50	0.1437	0.26	Q	V				
8+55	0.1455	0.26	Q	V				
9+ 0	0.1473	0.26	Q	V				
9+ 5	0.1491	0.26	Q	V				
9+10	0.1510	0.27	Q	V				
9+15	0.1528	0.27	Q	V				
9+20	0.1547	0.27	Q	V				
9+25	0.1566	0.27	Q	V				
9+30	0.1584	0.27	Q	V				
9+35	0.1603	0.28	Q	V				
9+40	0.1623	0.28	Q	V				
9+45	0.1642	0.28	Q	V				
9+50	0.1661	0.28	Q	V				
9+55	0.1681	0.28	Q	V				
10+ 0	0.1701	0.29	Q	V				
10+ 5	0.1721	0.29	Q	V				
10+10	0.1741	0.29	Q	V				
10+15	0.1761	0.29	Q	V				
10+20	0.1782	0.30	Q	V				
10+25	0.1802	0.30	Q	V				

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10+30       0.1823      0.30  Q     V   |          |          |          |
10+35       0.1844      0.31  Q      V  |          |          |          |
10+40       0.1865      0.31  Q      V  |          |          |          |
10+45       0.1887      0.31  Q      V  |          |          |          |
10+50       0.1908      0.31  Q      V  |          |          |          |
10+55       0.1930      0.32  Q      V  |          |          |          |
11+ 0       0.1952      0.32  Q      V  |          |          |          |
11+ 5       0.1974      0.32  Q      V  |          |          |          |
11+10       0.1997      0.33  Q      V  |          |          |          |
11+15       0.2020      0.33  Q      V  |          |          |          |
11+20       0.2043      0.33  Q      V  |          |          |          |
11+25       0.2066      0.34  Q      V  |          |          |          |
11+30       0.2089      0.34  Q       V |          |          |          |
11+35       0.2113      0.34  Q       V |          |          |          |
11+40       0.2137      0.35  Q       V |          |          |          |
11+45       0.2161      0.35  Q       V |          |          |          |
11+50       0.2185      0.36  Q       V |          |          |          |
11+55       0.2210      0.36  Q       V |          |          |          |
12+ 0       0.2235      0.36  Q       V |          |          |          |
12+ 5       0.2261      0.37  Q       V |          |          |          |
12+10       0.2286      0.37  Q       V |          |          |          |
12+15       0.2312      0.38  Q       V |          |          |          |
12+20       0.2339      0.38  Q       V |          |          |          |
12+25       0.2366      0.39  Q        V|          |          |          |
12+30       0.2393      0.39  Q        V|          |          |          |
12+35       0.2420      0.40  Q        V|          |          |          |
12+40       0.2448      0.40  Q        V|          |          |          |
12+45       0.2476      0.41  Q        V|          |          |          |
12+50       0.2505      0.42  Q        V|          |          |          |
12+55       0.2534      0.42  Q        V|          |          |          |
13+ 0       0.2564      0.43  Q        V|          |          |          |
13+ 5       0.2594      0.44  Q        V|          |          |          |
13+10       0.2624      0.44  Q         V          |          |          |
13+15       0.2655      0.45  Q         V          |          |          |
13+20       0.2687      0.46  Q         V          |          |          |
13+25       0.2719      0.47  Q         V          |          |          |
13+30       0.2752      0.48  Q         V          |          |          |
13+35       0.2785      0.49  Q         V          |          |          |
13+40       0.2820      0.50  Q         V          |          |          |
13+45       0.2854      0.51  |Q        V          |          |          |
13+50       0.2890      0.52  |Q         |V         |          |          |
13+55       0.2926      0.53  |Q         |V         |          |          |
14+ 0       0.2963      0.54  |Q         |V         |          |          |
14+ 5       0.3001      0.55  |Q         |V         |          |          |
14+10       0.3041      0.57  |Q         |V         |          |          |
14+15       0.3080      0.58  |Q         |V         |          |          |
14+20       0.3122      0.60  |Q         |V         |          |          |
14+25       0.3164      0.61  |Q         | V        |          |          |
14+30       0.3207      0.63  |Q         | V        |          |          |
14+35       0.3252      0.65  |Q         | V        |          |          |
14+40       0.3299      0.67  |Q         | V        |          |          |
14+45       0.3346      0.69  |Q         | V        |          |          |
14+50       0.3396      0.72  |Q         |  V       |          |          |
14+55       0.3448      0.75  |Q         |  V       |          |          |
15+ 0       0.3501      0.78  |Q         |  V       |          |          |
15+ 5       0.3558      0.81  |Q         |  V       |          |          |
15+10       0.3617      0.86  |Q         |  V       |          |          |
```



20+ 0	0.9739	0.25	Q	|	|	|	V |
20+ 5	0.9757	0.25	Q	|	|	|	V |
20+10	0.9774	0.25	Q	|	|	|	V |
20+15	0.9791	0.25	Q	|	|	|	V |
20+20	0.9807	0.24	Q	|	|	|	V |
20+25	0.9824	0.24	Q	|	|	|	V |
20+30	0.9840	0.24	Q	|	|	|	V |
20+35	0.9856	0.23	Q	|	|	|	V |
20+40	0.9872	0.23	Q	|	|	|	V |
20+45	0.9888	0.23	Q	|	|	|	V |
20+50	0.9903	0.23	Q	|	|	|	V |
20+55	0.9919	0.22	Q	|	|	|	V |
21+ 0	0.9934	0.22	Q	|	|	|	V |
21+ 5	0.9949	0.22	Q	|	|	|	V |
21+10	0.9964	0.22	Q	|	|	|	V |
21+15	0.9979	0.21	Q	|	|	|	V |
21+20	0.9993	0.21	Q	|	|	|	V |
21+25	1.0008	0.21	Q	|	|	|	V |
21+30	1.0022	0.21	Q	|	|	|	V |
21+35	1.0036	0.21	Q	|	|	|	V |
21+40	1.0050	0.20	Q	|	|	|	V |
21+45	1.0064	0.20	Q	|	|	|	V |
21+50	1.0078	0.20	Q	|	|	|	V |
21+55	1.0092	0.20	Q	|	|	|	V |
22+ 0	1.0105	0.20	Q	|	|	|	V |
22+ 5	1.0119	0.20	Q	|	|	|	V |
22+10	1.0132	0.19	Q	|	|	|	V |
22+15	1.0145	0.19	Q	|	|	|	V |
22+20	1.0158	0.19	Q	|	|	|	V |
22+25	1.0171	0.19	Q	|	|	|	V|
22+30	1.0184	0.19	Q	|	|	|	V|
22+35	1.0197	0.19	Q	|	|	|	V|
22+40	1.0210	0.18	Q	|	|	|	V|
22+45	1.0222	0.18	Q	|	|	|	V|
22+50	1.0235	0.18	Q	|	|	|	V|
22+55	1.0247	0.18	Q	|	|	|	V|
23+ 0	1.0259	0.18	Q	|	|	|	V|
23+ 5	1.0272	0.18	Q	|	|	|	V|
23+10	1.0284	0.18	Q	|	|	|	V|
23+15	1.0296	0.17	Q	|	|	|	V|
23+20	1.0308	0.17	Q	|	|	|	V|
23+25	1.0319	0.17	Q	|	|	|	V|
23+30	1.0331	0.17	Q	|	|	|	V|
23+35	1.0343	0.17	Q	|	|	|	V|
23+40	1.0354	0.17	Q	|	|	|	V|
23+45	1.0366	0.17	Q	|	|	|	V|
23+50	1.0377	0.17	Q	|	|	|	V|
23+55	1.0389	0.17	Q	|	|	|	V|
24+ 0	1.0400	0.16	Q	|	|	|	V|
24+ 5	1.0410	0.15	Q	|	|	|	V|
24+10	1.0416	0.08	Q	|	|	|	V|
24+15	1.0418	0.03	Q	|	|	|	V|
24+20	1.0419	0.02	Q	|	|	|	V|
24+25	1.0420	0.01	Q	|	|	|	V|
24+30	1.0420	0.00	Q	|	|	|	V|
24+35	1.0420	0.00	Q	|	|	|	V|
24+40	1.0420	0.00	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA D
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
10.00	6	0.82
Rainfall data for year 2		
10.00	24	1.37
Rainfall data for year 100		
10.00	6	2.34
Rainfall data for year 100		
10.00	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	10.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
10.00	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 2225.00(Ft.)
Length from concentration point to centroid = 1305.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 10.00(Ac.)
Catchment Lag time = 0.110 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 75.6060
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 10.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.384(In)
30-minute factor = 1.000 Adjusted rainfall = 0.860(In)
1-hour factor = 1.000 Adjusted rainfall = 1.174(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 120.94 (CFS))

1	8.166	9.875
2	53.593	54.939
3	79.849	31.752
4	90.088	12.383
5	95.440	6.473
6	97.869	2.937
7	98.562	0.838
8	99.083	0.631
9	100.000	1.109

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.384
2	3.15	0.52	0.52	0.141
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018

42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011

99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.73	2.73	0.010
107	0.31	2.74	2.74	0.010
108	0.31	2.75	2.75	0.010
109	0.30	2.76	2.76	0.010
110	0.30	2.77	2.77	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.94	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.17	3.17	0.008

156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.31	3.31	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.42	3.42	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007

213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.74	3.74	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006

270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019
29	0.0061	0.0041	0.0019
30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020

33	0.0062	0.0042	0.0020
34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020
37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020
40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025
86	0.0079	0.0054	0.0025
87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026

90	0.0081	0.0055	0.0026
91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026
94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027
97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039
143	0.0125	0.0085	0.0040
144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041

147	0.0129	0.0088	0.0041
148	0.0130	0.0088	0.0042
149	0.0132	0.0090	0.0042
150	0.0134	0.0091	0.0043
151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045
154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0155	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0161	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0193	0.0131	0.0062
170	0.0197	0.0134	0.0063
171	0.0204	0.0139	0.0065
172	0.0208	0.0141	0.0067
173	0.0217	0.0147	0.0069
174	0.0221	0.0150	0.0071
175	0.0231	0.0157	0.0074
176	0.0237	0.0161	0.0076
177	0.0249	0.0169	0.0080
178	0.0256	0.0174	0.0082
179	0.0271	0.0184	0.0087
180	0.0279	0.0190	0.0089
181	0.0299	0.0203	0.0096
182	0.0310	0.0211	0.0099
183	0.0335	0.0228	0.0107
184	0.0350	0.0238	0.0112
185	0.0451	0.0307	0.0144
186	0.0474	0.0322	0.0152
187	0.0533	0.0362	0.0170
188	0.0571	0.0388	0.0183
189	0.0677	0.0461	0.0217
190	0.0757	0.0472*	0.0285
191	0.1050	0.0472*	0.0578
192	0.1405	0.0472*	0.0933
193	0.3839	0.0472*	0.3367
194	0.0870	0.0472*	0.0398
195	0.0618	0.0420	0.0198
196	0.0501	0.0341	0.0160
197	0.0367	0.0250	0.0118
198	0.0322	0.0219	0.0103
199	0.0289	0.0196	0.0092
200	0.0263	0.0179	0.0084
201	0.0243	0.0165	0.0078
202	0.0226	0.0154	0.0072
203	0.0212	0.0144	0.0068

204	0.0200	0.0136	0.0064
205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055
208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049
211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023
257	0.0071	0.0048	0.0023
258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022

261	0.0068	0.0046	0.0022
262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021
265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021
268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0399	2.4445	1.5954

Total soil rain loss = 2.44(In)
Total effective rainfall = 1.60(In)
Peak flow rate in flood hydrograph = 22.86(CFS)

++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

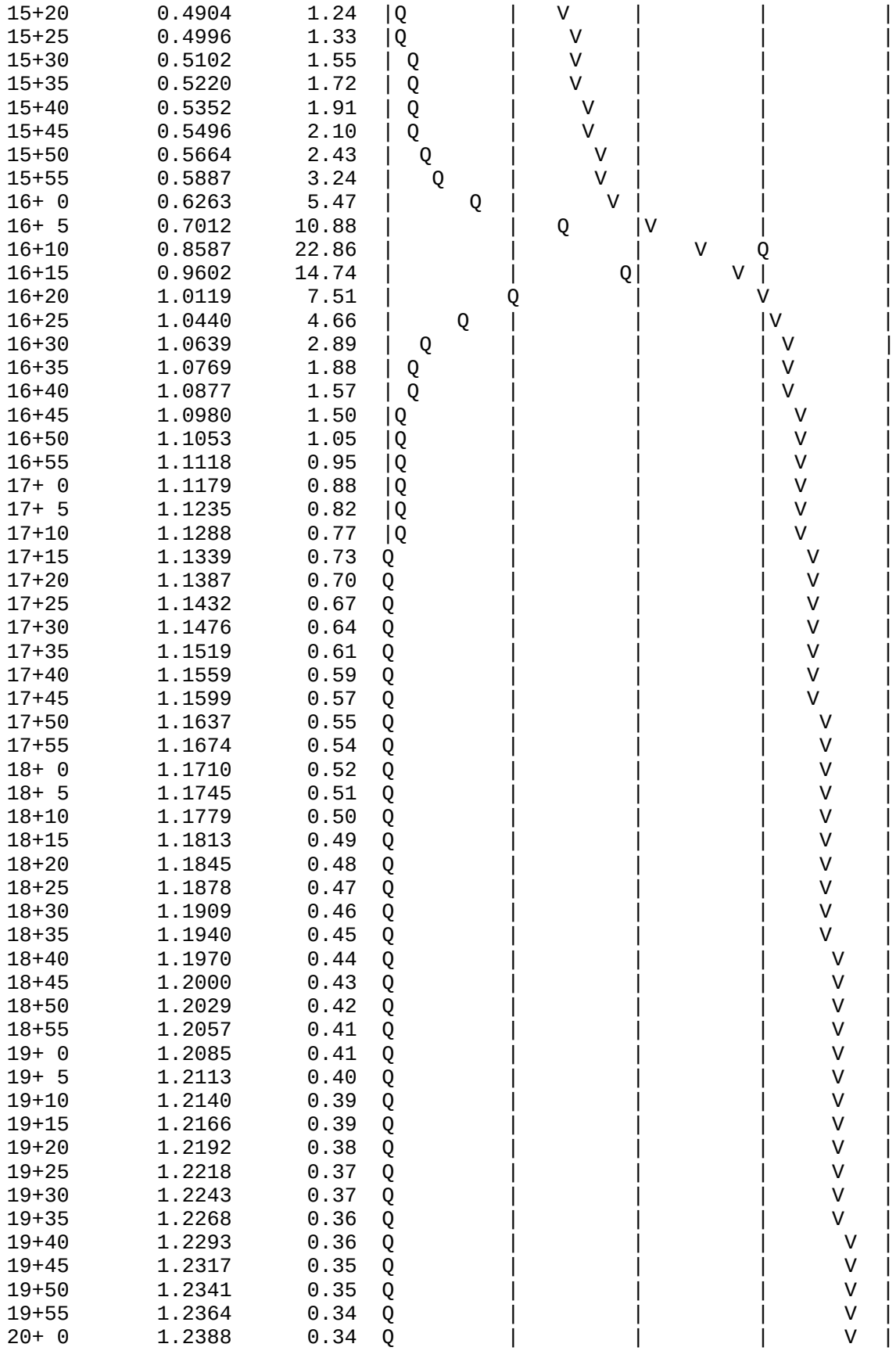
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.02	Q	|	|	|	|
0+10	0.0009	0.11	Q	|	|	|	|
0+15	0.0021	0.17	Q	|	|	|	|
0+20	0.0034	0.19	Q	|	|	|	|
0+25	0.0048	0.21	Q	|	|	|	|
0+30	0.0063	0.21	Q	|	|	|	|
0+35	0.0078	0.21	Q	|	|	|	|
0+40	0.0093	0.22	Q	|	|	|	|
0+45	0.0108	0.22	Q	|	|	|	|
0+50	0.0123	0.22	Q	|	|	|	|
0+55	0.0138	0.22	Q	|	|	|	|
1+ 0	0.0153	0.22	Q	|	|	|	|

1+ 5	0.0168	0.22	Q	|	|	|	|
1+10	0.0184	0.22	Q	|	|	|	|
1+15	0.0199	0.22	Q	|	|	|	|
1+20	0.0214	0.22	Q	|	|	|	|
1+25	0.0230	0.22	Q	|	|	|	|
1+30	0.0245	0.22	Q	|	|	|	|
1+35	0.0261	0.23	Q	|	|	|	|
1+40	0.0276	0.23	Q	|	|	|	|
1+45	0.0292	0.23	Q	|	|	|	|
1+50	0.0308	0.23	Q	|	|	|	|
1+55	0.0323	0.23	Q	|	|	|	|
2+ 0	0.0339	0.23	QV	|	|	|	|
2+ 5	0.0355	0.23	QV	|	|	|	|
2+10	0.0371	0.23	QV	|	|	|	|
2+15	0.0387	0.23	QV	|	|	|	|
2+20	0.0403	0.23	QV	|	|	|	|
2+25	0.0419	0.23	QV	|	|	|	|
2+30	0.0435	0.23	QV	|	|	|	|
2+35	0.0452	0.24	QV	|	|	|	|
2+40	0.0468	0.24	QV	|	|	|	|
2+45	0.0484	0.24	QV	|	|	|	|
2+50	0.0501	0.24	QV	|	|	|	|
2+55	0.0517	0.24	QV	|	|	|	|
3+ 0	0.0534	0.24	QV	|	|	|	|
3+ 5	0.0550	0.24	QV	|	|	|	|
3+10	0.0567	0.24	QV	|	|	|	|
3+15	0.0584	0.24	QV	|	|	|	|
3+20	0.0600	0.24	QV	|	|	|	|
3+25	0.0617	0.24	QV	|	|	|	|
3+30	0.0634	0.25	QV	|	|	|	|
3+35	0.0651	0.25	QV	|	|	|	|
3+40	0.0668	0.25	Q V	|	|	|	|
3+45	0.0685	0.25	Q V	|	|	|	|
3+50	0.0703	0.25	Q V	|	|	|	|
3+55	0.0720	0.25	Q V	|	|	|	|
4+ 0	0.0737	0.25	Q V	|	|	|	|
4+ 5	0.0755	0.25	Q V	|	|	|	|
4+10	0.0772	0.25	Q V	|	|	|	|
4+15	0.0790	0.25	Q V	|	|	|	|
4+20	0.0807	0.26	Q V	|	|	|	|
4+25	0.0825	0.26	Q V	|	|	|	|
4+30	0.0843	0.26	Q V	|	|	|	|
4+35	0.0861	0.26	Q V	|	|	|	|
4+40	0.0879	0.26	Q V	|	|	|	|
4+45	0.0897	0.26	Q V	|	|	|	|
4+50	0.0915	0.26	Q V	|	|	|	|
4+55	0.0933	0.26	Q V	|	|	|	|
5+ 0	0.0951	0.27	Q V	|	|	|	|
5+ 5	0.0970	0.27	Q V	|	|	|	|
5+10	0.0988	0.27	Q V	|	|	|	|
5+15	0.1007	0.27	Q V	|	|	|	|
5+20	0.1025	0.27	Q V	|	|	|	|
5+25	0.1044	0.27	Q V	|	|	|	|
5+30	0.1063	0.27	Q V	|	|	|	|
5+35	0.1081	0.27	Q V	|	|	|	|
5+40	0.1100	0.28	Q V	|	|	|	|
5+45	0.1119	0.28	Q V	|	|	|	|

5+50	0.1139	0.28	Q	V				
5+55	0.1158	0.28	Q	V				
6+ 0	0.1177	0.28	Q	V				
6+ 5	0.1197	0.28	Q	V				
6+10	0.1216	0.28	Q	V				
6+15	0.1236	0.28	Q	V				
6+20	0.1255	0.29	Q	V				
6+25	0.1275	0.29	Q	V				
6+30	0.1295	0.29	Q	V				
6+35	0.1315	0.29	Q	V				
6+40	0.1335	0.29	Q	V				
6+45	0.1356	0.29	Q	V				
6+50	0.1376	0.30	Q	V				
6+55	0.1396	0.30	Q	V				
7+ 0	0.1417	0.30	Q	V				
7+ 5	0.1438	0.30	Q	V				
7+10	0.1458	0.30	Q	V				
7+15	0.1479	0.30	Q	V				
7+20	0.1500	0.31	Q	V				
7+25	0.1522	0.31	Q	V				
7+30	0.1543	0.31	Q	V				
7+35	0.1564	0.31	Q	V				
7+40	0.1586	0.31	Q	V				
7+45	0.1607	0.31	Q	V				
7+50	0.1629	0.32	Q	V				
7+55	0.1651	0.32	Q	V				
8+ 0	0.1673	0.32	Q	V				
8+ 5	0.1695	0.32	Q	V				
8+10	0.1718	0.32	Q	V				
8+15	0.1740	0.33	Q	V				
8+20	0.1763	0.33	Q	V				
8+25	0.1786	0.33	Q	V				
8+30	0.1809	0.33	Q	V				
8+35	0.1832	0.33	Q	V				
8+40	0.1855	0.34	Q	V				
8+45	0.1878	0.34	Q	V				
8+50	0.1902	0.34	Q	V				
8+55	0.1925	0.34	Q	V				
9+ 0	0.1949	0.35	Q	V				
9+ 5	0.1973	0.35	Q	V				
9+10	0.1998	0.35	Q	V				
9+15	0.2022	0.35	Q	V				
9+20	0.2046	0.36	Q	V				
9+25	0.2071	0.36	Q	V				
9+30	0.2096	0.36	Q	V				
9+35	0.2121	0.36	Q	V				
9+40	0.2147	0.37	Q	V				
9+45	0.2172	0.37	Q	V				
9+50	0.2198	0.37	Q	V				
9+55	0.2224	0.38	Q	V				
10+ 0	0.2250	0.38	Q	V				
10+ 5	0.2276	0.38	Q	V				
10+10	0.2303	0.39	Q	V				
10+15	0.2329	0.39	Q	V				
10+20	0.2356	0.39	Q	V				
10+25	0.2384	0.40	Q	V				
10+30	0.2411	0.40	Q	V				

```
10+35       0.2439      0.40  Q      V  |          |          |          |
10+40       0.2467      0.41  Q      V  |          |          |          |
10+45       0.2495      0.41  Q      V  |          |          |          |
10+50       0.2524      0.41  Q      V  |          |          |          |
10+55       0.2552      0.42  Q      V  |          |          |          |
11+ 0       0.2581      0.42  Q      V  |          |          |          |
11+ 5       0.2611      0.43  Q      V  |          |          |          |
11+10       0.2640      0.43  Q      V  |          |          |          |
11+15       0.2670      0.43  Q       V |          |          |          |
11+20       0.2701      0.44  Q       V |          |          |          |
11+25       0.2731      0.44  Q       V |          |          |          |
11+30       0.2762      0.45  Q       V |          |          |          |
11+35       0.2793      0.45  Q       V |          |          |          |
11+40       0.2825      0.46  Q       V |          |          |          |
11+45       0.2857      0.46  Q       V |          |          |          |
11+50       0.2889      0.47  Q       V |          |          |          |
11+55       0.2922      0.47  Q       V |          |          |          |
12+ 0       0.2955      0.48  Q       V |          |          |          |
12+ 5       0.2988      0.48  Q       V |          |          |          |
12+10       0.3022      0.49  Q        V|          |          |          |
12+15       0.3055      0.49  Q        V|          |          |          |
12+20       0.3089      0.49  Q        V|          |          |          |
12+25       0.3124      0.50  Q        V|          |          |          |
12+30       0.3159      0.51  Q        V|          |          |          |
12+35       0.3194      0.51  Q        V|          |          |          |
12+40       0.3230      0.52  Q        V|          |          |          |
12+45       0.3266      0.53  Q        V|          |          |          |
12+50       0.3303      0.54  Q        V|          |          |          |
12+55       0.3341      0.54  Q         V          |          |          |
13+ 0       0.3379      0.55  Q         V          |          |          |
13+ 5       0.3417      0.56  Q         V          |          |          |
13+10       0.3457      0.57  Q         V          |          |          |
13+15       0.3497      0.58  Q         V          |          |          |
13+20       0.3538      0.59  Q         V          |          |          |
13+25       0.3579      0.60  Q         V          |          |          |
13+30       0.3621      0.61  Q         V          |          |          |
13+35       0.3665      0.63  Q         |V         |          |          |
13+40       0.3709      0.64  Q         |V         |          |          |
13+45       0.3753      0.65  Q         |V         |          |          |
13+50       0.3799      0.67  Q         |V         |          |          |
13+55       0.3846      0.68  Q         |V         |          |          |
14+ 0       0.3894      0.70  Q         |V         |          |          |
14+ 5       0.3943      0.71  Q         |V         |          |          |
14+10       0.3994      0.73  Q         | V        |          |          |
14+15       0.4045      0.75  Q         | V        |          |          |
14+20       0.4098      0.77  |Q        | V        |          |          |
14+25       0.4153      0.79  |Q        | V        |          |          |
14+30       0.4209      0.82  |Q        | V        |          |          |
14+35       0.4267      0.84  |Q        | V        |          |          |
14+40       0.4327      0.87  |Q        |  V       |          |          |
14+45       0.4389      0.90  |Q        |  V       |          |          |
14+50       0.4453      0.93  |Q        |  V       |          |          |
14+55       0.4520      0.97  |Q        |  V       |          |          |
15+ 0       0.4589      1.01  |Q        |  V       |          |          |
15+ 5       0.4662      1.05  |Q        |   V      |          |          |
15+10       0.4738      1.11  |Q        |   V      |          |          |
15+15       0.4819      1.16  |Q        |   V      |          |          |
```



20+ 5	1.2410	0.33	Q	|	|	|	V |
20+10	1.2433	0.33	Q	|	|	|	V |
20+15	1.2455	0.32	Q	|	|	|	V |
20+20	1.2477	0.32	Q	|	|	|	V |
20+25	1.2499	0.32	Q	|	|	|	V |
20+30	1.2521	0.31	Q	|	|	|	V |
20+35	1.2542	0.31	Q	|	|	|	V |
20+40	1.2563	0.31	Q	|	|	|	V |
20+45	1.2584	0.30	Q	|	|	|	V |
20+50	1.2604	0.30	Q	|	|	|	V |
20+55	1.2625	0.30	Q	|	|	|	V |
21+ 0	1.2645	0.29	Q	|	|	|	V |
21+ 5	1.2665	0.29	Q	|	|	|	V |
21+10	1.2684	0.29	Q	|	|	|	V |
21+15	1.2704	0.28	Q	|	|	|	V |
21+20	1.2723	0.28	Q	|	|	|	V |
21+25	1.2742	0.28	Q	|	|	|	V |
21+30	1.2761	0.28	Q	|	|	|	V |
21+35	1.2780	0.27	Q	|	|	|	V |
21+40	1.2799	0.27	Q	|	|	|	V |
21+45	1.2817	0.27	Q	|	|	|	V |
21+50	1.2835	0.27	Q	|	|	|	V |
21+55	1.2853	0.26	Q	|	|	|	V |
22+ 0	1.2871	0.26	Q	|	|	|	V |
22+ 5	1.2889	0.26	Q	|	|	|	V |
22+10	1.2907	0.26	Q	|	|	|	V |
22+15	1.2924	0.25	Q	|	|	|	V |
22+20	1.2942	0.25	Q	|	|	|	V |
22+25	1.2959	0.25	Q	|	|	|	V|
22+30	1.2976	0.25	Q	|	|	|	V|
22+35	1.2993	0.25	Q	|	|	|	V|
22+40	1.3009	0.24	Q	|	|	|	V|
22+45	1.3026	0.24	Q	|	|	|	V|
22+50	1.3043	0.24	Q	|	|	|	V|
22+55	1.3059	0.24	Q	|	|	|	V|
23+ 0	1.3075	0.24	Q	|	|	|	V|
23+ 5	1.3091	0.23	Q	|	|	|	V|
23+10	1.3108	0.23	Q	|	|	|	V|
23+15	1.3123	0.23	Q	|	|	|	V|
23+20	1.3139	0.23	Q	|	|	|	V|
23+25	1.3155	0.23	Q	|	|	|	V|
23+30	1.3171	0.23	Q	|	|	|	V|
23+35	1.3186	0.22	Q	|	|	|	V|
23+40	1.3201	0.22	Q	|	|	|	V|
23+45	1.3217	0.22	Q	|	|	|	V|
23+50	1.3232	0.22	Q	|	|	|	V|
23+55	1.3247	0.22	Q	|	|	|	V|
24+ 0	1.3262	0.22	Q	|	|	|	V|
24+ 5	1.3276	0.20	Q	|	|	|	V|
24+10	1.3282	0.10	Q	|	|	|	V|
24+15	1.3285	0.04	Q	|	|	|	V|
24+20	1.3287	0.02	Q	|	|	|	V|
24+25	1.3288	0.01	Q	|	|	|	V|
24+30	1.3288	0.00	Q	|	|	|	V|
24+35	1.3288	0.00	Q	|	|	|	V|
24+40	1.3288	0.00	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA E- EXISTING CONDITIONS
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
70.00	6	0.82
Rainfall data for year 2		
70.00	24	1.37
Rainfall data for year 100		
70.00	6	2.34
Rainfall data for year 100		
70.00	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	70.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
70.00	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
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Watercourse length = 2990.00(Ft.)
Length from concentration point to centroid = 1955.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 70.00(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.7896
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 70.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.229(In)
30-minute factor = 0.997 Adjusted rainfall = 0.514(In)
1-hour factor = 0.997 Adjusted rainfall = 0.702(In)
3-hour factor = 1.000 Adjusted rainfall = 1.085(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 846.56 (CFS))

1	4.937	41.793
2	30.828	219.183
3	67.136	307.376
4	80.546	113.519
5	88.317	65.787
6	93.212	41.438
7	96.189	25.201
8	97.844	14.016
9	98.384	4.572
10	98.762	3.199
11	99.140	3.199
12	100.000	7.281

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.229
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.51	0.040
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.58	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.67	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.72	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.82	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.92	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012

39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.17	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.43	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.49	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.54	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007

96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.67	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.70	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.84	1.84	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005

153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.97	1.97	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.16	2.16	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004

210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.29	2.29	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.32	2.32	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.36	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004

267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006
29	0.0037	0.0031	0.0006

30	0.0037	0.0031	0.0006
31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006
33	0.0038	0.0032	0.0006
34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006
37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006
40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008
86	0.0048	0.0040	0.0008

87	0.0049	0.0041	0.0008
88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008
90	0.0049	0.0041	0.0008
91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008
94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008
97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0062	0.0012
142	0.0075	0.0063	0.0012
143	0.0077	0.0064	0.0013

144	0.0077	0.0065	0.0013
145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013
147	0.0081	0.0067	0.0013
148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014
151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014
154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0096	0.0019
168	0.0116	0.0097	0.0019
169	0.0121	0.0101	0.0020
170	0.0123	0.0103	0.0020
171	0.0127	0.0106	0.0021
172	0.0130	0.0108	0.0021
173	0.0135	0.0113	0.0022
174	0.0138	0.0115	0.0023
175	0.0144	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0155	0.0129	0.0025
178	0.0159	0.0133	0.0026
179	0.0168	0.0140	0.0028
180	0.0173	0.0145	0.0028
181	0.0185	0.0155	0.0030
182	0.0192	0.0160	0.0032
183	0.0207	0.0173	0.0034
184	0.0216	0.0181	0.0036
185	0.0269	0.0225	0.0044
186	0.0283	0.0237	0.0047
187	0.0318	0.0266	0.0052
188	0.0341	0.0285	0.0056
189	0.0405	0.0338	0.0067
190	0.0452	0.0378	0.0074
191	0.0627	0.0472*	0.0156
192	0.0840	0.0472*	0.0368
193	0.2294	0.0472*	0.1822
194	0.0520	0.0434	0.0085
195	0.0369	0.0308	0.0061
196	0.0299	0.0250	0.0049
197	0.0227	0.0189	0.0037
198	0.0199	0.0166	0.0033
199	0.0179	0.0149	0.0029
200	0.0163	0.0136	0.0027

201	0.0151	0.0126	0.0025
202	0.0141	0.0118	0.0023
203	0.0132	0.0111	0.0022
204	0.0125	0.0104	0.0021
205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018
208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016
211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0014
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0069	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0065	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007

257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007
259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007
261	0.0042	0.0035	0.0007
262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007
265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006
268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4661	1.8878	0.5783

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 63.98(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

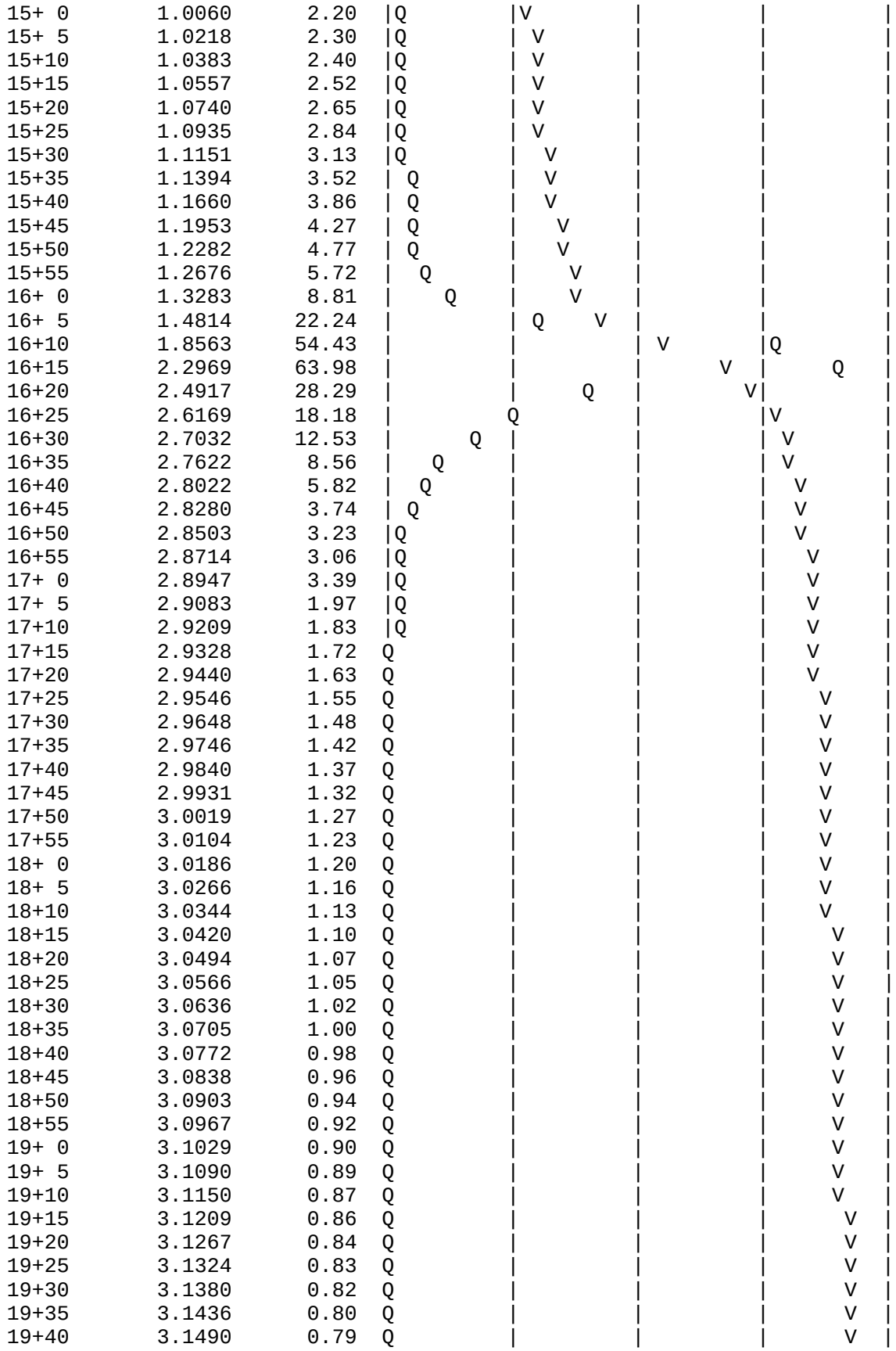
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	17.5	35.0	52.5	70.0
0+ 5	0.0002	0.02	Q	|	|	|	|
0+10	0.0012	0.15	Q	|	|	|	|
0+15	0.0033	0.32	Q	|	|	|	|
0+20	0.0060	0.38	Q	|	|	|	|
0+25	0.0088	0.42	Q	|	|	|	|
0+30	0.0119	0.44	Q	|	|	|	|
0+35	0.0150	0.46	Q	|	|	|	|
0+40	0.0183	0.47	Q	|	|	|	|

0+45	0.0215	0.47	Q	|	|	|	|
0+50	0.0248	0.47	Q	|	|	|	|
0+55	0.0281	0.48	Q	|	|	|	|
1+ 0	0.0314	0.48	Q	|	|	|	|
1+ 5	0.0348	0.49	Q	|	|	|	|
1+10	0.0381	0.49	Q	|	|	|	|
1+15	0.0415	0.49	Q	|	|	|	|
1+20	0.0448	0.49	Q	|	|	|	|
1+25	0.0482	0.49	Q	|	|	|	|
1+30	0.0516	0.49	Q	|	|	|	|
1+35	0.0550	0.50	Q	|	|	|	|
1+40	0.0585	0.50	Q	|	|	|	|
1+45	0.0619	0.50	Q	|	|	|	|
1+50	0.0654	0.50	Q	|	|	|	|
1+55	0.0688	0.50	Q	|	|	|	|
2+ 0	0.0723	0.50	Q	|	|	|	|
2+ 5	0.0758	0.51	Q	|	|	|	|
2+10	0.0793	0.51	Q	|	|	|	|
2+15	0.0828	0.51	Q	|	|	|	|
2+20	0.0863	0.51	QV	|	|	|	|
2+25	0.0898	0.51	QV	|	|	|	|
2+30	0.0934	0.52	QV	|	|	|	|
2+35	0.0969	0.52	QV	|	|	|	|
2+40	0.1005	0.52	QV	|	|	|	|
2+45	0.1041	0.52	QV	|	|	|	|
2+50	0.1077	0.52	QV	|	|	|	|
2+55	0.1113	0.52	QV	|	|	|	|
3+ 0	0.1149	0.53	QV	|	|	|	|
3+ 5	0.1186	0.53	QV	|	|	|	|
3+10	0.1222	0.53	QV	|	|	|	|
3+15	0.1259	0.53	QV	|	|	|	|
3+20	0.1296	0.53	QV	|	|	|	|
3+25	0.1333	0.54	QV	|	|	|	|
3+30	0.1370	0.54	QV	|	|	|	|
3+35	0.1407	0.54	QV	|	|	|	|
3+40	0.1445	0.54	QV	|	|	|	|
3+45	0.1482	0.55	QV	|	|	|	|
3+50	0.1520	0.55	QV	|	|	|	|
3+55	0.1558	0.55	QV	|	|	|	|
4+ 0	0.1596	0.55	QV	|	|	|	|
4+ 5	0.1634	0.55	QV	|	|	|	|
4+10	0.1672	0.56	QV	|	|	|	|
4+15	0.1711	0.56	Q V	|	|	|	|
4+20	0.1750	0.56	Q V	|	|	|	|
4+25	0.1789	0.56	Q V	|	|	|	|
4+30	0.1828	0.57	Q V	|	|	|	|
4+35	0.1867	0.57	Q V	|	|	|	|
4+40	0.1906	0.57	Q V	|	|	|	|
4+45	0.1946	0.57	Q V	|	|	|	|
4+50	0.1985	0.58	Q V	|	|	|	|
4+55	0.2025	0.58	Q V	|	|	|	|
5+ 0	0.2065	0.58	Q V	|	|	|	|
5+ 5	0.2105	0.58	Q V	|	|	|	|
5+10	0.2146	0.59	Q V	|	|	|	|
5+15	0.2186	0.59	Q V	|	|	|	|
5+20	0.2227	0.59	Q V	|	|	|	|
5+25	0.2268	0.59	Q V	|	|	|	|

5+30	0.2309	0.60	Q V	|	|	|	|
5+35	0.2351	0.60	Q V	|	|	|	|
5+40	0.2392	0.60	Q V	|	|	|	|
5+45	0.2434	0.61	Q V	|	|	|	|
5+50	0.2476	0.61	Q V	|	|	|	|
5+55	0.2518	0.61	Q V	|	|	|	|
6+ 0	0.2560	0.62	Q V	|	|	|	|
6+ 5	0.2603	0.62	Q V	|	|	|	|
6+10	0.2646	0.62	Q V	|	|	|	|
6+15	0.2689	0.62	Q V	|	|	|	|
6+20	0.2732	0.63	Q V	|	|	|	|
6+25	0.2775	0.63	Q V	|	|	|	|
6+30	0.2819	0.63	Q V	|	|	|	|
6+35	0.2863	0.64	Q V	|	|	|	|
6+40	0.2907	0.64	Q V	|	|	|	|
6+45	0.2951	0.64	Q V	|	|	|	|
6+50	0.2996	0.65	Q V	|	|	|	|
6+55	0.3041	0.65	Q V	|	|	|	|
7+ 0	0.3086	0.65	Q V	|	|	|	|
7+ 5	0.3131	0.66	Q V	|	|	|	|
7+10	0.3177	0.66	Q V	|	|	|	|
7+15	0.3223	0.67	Q V	|	|	|	|
7+20	0.3269	0.67	Q V	|	|	|	|
7+25	0.3315	0.67	Q V	|	|	|	|
7+30	0.3362	0.68	Q V	|	|	|	|
7+35	0.3409	0.68	Q V	|	|	|	|
7+40	0.3456	0.68	Q V	|	|	|	|
7+45	0.3503	0.69	Q V	|	|	|	|
7+50	0.3551	0.69	Q V	|	|	|	|
7+55	0.3599	0.70	Q V	|	|	|	|
8+ 0	0.3647	0.70	Q V	|	|	|	|
8+ 5	0.3696	0.71	Q V	|	|	|	|
8+10	0.3745	0.71	Q V	|	|	|	|
8+15	0.3794	0.71	Q V	|	|	|	|
8+20	0.3843	0.72	Q V	|	|	|	|
8+25	0.3893	0.72	Q V	|	|	|	|
8+30	0.3943	0.73	Q V	|	|	|	|
8+35	0.3994	0.73	Q V	|	|	|	|
8+40	0.4045	0.74	Q V	|	|	|	|
8+45	0.4096	0.74	Q V	|	|	|	|
8+50	0.4147	0.75	Q V	|	|	|	|
8+55	0.4199	0.75	Q V	|	|	|	|
9+ 0	0.4252	0.76	Q V	|	|	|	|
9+ 5	0.4304	0.76	Q V	|	|	|	|
9+10	0.4357	0.77	Q V	|	|	|	|
9+15	0.4410	0.77	Q V	|	|	|	|
9+20	0.4464	0.78	Q V	|	|	|	|
9+25	0.4518	0.79	Q V	|	|	|	|
9+30	0.4573	0.79	Q V	|	|	|	|
9+35	0.4628	0.80	Q V	|	|	|	|
9+40	0.4683	0.80	Q V	|	|	|	|
9+45	0.4739	0.81	Q V	|	|	|	|
9+50	0.4795	0.82	Q V	|	|	|	|
9+55	0.4852	0.82	Q V	|	|	|	|
10+ 0	0.4909	0.83	Q V	|	|	|	|
10+ 5	0.4966	0.84	Q V	|	|	|	|
10+10	0.5024	0.84	Q V	|	|	|	|

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10+15       0.5083      0.85  Q     V   |           |           |           |
10+20       0.5142      0.86  Q     V   |           |           |           |
10+25       0.5202      0.86  Q     V   |           |           |           |
10+30       0.5262      0.87  Q     V   |           |           |           |
10+35       0.5322      0.88  Q     V   |           |           |           |
10+40       0.5383      0.89  Q     V   |           |           |           |
10+45       0.5445      0.90  Q     V   |           |           |           |
10+50       0.5507      0.90  Q     V   |           |           |           |
10+55       0.5570      0.91  Q     V   |           |           |           |
11+ 0       0.5634      0.92  Q     V   |           |           |           |
11+ 5       0.5698      0.93  Q     V   |           |           |           |
11+10       0.5762      0.94  Q     V   |           |           |           |
11+15       0.5828      0.95  Q     V   |           |           |           |
11+20       0.5894      0.96  Q     V   |           |           |           |
11+25       0.5961      0.97  Q      V  |           |           |           |
11+30       0.6028      0.98  Q      V  |           |           |           |
11+35       0.6096      0.99  Q      V  |           |           |           |
11+40       0.6165      1.00  Q      V  |           |           |           |
11+45       0.6235      1.01  Q      V  |           |           |           |
11+50       0.6305      1.02  Q      V  |           |           |           |
11+55       0.6376      1.03  Q      V  |           |           |           |
12+ 0       0.6448      1.05  Q      V  |           |           |           |
12+ 5       0.6521      1.06  Q      V  |           |           |           |
12+10       0.6595      1.07  Q      V  |           |           |           |
12+15       0.6670      1.09  Q      V  |           |           |           |
12+20       0.6746      1.10  Q       V |           |           |           |
12+25       0.6823      1.11  Q       V |           |           |           |
12+30       0.6900      1.13  Q       V |           |           |           |
12+35       0.6979      1.15  Q       V |           |           |           |
12+40       0.7059      1.16  Q       V |           |           |           |
12+45       0.7140      1.18  Q       V |           |           |           |
12+50       0.7222      1.19  Q       V |           |           |           |
12+55       0.7306      1.21  Q       V |           |           |           |
13+ 0       0.7391      1.23  Q       V |           |           |           |
13+ 5       0.7477      1.25  Q       V |           |           |           |
13+10       0.7564      1.27  Q       V |           |           |           |
13+15       0.7653      1.29  Q        V|           |           |           |
13+20       0.7744      1.31  Q        V|           |           |           |
13+25       0.7836      1.34  Q        V|           |           |           |
13+30       0.7930      1.36  Q        V|           |           |           |
13+35       0.8025      1.39  Q        V|           |           |           |
13+40       0.8123      1.41  Q        V|           |           |           |
13+45       0.8222      1.44  Q        V|           |           |           |
13+50       0.8323      1.47  Q        V|           |           |           |
13+55       0.8427      1.50  Q        V|           |           |           |
14+ 0       0.8533      1.54  Q         V           |           |           |
14+ 5       0.8641      1.57  Q         V           |           |           |
14+10       0.8752      1.61  Q         V           |           |           |
14+15       0.8866      1.66  Q         V           |           |           |
14+20       0.8983      1.70  Q         V           |           |           |
14+25       0.9104      1.75  Q         V           |           |           |
14+30       0.9227      1.80  |Q        V           |           |           |
14+35       0.9355      1.85  |Q         |V          |           |           |
14+40       0.9486      1.91  |Q         |V          |           |           |
14+45       0.9622      1.97  |Q         |V          |           |           |
14+50       0.9763      2.04  |Q         |V          |           |           |
14+55       0.9908      2.12  |Q         |V          |           |           |
```



19+45	3.1544	0.78	Q	|	|	|	V |
19+50	3.1597	0.77	Q	|	|	|	V |
19+55	3.1649	0.76	Q	|	|	|	V |
20+ 0	3.1701	0.75	Q	|	|	|	V |
20+ 5	3.1751	0.74	Q	|	|	|	V |
20+10	3.1802	0.73	Q	|	|	|	V |
20+15	3.1851	0.72	Q	|	|	|	V |
20+20	3.1900	0.71	Q	|	|	|	V |
20+25	3.1948	0.70	Q	|	|	|	V |
20+30	3.1996	0.69	Q	|	|	|	V |
20+35	3.2043	0.68	Q	|	|	|	V |
20+40	3.2090	0.68	Q	|	|	|	V |
20+45	3.2136	0.67	Q	|	|	|	V |
20+50	3.2181	0.66	Q	|	|	|	V |
20+55	3.2226	0.65	Q	|	|	|	V |
21+ 0	3.2271	0.65	Q	|	|	|	V |
21+ 5	3.2315	0.64	Q	|	|	|	V |
21+10	3.2359	0.63	Q	|	|	|	V |
21+15	3.2402	0.63	Q	|	|	|	V |
21+20	3.2445	0.62	Q	|	|	|	V |
21+25	3.2487	0.61	Q	|	|	|	V |
21+30	3.2529	0.61	Q	|	|	|	V |
21+35	3.2570	0.60	Q	|	|	|	V |
21+40	3.2612	0.60	Q	|	|	|	V |
21+45	3.2652	0.59	Q	|	|	|	V |
21+50	3.2693	0.59	Q	|	|	|	V |
21+55	3.2733	0.58	Q	|	|	|	V |
22+ 0	3.2772	0.58	Q	|	|	|	V |
22+ 5	3.2812	0.57	Q	|	|	|	V |
22+10	3.2851	0.57	Q	|	|	|	V |
22+15	3.2889	0.56	Q	|	|	|	V|
22+20	3.2928	0.56	Q	|	|	|	V|
22+25	3.2966	0.55	Q	|	|	|	V|
22+30	3.3003	0.55	Q	|	|	|	V|
22+35	3.3041	0.54	Q	|	|	|	V|
22+40	3.3078	0.54	Q	|	|	|	V|
22+45	3.3115	0.53	Q	|	|	|	V|
22+50	3.3151	0.53	Q	|	|	|	V|
22+55	3.3188	0.53	Q	|	|	|	V|
23+ 0	3.3224	0.52	Q	|	|	|	V|
23+ 5	3.3259	0.52	Q	|	|	|	V|
23+10	3.3295	0.51	Q	|	|	|	V|
23+15	3.3330	0.51	Q	|	|	|	V|
23+20	3.3365	0.51	Q	|	|	|	V|
23+25	3.3400	0.50	Q	|	|	|	V|
23+30	3.3434	0.50	Q	|	|	|	V|
23+35	3.3468	0.50	Q	|	|	|	V|
23+40	3.3502	0.49	Q	|	|	|	V|
23+45	3.3536	0.49	Q	|	|	|	V|
23+50	3.3570	0.49	Q	|	|	|	V|
23+55	3.3603	0.48	Q	|	|	|	V|
24+ 0	3.3636	0.48	Q	|	|	|	V|
24+ 5	3.3667	0.45	Q	|	|	|	V|
24+10	3.3690	0.33	Q	|	|	|	V|
24+15	3.3701	0.16	Q	|	|	|	V|
24+20	3.3707	0.09	Q	|	|	|	V|
24+25	3.3711	0.06	Q	|	|	|	V|

```
   24+30       3.3713      0.03  Q          |          |          |        V|
   24+35       3.3714      0.02  Q          |          |          |        V|
   24+40       3.3715      0.01  Q          |          |          |        V|
   24+45       3.3716      0.01  Q          |          |          |        V|
   24+50       3.3716      0.01  Q          |          |          |        V|
   24+55       3.3716      0.00  Q          |          |          |         V
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA E
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
70.20	6	0.82
Rainfall data for year 2		
70.20	24	1.37
Rainfall data for year 100		
70.20	6	2.34
Rainfall data for year 100		
70.20	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
83.0	70.20	1.000	0.326	1.000	0.326

Area-averaged adjusted loss rate Fm (In/Hr) = 0.326

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
70.20	1.000	83.0	2.05	0.418

Area-averaged catchment yield fraction, Y = 0.418
Area-averaged low loss fraction, Yb = 0.582
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Watercourse length = 2990.00(Ft.)
Length from concentration point to centroid = 1955.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 70.20(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.7896
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.326(In/Hr)
Average low loss rate fraction (Yb) = 0.582 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 70.20(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.229(In)
30-minute factor = 0.997 Adjusted rainfall = 0.514(In)
1-hour factor = 0.997 Adjusted rainfall = 0.702(In)
3-hour factor = 1.000 Adjusted rainfall = 1.085(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 848.98 (CFS))

1	4.937	41.912
2	30.828	219.809
3	67.136	308.254
4	80.546	113.843
5	88.317	65.975
6	93.212	41.556
7	96.189	25.273
8	97.844	14.056
9	98.384	4.585
10	98.762	3.208
11	99.140	3.208
12	100.000	7.302

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.229
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.51	0.040
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.58	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.67	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.72	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.82	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.92	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012

39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.17	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.43	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.49	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.54	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007

96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.67	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.70	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.84	1.84	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005

153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.97	1.97	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.16	2.16	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004

210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.29	2.29	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.32	2.32	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.36	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004

267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0020	0.0014
2	0.0034	0.0020	0.0014
3	0.0034	0.0020	0.0014
4	0.0034	0.0020	0.0014
5	0.0034	0.0020	0.0014
6	0.0034	0.0020	0.0014
7	0.0034	0.0020	0.0014
8	0.0035	0.0020	0.0014
9	0.0035	0.0020	0.0015
10	0.0035	0.0020	0.0015
11	0.0035	0.0020	0.0015
12	0.0035	0.0020	0.0015
13	0.0035	0.0020	0.0015
14	0.0035	0.0021	0.0015
15	0.0035	0.0021	0.0015
16	0.0035	0.0021	0.0015
17	0.0036	0.0021	0.0015
18	0.0036	0.0021	0.0015
19	0.0036	0.0021	0.0015
20	0.0036	0.0021	0.0015
21	0.0036	0.0021	0.0015
22	0.0036	0.0021	0.0015
23	0.0036	0.0021	0.0015
24	0.0036	0.0021	0.0015
25	0.0037	0.0021	0.0015
26	0.0037	0.0021	0.0015
27	0.0037	0.0022	0.0015
28	0.0037	0.0022	0.0015
29	0.0037	0.0022	0.0016

30	0.0037	0.0022	0.0016
31	0.0037	0.0022	0.0016
32	0.0038	0.0022	0.0016
33	0.0038	0.0022	0.0016
34	0.0038	0.0022	0.0016
35	0.0038	0.0022	0.0016
36	0.0038	0.0022	0.0016
37	0.0038	0.0022	0.0016
38	0.0038	0.0022	0.0016
39	0.0039	0.0023	0.0016
40	0.0039	0.0023	0.0016
41	0.0039	0.0023	0.0016
42	0.0039	0.0023	0.0016
43	0.0039	0.0023	0.0016
44	0.0039	0.0023	0.0016
45	0.0040	0.0023	0.0017
46	0.0040	0.0023	0.0017
47	0.0040	0.0023	0.0017
48	0.0040	0.0023	0.0017
49	0.0040	0.0023	0.0017
50	0.0040	0.0024	0.0017
51	0.0041	0.0024	0.0017
52	0.0041	0.0024	0.0017
53	0.0041	0.0024	0.0017
54	0.0041	0.0024	0.0017
55	0.0041	0.0024	0.0017
56	0.0041	0.0024	0.0017
57	0.0042	0.0024	0.0017
58	0.0042	0.0024	0.0017
59	0.0042	0.0024	0.0018
60	0.0042	0.0025	0.0018
61	0.0042	0.0025	0.0018
62	0.0043	0.0025	0.0018
63	0.0043	0.0025	0.0018
64	0.0043	0.0025	0.0018
65	0.0043	0.0025	0.0018
66	0.0043	0.0025	0.0018
67	0.0044	0.0025	0.0018
68	0.0044	0.0026	0.0018
69	0.0044	0.0026	0.0018
70	0.0044	0.0026	0.0018
71	0.0045	0.0026	0.0019
72	0.0045	0.0026	0.0019
73	0.0045	0.0026	0.0019
74	0.0045	0.0026	0.0019
75	0.0045	0.0026	0.0019
76	0.0046	0.0027	0.0019
77	0.0046	0.0027	0.0019
78	0.0046	0.0027	0.0019
79	0.0046	0.0027	0.0019
80	0.0047	0.0027	0.0019
81	0.0047	0.0027	0.0020
82	0.0047	0.0027	0.0020
83	0.0047	0.0028	0.0020
84	0.0048	0.0028	0.0020
85	0.0048	0.0028	0.0020
86	0.0048	0.0028	0.0020

87	0.0049	0.0028	0.0020
88	0.0049	0.0028	0.0020
89	0.0049	0.0029	0.0021
90	0.0049	0.0029	0.0021
91	0.0050	0.0029	0.0021
92	0.0050	0.0029	0.0021
93	0.0050	0.0029	0.0021
94	0.0050	0.0029	0.0021
95	0.0051	0.0030	0.0021
96	0.0051	0.0030	0.0021
97	0.0052	0.0030	0.0022
98	0.0052	0.0030	0.0022
99	0.0052	0.0030	0.0022
100	0.0052	0.0031	0.0022
101	0.0053	0.0031	0.0022
102	0.0053	0.0031	0.0022
103	0.0054	0.0031	0.0022
104	0.0054	0.0031	0.0022
105	0.0054	0.0032	0.0023
106	0.0055	0.0032	0.0023
107	0.0055	0.0032	0.0023
108	0.0055	0.0032	0.0023
109	0.0056	0.0033	0.0023
110	0.0056	0.0033	0.0023
111	0.0057	0.0033	0.0024
112	0.0057	0.0033	0.0024
113	0.0058	0.0034	0.0024
114	0.0058	0.0034	0.0024
115	0.0058	0.0034	0.0024
116	0.0059	0.0034	0.0025
117	0.0059	0.0035	0.0025
118	0.0060	0.0035	0.0025
119	0.0060	0.0035	0.0025
120	0.0061	0.0035	0.0025
121	0.0061	0.0036	0.0026
122	0.0062	0.0036	0.0026
123	0.0062	0.0036	0.0026
124	0.0063	0.0037	0.0026
125	0.0064	0.0037	0.0027
126	0.0064	0.0037	0.0027
127	0.0065	0.0038	0.0027
128	0.0065	0.0038	0.0027
129	0.0066	0.0038	0.0028
130	0.0066	0.0039	0.0028
131	0.0067	0.0039	0.0028
132	0.0068	0.0039	0.0028
133	0.0069	0.0040	0.0029
134	0.0069	0.0040	0.0029
135	0.0070	0.0041	0.0029
136	0.0070	0.0041	0.0029
137	0.0071	0.0042	0.0030
138	0.0072	0.0042	0.0030
139	0.0073	0.0043	0.0031
140	0.0074	0.0043	0.0031
141	0.0075	0.0044	0.0031
142	0.0075	0.0044	0.0031
143	0.0077	0.0045	0.0032

144	0.0077	0.0045	0.0032
145	0.0079	0.0046	0.0033
146	0.0079	0.0046	0.0033
147	0.0081	0.0047	0.0034
148	0.0081	0.0047	0.0034
149	0.0083	0.0048	0.0035
150	0.0084	0.0049	0.0035
151	0.0085	0.0050	0.0036
152	0.0086	0.0050	0.0036
153	0.0088	0.0051	0.0037
154	0.0089	0.0052	0.0037
155	0.0091	0.0053	0.0038
156	0.0092	0.0053	0.0038
157	0.0094	0.0055	0.0039
158	0.0095	0.0055	0.0040
159	0.0097	0.0056	0.0041
160	0.0098	0.0057	0.0041
161	0.0101	0.0059	0.0042
162	0.0102	0.0059	0.0043
163	0.0105	0.0061	0.0044
164	0.0106	0.0062	0.0044
165	0.0109	0.0064	0.0046
166	0.0111	0.0065	0.0046
167	0.0114	0.0067	0.0048
168	0.0116	0.0068	0.0049
169	0.0121	0.0070	0.0050
170	0.0123	0.0071	0.0051
171	0.0127	0.0074	0.0053
172	0.0130	0.0076	0.0054
173	0.0135	0.0079	0.0056
174	0.0138	0.0080	0.0058
175	0.0144	0.0084	0.0060
176	0.0147	0.0086	0.0062
177	0.0155	0.0090	0.0065
178	0.0159	0.0093	0.0066
179	0.0168	0.0098	0.0070
180	0.0173	0.0101	0.0072
181	0.0185	0.0108	0.0077
182	0.0192	0.0112	0.0080
183	0.0207	0.0121	0.0087
184	0.0216	0.0126	0.0090
185	0.0269	0.0157	0.0113
186	0.0283	0.0165	0.0118
187	0.0318	0.0185	0.0133
188	0.0341	0.0199	0.0142
189	0.0405	0.0236	0.0169
190	0.0452	0.0263	0.0189
191	0.0627	0.0272*	0.0356
192	0.0840	0.0272*	0.0568
193	0.2294	0.0272*	0.2022
194	0.0520	0.0272*	0.0248
195	0.0369	0.0215	0.0154
196	0.0299	0.0174	0.0125
197	0.0227	0.0132	0.0095
198	0.0199	0.0116	0.0083
199	0.0179	0.0104	0.0075
200	0.0163	0.0095	0.0068

201	0.0151	0.0088	0.0063
202	0.0141	0.0082	0.0059
203	0.0132	0.0077	0.0055
204	0.0125	0.0073	0.0052
205	0.0118	0.0069	0.0049
206	0.0113	0.0066	0.0047
207	0.0108	0.0063	0.0045
208	0.0103	0.0060	0.0043
209	0.0099	0.0058	0.0042
210	0.0096	0.0056	0.0040
211	0.0093	0.0054	0.0039
212	0.0090	0.0052	0.0037
213	0.0087	0.0051	0.0036
214	0.0084	0.0049	0.0035
215	0.0082	0.0048	0.0034
216	0.0080	0.0047	0.0033
217	0.0078	0.0045	0.0033
218	0.0076	0.0044	0.0032
219	0.0074	0.0043	0.0031
220	0.0073	0.0042	0.0030
221	0.0071	0.0041	0.0030
222	0.0069	0.0040	0.0029
223	0.0068	0.0040	0.0028
224	0.0067	0.0039	0.0028
225	0.0065	0.0038	0.0027
226	0.0064	0.0037	0.0027
227	0.0063	0.0037	0.0026
228	0.0062	0.0036	0.0026
229	0.0061	0.0036	0.0025
230	0.0060	0.0035	0.0025
231	0.0059	0.0034	0.0025
232	0.0058	0.0034	0.0024
233	0.0057	0.0033	0.0024
234	0.0056	0.0033	0.0024
235	0.0056	0.0032	0.0023
236	0.0055	0.0032	0.0023
237	0.0054	0.0031	0.0023
238	0.0053	0.0031	0.0022
239	0.0053	0.0031	0.0022
240	0.0052	0.0030	0.0022
241	0.0051	0.0030	0.0021
242	0.0051	0.0029	0.0021
243	0.0050	0.0029	0.0021
244	0.0049	0.0029	0.0021
245	0.0049	0.0028	0.0020
246	0.0048	0.0028	0.0020
247	0.0048	0.0028	0.0020
248	0.0047	0.0028	0.0020
249	0.0047	0.0027	0.0020
250	0.0046	0.0027	0.0019
251	0.0046	0.0027	0.0019
252	0.0045	0.0026	0.0019
253	0.0045	0.0026	0.0019
254	0.0044	0.0026	0.0019
255	0.0044	0.0026	0.0018
256	0.0044	0.0025	0.0018
257	0.0043	0.0025	0.0018

258	0.0043	0.0025	0.0018
259	0.0042	0.0025	0.0018
260	0.0042	0.0024	0.0018
261	0.0042	0.0024	0.0017
262	0.0041	0.0024	0.0017
263	0.0041	0.0024	0.0017
264	0.0040	0.0024	0.0017
265	0.0040	0.0023	0.0017
266	0.0040	0.0023	0.0017
267	0.0039	0.0023	0.0017
268	0.0039	0.0023	0.0016
269	0.0039	0.0023	0.0016
270	0.0039	0.0022	0.0016
271	0.0038	0.0022	0.0016
272	0.0038	0.0022	0.0016
273	0.0038	0.0022	0.0016
274	0.0037	0.0022	0.0016
275	0.0037	0.0022	0.0016
276	0.0037	0.0021	0.0015
277	0.0037	0.0021	0.0015
278	0.0036	0.0021	0.0015
279	0.0036	0.0021	0.0015
280	0.0036	0.0021	0.0015
281	0.0036	0.0021	0.0015
282	0.0035	0.0021	0.0015
283	0.0035	0.0020	0.0015
284	0.0035	0.0020	0.0015
285	0.0035	0.0020	0.0014
286	0.0034	0.0020	0.0014
287	0.0034	0.0020	0.0014
288	0.0034	0.0020	0.0014
	2.4661	1.2951	1.1709

Total soil rain loss = 1.30(In)
Total effective rainfall = 1.17(In)
Peak flow rate in flood hydrograph = 78.86(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

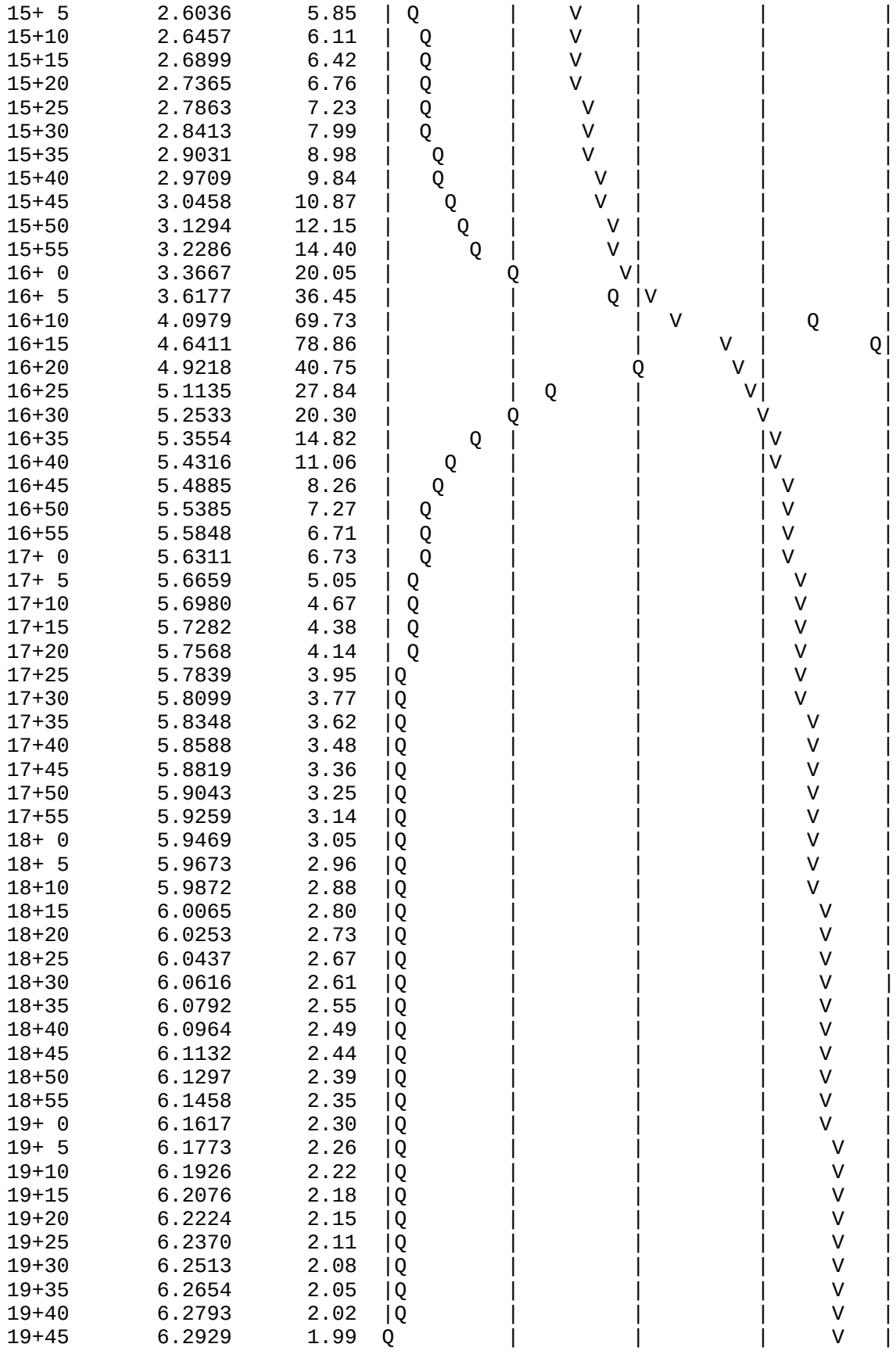
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0004	0.06	Q	|	|	|	|
0+10	0.0030	0.37	Q	|	|	|	|
0+15	0.0085	0.81	Q	|	|	|	|
0+20	0.0152	0.97	Q	|	|	|	|
0+25	0.0225	1.07	Q	|	|	|	|
0+30	0.0303	1.13	Q	|	|	|	|
0+35	0.0383	1.17	Q	|	|	|	|
0+40	0.0465	1.19	Q	|	|	|	|
0+45	0.0548	1.20	Q	|	|	|	|

0+50	0.0632	1.21	Q	|	|	|	|
0+55	0.0715	1.22	Q	|	|	|	|
1+ 0	0.0800	1.23	Q	|	|	|	|
1+ 5	0.0886	1.24	Q	|	|	|	|
1+10	0.0971	1.24	Q	|	|	|	|
1+15	0.1057	1.25	Q	|	|	|	|
1+20	0.1143	1.25	Q	|	|	|	|
1+25	0.1229	1.25	Q	|	|	|	|
1+30	0.1316	1.26	Q	|	|	|	|
1+35	0.1403	1.26	Q	|	|	|	|
1+40	0.1490	1.27	Q	|	|	|	|
1+45	0.1577	1.27	Q	|	|	|	|
1+50	0.1665	1.28	Q	|	|	|	|
1+55	0.1753	1.28	QV	|	|	|	|
2+ 0	0.1842	1.28	QV	|	|	|	|
2+ 5	0.1931	1.29	QV	|	|	|	|
2+10	0.2020	1.29	QV	|	|	|	|
2+15	0.2109	1.30	QV	|	|	|	|
2+20	0.2199	1.30	QV	|	|	|	|
2+25	0.2289	1.31	QV	|	|	|	|
2+30	0.2379	1.31	QV	|	|	|	|
2+35	0.2470	1.32	QV	|	|	|	|
2+40	0.2561	1.32	QV	|	|	|	|
2+45	0.2652	1.33	QV	|	|	|	|
2+50	0.2744	1.33	QV	|	|	|	|
2+55	0.2836	1.34	QV	|	|	|	|
3+ 0	0.2929	1.34	QV	|	|	|	|
3+ 5	0.3021	1.35	QV	|	|	|	|
3+10	0.3115	1.35	QV	|	|	|	|
3+15	0.3208	1.36	QV	|	|	|	|
3+20	0.3302	1.36	QV	|	|	|	|
3+25	0.3396	1.37	QV	|	|	|	|
3+30	0.3491	1.37	Q V	|	|	|	|
3+35	0.3586	1.38	Q V	|	|	|	|
3+40	0.3681	1.38	Q V	|	|	|	|
3+45	0.3777	1.39	Q V	|	|	|	|
3+50	0.3873	1.40	Q V	|	|	|	|
3+55	0.3970	1.40	Q V	|	|	|	|
4+ 0	0.4066	1.41	Q V	|	|	|	|
4+ 5	0.4164	1.41	Q V	|	|	|	|
4+10	0.4261	1.42	Q V	|	|	|	|
4+15	0.4360	1.42	Q V	|	|	|	|
4+20	0.4458	1.43	Q V	|	|	|	|
4+25	0.4557	1.44	Q V	|	|	|	|
4+30	0.4657	1.44	Q V	|	|	|	|
4+35	0.4756	1.45	Q V	|	|	|	|
4+40	0.4857	1.46	Q V	|	|	|	|
4+45	0.4957	1.46	Q V	|	|	|	|
4+50	0.5058	1.47	Q V	|	|	|	|
4+55	0.5160	1.48	Q V	|	|	|	|
5+ 0	0.5262	1.48	Q V	|	|	|	|
5+ 5	0.5365	1.49	Q V	|	|	|	|
5+10	0.5468	1.49	Q V	|	|	|	|
5+15	0.5571	1.50	Q V	|	|	|	|
5+20	0.5675	1.51	Q V	|	|	|	|
5+25	0.5779	1.52	Q V	|	|	|	|
5+30	0.5884	1.52	Q V	|	|	|	|

5+35	0.5990	1.53	Q	V				
5+40	0.6095	1.54	Q	V				
5+45	0.6202	1.54	Q	V				
5+50	0.6309	1.55	Q	V				
5+55	0.6416	1.56	Q	V				
6+ 0	0.6524	1.57	Q	V				
6+ 5	0.6633	1.58	Q	V				
6+10	0.6742	1.58	Q	V				
6+15	0.6851	1.59	Q	V				
6+20	0.6961	1.60	Q	V				
6+25	0.7072	1.61	Q	V				
6+30	0.7183	1.62	Q	V				
6+35	0.7295	1.62	Q	V				
6+40	0.7407	1.63	Q	V				
6+45	0.7520	1.64	Q	V				
6+50	0.7634	1.65	Q	V				
6+55	0.7748	1.66	Q	V				
7+ 0	0.7863	1.67	Q	V				
7+ 5	0.7979	1.68	Q	V				
7+10	0.8095	1.69	Q	V				
7+15	0.8212	1.70	Q	V				
7+20	0.8329	1.70	Q	V				
7+25	0.8447	1.71	Q	V				
7+30	0.8566	1.72	Q	V				
7+35	0.8685	1.73	Q	V				
7+40	0.8805	1.74	Q	V				
7+45	0.8926	1.76	Q	V				
7+50	0.9048	1.77	Q	V				
7+55	0.9170	1.78	Q	V				
8+ 0	0.9293	1.79	Q	V				
8+ 5	0.9417	1.80	Q	V				
8+10	0.9542	1.81	Q	V				
8+15	0.9667	1.82	Q	V				
8+20	0.9793	1.83	Q	V				
8+25	0.9920	1.84	Q	V				
8+30	1.0048	1.86	Q	V				
8+35	1.0177	1.87	Q	V				
8+40	1.0306	1.88	Q	V				
8+45	1.0437	1.89	Q	V				
8+50	1.0568	1.91	Q	V				
8+55	1.0700	1.92	Q	V				
9+ 0	1.0833	1.93	Q	V				
9+ 5	1.0967	1.95	Q	V				
9+10	1.1102	1.96	Q	V				
9+15	1.1238	1.97	Q	V				
9+20	1.1375	1.99	Q	V				
9+25	1.1513	2.00	|Q	V				
9+30	1.1652	2.02	|Q	V				
9+35	1.1792	2.03	|Q	V				
9+40	1.1933	2.05	|Q	V				
9+45	1.2075	2.06	|Q	V				
9+50	1.2218	2.08	|Q	V				
9+55	1.2362	2.10	|Q	V				
10+ 0	1.2508	2.11	|Q	V				
10+ 5	1.2655	2.13	|Q	V				
10+10	1.2802	2.15	|Q	V				
10+15	1.2952	2.17	|Q	V				

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10+20       1.3102      2.18  |Q     V  |          |          |          |
10+25       1.3254      2.20  |Q     V  |          |          |          |
10+30       1.3407      2.22  |Q     V  |          |          |          |
10+35       1.3561      2.24  |Q     V  |          |          |          |
10+40       1.3717      2.26  |Q      V |          |          |          |
10+45       1.3874      2.28  |Q      V |          |          |          |
10+50       1.4033      2.30  |Q      V |          |          |          |
10+55       1.4193      2.33  |Q      V |          |          |          |
11+ 0       1.4355      2.35  |Q      V |          |          |          |
11+ 5       1.4518      2.37  |Q      V |          |          |          |
11+10       1.4683      2.39  |Q      V |          |          |          |
11+15       1.4849      2.42  |Q      V |          |          |          |
11+20       1.5018      2.44  |Q      V |          |          |          |
11+25       1.5188      2.47  |Q      V |          |          |          |
11+30       1.5359      2.49  |Q      V |          |          |          |
11+35       1.5533      2.52  |Q       V|          |          |          |
11+40       1.5708      2.55  |Q       V|          |          |          |
11+45       1.5886      2.58  |Q       V|          |          |          |
11+50       1.6065      2.61  |Q       V|          |          |          |
11+55       1.6247      2.64  |Q       V|          |          |          |
12+ 0       1.6431      2.67  |Q       V|          |          |          |
12+ 5       1.6616      2.70  |Q       V|          |          |          |
12+10       1.6805      2.73  |Q       V|          |          |          |
12+15       1.6995      2.77  |Q       V|          |          |          |
12+20       1.7188      2.80  |Q        V          |          |          |
12+25       1.7384      2.84  |Q        V          |          |          |
12+30       1.7582      2.88  |Q        V          |          |          |
12+35       1.7783      2.92  |Q        V          |          |          |
12+40       1.7987      2.96  |Q        V          |          |          |
12+45       1.8193      3.00  |Q        V          |          |          |
12+50       1.8403      3.04  |Q        V          |          |          |
12+55       1.8616      3.09  |Q        V          |          |          |
13+ 0       1.8832      3.14  |Q         |V         |          |          |
13+ 5       1.9051      3.19  |Q         |V         |          |          |
13+10       1.9274      3.24  |Q         |V         |          |          |
13+15       1.9501      3.29  |Q         |V         |          |          |
13+20       1.9732      3.35  |Q         |V         |          |          |
13+25       1.9966      3.41  |Q         |V         |          |          |
13+30       2.0205      3.47  |Q         |V         |          |          |
13+35       2.0449      3.54  |Q         |V         |          |          |
13+40       2.0697      3.60  |Q         | V        |          |          |
13+45       2.0950      3.68  |Q         | V        |          |          |
13+50       2.1208      3.75  |Q         | V        |          |          |
13+55       2.1472      3.83  |Q         | V        |          |          |
14+ 0       2.1742      3.92  |Q         | V        |          |          |
14+ 5       2.2018      4.01  | Q        | V        |          |          |
14+10       2.2301      4.11  | Q        |  V       |          |          |
14+15       2.2591      4.22  | Q        |  V       |          |          |
14+20       2.2890      4.33  | Q        |  V       |          |          |
14+25       2.3196      4.45  | Q        |  V       |          |          |
14+30       2.3512      4.58  | Q        |  V       |          |          |
14+35       2.3836      4.72  | Q        |  V       |          |          |
14+40       2.4171      4.86  | Q        |   V      |          |          |
14+45       2.4517      5.03  | Q        |   V      |          |          |
14+50       2.4875      5.20  | Q        |   V      |          |          |
14+55       2.5247      5.40  | Q        |   V      |          |          |
15+ 0       2.5633      5.61  | Q        |   V      |          |          |
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19+50	6.3064	1.96	Q	|	|	|	V |
19+55	6.3197	1.93	Q	|	|	|	V |
20+ 0	6.3329	1.90	Q	|	|	|	V |
20+ 5	6.3458	1.88	Q	|	|	|	V |
20+10	6.3586	1.85	Q	|	|	|	V |
20+15	6.3712	1.83	Q	|	|	|	V |
20+20	6.3836	1.81	Q	|	|	|	V |
20+25	6.3959	1.79	Q	|	|	|	V |
20+30	6.4081	1.76	Q	|	|	|	V |
20+35	6.4201	1.74	Q	|	|	|	V |
20+40	6.4320	1.72	Q	|	|	|	V |
20+45	6.4437	1.70	Q	|	|	|	V |
20+50	6.4553	1.69	Q	|	|	|	V |
20+55	6.4668	1.67	Q	|	|	|	V |
21+ 0	6.4782	1.65	Q	|	|	|	V |
21+ 5	6.4894	1.63	Q	|	|	|	V |
21+10	6.5005	1.61	Q	|	|	|	V |
21+15	6.5115	1.60	Q	|	|	|	V |
21+20	6.5224	1.58	Q	|	|	|	V |
21+25	6.5332	1.57	Q	|	|	|	V |
21+30	6.5439	1.55	Q	|	|	|	V |
21+35	6.5545	1.54	Q	|	|	|	V |
21+40	6.5650	1.52	Q	|	|	|	V |
21+45	6.5754	1.51	Q	|	|	|	V |
21+50	6.5856	1.49	Q	|	|	|	V |
21+55	6.5958	1.48	Q	|	|	|	V |
22+ 0	6.6060	1.47	Q	|	|	|	V |
22+ 5	6.6160	1.46	Q	|	|	|	V |
22+10	6.6259	1.44	Q	|	|	|	V |
22+15	6.6358	1.43	Q	|	|	|	V |
22+20	6.6455	1.42	Q	|	|	|	V |
22+25	6.6552	1.41	Q	|	|	|	V |
22+30	6.6648	1.40	Q	|	|	|	V |
22+35	6.6744	1.38	Q	|	|	|	V |
22+40	6.6838	1.37	Q	|	|	|	V|
22+45	6.6932	1.36	Q	|	|	|	V|
22+50	6.7025	1.35	Q	|	|	|	V|
22+55	6.7117	1.34	Q	|	|	|	V|
23+ 0	6.7209	1.33	Q	|	|	|	V|
23+ 5	6.7300	1.32	Q	|	|	|	V|
23+10	6.7391	1.31	Q	|	|	|	V|
23+15	6.7480	1.30	Q	|	|	|	V|
23+20	6.7569	1.29	Q	|	|	|	V|
23+25	6.7658	1.28	Q	|	|	|	V|
23+30	6.7746	1.27	Q	|	|	|	V|
23+35	6.7833	1.27	Q	|	|	|	V|
23+40	6.7919	1.26	Q	|	|	|	V|
23+45	6.8005	1.25	Q	|	|	|	V|
23+50	6.8091	1.24	Q	|	|	|	V|
23+55	6.8176	1.23	Q	|	|	|	V|
24+ 0	6.8260	1.22	Q	|	|	|	V|
24+ 5	6.8340	1.16	Q	|	|	|	V|
24+10	6.8397	0.84	Q	|	|	|	V|
24+15	6.8425	0.40	Q	|	|	|	V|
24+20	6.8441	0.24	Q	|	|	|	V|
24+25	6.8451	0.14	Q	|	|	|	V|
24+30	6.8457	0.08	Q	|	|	|	V|

24+35	6.8460	0.05	Q	|	|	|	V|
24+40	6.8462	0.03	Q	|	|	|	V|
24+45	6.8463	0.02	Q	|	|	|	V|
24+50	6.8464	0.01	Q	|	|	|	V|
24+55	6.8465	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA E- EXISTING CONDITIONS
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
70.00	6	0.82
Rainfall data for year 2		
70.00	24	1.37
Rainfall data for year 100		
70.00	6	2.34
Rainfall data for year 100		
70.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	70.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
70.00	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
++
Watercourse length = 2990.00(Ft.)
Length from concentration point to centroid = 1955.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 70.00(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.7896
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 70.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.335(In)
30-minute factor = 0.997 Adjusted rainfall = 0.751(In)
1-hour factor = 0.997 Adjusted rainfall = 1.026(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.552(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 846.56 (CFS))

1	4.937	41.793
2	30.828	219.183
3	67.136	307.376
4	80.546	113.519
5	88.317	65.787
6	93.212	41.438
7	96.189	25.201
8	97.844	14.016
9	98.384	4.572
10	98.762	3.199
11	99.140	3.199
12	100.000	7.281

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.335
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.80	0.054
8	1.29	0.86	0.85	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.041
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.25	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.024
23	0.69	1.33	1.32	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017

39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.64	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.79	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.03	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.29	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009

96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.47	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.52	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.60	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.23	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007

153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.82	2.82	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.13	3.13	0.006

210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.21	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.26	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005

267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015
29	0.0053	0.0038	0.0015

30	0.0053	0.0038	0.0015
31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015
33	0.0054	0.0039	0.0015
34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015
37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015
40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019
86	0.0069	0.0050	0.0019

87	0.0069	0.0050	0.0019
88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019
90	0.0070	0.0051	0.0020
91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020
94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020
97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030
143	0.0110	0.0079	0.0030

144	0.0111	0.0080	0.0031
145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0032
147	0.0116	0.0084	0.0032
148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033
151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035
154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0177	0.0128	0.0049
171	0.0183	0.0132	0.0051
172	0.0187	0.0135	0.0052
173	0.0194	0.0140	0.0054
174	0.0198	0.0143	0.0055
175	0.0207	0.0150	0.0057
176	0.0212	0.0153	0.0059
177	0.0223	0.0161	0.0062
178	0.0229	0.0165	0.0064
179	0.0242	0.0175	0.0067
180	0.0250	0.0180	0.0069
181	0.0267	0.0193	0.0074
182	0.0276	0.0200	0.0077
183	0.0299	0.0216	0.0083
184	0.0312	0.0226	0.0087
185	0.0394	0.0285	0.0109
186	0.0414	0.0299	0.0115
187	0.0465	0.0336	0.0129
188	0.0499	0.0360	0.0138
189	0.0592	0.0427	0.0164
190	0.0661	0.0472*	0.0189
191	0.0917	0.0472*	0.0445
192	0.1227	0.0472*	0.0756
193	0.3353	0.0472*	0.2882
194	0.0760	0.0472*	0.0288
195	0.0539	0.0390	0.0150
196	0.0438	0.0316	0.0121
197	0.0327	0.0236	0.0091
198	0.0287	0.0207	0.0080
199	0.0258	0.0186	0.0072
200	0.0235	0.0170	0.0065

201	0.0217	0.0157	0.0060
202	0.0203	0.0146	0.0056
203	0.0190	0.0137	0.0053
204	0.0180	0.0130	0.0050
205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043
208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0138	0.0099	0.0038
211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0115	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017

257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017
259	0.0060	0.0044	0.0017
260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016
262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016
265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016
268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5522	2.3026	1.2496

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 108.61(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

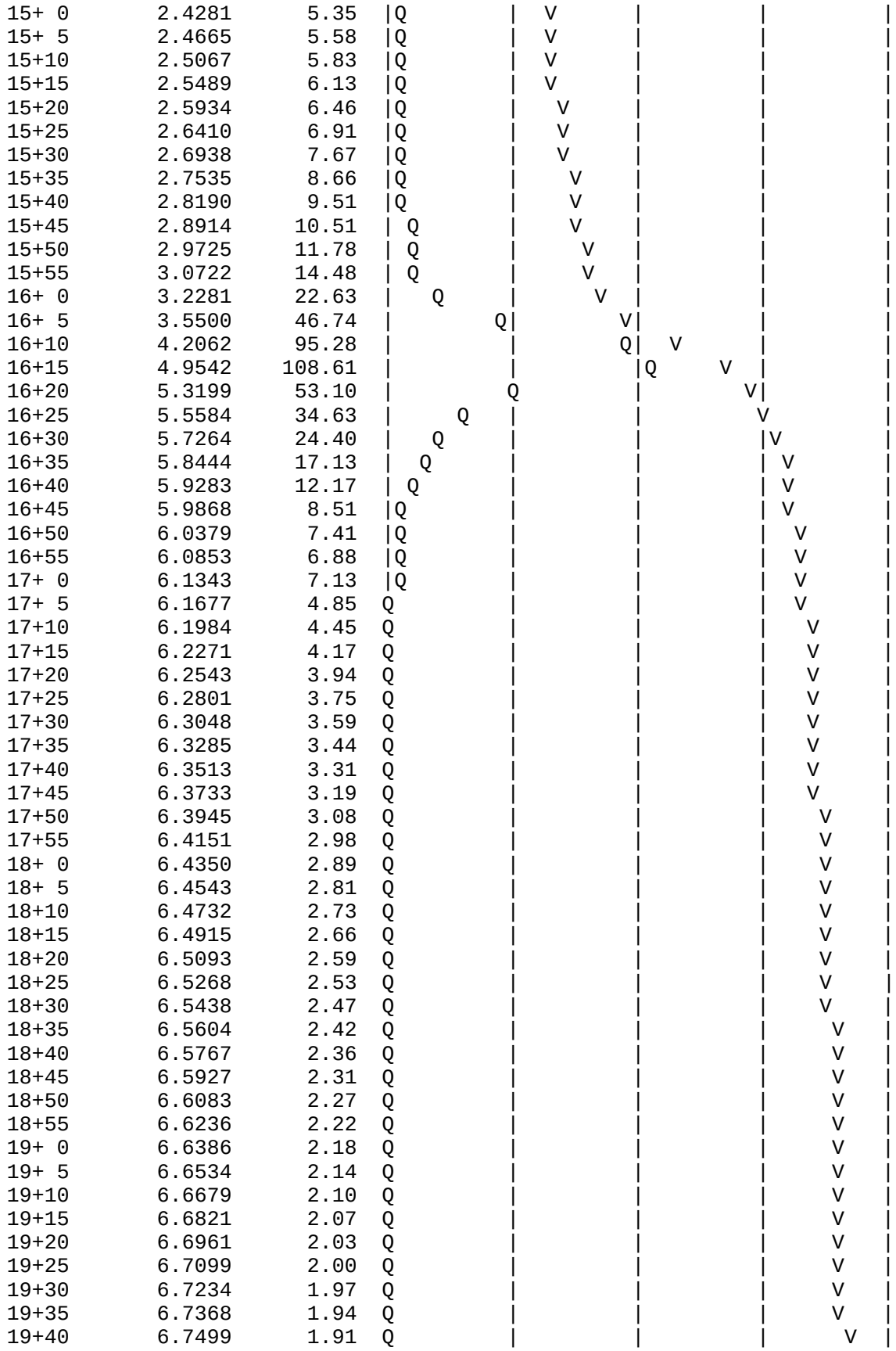
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0004	0.06	Q	|	|	|	|
0+10	0.0028	0.35	Q	|	|	|	|
0+15	0.0080	0.76	Q	|	|	|	|
0+20	0.0143	0.91	Q	|	|	|	|
0+25	0.0212	1.00	Q	|	|	|	|
0+30	0.0286	1.06	Q	|	|	|	|
0+35	0.0361	1.10	Q	|	|	|	|
0+40	0.0439	1.12	Q	|	|	|	|

0+45	0.0517	1.13	Q	|	|	|	|
0+50	0.0595	1.14	Q	|	|	|	|
0+55	0.0674	1.15	Q	|	|	|	|
1+ 0	0.0754	1.16	Q	|	|	|	|
1+ 5	0.0835	1.17	Q	|	|	|	|
1+10	0.0915	1.17	Q	|	|	|	|
1+15	0.0996	1.17	Q	|	|	|	|
1+20	0.1077	1.18	Q	|	|	|	|
1+25	0.1159	1.18	Q	|	|	|	|
1+30	0.1240	1.19	Q	|	|	|	|
1+35	0.1322	1.19	Q	|	|	|	|
1+40	0.1405	1.19	Q	|	|	|	|
1+45	0.1487	1.20	Q	|	|	|	|
1+50	0.1570	1.20	Q	|	|	|	|
1+55	0.1653	1.21	Q	|	|	|	|
2+ 0	0.1736	1.21	Q	|	|	|	|
2+ 5	0.1820	1.22	Q	|	|	|	|
2+10	0.1904	1.22	QV	|	|	|	|
2+15	0.1989	1.22	QV	|	|	|	|
2+20	0.2073	1.23	QV	|	|	|	|
2+25	0.2158	1.23	QV	|	|	|	|
2+30	0.2243	1.24	QV	|	|	|	|
2+35	0.2329	1.24	QV	|	|	|	|
2+40	0.2415	1.25	QV	|	|	|	|
2+45	0.2501	1.25	QV	|	|	|	|
2+50	0.2588	1.26	QV	|	|	|	|
2+55	0.2674	1.26	QV	|	|	|	|
3+ 0	0.2762	1.27	QV	|	|	|	|
3+ 5	0.2849	1.27	QV	|	|	|	|
3+10	0.2937	1.28	QV	|	|	|	|
3+15	0.3025	1.28	QV	|	|	|	|
3+20	0.3114	1.29	QV	|	|	|	|
3+25	0.3203	1.29	QV	|	|	|	|
3+30	0.3292	1.30	QV	|	|	|	|
3+35	0.3382	1.30	QV	|	|	|	|
3+40	0.3472	1.31	QV	|	|	|	|
3+45	0.3562	1.31	QV	|	|	|	|
3+50	0.3653	1.32	Q V	|	|	|	|
3+55	0.3744	1.32	Q V	|	|	|	|
4+ 0	0.3835	1.33	Q V	|	|	|	|
4+ 5	0.3927	1.33	Q V	|	|	|	|
4+10	0.4019	1.34	Q V	|	|	|	|
4+15	0.4112	1.34	Q V	|	|	|	|
4+20	0.4205	1.35	Q V	|	|	|	|
4+25	0.4298	1.36	Q V	|	|	|	|
4+30	0.4392	1.36	Q V	|	|	|	|
4+35	0.4486	1.37	Q V	|	|	|	|
4+40	0.4581	1.37	Q V	|	|	|	|
4+45	0.4676	1.38	Q V	|	|	|	|
4+50	0.4771	1.39	Q V	|	|	|	|
4+55	0.4867	1.39	Q V	|	|	|	|
5+ 0	0.4964	1.40	Q V	|	|	|	|
5+ 5	0.5060	1.41	Q V	|	|	|	|
5+10	0.5158	1.41	Q V	|	|	|	|
5+15	0.5255	1.42	Q V	|	|	|	|
5+20	0.5353	1.42	Q V	|	|	|	|
5+25	0.5452	1.43	Q V	|	|	|	|

5+30	0.5551	1.44	Q	V				
5+35	0.5651	1.44	Q	V				
5+40	0.5751	1.45	Q	V				
5+45	0.5851	1.46	Q	V				
5+50	0.5952	1.47	Q	V				
5+55	0.6053	1.47	Q	V				
6+ 0	0.6155	1.48	Q	V				
6+ 5	0.6258	1.49	Q	V				
6+10	0.6361	1.50	Q	V				
6+15	0.6464	1.50	Q	V				
6+20	0.6568	1.51	Q	V				
6+25	0.6673	1.52	Q	V				
6+30	0.6778	1.53	Q	V				
6+35	0.6884	1.53	Q	V				
6+40	0.6990	1.54	Q	V				
6+45	0.7097	1.55	Q	V				
6+50	0.7204	1.56	Q	V				
6+55	0.7312	1.57	Q	V				
7+ 0	0.7420	1.58	Q	V				
7+ 5	0.7530	1.58	Q	V				
7+10	0.7639	1.59	Q	V				
7+15	0.7750	1.60	Q	V				
7+20	0.7861	1.61	Q	V				
7+25	0.7972	1.62	Q	V				
7+30	0.8084	1.63	Q	V				
7+35	0.8197	1.64	Q	V				
7+40	0.8311	1.65	Q	V				
7+45	0.8425	1.66	Q	V				
7+50	0.8540	1.67	Q	V				
7+55	0.8656	1.68	Q	V				
8+ 0	0.8772	1.69	Q	V				
8+ 5	0.8889	1.70	Q	V				
8+10	0.9007	1.71	Q	V				
8+15	0.9126	1.72	Q	V				
8+20	0.9245	1.73	Q	V				
8+25	0.9365	1.74	Q	V				
8+30	0.9486	1.75	Q	V				
8+35	0.9608	1.77	Q	V				
8+40	0.9730	1.78	Q	V				
8+45	0.9853	1.79	Q	V				
8+50	0.9977	1.80	Q	V				
8+55	1.0102	1.82	Q	V				
9+ 0	1.0228	1.83	Q	V				
9+ 5	1.0355	1.84	Q	V				
9+10	1.0483	1.85	Q	V				
9+15	1.0611	1.87	Q	V				
9+20	1.0741	1.88	Q	V				
9+25	1.0871	1.89	Q	V				
9+30	1.1003	1.91	Q	V				
9+35	1.1135	1.92	Q	V				
9+40	1.1269	1.94	Q	V				
9+45	1.1403	1.95	Q	V				
9+50	1.1539	1.97	Q	V				
9+55	1.1676	1.98	Q	V				
10+ 0	1.1813	2.00	Q	V				
10+ 5	1.1952	2.02	Q	V				
10+10	1.2092	2.03	Q	V				

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10+15       1.2234      2.05  Q     V   |          |          |          |
10+20       1.2376      2.07  Q     V   |          |          |          |
10+25       1.2520      2.09  Q     V   |          |          |          |
10+30       1.2665      2.10  Q     V   |          |          |          |
10+35       1.2811      2.12  Q      V  |          |          |          |
10+40       1.2958      2.14  Q      V  |          |          |          |
10+45       1.3107      2.16  Q      V  |          |          |          |
10+50       1.3258      2.18  Q      V  |          |          |          |
10+55       1.3409      2.20  Q      V  |          |          |          |
11+ 0       1.3562      2.22  Q      V  |          |          |          |
11+ 5       1.3717      2.25  Q      V  |          |          |          |
11+10       1.3873      2.27  Q      V  |          |          |          |
11+15       1.4031      2.29  Q      V  |          |          |          |
11+20       1.4191      2.31  Q      V  |          |          |          |
11+25       1.4352      2.34  Q      V  |          |          |          |
11+30       1.4514      2.36  Q      V  |          |          |          |
11+35       1.4679      2.39  Q       V |          |          |          |
11+40       1.4845      2.42  Q       V |          |          |          |
11+45       1.5014      2.44  Q       V |          |          |          |
11+50       1.5184      2.47  Q       V |          |          |          |
11+55       1.5356      2.50  Q       V |          |          |          |
12+ 0       1.5530      2.53  Q       V |          |          |          |
12+ 5       1.5706      2.56  Q       V |          |          |          |
12+10       1.5885      2.59  Q       V |          |          |          |
12+15       1.6066      2.63  Q       V |          |          |          |
12+20       1.6249      2.66  Q       V |          |          |          |
12+25       1.6434      2.69  Q        V|          |          |          |
12+30       1.6622      2.73  Q        V|          |          |          |
12+35       1.6813      2.77  Q        V|          |          |          |
12+40       1.7006      2.81  Q        V|          |          |          |
12+45       1.7203      2.85  Q        V|          |          |          |
12+50       1.7402      2.89  Q        V|          |          |          |
12+55       1.7604      2.93  Q        V|          |          |          |
13+ 0       1.7809      2.98  Q        V|          |          |          |
13+ 5       1.8017      3.03  Q        V|          |          |          |
13+10       1.8229      3.08  Q         V          |          |          |
13+15       1.8444      3.13  Q         V          |          |          |
13+20       1.8664      3.18  Q         V          |          |          |
13+25       1.8887      3.24  Q         V          |          |          |
13+30       1.9114      3.30  Q         V          |          |          |
13+35       1.9345      3.36  Q         V          |          |          |
13+40       1.9581      3.42  Q         V          |          |          |
13+45       1.9821      3.49  Q         V          |          |          |
13+50       2.0067      3.57  Q          |V         |          |          |
13+55       2.0318      3.64  Q          |V         |          |          |
14+ 0       2.0574      3.72  Q          |V         |          |          |
14+ 5       2.0837      3.81  Q          |V         |          |          |
14+10       2.1106      3.91  Q          |V         |          |          |
14+15       2.1383      4.02  Q          |V         |          |          |
14+20       2.1667      4.12  Q          |V         |          |          |
14+25       2.1959      4.24  Q          | V        |          |          |
14+30       2.2259      4.36  Q          | V        |          |          |
14+35       2.2568      4.49  Q          | V        |          |          |
14+40       2.2887      4.63  Q          | V        |          |          |
14+45       2.3217      4.79  Q          | V        |          |          |
14+50       2.3558      4.96  Q          | V        |          |          |
14+55       2.3913      5.14  |Q         |  V       |          |          |
```



19+45	6.7629	1.88	Q	|	|	|	V |
19+50	6.7756	1.85	Q	|	|	|	V |
19+55	6.7882	1.83	Q	|	|	|	V |
20+ 0	6.8006	1.80	Q	|	|	|	V |
20+ 5	6.8129	1.78	Q	|	|	|	V |
20+10	6.8249	1.75	Q	|	|	|	V |
20+15	6.8369	1.73	Q	|	|	|	V |
20+20	6.8486	1.71	Q	|	|	|	V |
20+25	6.8603	1.69	Q	|	|	|	V |
20+30	6.8718	1.67	Q	|	|	|	V |
20+35	6.8831	1.65	Q	|	|	|	V |
20+40	6.8943	1.63	Q	|	|	|	V |
20+45	6.9054	1.61	Q	|	|	|	V |
20+50	6.9164	1.59	Q	|	|	|	V |
20+55	6.9272	1.58	Q	|	|	|	V |
21+ 0	6.9380	1.56	Q	|	|	|	V |
21+ 5	6.9486	1.54	Q	|	|	|	V |
21+10	6.9591	1.53	Q	|	|	|	V |
21+15	6.9695	1.51	Q	|	|	|	V |
21+20	6.9798	1.49	Q	|	|	|	V |
21+25	6.9900	1.48	Q	|	|	|	V |
21+30	7.0001	1.47	Q	|	|	|	V |
21+35	7.0101	1.45	Q	|	|	|	V |
21+40	7.0200	1.44	Q	|	|	|	V |
21+45	7.0298	1.42	Q	|	|	|	V |
21+50	7.0395	1.41	Q	|	|	|	V |
21+55	7.0491	1.40	Q	|	|	|	V |
22+ 0	7.0587	1.39	Q	|	|	|	V |
22+ 5	7.0681	1.37	Q	|	|	|	V |
22+10	7.0775	1.36	Q	|	|	|	V |
22+15	7.0868	1.35	Q	|	|	|	V |
22+20	7.0960	1.34	Q	|	|	|	V |
22+25	7.1052	1.33	Q	|	|	|	V|
22+30	7.1142	1.32	Q	|	|	|	V|
22+35	7.1232	1.31	Q	|	|	|	V|
22+40	7.1321	1.30	Q	|	|	|	V|
22+45	7.1410	1.29	Q	|	|	|	V|
22+50	7.1498	1.28	Q	|	|	|	V|
22+55	7.1585	1.27	Q	|	|	|	V|
23+ 0	7.1671	1.26	Q	|	|	|	V|
23+ 5	7.1757	1.25	Q	|	|	|	V|
23+10	7.1843	1.24	Q	|	|	|	V|
23+15	7.1927	1.23	Q	|	|	|	V|
23+20	7.2011	1.22	Q	|	|	|	V|
23+25	7.2094	1.21	Q	|	|	|	V|
23+30	7.2177	1.20	Q	|	|	|	V|
23+35	7.2259	1.19	Q	|	|	|	V|
23+40	7.2341	1.19	Q	|	|	|	V|
23+45	7.2422	1.18	Q	|	|	|	V|
23+50	7.2503	1.17	Q	|	|	|	V|
23+55	7.2583	1.16	Q	|	|	|	V|
24+ 0	7.2662	1.15	Q	|	|	|	V|
24+ 5	7.2737	1.09	Q	|	|	|	V|
24+10	7.2792	0.79	Q	|	|	|	V|
24+15	7.2818	0.38	Q	|	|	|	V|
24+20	7.2833	0.22	Q	|	|	|	V|
24+25	7.2842	0.13	Q	|	|	|	V|

24+30	7.2848	0.08	Q	|	|	|	V|
24+35	7.2851	0.04	Q	|	|	|	V|
24+40	7.2853	0.02	Q	|	|	|	V|
24+45	7.2854	0.02	Q	|	|	|	V|
24+50	7.2855	0.01	Q	|	|	|	V|
24+55	7.2855	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 07/23/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA E
50-YEAR EVENT
HYDROLOGY STUDY

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2	70.00	6	0.82
Rainfall data for year 2	70.00	24	1.37
Rainfall data for year 100	70.00	6	2.34
Rainfall data for year 100	70.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
83.0	70.00	1.000	0.326	1.000	0.326

Area-averaged adjusted loss rate Fm (In/Hr) = 0.326

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
70.00	1.000	83.0	2.05	0.536

Area-averaged catchment yield fraction, Y = 0.536
Area-averaged low loss fraction, Yb = 0.464
++
Watercourse length = 2990.00(Ft.)
Length from concentration point to centroid = 1955.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 70.00(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.7896
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.326(In/Hr)
Average low loss rate fraction (Yb) = 0.464 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 70.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.335(In)
30-minute factor = 0.997 Adjusted rainfall = 0.751(In)
1-hour factor = 0.997 Adjusted rainfall = 1.026(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.552(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 846.56 (CFS))

1	4.937	41.793
2	30.828	219.183
3	67.136	307.376
4	80.546	113.519
5	88.317	65.787
6	93.212	41.438
7	96.189	25.201
8	97.844	14.016
9	98.384	4.572
10	98.762	3.199
11	99.140	3.199
12	100.000	7.281

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.335
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.80	0.054
8	1.29	0.86	0.85	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.041
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.25	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.024
23	0.69	1.33	1.32	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017

39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.64	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.79	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.03	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.29	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009

96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.47	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.52	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.60	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.23	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007

153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.82	2.82	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.13	3.13	0.006

210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.21	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.26	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005

267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0022	0.0026
2	0.0048	0.0022	0.0026
3	0.0048	0.0023	0.0026
4	0.0049	0.0023	0.0026
5	0.0049	0.0023	0.0026
6	0.0049	0.0023	0.0026
7	0.0049	0.0023	0.0026
8	0.0049	0.0023	0.0026
9	0.0049	0.0023	0.0026
10	0.0050	0.0023	0.0027
11	0.0050	0.0023	0.0027
12	0.0050	0.0023	0.0027
13	0.0050	0.0023	0.0027
14	0.0050	0.0023	0.0027
15	0.0050	0.0023	0.0027
16	0.0051	0.0023	0.0027
17	0.0051	0.0024	0.0027
18	0.0051	0.0024	0.0027
19	0.0051	0.0024	0.0027
20	0.0051	0.0024	0.0027
21	0.0051	0.0024	0.0028
22	0.0052	0.0024	0.0028
23	0.0052	0.0024	0.0028
24	0.0052	0.0024	0.0028
25	0.0052	0.0024	0.0028
26	0.0052	0.0024	0.0028
27	0.0053	0.0024	0.0028
28	0.0053	0.0024	0.0028
29	0.0053	0.0025	0.0028

30	0.0053	0.0025	0.0028
31	0.0053	0.0025	0.0029
32	0.0054	0.0025	0.0029
33	0.0054	0.0025	0.0029
34	0.0054	0.0025	0.0029
35	0.0054	0.0025	0.0029
36	0.0054	0.0025	0.0029
37	0.0055	0.0025	0.0029
38	0.0055	0.0025	0.0029
39	0.0055	0.0026	0.0030
40	0.0055	0.0026	0.0030
41	0.0056	0.0026	0.0030
42	0.0056	0.0026	0.0030
43	0.0056	0.0026	0.0030
44	0.0056	0.0026	0.0030
45	0.0056	0.0026	0.0030
46	0.0057	0.0026	0.0030
47	0.0057	0.0026	0.0030
48	0.0057	0.0027	0.0031
49	0.0057	0.0027	0.0031
50	0.0058	0.0027	0.0031
51	0.0058	0.0027	0.0031
52	0.0058	0.0027	0.0031
53	0.0058	0.0027	0.0031
54	0.0059	0.0027	0.0031
55	0.0059	0.0027	0.0032
56	0.0059	0.0027	0.0032
57	0.0059	0.0028	0.0032
58	0.0060	0.0028	0.0032
59	0.0060	0.0028	0.0032
60	0.0060	0.0028	0.0032
61	0.0061	0.0028	0.0032
62	0.0061	0.0028	0.0033
63	0.0061	0.0028	0.0033
64	0.0061	0.0028	0.0033
65	0.0062	0.0029	0.0033
66	0.0062	0.0029	0.0033
67	0.0062	0.0029	0.0033
68	0.0062	0.0029	0.0033
69	0.0063	0.0029	0.0034
70	0.0063	0.0029	0.0034
71	0.0064	0.0029	0.0034
72	0.0064	0.0030	0.0034
73	0.0064	0.0030	0.0034
74	0.0064	0.0030	0.0034
75	0.0065	0.0030	0.0035
76	0.0065	0.0030	0.0035
77	0.0066	0.0030	0.0035
78	0.0066	0.0031	0.0035
79	0.0066	0.0031	0.0035
80	0.0066	0.0031	0.0036
81	0.0067	0.0031	0.0036
82	0.0067	0.0031	0.0036
83	0.0068	0.0031	0.0036
84	0.0068	0.0032	0.0036
85	0.0068	0.0032	0.0037
86	0.0069	0.0032	0.0037

87	0.0069	0.0032	0.0037
88	0.0070	0.0032	0.0037
89	0.0070	0.0033	0.0038
90	0.0070	0.0033	0.0038
91	0.0071	0.0033	0.0038
92	0.0071	0.0033	0.0038
93	0.0072	0.0033	0.0038
94	0.0072	0.0033	0.0039
95	0.0073	0.0034	0.0039
96	0.0073	0.0034	0.0039
97	0.0074	0.0034	0.0039
98	0.0074	0.0034	0.0040
99	0.0075	0.0035	0.0040
100	0.0075	0.0035	0.0040
101	0.0076	0.0035	0.0040
102	0.0076	0.0035	0.0041
103	0.0077	0.0036	0.0041
104	0.0077	0.0036	0.0041
105	0.0078	0.0036	0.0042
106	0.0078	0.0036	0.0042
107	0.0079	0.0037	0.0042
108	0.0079	0.0037	0.0042
109	0.0080	0.0037	0.0043
110	0.0080	0.0037	0.0043
111	0.0081	0.0038	0.0043
112	0.0081	0.0038	0.0044
113	0.0082	0.0038	0.0044
114	0.0083	0.0038	0.0044
115	0.0084	0.0039	0.0045
116	0.0084	0.0039	0.0045
117	0.0085	0.0039	0.0045
118	0.0085	0.0040	0.0046
119	0.0086	0.0040	0.0046
120	0.0087	0.0040	0.0046
121	0.0088	0.0041	0.0047
122	0.0088	0.0041	0.0047
123	0.0089	0.0041	0.0048
124	0.0090	0.0042	0.0048
125	0.0091	0.0042	0.0049
126	0.0091	0.0042	0.0049
127	0.0093	0.0043	0.0050
128	0.0093	0.0043	0.0050
129	0.0094	0.0044	0.0051
130	0.0095	0.0044	0.0051
131	0.0096	0.0045	0.0052
132	0.0097	0.0045	0.0052
133	0.0098	0.0046	0.0053
134	0.0099	0.0046	0.0053
135	0.0100	0.0047	0.0054
136	0.0101	0.0047	0.0054
137	0.0102	0.0048	0.0055
138	0.0103	0.0048	0.0055
139	0.0105	0.0049	0.0056
140	0.0105	0.0049	0.0056
141	0.0107	0.0050	0.0057
142	0.0108	0.0050	0.0058
143	0.0110	0.0051	0.0059

144	0.0111	0.0051	0.0059
145	0.0113	0.0052	0.0060
146	0.0114	0.0053	0.0061
147	0.0116	0.0054	0.0062
148	0.0117	0.0054	0.0062
149	0.0119	0.0055	0.0064
150	0.0120	0.0056	0.0064
151	0.0122	0.0057	0.0065
152	0.0123	0.0057	0.0066
153	0.0126	0.0058	0.0067
154	0.0127	0.0059	0.0068
155	0.0130	0.0060	0.0070
156	0.0131	0.0061	0.0070
157	0.0134	0.0062	0.0072
158	0.0136	0.0063	0.0073
159	0.0139	0.0065	0.0075
160	0.0141	0.0065	0.0075
161	0.0144	0.0067	0.0077
162	0.0146	0.0068	0.0078
163	0.0150	0.0070	0.0081
164	0.0152	0.0071	0.0082
165	0.0157	0.0073	0.0084
166	0.0159	0.0074	0.0085
167	0.0164	0.0076	0.0088
168	0.0167	0.0078	0.0089
169	0.0173	0.0081	0.0093
170	0.0177	0.0082	0.0095
171	0.0183	0.0085	0.0098
172	0.0187	0.0087	0.0100
173	0.0194	0.0090	0.0104
174	0.0198	0.0092	0.0106
175	0.0207	0.0096	0.0111
176	0.0212	0.0099	0.0114
177	0.0223	0.0104	0.0119
178	0.0229	0.0106	0.0123
179	0.0242	0.0112	0.0130
180	0.0250	0.0116	0.0134
181	0.0267	0.0124	0.0143
182	0.0276	0.0128	0.0148
183	0.0299	0.0139	0.0160
184	0.0312	0.0145	0.0167
185	0.0394	0.0183	0.0211
186	0.0414	0.0192	0.0222
187	0.0465	0.0216	0.0249
188	0.0499	0.0231	0.0267
189	0.0592	0.0272*	0.0320
190	0.0661	0.0272*	0.0389
191	0.0917	0.0272*	0.0645
192	0.1227	0.0272*	0.0956
193	0.3353	0.0272*	0.3082
194	0.0760	0.0272*	0.0488
195	0.0539	0.0250	0.0289
196	0.0438	0.0203	0.0234
197	0.0327	0.0152	0.0175
198	0.0287	0.0133	0.0154
199	0.0258	0.0120	0.0138
200	0.0235	0.0109	0.0126

201	0.0217	0.0101	0.0116
202	0.0203	0.0094	0.0109
203	0.0190	0.0088	0.0102
204	0.0180	0.0083	0.0096
205	0.0170	0.0079	0.0091
206	0.0162	0.0075	0.0087
207	0.0155	0.0072	0.0083
208	0.0148	0.0069	0.0079
209	0.0143	0.0066	0.0076
210	0.0138	0.0064	0.0074
211	0.0133	0.0062	0.0071
212	0.0129	0.0060	0.0069
213	0.0125	0.0058	0.0067
214	0.0121	0.0056	0.0065
215	0.0118	0.0055	0.0063
216	0.0115	0.0053	0.0061
217	0.0112	0.0052	0.0060
218	0.0109	0.0051	0.0058
219	0.0106	0.0049	0.0057
220	0.0104	0.0048	0.0056
221	0.0102	0.0047	0.0054
222	0.0099	0.0046	0.0053
223	0.0097	0.0045	0.0052
224	0.0096	0.0044	0.0051
225	0.0094	0.0044	0.0050
226	0.0092	0.0043	0.0049
227	0.0090	0.0042	0.0048
228	0.0089	0.0041	0.0048
229	0.0087	0.0041	0.0047
230	0.0086	0.0040	0.0046
231	0.0084	0.0039	0.0045
232	0.0083	0.0039	0.0045
233	0.0082	0.0038	0.0044
234	0.0081	0.0037	0.0043
235	0.0079	0.0037	0.0043
236	0.0078	0.0036	0.0042
237	0.0077	0.0036	0.0041
238	0.0076	0.0035	0.0041
239	0.0075	0.0035	0.0040
240	0.0074	0.0034	0.0040
241	0.0073	0.0034	0.0039
242	0.0072	0.0034	0.0039
243	0.0071	0.0033	0.0038
244	0.0071	0.0033	0.0038
245	0.0070	0.0032	0.0037
246	0.0069	0.0032	0.0037
247	0.0068	0.0032	0.0037
248	0.0067	0.0031	0.0036
249	0.0067	0.0031	0.0036
250	0.0066	0.0031	0.0035
251	0.0065	0.0030	0.0035
252	0.0065	0.0030	0.0035
253	0.0064	0.0030	0.0034
254	0.0063	0.0029	0.0034
255	0.0063	0.0029	0.0034
256	0.0062	0.0029	0.0033
257	0.0061	0.0029	0.0033

258	0.0061	0.0028	0.0033
259	0.0060	0.0028	0.0032
260	0.0060	0.0028	0.0032
261	0.0059	0.0028	0.0032
262	0.0059	0.0027	0.0031
263	0.0058	0.0027	0.0031
264	0.0058	0.0027	0.0031
265	0.0057	0.0027	0.0031
266	0.0057	0.0026	0.0030
267	0.0056	0.0026	0.0030
268	0.0056	0.0026	0.0030
269	0.0055	0.0026	0.0030
270	0.0055	0.0026	0.0029
271	0.0055	0.0025	0.0029
272	0.0054	0.0025	0.0029
273	0.0054	0.0025	0.0029
274	0.0053	0.0025	0.0029
275	0.0053	0.0025	0.0028
276	0.0052	0.0024	0.0028
277	0.0052	0.0024	0.0028
278	0.0052	0.0024	0.0028
279	0.0051	0.0024	0.0028
280	0.0051	0.0024	0.0027
281	0.0051	0.0024	0.0027
282	0.0050	0.0023	0.0027
283	0.0050	0.0023	0.0027
284	0.0050	0.0023	0.0027
285	0.0049	0.0023	0.0026
286	0.0049	0.0023	0.0026
287	0.0049	0.0023	0.0026
288	0.0048	0.0022	0.0026
	3.5522	1.4638	2.0884

Total soil rain loss = 1.46(In)
Total effective rainfall = 2.09(In)
Peak flow rate in flood hydrograph = 124.89(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

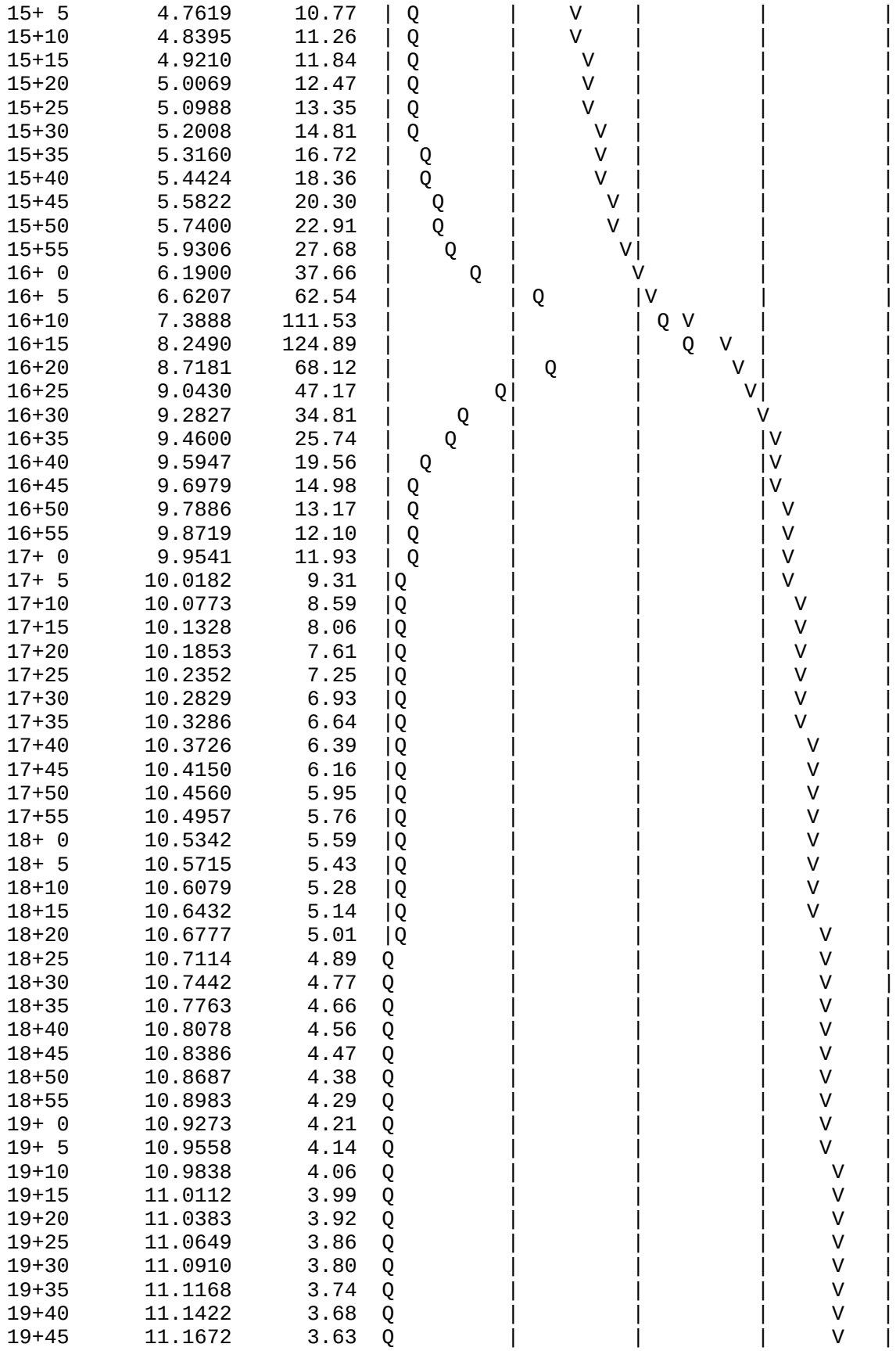
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0007	0.11	Q				
0+10	0.0054	0.67	Q				
0+15	0.0155	1.47	Q				
0+20	0.0276	1.76	Q				
0+25	0.0410	1.94	Q				
0+30	0.0551	2.05	Q				
0+35	0.0698	2.12	Q				
0+40	0.0847	2.17	Q				
0+45	0.0998	2.19	Q				

0+50	0.1149	2.20	Q	|	|	|	|
0+55	0.1302	2.22	Q	|	|	|	|
1+ 0	0.1457	2.24	Q	|	|	|	|
1+ 5	0.1612	2.25	Q	|	|	|	|
1+10	0.1767	2.26	Q	|	|	|	|
1+15	0.1923	2.27	Q	|	|	|	|
1+20	0.2080	2.27	Q	|	|	|	|
1+25	0.2237	2.28	Q	|	|	|	|
1+30	0.2395	2.29	Q	|	|	|	|
1+35	0.2553	2.30	Q	|	|	|	|
1+40	0.2712	2.31	Q	|	|	|	|
1+45	0.2871	2.31	Q	|	|	|	|
1+50	0.3031	2.32	Q	|	|	|	|
1+55	0.3191	2.33	QV	|	|	|	|
2+ 0	0.3352	2.34	QV	|	|	|	|
2+ 5	0.3514	2.35	QV	|	|	|	|
2+10	0.3676	2.36	QV	|	|	|	|
2+15	0.3839	2.36	QV	|	|	|	|
2+20	0.4002	2.37	QV	|	|	|	|
2+25	0.4166	2.38	QV	|	|	|	|
2+30	0.4331	2.39	QV	|	|	|	|
2+35	0.4496	2.40	QV	|	|	|	|
2+40	0.4662	2.41	QV	|	|	|	|
2+45	0.4828	2.42	QV	|	|	|	|
2+50	0.4996	2.43	QV	|	|	|	|
2+55	0.5163	2.44	QV	|	|	|	|
3+ 0	0.5332	2.44	QV	|	|	|	|
3+ 5	0.5501	2.45	QV	|	|	|	|
3+10	0.5670	2.46	QV	|	|	|	|
3+15	0.5841	2.47	QV	|	|	|	|
3+20	0.6012	2.48	QV	|	|	|	|
3+25	0.6183	2.49	Q V	|	|	|	|
3+30	0.6355	2.50	Q V	|	|	|	|
3+35	0.6529	2.51	Q V	|	|	|	|
3+40	0.6702	2.52	Q V	|	|	|	|
3+45	0.6877	2.53	Q V	|	|	|	|
3+50	0.7052	2.54	Q V	|	|	|	|
3+55	0.7228	2.55	Q V	|	|	|	|
4+ 0	0.7404	2.56	Q V	|	|	|	|
4+ 5	0.7582	2.57	Q V	|	|	|	|
4+10	0.7760	2.59	Q V	|	|	|	|
4+15	0.7938	2.60	Q V	|	|	|	|
4+20	0.8118	2.61	Q V	|	|	|	|
4+25	0.8298	2.62	Q V	|	|	|	|
4+30	0.8479	2.63	Q V	|	|	|	|
4+35	0.8661	2.64	Q V	|	|	|	|
4+40	0.8844	2.65	Q V	|	|	|	|
4+45	0.9028	2.66	Q V	|	|	|	|
4+50	0.9212	2.68	Q V	|	|	|	|
4+55	0.9397	2.69	Q V	|	|	|	|
5+ 0	0.9583	2.70	Q V	|	|	|	|
5+ 5	0.9770	2.71	Q V	|	|	|	|
5+10	0.9958	2.73	Q V	|	|	|	|
5+15	1.0146	2.74	Q V	|	|	|	|
5+20	1.0336	2.75	Q V	|	|	|	|
5+25	1.0526	2.76	Q V	|	|	|	|
5+30	1.0717	2.78	Q V	|	|	|	|

5+35	1.0909	2.79	Q	V				
5+40	1.1102	2.80	Q	V				
5+45	1.1296	2.82	Q	V				
5+50	1.1491	2.83	Q	V				
5+55	1.1687	2.84	Q	V				
6+ 0	1.1884	2.86	Q	V				
6+ 5	1.2082	2.87	Q	V				
6+10	1.2280	2.89	Q	V				
6+15	1.2480	2.90	Q	V				
6+20	1.2681	2.92	Q	V				
6+25	1.2883	2.93	Q	V				
6+30	1.3086	2.95	Q	V				
6+35	1.3290	2.96	Q	V				
6+40	1.3495	2.98	Q	V				
6+45	1.3701	2.99	Q	V				
6+50	1.3908	3.01	Q	V				
6+55	1.4117	3.03	Q	V				
7+ 0	1.4326	3.04	Q	V				
7+ 5	1.4537	3.06	Q	V				
7+10	1.4749	3.08	Q	V				
7+15	1.4962	3.09	Q	V				
7+20	1.5176	3.11	Q	V				
7+25	1.5391	3.13	Q	V				
7+30	1.5608	3.15	Q	V				
7+35	1.5826	3.17	Q	V				
7+40	1.6045	3.18	Q	V				
7+45	1.6266	3.20	Q	V				
7+50	1.6488	3.22	Q	V				
7+55	1.6711	3.24	Q	V				
8+ 0	1.6936	3.26	Q	V				
8+ 5	1.7162	3.28	Q	V				
8+10	1.7389	3.30	Q	V				
8+15	1.7618	3.32	Q	V				
8+20	1.7849	3.34	Q	V				
8+25	1.8080	3.37	Q	V				
8+30	1.8314	3.39	Q	V				
8+35	1.8549	3.41	Q	V				
8+40	1.8785	3.43	Q	V				
8+45	1.9023	3.46	Q	V				
8+50	1.9263	3.48	Q	V				
8+55	1.9504	3.50	Q	V				
9+ 0	1.9747	3.53	Q	V				
9+ 5	1.9992	3.55	Q	V				
9+10	2.0238	3.58	Q	V				
9+15	2.0487	3.60	Q	V				
9+20	2.0737	3.63	Q	V				
9+25	2.0989	3.66	Q	V				
9+30	2.1242	3.69	Q	V				
9+35	2.1498	3.71	Q	V				
9+40	2.1756	3.74	Q	V				
9+45	2.2016	3.77	Q	V				
9+50	2.2277	3.80	Q	V				
9+55	2.2541	3.83	Q	V				
10+ 0	2.2807	3.86	Q	V				
10+ 5	2.3075	3.89	Q	V				
10+10	2.3346	3.93	Q	V				
10+15	2.3618	3.96	Q	V				

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10+20       2.3893      3.99  Q      V  |          |          |          |
10+25       2.4171      4.03  Q      V  |          |          |          |
10+30       2.4451      4.06  Q       V |          |          |          |
10+35       2.4733      4.10  Q       V |          |          |          |
10+40       2.5018      4.14  Q       V |          |          |          |
10+45       2.5305      4.17  Q       V |          |          |          |
10+50       2.5595      4.21  Q       V |          |          |          |
10+55       2.5888      4.25  Q       V |          |          |          |
11+ 0       2.6184      4.29  Q       V |          |          |          |
11+ 5       2.6483      4.34  Q       V |          |          |          |
11+10       2.6784      4.38  Q       V |          |          |          |
11+15       2.7089      4.42  Q       V |          |          |          |
11+20       2.7397      4.47  Q        V|          |          |          |
11+25       2.7708      4.52  Q        V|          |          |          |
11+30       2.8022      4.56  Q        V|          |          |          |
11+35       2.8340      4.61  Q        V|          |          |          |
11+40       2.8661      4.66  Q        V|          |          |          |
11+45       2.8986      4.72  Q        V|          |          |          |
11+50       2.9314      4.77  Q        V|          |          |          |
11+55       2.9647      4.83  Q        V|          |          |          |
12+ 0       2.9983      4.88  Q        V|          |          |          |
12+ 5       3.0323      4.94  Q        V|          |          |          |
12+10       3.0668      5.00  |Q        V          |          |          |
12+15       3.1017      5.07  |Q        V          |          |          |
12+20       3.1371      5.13  |Q        V          |          |          |
12+25       3.1729      5.20  |Q        V          |          |          |
12+30       3.2092      5.27  |Q        V          |          |          |
12+35       3.2460      5.35  |Q        V          |          |          |
12+40       3.2833      5.42  |Q        V          |          |          |
12+45       3.3212      5.50  |Q        V          |          |          |
12+50       3.3596      5.58  |Q        |V         |          |          |
12+55       3.3986      5.66  |Q        |V         |          |          |
13+ 0       3.4382      5.75  |Q        |V         |          |          |
13+ 5       3.4785      5.84  |Q        |V         |          |          |
13+10       3.5194      5.94  |Q        |V         |          |          |
13+15       3.5610      6.04  |Q        |V         |          |          |
13+20       3.6033      6.14  |Q        |V         |          |          |
13+25       3.6463      6.25  |Q        |V         |          |          |
13+30       3.6901      6.36  |Q        | V        |          |          |
13+35       3.7348      6.49  |Q        | V        |          |          |
13+40       3.7803      6.61  |Q        | V        |          |          |
13+45       3.8268      6.75  |Q        | V        |          |          |
13+50       3.8742      6.88  |Q        | V        |          |          |
13+55       3.9227      7.03  |Q        | V        |          |          |
14+ 0       3.9722      7.19  |Q        |  V       |          |          |
14+ 5       4.0229      7.36  |Q        |  V       |          |          |
14+10       4.0748      7.55  |Q        |  V       |          |          |
14+15       4.1282      7.75  |Q        |  V       |          |          |
14+20       4.1830      7.96  |Q        |  V       |          |          |
14+25       4.2394      8.18  |Q        |  V       |          |          |
14+30       4.2973      8.41  |Q        |   V      |          |          |
14+35       4.3571      8.67  |Q        |   V      |          |          |
14+40       4.4187      8.94  |Q        |   V      |          |          |
14+45       4.4823      9.25  |Q        |   V      |          |          |
14+50       4.5482      9.57  |Q        |   V      |          |          |
14+55       4.6166      9.93  |Q        |    V     |          |          |
15+ 0       4.6877     10.32  | Q       |    V     |          |          |
```



19+50	11.1918	3.58	Q				V
19+55	11.2161	3.53	Q				V
20+ 0	11.2401	3.48	Q				V
20+ 5	11.2637	3.43	Q				V
20+10	11.2870	3.39	Q				V
20+15	11.3100	3.34	Q				V
20+20	11.3328	3.30	Q				V
20+25	11.3552	3.26	Q				V
20+30	11.3774	3.22	Q				V
20+35	11.3993	3.18	Q				V
20+40	11.4210	3.15	Q				V
20+45	11.4424	3.11	Q				V
20+50	11.4636	3.07	Q				V
20+55	11.4845	3.04	Q				V
21+ 0	11.5053	3.01	Q				V
21+ 5	11.5257	2.98	Q				V
21+10	11.5460	2.95	Q				V
21+15	11.5661	2.91	Q				V
21+20	11.5860	2.89	Q				V
21+25	11.6057	2.86	Q				V
21+30	11.6251	2.83	Q				V
21+35	11.6444	2.80	Q				V
21+40	11.6635	2.78	Q				V
21+45	11.6825	2.75	Q				V
21+50	11.7012	2.72	Q				V
21+55	11.7198	2.70	Q				V
22+ 0	11.7383	2.68	Q				V
22+ 5	11.7565	2.65	Q				V
22+10	11.7746	2.63	Q				V
22+15	11.7926	2.61	Q				V
22+20	11.8104	2.58	Q				V
22+25	11.8280	2.56	Q				V
22+30	11.8455	2.54	Q				V
22+35	11.8629	2.52	Q				V
22+40	11.8801	2.50	Q				V
22+45	11.8972	2.48	Q				V
22+50	11.9142	2.46	Q				V
22+55	11.9310	2.44	Q				V
23+ 0	11.9477	2.42	Q				V
23+ 5	11.9643	2.41	Q				V
23+10	11.9807	2.39	Q				V
23+15	11.9970	2.37	Q				V
23+20	12.0133	2.35	Q				V
23+25	12.0294	2.34	Q				V
23+30	12.0453	2.32	Q				V
23+35	12.0612	2.30	Q				V
23+40	12.0770	2.29	Q				V
23+45	12.0926	2.27	Q				V
23+50	12.1082	2.26	Q				V
23+55	12.1236	2.24	Q				V
24+ 0	12.1390	2.23	Q				V
24+ 5	12.1535	2.11	Q				V
24+10	12.1640	1.53	Q				V
24+15	12.1690	0.73	Q				V
24+20	12.1720	0.43	Q				V
24+25	12.1738	0.26	Q				V
24+30	12.1748	0.15	Q				V

24+35	12.1754	0.08	Q	|	|	|	V|
24+40	12.1757	0.05	Q	|	|	|	V|
24+45	12.1760	0.04	Q	|	|	|	V|
24+50	12.1761	0.03	Q	|	|	|	V|
24+55	12.1763	0.02	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 08/05/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA E- EXISTING CONDITIONS
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH MINE

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
70.00	6	0.82
Rainfall data for year 2		
70.00	24	1.37
Rainfall data for year 100		
70.00	6	2.34
Rainfall data for year 100		
70.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	70.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
70.00	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 2990.00(Ft.)
Length from concentration point to centroid = 1955.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 70.00(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.7896
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 70.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.383(In)
30-minute factor = 0.997 Adjusted rainfall = 0.857(In)
1-hour factor = 0.997 Adjusted rainfall = 1.171(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.339(In)
24-hour factor = 1.000 Adjusted rainfall = 4.039(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 846.56 (CFS))

1	4.937	41.793
2	30.828	219.183
3	67.136	307.376
4	80.546	113.519
5	88.317	65.787
6	93.212	41.438
7	96.189	25.201
8	97.844	14.016
9	98.384	4.572
10	98.762	3.199
11	99.140	3.199
12	100.000	7.281

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.383
2	3.15	0.52	0.52	0.140
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.71	0.087
5	1.90	0.79	0.79	0.075
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.24	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.45	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.021
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019

39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.19	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.36	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011

96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.72	2.72	0.010
107	0.31	2.73	2.73	0.010
108	0.30	2.74	2.74	0.010
109	0.30	2.75	2.75	0.010
110	0.30	2.76	2.76	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.93	2.93	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008

153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.16	3.16	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.30	3.30	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.41	3.41	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007

209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.73	3.73	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006

266	0.18	3.92	3.91	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	3.99	3.99	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019

29	0.0061	0.0041	0.0019
30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020
33	0.0062	0.0042	0.0020
34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020
37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020
40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025

86	0.0079	0.0054	0.0025
87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026
90	0.0081	0.0055	0.0026
91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026
94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027
97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039

143	0.0125	0.0085	0.0040
144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041
147	0.0129	0.0088	0.0041
148	0.0130	0.0088	0.0042
149	0.0133	0.0090	0.0042
150	0.0134	0.0091	0.0043
151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045
154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0156	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0162	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0194	0.0132	0.0062
170	0.0198	0.0134	0.0063
171	0.0205	0.0139	0.0066
172	0.0209	0.0142	0.0067
173	0.0218	0.0148	0.0070
174	0.0222	0.0151	0.0071
175	0.0232	0.0158	0.0074
176	0.0238	0.0162	0.0076
177	0.0250	0.0170	0.0080
178	0.0257	0.0175	0.0082
179	0.0272	0.0185	0.0087
180	0.0280	0.0191	0.0090
181	0.0300	0.0204	0.0096
182	0.0311	0.0211	0.0099
183	0.0336	0.0229	0.0108
184	0.0351	0.0239	0.0112
185	0.0450	0.0306	0.0144
186	0.0473	0.0322	0.0151
187	0.0531	0.0361	0.0170
188	0.0569	0.0387	0.0182
189	0.0675	0.0459	0.0216
190	0.0755	0.0472*	0.0283
191	0.1047	0.0472*	0.0575
192	0.1401	0.0472*	0.0930
193	0.3828	0.0472*	0.3357
194	0.0868	0.0472*	0.0396
195	0.0616	0.0419	0.0197
196	0.0500	0.0340	0.0160
197	0.0368	0.0251	0.0118
198	0.0323	0.0220	0.0103
199	0.0290	0.0197	0.0093

200	0.0264	0.0180	0.0085
201	0.0244	0.0166	0.0078
202	0.0227	0.0154	0.0073
203	0.0213	0.0145	0.0068
204	0.0201	0.0137	0.0064
205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055
208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049
211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023

257	0.0071	0.0048	0.0023
258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022
261	0.0068	0.0046	0.0022
262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021
265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021
268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0394	2.4456	1.5938

Total soil rain loss = 2.45(In)
Total effective rainfall = 1.59(In)
Peak flow rate in flood hydrograph = 129.24(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

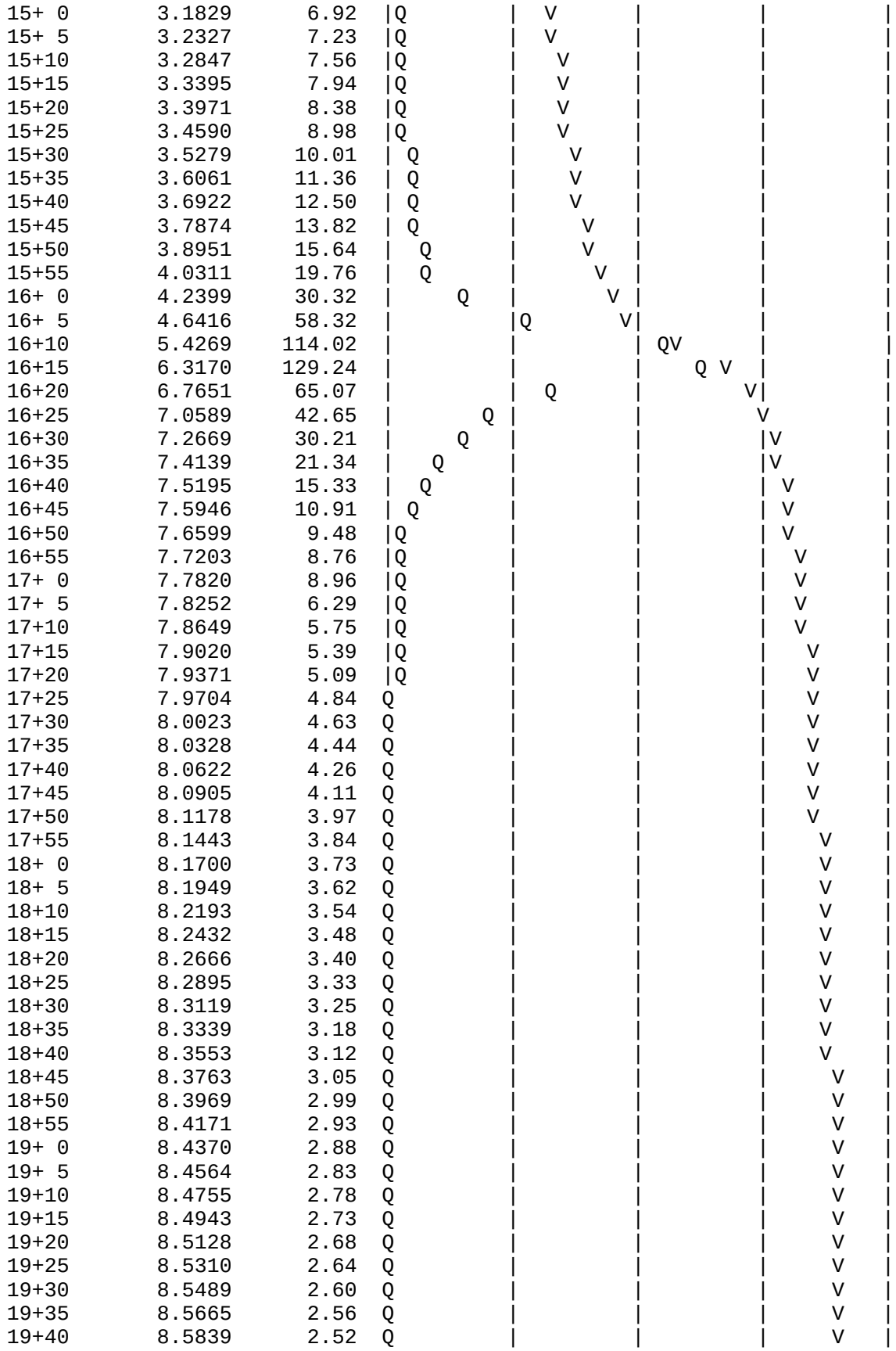
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0005	0.07	Q	|	|	|	|
0+10	0.0037	0.46	Q	|	|	|	|
0+15	0.0106	1.01	Q	|	|	|	|
0+20	0.0190	1.21	Q	|	|	|	|
0+25	0.0281	1.33	Q	|	|	|	|
0+30	0.0378	1.41	Q	|	|	|	|
0+35	0.0479	1.46	Q	|	|	|	|
0+40	0.0581	1.49	Q	|	|	|	|

0+45	0.0685	1.50	Q	|	|	|	|
0+50	0.0789	1.51	Q	|	|	|	|
0+55	0.0894	1.52	Q	|	|	|	|
1+ 0	0.1000	1.54	Q	|	|	|	|
1+ 5	0.1106	1.54	Q	|	|	|	|
1+10	0.1213	1.55	Q	|	|	|	|
1+15	0.1320	1.56	Q	|	|	|	|
1+20	0.1427	1.56	Q	|	|	|	|
1+25	0.1535	1.57	Q	|	|	|	|
1+30	0.1643	1.57	Q	|	|	|	|
1+35	0.1752	1.58	Q	|	|	|	|
1+40	0.1861	1.58	Q	|	|	|	|
1+45	0.1970	1.59	Q	|	|	|	|
1+50	0.2080	1.59	Q	|	|	|	|
1+55	0.2190	1.60	Q	|	|	|	|
2+ 0	0.2301	1.60	Q	|	|	|	|
2+ 5	0.2411	1.61	QV	|	|	|	|
2+10	0.2523	1.62	QV	|	|	|	|
2+15	0.2634	1.62	QV	|	|	|	|
2+20	0.2746	1.63	QV	|	|	|	|
2+25	0.2859	1.63	QV	|	|	|	|
2+30	0.2972	1.64	QV	|	|	|	|
2+35	0.3085	1.65	QV	|	|	|	|
2+40	0.3199	1.65	QV	|	|	|	|
2+45	0.3313	1.66	QV	|	|	|	|
2+50	0.3428	1.66	QV	|	|	|	|
2+55	0.3543	1.67	QV	|	|	|	|
3+ 0	0.3658	1.68	QV	|	|	|	|
3+ 5	0.3774	1.68	QV	|	|	|	|
3+10	0.3890	1.69	QV	|	|	|	|
3+15	0.4007	1.70	QV	|	|	|	|
3+20	0.4124	1.70	QV	|	|	|	|
3+25	0.4242	1.71	QV	|	|	|	|
3+30	0.4360	1.72	QV	|	|	|	|
3+35	0.4479	1.72	QV	|	|	|	|
3+40	0.4598	1.73	QV	|	|	|	|
3+45	0.4718	1.74	Q V	|	|	|	|
3+50	0.4838	1.74	Q V	|	|	|	|
3+55	0.4958	1.75	Q V	|	|	|	|
4+ 0	0.5079	1.76	Q V	|	|	|	|
4+ 5	0.5201	1.77	Q V	|	|	|	|
4+10	0.5323	1.77	Q V	|	|	|	|
4+15	0.5446	1.78	Q V	|	|	|	|
4+20	0.5569	1.79	Q V	|	|	|	|
4+25	0.5692	1.80	Q V	|	|	|	|
4+30	0.5816	1.80	Q V	|	|	|	|
4+35	0.5941	1.81	Q V	|	|	|	|
4+40	0.6066	1.82	Q V	|	|	|	|
4+45	0.6192	1.83	Q V	|	|	|	|
4+50	0.6319	1.83	Q V	|	|	|	|
4+55	0.6445	1.84	Q V	|	|	|	|
5+ 0	0.6573	1.85	Q V	|	|	|	|
5+ 5	0.6701	1.86	Q V	|	|	|	|
5+10	0.6830	1.87	Q V	|	|	|	|
5+15	0.6959	1.88	Q V	|	|	|	|
5+20	0.7089	1.88	Q V	|	|	|	|
5+25	0.7219	1.89	Q V	|	|	|	|

5+30	0.7350	1.90	Q	V				
5+35	0.7482	1.91	Q	V				
5+40	0.7614	1.92	Q	V				
5+45	0.7747	1.93	Q	V				
5+50	0.7880	1.94	Q	V				
5+55	0.8015	1.95	Q	V				
6+ 0	0.8149	1.96	Q	V				
6+ 5	0.8285	1.97	Q	V				
6+10	0.8421	1.98	Q	V				
6+15	0.8558	1.99	Q	V				
6+20	0.8696	2.00	Q	V				
6+25	0.8834	2.01	Q	V				
6+30	0.8973	2.02	Q	V				
6+35	0.9113	2.03	Q	V				
6+40	0.9253	2.04	Q	V				
6+45	0.9394	2.05	Q	V				
6+50	0.9536	2.06	Q	V				
6+55	0.9679	2.07	Q	V				
7+ 0	0.9822	2.08	Q	V				
7+ 5	0.9967	2.10	Q	V				
7+10	1.0112	2.11	Q	V				
7+15	1.0258	2.12	Q	V				
7+20	1.0404	2.13	Q	V				
7+25	1.0552	2.14	Q	V				
7+30	1.0700	2.15	Q	V				
7+35	1.0850	2.17	Q	V				
7+40	1.1000	2.18	Q	V				
7+45	1.1151	2.19	Q	V				
7+50	1.1303	2.21	Q	V				
7+55	1.1456	2.22	Q	V				
8+ 0	1.1609	2.23	Q	V				
8+ 5	1.1764	2.25	Q	V				
8+10	1.1920	2.26	Q	V				
8+15	1.2076	2.27	Q	V				
8+20	1.2234	2.29	Q	V				
8+25	1.2393	2.30	Q	V				
8+30	1.2552	2.32	Q	V				
8+35	1.2713	2.33	Q	V				
8+40	1.2875	2.35	Q	V				
8+45	1.3038	2.37	Q	V				
8+50	1.3202	2.38	Q	V				
8+55	1.3367	2.40	Q	V				
9+ 0	1.3533	2.41	Q	V				
9+ 5	1.3701	2.43	Q	V				
9+10	1.3869	2.45	Q	V				
9+15	1.4039	2.47	Q	V				
9+20	1.4210	2.48	Q	V				
9+25	1.4383	2.50	Q	V				
9+30	1.4556	2.52	Q	V				
9+35	1.4731	2.54	Q	V				
9+40	1.4907	2.56	Q	V				
9+45	1.5085	2.58	Q	V				
9+50	1.5264	2.60	Q	V				
9+55	1.5444	2.62	Q	V				
10+ 0	1.5626	2.64	Q	V				
10+ 5	1.5810	2.66	Q	V				
10+10	1.5994	2.68	Q	V				

```
10+15       1.6181      2.71  Q     V   |          |          |          |
10+20       1.6369      2.73  Q      V  |          |          |          |
10+25       1.6558      2.75  Q      V  |          |          |          |
10+30       1.6750      2.78  Q      V  |          |          |          |
10+35       1.6943      2.80  Q      V  |          |          |          |
10+40       1.7137      2.83  Q      V  |          |          |          |
10+45       1.7334      2.85  Q      V  |          |          |          |
10+50       1.7532      2.88  Q      V  |          |          |          |
10+55       1.7732      2.91  Q      V  |          |          |          |
11+ 0       1.7934      2.93  Q      V  |          |          |          |
11+ 5       1.8138      2.96  Q      V  |          |          |          |
11+10       1.8344      2.99  Q      V  |          |          |          |
11+15       1.8553      3.02  Q      V  |          |          |          |
11+20       1.8763      3.05  Q       V |          |          |          |
11+25       1.8975      3.08  Q       V |          |          |          |
11+30       1.9190      3.12  Q       V |          |          |          |
11+35       1.9407      3.15  Q       V |          |          |          |
11+40       1.9626      3.18  Q       V |          |          |          |
11+45       1.9848      3.22  Q       V |          |          |          |
11+50       2.0072      3.26  Q       V |          |          |          |
11+55       2.0299      3.30  Q       V |          |          |          |
12+ 0       2.0529      3.33  Q       V |          |          |          |
12+ 5       2.0761      3.37  Q       V |          |          |          |
12+10       2.0994      3.39  Q        V|          |          |          |
12+15       2.1229      3.40  Q        V|          |          |          |
12+20       2.1465      3.44  Q        V|          |          |          |
12+25       2.1705      3.48  Q        V|          |          |          |
12+30       2.1947      3.52  Q        V|          |          |          |
12+35       2.2193      3.57  Q        V|          |          |          |
12+40       2.2442      3.61  Q        V|          |          |          |
12+45       2.2694      3.67  Q        V|          |          |          |
12+50       2.2950      3.72  Q        V|          |          |          |
12+55       2.3211      3.78  Q        V|          |          |          |
13+ 0       2.3475      3.84  Q         V          |          |          |
13+ 5       2.3743      3.90  Q         V          |          |          |
13+10       2.4016      3.96  Q         V          |          |          |
13+15       2.4293      4.03  Q         V          |          |          |
13+20       2.4576      4.10  Q         V          |          |          |
13+25       2.4863      4.17  Q         V          |          |          |
13+30       2.5156      4.25  Q         V          |          |          |
13+35       2.5454      4.33  Q         V          |          |          |
13+40       2.5758      4.41  Q          |V         |          |          |
13+45       2.6068      4.51  Q          |V         |          |          |
13+50       2.6385      4.60  Q          |V         |          |          |
13+55       2.6709      4.70  Q          |V         |          |          |
14+ 0       2.7039      4.80  Q          |V         |          |          |
14+ 5       2.7378      4.92  Q          |V         |          |          |
14+10       2.7726      5.04  |Q         |V         |          |          |
14+15       2.8083      5.18  |Q         | V        |          |          |
14+20       2.8449      5.32  |Q         | V        |          |          |
14+25       2.8826      5.47  |Q         | V        |          |          |
14+30       2.9214      5.63  |Q         | V        |          |          |
14+35       2.9614      5.81  |Q         | V        |          |          |
14+40       3.0026      5.99  |Q         | V        |          |          |
14+45       3.0453      6.19  |Q         |  V       |          |          |
14+50       3.0894      6.41  |Q         |  V       |          |          |
14+55       3.1353      6.66  |Q         |  V       |          |          |
```



19+45	8.6010	2.48	Q	|	|	|	V |
19+50	8.6178	2.45	Q	|	|	|	V |
19+55	8.6345	2.41	Q	|	|	|	V |
20+ 0	8.6508	2.38	Q	|	|	|	V |
20+ 5	8.6670	2.35	Q	|	|	|	V |
20+10	8.6830	2.32	Q	|	|	|	V |
20+15	8.6987	2.29	Q	|	|	|	V |
20+20	8.7143	2.26	Q	|	|	|	V |
20+25	8.7297	2.23	Q	|	|	|	V |
20+30	8.7449	2.20	Q	|	|	|	V |
20+35	8.7599	2.18	Q	|	|	|	V |
20+40	8.7747	2.15	Q	|	|	|	V |
20+45	8.7894	2.13	Q	|	|	|	V |
20+50	8.8039	2.11	Q	|	|	|	V |
20+55	8.8182	2.08	Q	|	|	|	V |
21+ 0	8.8324	2.06	Q	|	|	|	V |
21+ 5	8.8464	2.04	Q	|	|	|	V |
21+10	8.8603	2.02	Q	|	|	|	V |
21+15	8.8741	2.00	Q	|	|	|	V |
21+20	8.8877	1.98	Q	|	|	|	V |
21+25	8.9012	1.96	Q	|	|	|	V |
21+30	8.9145	1.94	Q	|	|	|	V |
21+35	8.9277	1.92	Q	|	|	|	V |
21+40	8.9408	1.90	Q	|	|	|	V |
21+45	8.9538	1.88	Q	|	|	|	V |
21+50	8.9667	1.87	Q	|	|	|	V |
21+55	8.9794	1.85	Q	|	|	|	V |
22+ 0	8.9920	1.83	Q	|	|	|	V |
22+ 5	9.0046	1.82	Q	|	|	|	V |
22+10	9.0170	1.80	Q	|	|	|	V |
22+15	9.0293	1.79	Q	|	|	|	V |
22+20	9.0415	1.77	Q	|	|	|	V |
22+25	9.0536	1.76	Q	|	|	|	V |
22+30	9.0656	1.74	Q	|	|	|	V|
22+35	9.0775	1.73	Q	|	|	|	V|
22+40	9.0893	1.72	Q	|	|	|	V|
22+45	9.1010	1.70	Q	|	|	|	V|
22+50	9.1127	1.69	Q	|	|	|	V|
22+55	9.1242	1.68	Q	|	|	|	V|
23+ 0	9.1357	1.66	Q	|	|	|	V|
23+ 5	9.1470	1.65	Q	|	|	|	V|
23+10	9.1583	1.64	Q	|	|	|	V|
23+15	9.1695	1.63	Q	|	|	|	V|
23+20	9.1806	1.62	Q	|	|	|	V|
23+25	9.1917	1.60	Q	|	|	|	V|
23+30	9.2026	1.59	Q	|	|	|	V|
23+35	9.2135	1.58	Q	|	|	|	V|
23+40	9.2244	1.57	Q	|	|	|	V|
23+45	9.2351	1.56	Q	|	|	|	V|
23+50	9.2458	1.55	Q	|	|	|	V|
23+55	9.2564	1.54	Q	|	|	|	V|
24+ 0	9.2669	1.53	Q	|	|	|	V|
24+ 5	9.2769	1.45	Q	|	|	|	V|
24+10	9.2841	1.05	Q	|	|	|	V|
24+15	9.2875	0.50	Q	|	|	|	V|
24+20	9.2895	0.30	Q	|	|	|	V|
24+25	9.2908	0.18	Q	|	|	|	V|

24+30	9.2915	0.10	Q	|	|	|	V|
24+35	9.2919	0.06	Q	|	|	|	V|
24+40	9.2921	0.03	Q	|	|	|	V|
24+45	9.2923	0.02	Q	|	|	|	V|
24+50	9.2924	0.02	Q	|	|	|	V|
24+55	9.2925	0.01	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA E
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
70.20	6	0.82
Rainfall data for year 2		
70.20	24	1.37
Rainfall data for year 100		
70.20	6	2.34
Rainfall data for year 100		
70.20	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
83.0	70.20	1.000	0.326	1.000	0.326

Area-averaged adjusted loss rate Fm (In/Hr) = 0.326

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
70.20	1.000	83.0	2.05	0.574

Area-averaged catchment yield fraction, Y = 0.574
Area-averaged low loss fraction, Yb = 0.426
++
Watercourse length = 2990.00(Ft.)
Length from concentration point to centroid = 1955.00(Ft.)
Elevation difference along watercourse = 405.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 70.20(Ac.)
Catchment Lag time = 0.152 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 54.7896
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.326(In/Hr)
Average low loss rate fraction (Yb) = 0.426 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 70.20(Ac.) (Ref: fig. E-4)

5-minute factor = 0.997 Adjusted rainfall = 0.383(In)
30-minute factor = 0.997 Adjusted rainfall = 0.857(In)
1-hour factor = 0.997 Adjusted rainfall = 1.171(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.339(In)
24-hour factor = 1.000 Adjusted rainfall = 4.039(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 848.98 (CFS))

1	4.937	41.912
2	30.828	219.809
3	67.136	308.254
4	80.546	113.843
5	88.317	65.975
6	93.212	41.556
7	96.189	25.273
8	97.844	14.056
9	98.384	4.585
10	98.762	3.208
11	99.140	3.208
12	100.000	7.302

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.383
2	3.15	0.52	0.52	0.140
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.71	0.087
5	1.90	0.79	0.79	0.075
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.24	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.45	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.021
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019

39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.19	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.36	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011

96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.72	2.72	0.010
107	0.31	2.73	2.73	0.010
108	0.30	2.74	2.74	0.010
109	0.30	2.75	2.75	0.010
110	0.30	2.76	2.76	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.93	2.93	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008

153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.16	3.16	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.30	3.30	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.41	3.41	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007

210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.73	3.73	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.91	0.006

267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	3.99	3.99	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0024	0.0032
2	0.0055	0.0024	0.0032
3	0.0056	0.0024	0.0032
4	0.0056	0.0024	0.0032
5	0.0056	0.0024	0.0032
6	0.0056	0.0024	0.0032
7	0.0056	0.0024	0.0032
8	0.0057	0.0024	0.0032
9	0.0057	0.0024	0.0033
10	0.0057	0.0024	0.0033
11	0.0057	0.0024	0.0033
12	0.0057	0.0024	0.0033
13	0.0058	0.0024	0.0033
14	0.0058	0.0025	0.0033
15	0.0058	0.0025	0.0033
16	0.0058	0.0025	0.0033
17	0.0058	0.0025	0.0034
18	0.0058	0.0025	0.0034
19	0.0059	0.0025	0.0034
20	0.0059	0.0025	0.0034
21	0.0059	0.0025	0.0034
22	0.0059	0.0025	0.0034
23	0.0060	0.0025	0.0034
24	0.0060	0.0025	0.0034
25	0.0060	0.0026	0.0034
26	0.0060	0.0026	0.0035
27	0.0060	0.0026	0.0035
28	0.0061	0.0026	0.0035
29	0.0061	0.0026	0.0035

30	0.0061	0.0026	0.0035
31	0.0061	0.0026	0.0035
32	0.0061	0.0026	0.0035
33	0.0062	0.0026	0.0036
34	0.0062	0.0026	0.0036
35	0.0062	0.0026	0.0036
36	0.0062	0.0027	0.0036
37	0.0063	0.0027	0.0036
38	0.0063	0.0027	0.0036
39	0.0063	0.0027	0.0036
40	0.0063	0.0027	0.0036
41	0.0064	0.0027	0.0037
42	0.0064	0.0027	0.0037
43	0.0064	0.0027	0.0037
44	0.0064	0.0027	0.0037
45	0.0065	0.0028	0.0037
46	0.0065	0.0028	0.0037
47	0.0065	0.0028	0.0038
48	0.0066	0.0028	0.0038
49	0.0066	0.0028	0.0038
50	0.0066	0.0028	0.0038
51	0.0066	0.0028	0.0038
52	0.0067	0.0028	0.0038
53	0.0067	0.0029	0.0038
54	0.0067	0.0029	0.0039
55	0.0068	0.0029	0.0039
56	0.0068	0.0029	0.0039
57	0.0068	0.0029	0.0039
58	0.0068	0.0029	0.0039
59	0.0069	0.0029	0.0040
60	0.0069	0.0029	0.0040
61	0.0069	0.0030	0.0040
62	0.0070	0.0030	0.0040
63	0.0070	0.0030	0.0040
64	0.0070	0.0030	0.0040
65	0.0071	0.0030	0.0041
66	0.0071	0.0030	0.0041
67	0.0071	0.0030	0.0041
68	0.0072	0.0030	0.0041
69	0.0072	0.0031	0.0041
70	0.0072	0.0031	0.0042
71	0.0073	0.0031	0.0042
72	0.0073	0.0031	0.0042
73	0.0074	0.0031	0.0042
74	0.0074	0.0031	0.0042
75	0.0074	0.0032	0.0043
76	0.0075	0.0032	0.0043
77	0.0075	0.0032	0.0043
78	0.0075	0.0032	0.0043
79	0.0076	0.0032	0.0044
80	0.0076	0.0032	0.0044
81	0.0077	0.0033	0.0044
82	0.0077	0.0033	0.0044
83	0.0078	0.0033	0.0045
84	0.0078	0.0033	0.0045
85	0.0078	0.0033	0.0045
86	0.0079	0.0034	0.0045

87	0.0079	0.0034	0.0046
88	0.0080	0.0034	0.0046
89	0.0080	0.0034	0.0046
90	0.0081	0.0034	0.0046
91	0.0081	0.0035	0.0047
92	0.0082	0.0035	0.0047
93	0.0082	0.0035	0.0047
94	0.0083	0.0035	0.0047
95	0.0083	0.0035	0.0048
96	0.0084	0.0036	0.0048
97	0.0084	0.0036	0.0048
98	0.0085	0.0036	0.0049
99	0.0085	0.0036	0.0049
100	0.0086	0.0036	0.0049
101	0.0086	0.0037	0.0050
102	0.0087	0.0037	0.0050
103	0.0088	0.0037	0.0050
104	0.0088	0.0037	0.0051
105	0.0089	0.0038	0.0051
106	0.0089	0.0038	0.0051
107	0.0090	0.0038	0.0052
108	0.0091	0.0039	0.0052
109	0.0091	0.0039	0.0053
110	0.0092	0.0039	0.0053
111	0.0093	0.0039	0.0053
112	0.0093	0.0040	0.0054
113	0.0094	0.0040	0.0054
114	0.0095	0.0040	0.0054
115	0.0096	0.0041	0.0055
116	0.0096	0.0041	0.0055
117	0.0097	0.0041	0.0056
118	0.0098	0.0042	0.0056
119	0.0099	0.0042	0.0057
120	0.0099	0.0042	0.0057
121	0.0100	0.0043	0.0058
122	0.0101	0.0043	0.0058
123	0.0102	0.0043	0.0059
124	0.0103	0.0044	0.0059
125	0.0104	0.0044	0.0060
126	0.0105	0.0045	0.0060
127	0.0106	0.0045	0.0061
128	0.0107	0.0045	0.0061
129	0.0108	0.0046	0.0062
130	0.0109	0.0046	0.0062
131	0.0110	0.0047	0.0063
132	0.0111	0.0047	0.0064
133	0.0112	0.0048	0.0064
134	0.0113	0.0048	0.0065
135	0.0115	0.0049	0.0066
136	0.0115	0.0049	0.0066
137	0.0117	0.0050	0.0067
138	0.0118	0.0050	0.0068
139	0.0120	0.0051	0.0069
140	0.0121	0.0051	0.0069
141	0.0122	0.0052	0.0070
142	0.0123	0.0053	0.0071
143	0.0125	0.0053	0.0072

144	0.0126	0.0054	0.0073
145	0.0126	0.0053	0.0072
146	0.0127	0.0054	0.0073
147	0.0129	0.0055	0.0074
148	0.0130	0.0055	0.0075
149	0.0133	0.0056	0.0076
150	0.0134	0.0057	0.0077
151	0.0136	0.0058	0.0078
152	0.0138	0.0059	0.0079
153	0.0141	0.0060	0.0081
154	0.0142	0.0060	0.0082
155	0.0145	0.0062	0.0083
156	0.0147	0.0062	0.0084
157	0.0150	0.0064	0.0086
158	0.0152	0.0065	0.0087
159	0.0156	0.0066	0.0089
160	0.0157	0.0067	0.0090
161	0.0162	0.0069	0.0093
162	0.0164	0.0070	0.0094
163	0.0168	0.0072	0.0097
164	0.0170	0.0073	0.0098
165	0.0175	0.0075	0.0101
166	0.0178	0.0076	0.0102
167	0.0184	0.0078	0.0106
168	0.0187	0.0079	0.0107
169	0.0194	0.0083	0.0112
170	0.0198	0.0084	0.0114
171	0.0205	0.0087	0.0118
172	0.0209	0.0089	0.0120
173	0.0218	0.0093	0.0125
174	0.0222	0.0095	0.0128
175	0.0232	0.0099	0.0133
176	0.0238	0.0101	0.0137
177	0.0250	0.0106	0.0144
178	0.0257	0.0109	0.0148
179	0.0272	0.0116	0.0156
180	0.0280	0.0119	0.0161
181	0.0300	0.0128	0.0172
182	0.0311	0.0132	0.0179
183	0.0336	0.0143	0.0193
184	0.0351	0.0150	0.0202
185	0.0450	0.0191	0.0258
186	0.0473	0.0201	0.0272
187	0.0531	0.0226	0.0305
188	0.0569	0.0242	0.0327
189	0.0675	0.0272*	0.0404
190	0.0755	0.0272*	0.0483
191	0.1047	0.0272*	0.0775
192	0.1401	0.0272*	0.1130
193	0.3828	0.0272*	0.3557
194	0.0867	0.0272*	0.0596
195	0.0616	0.0262	0.0354
196	0.0500	0.0213	0.0287
197	0.0368	0.0157	0.0212
198	0.0323	0.0137	0.0185
199	0.0290	0.0123	0.0166
200	0.0264	0.0112	0.0152

201	0.0244	0.0104	0.0140
202	0.0227	0.0097	0.0130
203	0.0213	0.0091	0.0122
204	0.0201	0.0086	0.0116
205	0.0190	0.0081	0.0109
206	0.0181	0.0077	0.0104
207	0.0173	0.0074	0.0099
208	0.0166	0.0071	0.0095
209	0.0159	0.0068	0.0092
210	0.0154	0.0065	0.0088
211	0.0148	0.0063	0.0085
212	0.0144	0.0061	0.0082
213	0.0139	0.0059	0.0080
214	0.0135	0.0057	0.0078
215	0.0131	0.0056	0.0075
216	0.0128	0.0054	0.0073
217	0.0127	0.0054	0.0073
218	0.0124	0.0053	0.0071
219	0.0121	0.0052	0.0070
220	0.0119	0.0051	0.0068
221	0.0116	0.0049	0.0067
222	0.0114	0.0048	0.0065
223	0.0111	0.0047	0.0064
224	0.0109	0.0046	0.0063
225	0.0107	0.0046	0.0062
226	0.0105	0.0045	0.0060
227	0.0103	0.0044	0.0059
228	0.0102	0.0043	0.0058
229	0.0100	0.0042	0.0057
230	0.0098	0.0042	0.0056
231	0.0097	0.0041	0.0056
232	0.0095	0.0040	0.0055
233	0.0094	0.0040	0.0054
234	0.0092	0.0039	0.0053
235	0.0091	0.0039	0.0052
236	0.0090	0.0038	0.0052
237	0.0088	0.0038	0.0051
238	0.0087	0.0037	0.0050
239	0.0086	0.0037	0.0049
240	0.0085	0.0036	0.0049
241	0.0084	0.0036	0.0048
242	0.0083	0.0035	0.0048
243	0.0082	0.0035	0.0047
244	0.0081	0.0034	0.0046
245	0.0080	0.0034	0.0046
246	0.0079	0.0034	0.0045
247	0.0078	0.0033	0.0045
248	0.0077	0.0033	0.0044
249	0.0076	0.0033	0.0044
250	0.0076	0.0032	0.0043
251	0.0075	0.0032	0.0043
252	0.0074	0.0032	0.0043
253	0.0073	0.0031	0.0042
254	0.0073	0.0031	0.0042
255	0.0072	0.0031	0.0041
256	0.0071	0.0030	0.0041
257	0.0071	0.0030	0.0041

258	0.0070	0.0030	0.0040
259	0.0069	0.0029	0.0040
260	0.0069	0.0029	0.0039
261	0.0068	0.0029	0.0039
262	0.0067	0.0029	0.0039
263	0.0067	0.0028	0.0038
264	0.0066	0.0028	0.0038
265	0.0066	0.0028	0.0038
266	0.0065	0.0028	0.0037
267	0.0065	0.0027	0.0037
268	0.0064	0.0027	0.0037
269	0.0064	0.0027	0.0037
270	0.0063	0.0027	0.0036
271	0.0063	0.0027	0.0036
272	0.0062	0.0026	0.0036
273	0.0062	0.0026	0.0035
274	0.0061	0.0026	0.0035
275	0.0061	0.0026	0.0035
276	0.0060	0.0026	0.0035
277	0.0060	0.0025	0.0034
278	0.0059	0.0025	0.0034
279	0.0059	0.0025	0.0034
280	0.0059	0.0025	0.0034
281	0.0058	0.0025	0.0033
282	0.0058	0.0025	0.0033
283	0.0057	0.0024	0.0033
284	0.0057	0.0024	0.0033
285	0.0057	0.0024	0.0033
286	0.0056	0.0024	0.0032
287	0.0056	0.0024	0.0032
288	0.0056	0.0024	0.0032
	4.0394	1.5170	2.5224

Total soil rain loss = 1.52(In)
Total effective rainfall = 2.52(In)
Peak flow rate in flood hydrograph = 146.14(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

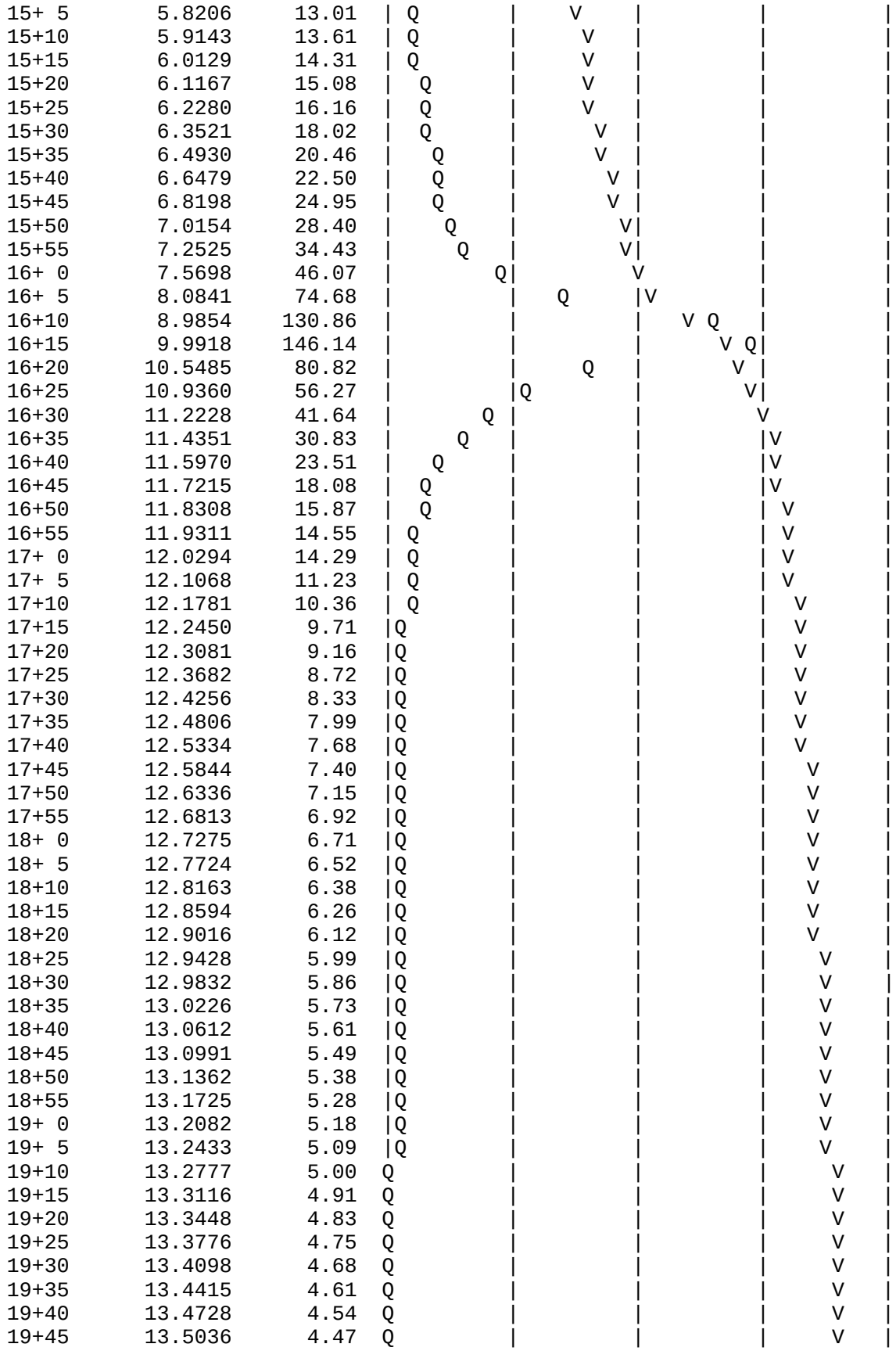
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	50.0	100.0	150.0	200.0
0+ 5	0.0009	0.13	Q	|	|	|	|
0+10	0.0066	0.83	Q	|	|	|	|
0+15	0.0191	1.81	Q	|	|	|	|
0+20	0.0342	2.18	Q	|	|	|	|
0+25	0.0507	2.40	Q	|	|	|	|
0+30	0.0681	2.54	Q	|	|	|	|
0+35	0.0862	2.63	Q	|	|	|	|
0+40	0.1047	2.68	Q	|	|	|	|
0+45	0.1233	2.70	Q	|	|	|	|

0+50	0.1420	2.72	Q	|	|	|	|
0+55	0.1609	2.74	Q	|	|	|	|
1+ 0	0.1800	2.77	Q	|	|	|	|
1+ 5	0.1991	2.78	Q	|	|	|	|
1+10	0.2184	2.79	Q	|	|	|	|
1+15	0.2376	2.80	Q	|	|	|	|
1+20	0.2570	2.81	Q	|	|	|	|
1+25	0.2764	2.82	Q	|	|	|	|
1+30	0.2959	2.83	Q	|	|	|	|
1+35	0.3154	2.84	Q	|	|	|	|
1+40	0.3351	2.85	Q	|	|	|	|
1+45	0.3547	2.86	Q	|	|	|	|
1+50	0.3745	2.87	QV	|	|	|	|
1+55	0.3943	2.88	QV	|	|	|	|
2+ 0	0.4142	2.89	QV	|	|	|	|
2+ 5	0.4342	2.90	QV	|	|	|	|
2+10	0.4542	2.91	QV	|	|	|	|
2+15	0.4743	2.92	QV	|	|	|	|
2+20	0.4945	2.93	QV	|	|	|	|
2+25	0.5148	2.94	QV	|	|	|	|
2+30	0.5351	2.95	QV	|	|	|	|
2+35	0.5555	2.96	QV	|	|	|	|
2+40	0.5760	2.97	QV	|	|	|	|
2+45	0.5965	2.98	QV	|	|	|	|
2+50	0.6172	3.00	QV	|	|	|	|
2+55	0.6379	3.01	QV	|	|	|	|
3+ 0	0.6587	3.02	QV	|	|	|	|
3+ 5	0.6795	3.03	QV	|	|	|	|
3+10	0.7005	3.04	QV	|	|	|	|
3+15	0.7215	3.05	QV	|	|	|	|
3+20	0.7426	3.07	Q V	|	|	|	|
3+25	0.7638	3.08	Q V	|	|	|	|
3+30	0.7851	3.09	Q V	|	|	|	|
3+35	0.8064	3.10	Q V	|	|	|	|
3+40	0.8279	3.11	Q V	|	|	|	|
3+45	0.8494	3.13	Q V	|	|	|	|
3+50	0.8710	3.14	Q V	|	|	|	|
3+55	0.8928	3.15	Q V	|	|	|	|
4+ 0	0.9146	3.17	Q V	|	|	|	|
4+ 5	0.9364	3.18	Q V	|	|	|	|
4+10	0.9584	3.19	Q V	|	|	|	|
4+15	0.9805	3.21	Q V	|	|	|	|
4+20	1.0027	3.22	Q V	|	|	|	|
4+25	1.0249	3.23	Q V	|	|	|	|
4+30	1.0473	3.25	Q V	|	|	|	|
4+35	1.0697	3.26	Q V	|	|	|	|
4+40	1.0923	3.27	Q V	|	|	|	|
4+45	1.1149	3.29	Q V	|	|	|	|
4+50	1.1377	3.30	Q V	|	|	|	|
4+55	1.1605	3.32	Q V	|	|	|	|
5+ 0	1.1835	3.33	Q V	|	|	|	|
5+ 5	1.2065	3.35	Q V	|	|	|	|
5+10	1.2297	3.36	Q V	|	|	|	|
5+15	1.2530	3.38	Q V	|	|	|	|
5+20	1.2763	3.39	Q V	|	|	|	|
5+25	1.2998	3.41	Q V	|	|	|	|
5+30	1.3234	3.43	Q V	|	|	|	|

5+35	1.3471	3.44	Q	V	|	|	|	|
5+40	1.3709	3.46	Q	V	|	|	|	|
5+45	1.3949	3.47	Q	V	|	|	|	|
5+50	1.4189	3.49	Q	V	|	|	|	|
5+55	1.4431	3.51	Q	V	|	|	|	|
6+ 0	1.4674	3.53	Q	V	|	|	|	|
6+ 5	1.4918	3.54	Q	V	|	|	|	|
6+10	1.5163	3.56	Q	V	|	|	|	|
6+15	1.5409	3.58	Q	V	|	|	|	|
6+20	1.5657	3.60	Q	V	|	|	|	|
6+25	1.5906	3.62	Q	V	|	|	|	|
6+30	1.6156	3.63	Q	V	|	|	|	|
6+35	1.6408	3.65	Q	V	|	|	|	|
6+40	1.6661	3.67	Q	V	|	|	|	|
6+45	1.6915	3.69	Q	V	|	|	|	|
6+50	1.7171	3.71	Q	V	|	|	|	|
6+55	1.7427	3.73	Q	V	|	|	|	|
7+ 0	1.7686	3.75	Q	V	|	|	|	|
7+ 5	1.7946	3.77	Q	V	|	|	|	|
7+10	1.8207	3.79	Q	V	|	|	|	|
7+15	1.8470	3.81	Q	V	|	|	|	|
7+20	1.8734	3.84	Q	V	|	|	|	|
7+25	1.8999	3.86	Q	V	|	|	|	|
7+30	1.9267	3.88	Q	V	|	|	|	|
7+35	1.9535	3.90	Q	V	|	|	|	|
7+40	1.9806	3.92	Q	V	|	|	|	|
7+45	2.0078	3.95	Q	V	|	|	|	|
7+50	2.0351	3.97	Q	V	|	|	|	|
7+55	2.0626	4.00	Q	V	|	|	|	|
8+ 0	2.0903	4.02	Q	V	|	|	|	|
8+ 5	2.1182	4.05	Q	V	|	|	|	|
8+10	2.1462	4.07	Q	V	|	|	|	|
8+15	2.1744	4.10	Q	V	|	|	|	|
8+20	2.2028	4.12	Q	V	|	|	|	|
8+25	2.2314	4.15	Q	V	|	|	|	|
8+30	2.2601	4.17	Q	V	|	|	|	|
8+35	2.2891	4.20	Q	V	|	|	|	|
8+40	2.3182	4.23	Q	V	|	|	|	|
8+45	2.3475	4.26	Q	V	|	|	|	|
8+50	2.3771	4.29	Q	V	|	|	|	|
8+55	2.4068	4.32	Q	V	|	|	|	|
9+ 0	2.4367	4.35	Q	V	|	|	|	|
9+ 5	2.4669	4.38	Q	V	|	|	|	|
9+10	2.4972	4.41	Q	V	|	|	|	|
9+15	2.5278	4.44	Q	V	|	|	|	|
9+20	2.5586	4.47	Q	V	|	|	|	|
9+25	2.5896	4.51	Q	V	|	|	|	|
9+30	2.6209	4.54	Q	V	|	|	|	|
9+35	2.6524	4.57	Q	V	|	|	|	|
9+40	2.6841	4.61	Q	V	|	|	|	|
9+45	2.7161	4.64	Q	V	|	|	|	|
9+50	2.7483	4.68	Q	V	|	|	|	|
9+55	2.7808	4.72	Q	V	|	|	|	|
10+ 0	2.8136	4.75	Q	V	|	|	|	|
10+ 5	2.8466	4.79	Q	V	|	|	|	|
10+10	2.8799	4.83	Q	V	|	|	|	|
10+15	2.9134	4.87	Q	V	|	|	|	|

```
10+20       2.9473      4.91  Q      V  |          |          |          |
10+25       2.9814      4.96  Q       V |          |          |          |
10+30       3.0159      5.00  |Q      V |          |          |          |
10+35       3.0506      5.05  |Q      V |          |          |          |
10+40       3.0857      5.09  |Q      V |          |          |          |
10+45       3.1210      5.14  |Q      V |          |          |          |
10+50       3.1567      5.18  |Q      V |          |          |          |
10+55       3.1928      5.23  |Q      V |          |          |          |
11+ 0       3.2292      5.28  |Q      V |          |          |          |
11+ 5       3.2659      5.33  |Q      V |          |          |          |
11+10       3.3030      5.39  |Q      V |          |          |          |
11+15       3.3405      5.44  |Q       V|          |          |          |
11+20       3.3783      5.50  |Q       V|          |          |          |
11+25       3.4166      5.55  |Q       V|          |          |          |
11+30       3.4552      5.61  |Q       V|          |          |          |
11+35       3.4943      5.67  |Q       V|          |          |          |
11+40       3.5338      5.73  |Q       V|          |          |          |
11+45       3.5737      5.80  |Q       V|          |          |          |
11+50       3.6141      5.86  |Q       V|          |          |          |
11+55       3.6550      5.93  |Q       V|          |          |          |
12+ 0       3.6963      6.00  |Q        V          |          |          |
12+ 5       3.7381      6.07  |Q        V          |          |          |
12+10       3.7801      6.10  |Q        V          |          |          |
12+15       3.8223      6.13  |Q        V          |          |          |
12+20       3.8649      6.19  |Q        V          |          |          |
12+25       3.9081      6.26  |Q        V          |          |          |
12+30       3.9517      6.34  |Q        V          |          |          |
12+35       3.9959      6.42  |Q        V          |          |          |
12+40       4.0407      6.51  |Q        V          |          |          |
12+45       4.0862      6.60  |Q         |V         |          |          |
12+50       4.1323      6.70  |Q         |V         |          |          |
12+55       4.1792      6.80  |Q         |V         |          |          |
13+ 0       4.2267      6.91  |Q         |V         |          |          |
13+ 5       4.2751      7.02  |Q         |V         |          |          |
13+10       4.3242      7.13  |Q         |V         |          |          |
13+15       4.3742      7.25  |Q         |V         |          |          |
13+20       4.4250      7.38  |Q         | V        |          |          |
13+25       4.4767      7.51  |Q         | V        |          |          |
13+30       4.5294      7.65  |Q         | V        |          |          |
13+35       4.5831      7.80  |Q         | V        |          |          |
13+40       4.6378      7.95  |Q         | V        |          |          |
13+45       4.6937      8.11  |Q         | V        |          |          |
13+50       4.7507      8.28  |Q         | V        |          |          |
13+55       4.8090      8.46  |Q         |  V       |          |          |
14+ 0       4.8686      8.65  |Q         |  V       |          |          |
14+ 5       4.9296      8.86  |Q         |  V       |          |          |
14+10       4.9921      9.08  |Q         |  V       |          |          |
14+15       5.0564      9.34  |Q         |  V       |          |          |
14+20       5.1224      9.58  |Q         |  V       |          |          |
14+25       5.1903      9.86  |Q         |   V      |          |          |
14+30       5.2602     10.14  | Q       |   V      |          |          |
14+35       5.3321     10.45  | Q       |   V      |          |          |
14+40       5.4064     10.78  | Q       |   V      |          |          |
14+45       5.4832     11.15  | Q       |   V      |          |          |
14+50       5.5627     11.54  | Q       |    V     |          |          |
14+55       5.6452     11.99  | Q       |    V     |          |          |
15+ 0       5.7310     12.46  | Q       |    V     |          |          |
```



19+50	13.5339	4.41	Q	|	|	|	V |
19+55	13.5638	4.35	Q	|	|	|	V |
20+ 0	13.5933	4.29	Q	|	|	|	V |
20+ 5	13.6225	4.23	Q	|	|	|	V |
20+10	13.6512	4.17	Q	|	|	|	V |
20+15	13.6796	4.12	Q	|	|	|	V |
20+20	13.7076	4.07	Q	|	|	|	V |
20+25	13.7353	4.02	Q	|	|	|	V |
20+30	13.7626	3.97	Q	|	|	|	V |
20+35	13.7896	3.92	Q	|	|	|	V |
20+40	13.8164	3.88	Q	|	|	|	V |
20+45	13.8428	3.83	Q	|	|	|	V |
20+50	13.8689	3.79	Q	|	|	|	V |
20+55	13.8947	3.75	Q	|	|	|	V |
21+ 0	13.9202	3.71	Q	|	|	|	V |
21+ 5	13.9455	3.67	Q	|	|	|	V |
21+10	13.9705	3.63	Q	|	|	|	V |
21+15	13.9953	3.60	Q	|	|	|	V |
21+20	14.0198	3.56	Q	|	|	|	V |
21+25	14.0441	3.52	Q	|	|	|	V |
21+30	14.0681	3.49	Q	|	|	|	V |
21+35	14.0919	3.46	Q	|	|	|	V |
21+40	14.1155	3.42	Q	|	|	|	V |
21+45	14.1389	3.39	Q	|	|	|	V |
21+50	14.1620	3.36	Q	|	|	|	V |
21+55	14.1850	3.33	Q	|	|	|	V |
22+ 0	14.2077	3.30	Q	|	|	|	V |
22+ 5	14.2302	3.27	Q	|	|	|	V |
22+10	14.2526	3.24	Q	|	|	|	V |
22+15	14.2747	3.22	Q	|	|	|	V |
22+20	14.2967	3.19	Q	|	|	|	V |
22+25	14.3185	3.16	Q	|	|	|	V |
22+30	14.3401	3.14	Q	|	|	|	V |
22+35	14.3616	3.11	Q	|	|	|	V |
22+40	14.3828	3.09	Q	|	|	|	V|
22+45	14.4039	3.06	Q	|	|	|	V|
22+50	14.4249	3.04	Q	|	|	|	V|
22+55	14.4456	3.02	Q	|	|	|	V|
23+ 0	14.4663	2.99	Q	|	|	|	V|
23+ 5	14.4867	2.97	Q	|	|	|	V|
23+10	14.5071	2.95	Q	|	|	|	V|
23+15	14.5272	2.93	Q	|	|	|	V|
23+20	14.5473	2.91	Q	|	|	|	V|
23+25	14.5671	2.89	Q	|	|	|	V|
23+30	14.5869	2.87	Q	|	|	|	V|
23+35	14.6065	2.85	Q	|	|	|	V|
23+40	14.6260	2.83	Q	|	|	|	V|
23+45	14.6453	2.81	Q	|	|	|	V|
23+50	14.6645	2.79	Q	|	|	|	V|
23+55	14.6836	2.77	Q	|	|	|	V|
24+ 0	14.7026	2.75	Q	|	|	|	V|
24+ 5	14.7205	2.60	Q	|	|	|	V|
24+10	14.7335	1.89	Q	|	|	|	V|
24+15	14.7397	0.90	Q	|	|	|	V|
24+20	14.7434	0.53	Q	|	|	|	V|
24+25	14.7456	0.32	Q	|	|	|	V|
24+30	14.7468	0.19	Q	|	|	|	V|

24+35	14.7476	0.10	Q	|	|	|	V|
24+40	14.7480	0.06	Q	|	|	|	V|
24+45	14.7483	0.04	Q	|	|	|	V|
24+50	14.7485	0.03	Q	|	|	|	V|
24+55	14.7487	0.02	Q	|	|	|	V|

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA F
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2	19.90	6	0.82
Rainfall data for year 2	19.90	24	1.37
Rainfall data for year 100	19.90	6	2.34
Rainfall data for year 100	19.90	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	19.90	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
19.90	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
++
Watercourse length = 2150.00(Ft.)
Length from concentration point to centroid = 1110.00(Ft.)
Elevation difference along watercourse = 332.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 19.90(Ac.)
Catchment Lag time = 0.106 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 78.9502
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 19.90(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.230(In)
30-minute factor = 0.999 Adjusted rainfall = 0.515(In)
1-hour factor = 0.999 Adjusted rainfall = 0.703(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 240.67 (CFS))

1	8.804	21.189
2	56.500	114.787
3	81.326	59.747
4	91.151	23.645
5	96.092	11.890
6	98.130	4.905
7	98.712	1.400
8	100.000	3.101

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.51	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.93	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.95	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011

43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010
49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.54	1.54	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006

100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006
106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.67	1.67	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.85	1.85	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005

157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005
163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.98	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.17	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004

214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004
220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.33	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004

271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003
277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006
29	0.0037	0.0031	0.0006
30	0.0037	0.0031	0.0006
31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006
33	0.0038	0.0032	0.0006

34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006
37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006
40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008
86	0.0048	0.0040	0.0008
87	0.0049	0.0041	0.0008
88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008
90	0.0049	0.0041	0.0008

91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008
94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008
97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0062	0.0012
142	0.0075	0.0063	0.0012
143	0.0077	0.0064	0.0013
144	0.0077	0.0065	0.0013
145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013
147	0.0081	0.0067	0.0013

148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014
151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014
154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0095	0.0019
168	0.0116	0.0097	0.0019
169	0.0120	0.0100	0.0020
170	0.0122	0.0102	0.0020
171	0.0127	0.0106	0.0021
172	0.0129	0.0108	0.0021
173	0.0134	0.0112	0.0022
174	0.0137	0.0115	0.0023
175	0.0143	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0154	0.0129	0.0025
178	0.0158	0.0132	0.0026
179	0.0168	0.0140	0.0028
180	0.0173	0.0144	0.0028
181	0.0184	0.0154	0.0030
182	0.0191	0.0160	0.0031
183	0.0207	0.0173	0.0034
184	0.0216	0.0180	0.0035
185	0.0270	0.0226	0.0044
186	0.0284	0.0237	0.0047
187	0.0319	0.0267	0.0052
188	0.0342	0.0286	0.0056
189	0.0406	0.0339	0.0067
190	0.0453	0.0379	0.0075
191	0.0629	0.0472*	0.0157
192	0.0842	0.0472*	0.0370
193	0.2299	0.0472*	0.1827
194	0.0521	0.0435	0.0086
195	0.0370	0.0309	0.0061
196	0.0300	0.0251	0.0049
197	0.0226	0.0189	0.0037
198	0.0198	0.0166	0.0033
199	0.0178	0.0149	0.0029
200	0.0163	0.0136	0.0027
201	0.0150	0.0126	0.0025
202	0.0140	0.0117	0.0023
203	0.0132	0.0110	0.0022
204	0.0124	0.0104	0.0020

205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018
208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016
211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0013
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0070	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0066	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007
257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007
259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007
261	0.0042	0.0035	0.0007

262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007
265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006
268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4663	1.8873	0.5790

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 23.89(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0001	0.01	Q	|	|	|	|
0+10	0.0006	0.08	Q	|	|	|	|
0+15	0.0014	0.11	Q	|	|	|	|
0+20	0.0022	0.12	Q	|	|	|	|
0+25	0.0031	0.13	Q	|	|	|	|
0+30	0.0040	0.13	Q	|	|	|	|
0+35	0.0049	0.13	Q	|	|	|	|
0+40	0.0059	0.14	Q	|	|	|	|
0+45	0.0068	0.14	Q	|	|	|	|
0+50	0.0077	0.14	Q	|	|	|	|
0+55	0.0087	0.14	Q	|	|	|	|
1+ 0	0.0096	0.14	Q	|	|	|	|
1+ 5	0.0106	0.14	Q	|	|	|	|

1+10	0.0116	0.14	Q				
1+15	0.0125	0.14	Q				
1+20	0.0135	0.14	Q				
1+25	0.0144	0.14	Q				
1+30	0.0154	0.14	Q				
1+35	0.0164	0.14	Q				
1+40	0.0174	0.14	Q				
1+45	0.0183	0.14	Q				
1+50	0.0193	0.14	Q				
1+55	0.0203	0.14	Q				
2+ 0	0.0213	0.14	Q				
2+ 5	0.0223	0.14	Q				
2+10	0.0233	0.14	Q				
2+15	0.0243	0.15	QV				
2+20	0.0253	0.15	QV				
2+25	0.0263	0.15	QV				
2+30	0.0273	0.15	QV				
2+35	0.0283	0.15	QV				
2+40	0.0293	0.15	QV				
2+45	0.0304	0.15	QV				
2+50	0.0314	0.15	QV				
2+55	0.0324	0.15	QV				
3+ 0	0.0335	0.15	QV				
3+ 5	0.0345	0.15	QV				
3+10	0.0355	0.15	QV				
3+15	0.0366	0.15	QV				
3+20	0.0376	0.15	QV				
3+25	0.0387	0.15	QV				
3+30	0.0397	0.15	QV				
3+35	0.0408	0.15	QV				
3+40	0.0419	0.15	QV				
3+45	0.0429	0.16	QV				
3+50	0.0440	0.16	QV				
3+55	0.0451	0.16	QV				
4+ 0	0.0462	0.16	QV				
4+ 5	0.0473	0.16	QV				
4+10	0.0484	0.16	Q V				
4+15	0.0495	0.16	Q V				
4+20	0.0506	0.16	Q V				
4+25	0.0517	0.16	Q V				
4+30	0.0528	0.16	Q V				
4+35	0.0539	0.16	Q V				
4+40	0.0550	0.16	Q V				
4+45	0.0562	0.16	Q V				
4+50	0.0573	0.16	Q V				
4+55	0.0584	0.17	Q V				
5+ 0	0.0596	0.17	Q V				
5+ 5	0.0607	0.17	Q V				
5+10	0.0619	0.17	Q V				
5+15	0.0630	0.17	Q V				
5+20	0.0642	0.17	Q V				
5+25	0.0654	0.17	Q V				
5+30	0.0665	0.17	Q V				
5+35	0.0677	0.17	Q V				
5+40	0.0689	0.17	Q V				
5+45	0.0701	0.17	Q V				
5+50	0.0713	0.17	Q V				

5+55	0.0725	0.17	Q	V				
6+ 0	0.0737	0.18	Q	V				
6+ 5	0.0749	0.18	Q	V				
6+10	0.0761	0.18	Q	V				
6+15	0.0774	0.18	Q	V				
6+20	0.0786	0.18	Q	V				
6+25	0.0798	0.18	Q	V				
6+30	0.0811	0.18	Q	V				
6+35	0.0823	0.18	Q	V				
6+40	0.0836	0.18	Q	V				
6+45	0.0849	0.18	Q	V				
6+50	0.0861	0.18	Q	V				
6+55	0.0874	0.19	Q	V				
7+ 0	0.0887	0.19	Q	V				
7+ 5	0.0900	0.19	Q	V				
7+10	0.0913	0.19	Q	V				
7+15	0.0926	0.19	Q	V				
7+20	0.0939	0.19	Q	V				
7+25	0.0952	0.19	Q	V				
7+30	0.0966	0.19	Q	V				
7+35	0.0979	0.19	Q	V				
7+40	0.0993	0.20	Q	V				
7+45	0.1006	0.20	Q	V				
7+50	0.1020	0.20	Q	V				
7+55	0.1033	0.20	Q	V				
8+ 0	0.1047	0.20	Q	V				
8+ 5	0.1061	0.20	Q	V				
8+10	0.1075	0.20	Q	V				
8+15	0.1089	0.20	Q	V				
8+20	0.1103	0.21	Q	V				
8+25	0.1117	0.21	Q	V				
8+30	0.1132	0.21	Q	V				
8+35	0.1146	0.21	Q	V				
8+40	0.1161	0.21	Q	V				
8+45	0.1175	0.21	Q	V				
8+50	0.1190	0.21	Q	V				
8+55	0.1205	0.22	Q	V				
9+ 0	0.1220	0.22	Q	V				
9+ 5	0.1235	0.22	Q	V				
9+10	0.1250	0.22	Q	V				
9+15	0.1265	0.22	Q	V				
9+20	0.1281	0.22	Q	V				
9+25	0.1296	0.22	Q	V				
9+30	0.1312	0.23	Q	V				
9+35	0.1327	0.23	Q	V				
9+40	0.1343	0.23	Q	V				
9+45	0.1359	0.23	Q	V				
9+50	0.1375	0.23	Q	V				
9+55	0.1391	0.24	Q	V				
10+ 0	0.1408	0.24	Q	V				
10+ 5	0.1424	0.24	Q	V				
10+10	0.1441	0.24	Q	V				
10+15	0.1458	0.24	Q	V				
10+20	0.1474	0.25	Q	V				
10+25	0.1491	0.25	Q	V				
10+30	0.1509	0.25	Q	V				
10+35	0.1526	0.25	Q	V				

10+40	0.1544	0.25	Q	V	|	|	|	|
10+45	0.1561	0.26	Q	V	|	|	|	|
10+50	0.1579	0.26	Q	V	|	|	|	|
10+55	0.1597	0.26	Q	V	|	|	|	|
11+ 0	0.1615	0.26	Q	V	|	|	|	|
11+ 5	0.1634	0.27	Q	V	|	|	|	|
11+10	0.1652	0.27	Q	V	|	|	|	|
11+15	0.1671	0.27	Q	V	|	|	|	|
11+20	0.1690	0.27	Q	V	|	|	|	|
11+25	0.1709	0.28	Q	V	|	|	|	|
11+30	0.1728	0.28	Q	V	|	|	|	|
11+35	0.1748	0.28	Q	V	|	|	|	|
11+40	0.1767	0.29	Q	V	|	|	|	|
11+45	0.1787	0.29	Q	V	|	|	|	|
11+50	0.1808	0.29	Q	V	|	|	|	|
11+55	0.1828	0.30	Q	V	|	|	|	|
12+ 0	0.1849	0.30	Q	V	|	|	|	|
12+ 5	0.1870	0.30	Q	V	|	|	|	|
12+10	0.1891	0.31	Q	V	|	|	|	|
12+15	0.1912	0.31	Q	V	|	|	|	|
12+20	0.1934	0.32	Q	V	|	|	|	|
12+25	0.1956	0.32	Q	V	|	|	|	|
12+30	0.1978	0.32	Q	V	|	|	|	|
12+35	0.2001	0.33	Q	V	|	|	|	|
12+40	0.2024	0.33	Q	V	|	|	|	|
12+45	0.2047	0.34	Q	V	|	|	|	|
12+50	0.2071	0.34	Q	V	|	|	|	|
12+55	0.2095	0.35	Q	V	|	|	|	|
13+ 0	0.2119	0.35	Q	V	|	|	|	|
13+ 5	0.2144	0.36	Q	V	|	|	|	|
13+10	0.2169	0.37	Q	V	|	|	|	|
13+15	0.2195	0.37	Q	V	|	|	|	|
13+20	0.2221	0.38	Q	V	|	|	|	|
13+25	0.2247	0.38	Q	V	|	|	|	|
13+30	0.2274	0.39	Q	V	|	|	|	|
13+35	0.2302	0.40	Q	V	|	|	|	|
13+40	0.2330	0.41	Q	V	|	|	|	|
13+45	0.2358	0.42	Q	V	|	|	|	|
13+50	0.2388	0.42	Q	V	|	|	|	|
13+55	0.2418	0.43	Q	V	|	|	|	|
14+ 0	0.2448	0.44	Q	V	|	|	|	|
14+ 5	0.2479	0.45	Q	V	|	|	|	|
14+10	0.2512	0.47	Q	V	|	|	|	|
14+15	0.2544	0.48	Q	V	|	|	|	|
14+20	0.2578	0.49	Q	V	|	|	|	|
14+25	0.2613	0.50	Q	V	|	|	|	|
14+30	0.2649	0.52	Q	|	V	|	|	|
14+35	0.2686	0.53	Q	|	V	|	|	|
14+40	0.2724	0.55	Q	|	V	|	|	|
14+45	0.2763	0.57	Q	|	V	|	|	|
14+50	0.2804	0.59	Q	|	V	|	|	|
14+55	0.2846	0.61	Q	|	V	|	|	|
15+ 0	0.2891	0.64	Q	|	V	|	|	|
15+ 5	0.2937	0.67	Q	|	V	|	|	|
15+10	0.2985	0.70	Q	|	V	|	|	|
15+15	0.3036	0.74	Q	|	V	|	|	|
15+20	0.3090	0.78	|Q	|	V	|	|	|

15+25	0.3148	0.84	Q	V			
15+30	0.3214	0.97	Q	V			
15+35	0.3288	1.07	Q	V			
15+40	0.3369	1.18	Q	V			
15+45	0.3458	1.30	Q	V			
15+50	0.3560	1.48	Q	V			
15+55	0.3685	1.82	Q	V			
16+ 0	0.3913	3.30	Q	V			
16+ 5	0.4557	9.36	Q	V			
16+10	0.6202	23.89		V	Q		
16+15	0.7108	13.16		Q	V		
16+20	0.7534	6.18	Q		V		
16+25	0.7783	3.61	Q		V		
16+30	0.7923	2.03	Q		V		
16+35	0.8010	1.26	Q		V		
16+40	0.8102	1.34	Q		V		
16+45	0.8151	0.72	Q		V		
16+50	0.8196	0.64	Q		V		
16+55	0.8237	0.59	Q		V		
17+ 0	0.8275	0.55	Q		V		
17+ 5	0.8310	0.52	Q		V		
17+10	0.8344	0.49	Q		V		
17+15	0.8376	0.46	Q		V		
17+20	0.8406	0.44	Q		V		
17+25	0.8435	0.42	Q		V		
17+30	0.8463	0.41	Q		V		
17+35	0.8490	0.39	Q		V		
17+40	0.8516	0.38	Q		V		
17+45	0.8541	0.36	Q		V		
17+50	0.8565	0.35	Q		V		
17+55	0.8589	0.34	Q		V		
18+ 0	0.8612	0.33	Q		V		
18+ 5	0.8634	0.32	Q		V		
18+10	0.8656	0.31	Q		V		
18+15	0.8677	0.31	Q		V		
18+20	0.8697	0.30	Q		V		
18+25	0.8717	0.29	Q		V		
18+30	0.8737	0.29	Q		V		
18+35	0.8756	0.28	Q		V		
18+40	0.8775	0.27	Q		V		
18+45	0.8794	0.27	Q		V		
18+50	0.8812	0.26	Q		V		
18+55	0.8829	0.26	Q		V		
19+ 0	0.8847	0.25	Q		V		
19+ 5	0.8864	0.25	Q		V		
19+10	0.8881	0.24	Q		V		
19+15	0.8897	0.24	Q		V		
19+20	0.8914	0.24	Q		V		
19+25	0.8930	0.23	Q		V		
19+30	0.8945	0.23	Q		V		
19+35	0.8961	0.23	Q		V		
19+40	0.8976	0.22	Q		V		
19+45	0.8991	0.22	Q		V		
19+50	0.9006	0.22	Q		V		
19+55	0.9021	0.21	Q		V		
20+ 0	0.9035	0.21	Q		V		
20+ 5	0.9050	0.21	Q		V		

20+10	0.9064	0.20	Q	|	|	|	V |
20+15	0.9078	0.20	Q	|	|	|	V |
20+20	0.9092	0.20	Q	|	|	|	V |
20+25	0.9105	0.20	Q	|	|	|	V |
20+30	0.9119	0.20	Q	|	|	|	V |
20+35	0.9132	0.19	Q	|	|	|	V |
20+40	0.9145	0.19	Q	|	|	|	V |
20+45	0.9158	0.19	Q	|	|	|	V |
20+50	0.9171	0.19	Q	|	|	|	V |
20+55	0.9184	0.18	Q	|	|	|	V |
21+ 0	0.9196	0.18	Q	|	|	|	V |
21+ 5	0.9209	0.18	Q	|	|	|	V |
21+10	0.9221	0.18	Q	|	|	|	V |
21+15	0.9233	0.18	Q	|	|	|	V |
21+20	0.9245	0.18	Q	|	|	|	V |
21+25	0.9257	0.17	Q	|	|	|	V |
21+30	0.9269	0.17	Q	|	|	|	V |
21+35	0.9281	0.17	Q	|	|	|	V |
21+40	0.9292	0.17	Q	|	|	|	V |
21+45	0.9304	0.17	Q	|	|	|	V |
21+50	0.9315	0.17	Q	|	|	|	V |
21+55	0.9326	0.16	Q	|	|	|	V |
22+ 0	0.9338	0.16	Q	|	|	|	V |
22+ 5	0.9349	0.16	Q	|	|	|	V |
22+10	0.9360	0.16	Q	|	|	|	V|
22+15	0.9371	0.16	Q	|	|	|	V|
22+20	0.9381	0.16	Q	|	|	|	V|
22+25	0.9392	0.16	Q	|	|	|	V|
22+30	0.9403	0.15	Q	|	|	|	V|
22+35	0.9413	0.15	Q	|	|	|	V|
22+40	0.9424	0.15	Q	|	|	|	V|
22+45	0.9434	0.15	Q	|	|	|	V|
22+50	0.9445	0.15	Q	|	|	|	V|
22+55	0.9455	0.15	Q	|	|	|	V|
23+ 0	0.9465	0.15	Q	|	|	|	V|
23+ 5	0.9475	0.15	Q	|	|	|	V|
23+10	0.9485	0.15	Q	|	|	|	V|
23+15	0.9495	0.14	Q	|	|	|	V|
23+20	0.9505	0.14	Q	|	|	|	V|
23+25	0.9515	0.14	Q	|	|	|	V|
23+30	0.9525	0.14	Q	|	|	|	V|
23+35	0.9534	0.14	Q	|	|	|	V|
23+40	0.9544	0.14	Q	|	|	|	V|
23+45	0.9553	0.14	Q	|	|	|	V|
23+50	0.9563	0.14	Q	|	|	|	V|
23+55	0.9572	0.14	Q	|	|	|	V|
24+ 0	0.9582	0.14	Q	|	|	|	V|
24+ 5	0.9590	0.12	Q	|	|	|	V|
24+10	0.9594	0.06	Q	|	|	|	V|
24+15	0.9596	0.03	Q	|	|	|	V|
24+20	0.9597	0.01	Q	|	|	|	V|
24+25	0.9597	0.01	Q	|	|	|	V|
24+30	0.9597	0.00	Q	|	|	|	V|
24+35	0.9597	0.00	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 07/23/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA F
50-YEAR EVENT
HYDROLOGY STUDY
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Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2	20.00	6	0.82
Rainfall data for year 2	20.00	24	1.37
Rainfall data for year 100	20.00	6	2.34
Rainfall data for year 100	20.00	24	4.04

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COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	20.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
20.00	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
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Watercourse length = 2150.00(Ft.)
Length from concentration point to centroid = 1110.00(Ft.)
Elevation difference along watercourse = 332.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 20.00(Ac.)
Catchment Lag time = 0.106 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 78.9502
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 20.00(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.336(In)
30-minute factor = 0.999 Adjusted rainfall = 0.753(In)
1-hour factor = 0.999 Adjusted rainfall = 1.028(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.553(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 241.88 (CFS))

1	8.804	21.296
2	56.500	115.364
3	81.326	60.048
4	91.151	23.764
5	96.092	11.950
6	98.130	4.930
7	98.712	1.407
8	100.000	3.116

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.042
12	1.03	1.03	1.03	0.039
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.20	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.26	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016

43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014
49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.79	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009

100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009
106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007

157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.83	2.82	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007
163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.94	2.94	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.14	0.006
210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006

214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006
220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005

271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005
277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015
29	0.0053	0.0038	0.0015
30	0.0053	0.0038	0.0015
31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015
33	0.0054	0.0039	0.0015

34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015
37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015
40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019
86	0.0069	0.0050	0.0019
87	0.0069	0.0050	0.0019
88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019
90	0.0070	0.0051	0.0020

91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020
94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020
97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030
143	0.0110	0.0079	0.0030
144	0.0111	0.0080	0.0031
145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0031
147	0.0116	0.0083	0.0032

148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033
151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035
154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0176	0.0127	0.0049
171	0.0182	0.0132	0.0051
172	0.0186	0.0134	0.0052
173	0.0193	0.0140	0.0054
174	0.0198	0.0143	0.0055
175	0.0206	0.0149	0.0057
176	0.0211	0.0153	0.0059
177	0.0222	0.0161	0.0062
178	0.0228	0.0165	0.0063
179	0.0241	0.0174	0.0067
180	0.0249	0.0180	0.0069
181	0.0266	0.0192	0.0074
182	0.0276	0.0199	0.0076
183	0.0298	0.0215	0.0083
184	0.0312	0.0225	0.0086
185	0.0395	0.0285	0.0110
186	0.0415	0.0300	0.0115
187	0.0466	0.0337	0.0129
188	0.0500	0.0361	0.0139
189	0.0593	0.0428	0.0164
190	0.0662	0.0472*	0.0191
191	0.0919	0.0472*	0.0447
192	0.1230	0.0472*	0.0759
193	0.3361	0.0472*	0.2889
194	0.0762	0.0472*	0.0290
195	0.0541	0.0391	0.0150
196	0.0439	0.0317	0.0122
197	0.0327	0.0236	0.0091
198	0.0286	0.0207	0.0079
199	0.0257	0.0186	0.0071
200	0.0235	0.0169	0.0065
201	0.0217	0.0157	0.0060
202	0.0202	0.0146	0.0056
203	0.0190	0.0137	0.0053
204	0.0179	0.0129	0.0050

205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043
208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0137	0.0099	0.0038
211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0115	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017
257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017
259	0.0060	0.0044	0.0017
260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016

262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016
265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016
268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5526	2.3017	1.2508

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 39.93(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

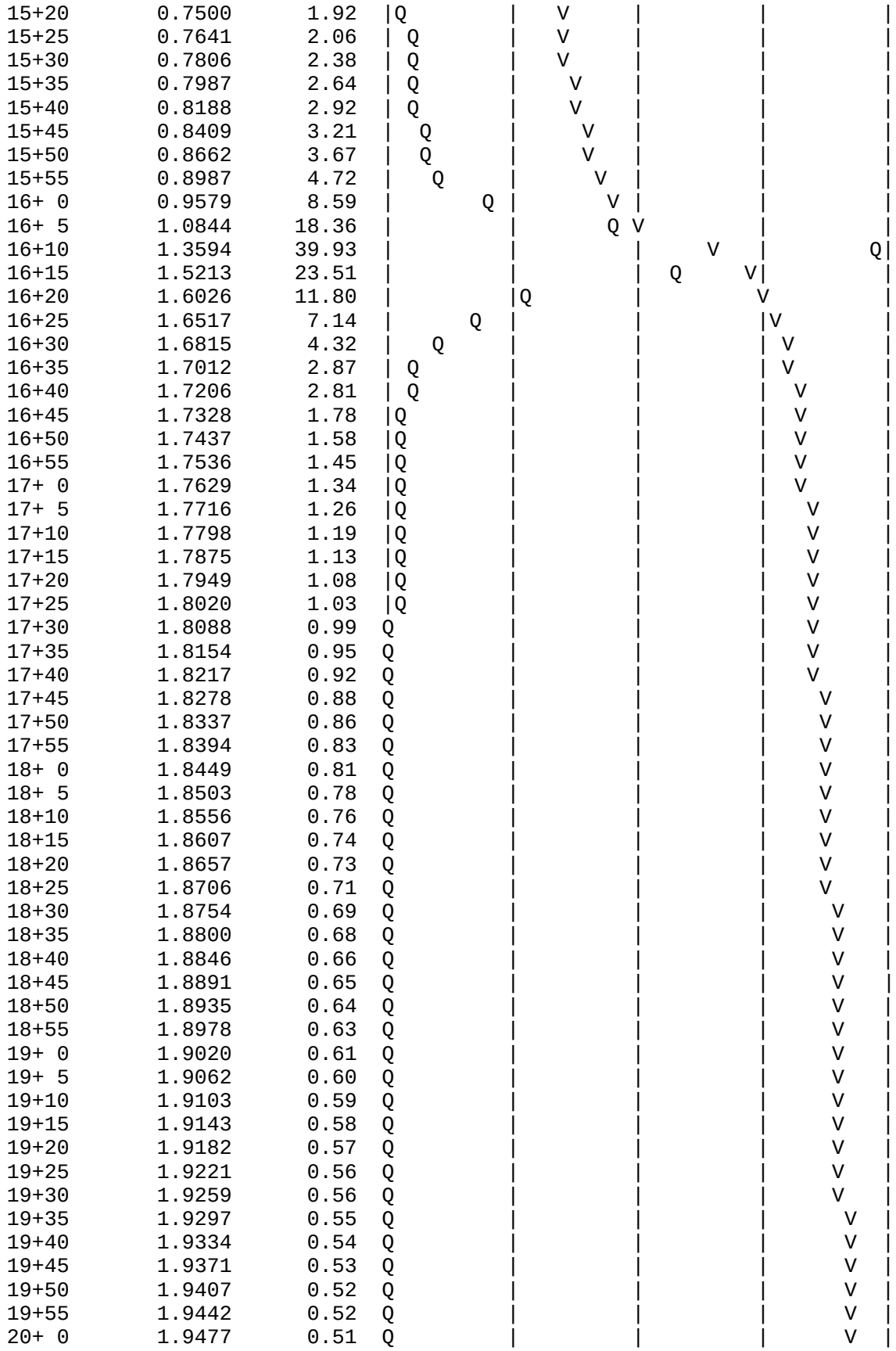
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	10.0	20.0	30.0	40.0
0+ 5	0.0002	0.03	Q	|	|	|	|
0+10	0.0015	0.18	Q	|	|	|	|
0+15	0.0033	0.26	Q	|	|	|	|
0+20	0.0053	0.30	Q	|	|	|	|
0+25	0.0075	0.31	Q	|	|	|	|
0+30	0.0097	0.32	Q	|	|	|	|
0+35	0.0119	0.32	Q	|	|	|	|
0+40	0.0142	0.33	Q	|	|	|	|
0+45	0.0164	0.33	Q	|	|	|	|
0+50	0.0187	0.33	Q	|	|	|	|
0+55	0.0210	0.33	Q	|	|	|	|
1+ 0	0.0233	0.33	Q	|	|	|	|

1+ 5	0.0256	0.33	Q	|	|	|	|
1+10	0.0279	0.34	Q	|	|	|	|
1+15	0.0302	0.34	Q	|	|	|	|
1+20	0.0325	0.34	Q	|	|	|	|
1+25	0.0349	0.34	Q	|	|	|	|
1+30	0.0372	0.34	Q	|	|	|	|
1+35	0.0395	0.34	Q	|	|	|	|
1+40	0.0419	0.34	Q	|	|	|	|
1+45	0.0443	0.34	Q	|	|	|	|
1+50	0.0466	0.34	Q	|	|	|	|
1+55	0.0490	0.35	Q	|	|	|	|
2+ 0	0.0514	0.35	Q	|	|	|	|
2+ 5	0.0538	0.35	QV	|	|	|	|
2+10	0.0562	0.35	QV	|	|	|	|
2+15	0.0586	0.35	QV	|	|	|	|
2+20	0.0611	0.35	QV	|	|	|	|
2+25	0.0635	0.35	QV	|	|	|	|
2+30	0.0659	0.35	QV	|	|	|	|
2+35	0.0684	0.36	QV	|	|	|	|
2+40	0.0708	0.36	QV	|	|	|	|
2+45	0.0733	0.36	QV	|	|	|	|
2+50	0.0758	0.36	QV	|	|	|	|
2+55	0.0783	0.36	QV	|	|	|	|
3+ 0	0.0808	0.36	QV	|	|	|	|
3+ 5	0.0833	0.36	QV	|	|	|	|
3+10	0.0858	0.37	QV	|	|	|	|
3+15	0.0883	0.37	QV	|	|	|	|
3+20	0.0909	0.37	QV	|	|	|	|
3+25	0.0934	0.37	QV	|	|	|	|
3+30	0.0960	0.37	QV	|	|	|	|
3+35	0.0985	0.37	QV	|	|	|	|
3+40	0.1011	0.37	QV	|	|	|	|
3+45	0.1037	0.38	QV	|	|	|	|
3+50	0.1063	0.38	Q V	|	|	|	|
3+55	0.1089	0.38	Q V	|	|	|	|
4+ 0	0.1115	0.38	Q V	|	|	|	|
4+ 5	0.1142	0.38	Q V	|	|	|	|
4+10	0.1168	0.38	Q V	|	|	|	|
4+15	0.1195	0.39	Q V	|	|	|	|
4+20	0.1221	0.39	Q V	|	|	|	|
4+25	0.1248	0.39	Q V	|	|	|	|
4+30	0.1275	0.39	Q V	|	|	|	|
4+35	0.1302	0.39	Q V	|	|	|	|
4+40	0.1329	0.39	Q V	|	|	|	|
4+45	0.1356	0.40	Q V	|	|	|	|
4+50	0.1384	0.40	Q V	|	|	|	|
4+55	0.1411	0.40	Q V	|	|	|	|
5+ 0	0.1439	0.40	Q V	|	|	|	|
5+ 5	0.1467	0.40	Q V	|	|	|	|
5+10	0.1495	0.40	Q V	|	|	|	|
5+15	0.1523	0.41	Q V	|	|	|	|
5+20	0.1551	0.41	Q V	|	|	|	|
5+25	0.1579	0.41	Q V	|	|	|	|
5+30	0.1607	0.41	Q V	|	|	|	|
5+35	0.1636	0.41	Q V	|	|	|	|
5+40	0.1665	0.42	Q V	|	|	|	|
5+45	0.1693	0.42	Q V	|	|	|	|

5+50	0.1722	0.42	Q	V				
5+55	0.1751	0.42	Q	V				
6+ 0	0.1781	0.42	Q	V				
6+ 5	0.1810	0.43	Q	V				
6+10	0.1840	0.43	Q	V				
6+15	0.1869	0.43	Q	V				
6+20	0.1899	0.43	Q	V				
6+25	0.1929	0.44	Q	V				
6+30	0.1959	0.44	Q	V				
6+35	0.1989	0.44	Q	V				
6+40	0.2020	0.44	Q	V				
6+45	0.2051	0.44	Q	V				
6+50	0.2081	0.45	Q	V				
6+55	0.2112	0.45	Q	V				
7+ 0	0.2143	0.45	Q	V				
7+ 5	0.2175	0.45	Q	V				
7+10	0.2206	0.46	Q	V				
7+15	0.2238	0.46	Q	V				
7+20	0.2270	0.46	Q	V				
7+25	0.2302	0.46	Q	V				
7+30	0.2334	0.47	Q	V				
7+35	0.2366	0.47	Q	V				
7+40	0.2399	0.47	Q	V				
7+45	0.2432	0.48	Q	V				
7+50	0.2465	0.48	Q	V				
7+55	0.2498	0.48	Q	V				
8+ 0	0.2531	0.49	Q	V				
8+ 5	0.2565	0.49	Q	V				
8+10	0.2599	0.49	Q	V				
8+15	0.2633	0.49	Q	V				
8+20	0.2667	0.50	Q	V				
8+25	0.2702	0.50	Q	V				
8+30	0.2736	0.50	Q	V				
8+35	0.2771	0.51	Q	V				
8+40	0.2806	0.51	Q	V				
8+45	0.2842	0.51	Q	V				
8+50	0.2877	0.52	Q	V				
8+55	0.2913	0.52	Q	V				
9+ 0	0.2949	0.53	Q	V				
9+ 5	0.2986	0.53	Q	V				
9+10	0.3023	0.53	Q	V				
9+15	0.3059	0.54	Q	V				
9+20	0.3097	0.54	Q	V				
9+25	0.3134	0.54	Q	V				
9+30	0.3172	0.55	Q	V				
9+35	0.3210	0.55	Q	V				
9+40	0.3248	0.56	Q	V				
9+45	0.3287	0.56	Q	V				
9+50	0.3326	0.57	Q	V				
9+55	0.3365	0.57	Q	V				
10+ 0	0.3405	0.58	Q	V				
10+ 5	0.3445	0.58	Q	V				
10+10	0.3485	0.58	Q	V				
10+15	0.3526	0.59	Q	V				
10+20	0.3567	0.59	Q	V				
10+25	0.3608	0.60	Q	V				
10+30	0.3650	0.61	Q	V				

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10+35       0.3692      0.61  Q      V  |          |          |          |
10+40       0.3734      0.62  Q      V  |          |          |          |
10+45       0.3777      0.62  Q      V  |          |          |          |
10+50       0.3820      0.63  Q      V  |          |          |          |
10+55       0.3864      0.63  Q      V  |          |          |          |
11+ 0       0.3908      0.64  Q      V  |          |          |          |
11+ 5       0.3952      0.65  Q      V  |          |          |          |
11+10       0.3997      0.65  Q      V  |          |          |          |
11+15       0.4043      0.66  Q      V  |          |          |          |
11+20       0.4089      0.67  Q      V  |          |          |          |
11+25       0.4135      0.67  Q      V  |          |          |          |
11+30       0.4182      0.68  Q       V |          |          |          |
11+35       0.4229      0.69  Q       V |          |          |          |
11+40       0.4277      0.70  Q       V |          |          |          |
11+45       0.4326      0.70  Q       V |          |          |          |
11+50       0.4375      0.71  Q       V |          |          |          |
11+55       0.4424      0.72  Q       V |          |          |          |
12+ 0       0.4475      0.73  Q       V |          |          |          |
12+ 5       0.4525      0.74  Q       V |          |          |          |
12+10       0.4577      0.75  Q       V |          |          |          |
12+15       0.4629      0.76  Q       V |          |          |          |
12+20       0.4682      0.77  Q       V |          |          |          |
12+25       0.4735      0.78  Q        V|          |          |          |
12+30       0.4790      0.79  Q        V|          |          |          |
12+35       0.4845      0.80  Q        V|          |          |          |
12+40       0.4900      0.81  Q        V|          |          |          |
12+45       0.4957      0.82  Q        V|          |          |          |
12+50       0.5014      0.83  Q        V|          |          |          |
12+55       0.5073      0.85  Q        V|          |          |          |
13+ 0       0.5132      0.86  Q        V|          |          |          |
13+ 5       0.5192      0.87  Q        V|          |          |          |
13+10       0.5254      0.89  Q         V          |          |          |
13+15       0.5316      0.90  Q         V          |          |          |
13+20       0.5379      0.92  Q         V          |          |          |
13+25       0.5444      0.94  Q         V          |          |          |
13+30       0.5509      0.95  Q         V          |          |          |
13+35       0.5576      0.97  Q         V          |          |          |
13+40       0.5645      0.99  Q         V          |          |          |
13+45       0.5714      1.01  |Q        V          |          |          |
13+50       0.5786      1.03  |Q         |V         |          |          |
13+55       0.5858      1.06  |Q         |V         |          |          |
14+ 0       0.5933      1.08  |Q         |V         |          |          |
14+ 5       0.6009      1.11  |Q         |V         |          |          |
14+10       0.6087      1.14  |Q         |V         |          |          |
14+15       0.6168      1.16  |Q         |V         |          |          |
14+20       0.6250      1.20  |Q         |V         |          |          |
14+25       0.6335      1.23  |Q         | V        |          |          |
14+30       0.6422      1.27  |Q         | V        |          |          |
14+35       0.6512      1.30  |Q         | V        |          |          |
14+40       0.6605      1.35  |Q         | V        |          |          |
14+45       0.6701      1.39  |Q         | V        |          |          |
14+50       0.6801      1.45  |Q         |  V       |          |          |
14+55       0.6904      1.50  |Q         |  V       |          |          |
15+ 0       0.7012      1.57  |Q         |  V       |          |          |
15+ 5       0.7125      1.63  |Q         |  V       |          |          |
15+10       0.7243      1.72  |Q         |  V       |          |          |
15+15       0.7367      1.80  |Q         |   V      |          |          |
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20+ 5	1.9512	0.50	Q	|	|	|	V |
20+10	1.9546	0.50	Q	|	|	|	V |
20+15	1.9580	0.49	Q	|	|	|	V |
20+20	1.9613	0.48	Q	|	|	|	V |
20+25	1.9646	0.48	Q	|	|	|	V |
20+30	1.9679	0.47	Q	|	|	|	V |
20+35	1.9711	0.47	Q	|	|	|	V |
20+40	1.9743	0.46	Q	|	|	|	V |
20+45	1.9774	0.46	Q	|	|	|	V |
20+50	1.9805	0.45	Q	|	|	|	V |
20+55	1.9836	0.45	Q	|	|	|	V |
21+ 0	1.9866	0.44	Q	|	|	|	V |
21+ 5	1.9896	0.44	Q	|	|	|	V |
21+10	1.9926	0.43	Q	|	|	|	V |
21+15	1.9956	0.43	Q	|	|	|	V |
21+20	1.9985	0.42	Q	|	|	|	V |
21+25	2.0014	0.42	Q	|	|	|	V |
21+30	2.0042	0.42	Q	|	|	|	V |
21+35	2.0071	0.41	Q	|	|	|	V |
21+40	2.0099	0.41	Q	|	|	|	V |
21+45	2.0127	0.40	Q	|	|	|	V |
21+50	2.0154	0.40	Q	|	|	|	V |
21+55	2.0181	0.40	Q	|	|	|	V |
22+ 0	2.0209	0.39	Q	|	|	|	V |
22+ 5	2.0235	0.39	Q	|	|	|	V |
22+10	2.0262	0.39	Q	|	|	|	V |
22+15	2.0288	0.38	Q	|	|	|	V |
22+20	2.0315	0.38	Q	|	|	|	V |
22+25	2.0341	0.38	Q	|	|	|	V|
22+30	2.0366	0.37	Q	|	|	|	V|
22+35	2.0392	0.37	Q	|	|	|	V|
22+40	2.0417	0.37	Q	|	|	|	V|
22+45	2.0442	0.37	Q	|	|	|	V|
22+50	2.0467	0.36	Q	|	|	|	V|
22+55	2.0492	0.36	Q	|	|	|	V|
23+ 0	2.0517	0.36	Q	|	|	|	V|
23+ 5	2.0541	0.35	Q	|	|	|	V|
23+10	2.0565	0.35	Q	|	|	|	V|
23+15	2.0589	0.35	Q	|	|	|	V|
23+20	2.0613	0.35	Q	|	|	|	V|
23+25	2.0637	0.34	Q	|	|	|	V|
23+30	2.0660	0.34	Q	|	|	|	V|
23+35	2.0684	0.34	Q	|	|	|	V|
23+40	2.0707	0.34	Q	|	|	|	V|
23+45	2.0730	0.33	Q	|	|	|	V|
23+50	2.0753	0.33	Q	|	|	|	V|
23+55	2.0776	0.33	Q	|	|	|	V|
24+ 0	2.0798	0.33	Q	|	|	|	V|
24+ 5	2.0819	0.30	Q	|	|	|	V|
24+10	2.0828	0.14	Q	|	|	|	V|
24+15	2.0833	0.06	Q	|	|	|	V|
24+20	2.0835	0.03	Q	|	|	|	V|
24+25	2.0835	0.01	Q	|	|	|	V|
24+30	2.0836	0.01	Q	|	|	|	V|
24+35	2.0836	0.00	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA F
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

	Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2	19.90	6	0.82
Rainfall data for year 2	19.90	24	1.37
Rainfall data for year 100	19.90	6	2.34
Rainfall data for year 100	19.90	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	19.90	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
19.90	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 2150.00(Ft.)
Length from concentration point to centroid = 1110.00(Ft.)
Elevation difference along watercourse = 332.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 19.90(Ac.)
Catchment Lag time = 0.106 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 78.9502
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 19.90(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999 Adjusted rainfall = 0.384(In)
30-minute factor = 0.999 Adjusted rainfall = 0.859(In)
1-hour factor = 0.999 Adjusted rainfall = 1.174(In)
3-hour factor = 1.000 Adjusted rainfall = 1.792(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 240.67 (CFS))

1	8.804	21.189
2	56.500	114.787
3	81.326	59.747
4	91.151	23.645
5	96.092	11.890
6	98.130	4.905
7	98.712	1.400
8	100.000	3.101

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.384
2	3.15	0.52	0.52	0.140
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018

43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016
49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011

100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010
106	0.31	2.73	2.72	0.010
107	0.31	2.74	2.74	0.010
108	0.31	2.75	2.75	0.010
109	0.30	2.76	2.76	0.010
110	0.30	2.77	2.77	0.010
111	0.30	2.77	2.77	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.94	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.17	3.16	0.008
156	0.24	3.17	3.17	0.008

157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008
163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.31	3.30	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.33	3.33	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.42	3.42	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007

214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007
220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.74	3.74	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006

271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006
277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019
29	0.0061	0.0041	0.0019
30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020
33	0.0062	0.0042	0.0020

34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020
37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020
40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025
86	0.0079	0.0054	0.0025
87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026
90	0.0081	0.0055	0.0026

91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026
94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027
97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039
143	0.0125	0.0085	0.0040
144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041
147	0.0129	0.0088	0.0041

148	0.0130	0.0088	0.0042
149	0.0132	0.0090	0.0042
150	0.0134	0.0091	0.0043
151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045
154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0155	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0161	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0193	0.0132	0.0062
170	0.0197	0.0134	0.0063
171	0.0204	0.0139	0.0065
172	0.0208	0.0142	0.0067
173	0.0217	0.0147	0.0069
174	0.0221	0.0151	0.0071
175	0.0232	0.0157	0.0074
176	0.0237	0.0161	0.0076
177	0.0249	0.0170	0.0080
178	0.0256	0.0174	0.0082
179	0.0271	0.0184	0.0087
180	0.0280	0.0190	0.0089
181	0.0299	0.0203	0.0096
182	0.0310	0.0211	0.0099
183	0.0335	0.0228	0.0107
184	0.0351	0.0238	0.0112
185	0.0451	0.0307	0.0144
186	0.0474	0.0322	0.0152
187	0.0532	0.0362	0.0170
188	0.0570	0.0388	0.0183
189	0.0677	0.0460	0.0217
190	0.0756	0.0472*	0.0285
191	0.1049	0.0472*	0.0578
192	0.1405	0.0472*	0.0933
193	0.3837	0.0472*	0.3365
194	0.0869	0.0472*	0.0398
195	0.0617	0.0420	0.0198
196	0.0501	0.0341	0.0160
197	0.0368	0.0250	0.0118
198	0.0322	0.0219	0.0103
199	0.0289	0.0196	0.0092
200	0.0263	0.0179	0.0084
201	0.0243	0.0165	0.0078
202	0.0226	0.0154	0.0072
203	0.0212	0.0144	0.0068
204	0.0200	0.0136	0.0064

205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055
208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049
211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023
257	0.0071	0.0048	0.0023
258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022
261	0.0068	0.0046	0.0022

262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021
265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021
268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0398	2.4447	1.5952

Total soil rain loss = 2.44(In)
Total effective rainfall = 1.60(In)
Peak flow rate in flood hydrograph = 46.94(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

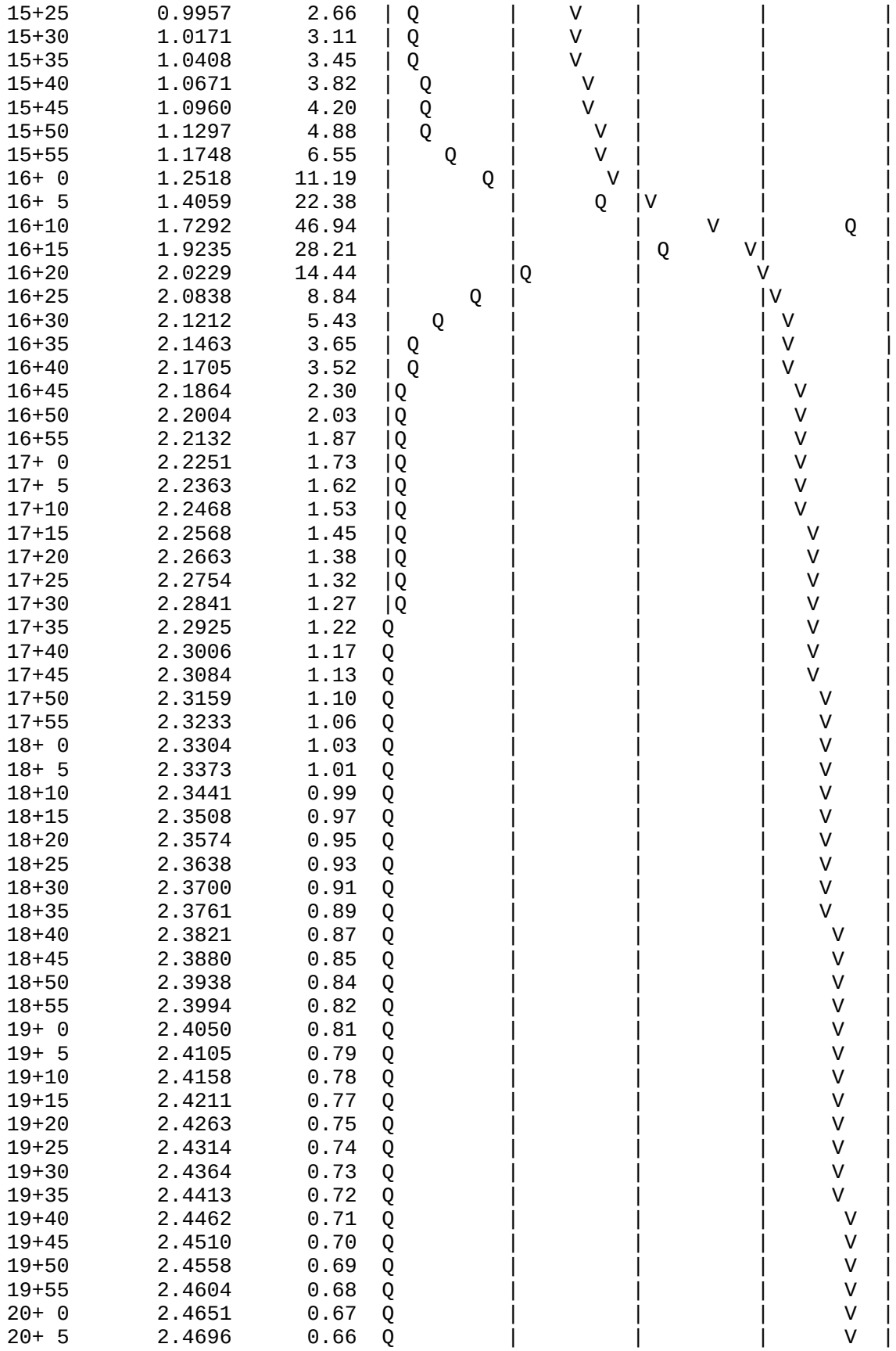
Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0003	0.04	Q	|	|	|	|
0+10	0.0019	0.24	Q	|	|	|	|
0+15	0.0043	0.35	Q	|	|	|	|
0+20	0.0070	0.39	Q	|	|	|	|
0+25	0.0098	0.41	Q	|	|	|	|
0+30	0.0127	0.42	Q	|	|	|	|
0+35	0.0157	0.43	Q	|	|	|	|
0+40	0.0187	0.43	Q	|	|	|	|
0+45	0.0217	0.43	Q	|	|	|	|
0+50	0.0247	0.44	Q	|	|	|	|
0+55	0.0277	0.44	Q	|	|	|	|
1+ 0	0.0307	0.44	Q	|	|	|	|
1+ 5	0.0337	0.44	Q	|	|	|	|

1+10	0.0368	0.44	Q	|	|	|	|
1+15	0.0398	0.44	Q	|	|	|	|
1+20	0.0429	0.44	Q	|	|	|	|
1+25	0.0460	0.45	Q	|	|	|	|
1+30	0.0490	0.45	Q	|	|	|	|
1+35	0.0521	0.45	Q	|	|	|	|
1+40	0.0552	0.45	Q	|	|	|	|
1+45	0.0584	0.45	Q	|	|	|	|
1+50	0.0615	0.45	Q	|	|	|	|
1+55	0.0646	0.46	Q	|	|	|	|
2+ 0	0.0678	0.46	QV	|	|	|	|
2+ 5	0.0709	0.46	QV	|	|	|	|
2+10	0.0741	0.46	QV	|	|	|	|
2+15	0.0773	0.46	QV	|	|	|	|
2+20	0.0805	0.46	QV	|	|	|	|
2+25	0.0837	0.47	QV	|	|	|	|
2+30	0.0869	0.47	QV	|	|	|	|
2+35	0.0901	0.47	QV	|	|	|	|
2+40	0.0934	0.47	QV	|	|	|	|
2+45	0.0966	0.47	QV	|	|	|	|
2+50	0.0999	0.47	QV	|	|	|	|
2+55	0.1032	0.48	QV	|	|	|	|
3+ 0	0.1065	0.48	QV	|	|	|	|
3+ 5	0.1098	0.48	QV	|	|	|	|
3+10	0.1131	0.48	QV	|	|	|	|
3+15	0.1164	0.48	QV	|	|	|	|
3+20	0.1198	0.49	QV	|	|	|	|
3+25	0.1231	0.49	QV	|	|	|	|
3+30	0.1265	0.49	QV	|	|	|	|
3+35	0.1299	0.49	QV	|	|	|	|
3+40	0.1333	0.49	Q V	|	|	|	|
3+45	0.1367	0.50	Q V	|	|	|	|
3+50	0.1401	0.50	Q V	|	|	|	|
3+55	0.1435	0.50	Q V	|	|	|	|
4+ 0	0.1470	0.50	Q V	|	|	|	|
4+ 5	0.1505	0.50	Q V	|	|	|	|
4+10	0.1539	0.51	Q V	|	|	|	|
4+15	0.1574	0.51	Q V	|	|	|	|
4+20	0.1609	0.51	Q V	|	|	|	|
4+25	0.1645	0.51	Q V	|	|	|	|
4+30	0.1680	0.51	Q V	|	|	|	|
4+35	0.1716	0.52	Q V	|	|	|	|
4+40	0.1751	0.52	Q V	|	|	|	|
4+45	0.1787	0.52	Q V	|	|	|	|
4+50	0.1823	0.52	Q V	|	|	|	|
4+55	0.1860	0.53	Q V	|	|	|	|
5+ 0	0.1896	0.53	Q V	|	|	|	|
5+ 5	0.1932	0.53	Q V	|	|	|	|
5+10	0.1969	0.53	Q V	|	|	|	|
5+15	0.2006	0.54	Q V	|	|	|	|
5+20	0.2043	0.54	Q V	|	|	|	|
5+25	0.2080	0.54	Q V	|	|	|	|
5+30	0.2118	0.54	Q V	|	|	|	|
5+35	0.2155	0.55	Q V	|	|	|	|
5+40	0.2193	0.55	Q V	|	|	|	|
5+45	0.2231	0.55	Q V	|	|	|	|
5+50	0.2269	0.55	Q V	|	|	|	|

5+55	0.2307	0.56	Q	V				
6+ 0	0.2346	0.56	Q	V				
6+ 5	0.2384	0.56	Q	V				
6+10	0.2423	0.56	Q	V				
6+15	0.2462	0.57	Q	V				
6+20	0.2501	0.57	Q	V				
6+25	0.2541	0.57	Q	V				
6+30	0.2581	0.58	Q	V				
6+35	0.2620	0.58	Q	V				
6+40	0.2661	0.58	Q	V				
6+45	0.2701	0.59	Q	V				
6+50	0.2741	0.59	Q	V				
6+55	0.2782	0.59	Q	V				
7+ 0	0.2823	0.59	Q	V				
7+ 5	0.2864	0.60	Q	V				
7+10	0.2906	0.60	Q	V				
7+15	0.2947	0.60	Q	V				
7+20	0.2989	0.61	Q	V				
7+25	0.3031	0.61	Q	V				
7+30	0.3074	0.62	Q	V				
7+35	0.3116	0.62	Q	V				
7+40	0.3159	0.62	Q	V				
7+45	0.3202	0.63	Q	V				
7+50	0.3246	0.63	Q	V				
7+55	0.3289	0.63	Q	V				
8+ 0	0.3333	0.64	Q	V				
8+ 5	0.3377	0.64	Q	V				
8+10	0.3422	0.65	Q	V				
8+15	0.3467	0.65	Q	V				
8+20	0.3512	0.65	Q	V				
8+25	0.3557	0.66	Q	V				
8+30	0.3603	0.66	Q	V				
8+35	0.3649	0.67	Q	V				
8+40	0.3695	0.67	Q	V				
8+45	0.3741	0.68	Q	V				
8+50	0.3788	0.68	Q	V				
8+55	0.3835	0.68	Q	V				
9+ 0	0.3883	0.69	Q	V				
9+ 5	0.3931	0.69	Q	V				
9+10	0.3979	0.70	Q	V				
9+15	0.4027	0.70	Q	V				
9+20	0.4076	0.71	Q	V				
9+25	0.4126	0.72	Q	V				
9+30	0.4175	0.72	Q	V				
9+35	0.4225	0.73	Q	V				
9+40	0.4276	0.73	Q	V				
9+45	0.4326	0.74	Q	V				
9+50	0.4378	0.74	Q	V				
9+55	0.4429	0.75	Q	V				
10+ 0	0.4481	0.76	Q	V				
10+ 5	0.4534	0.76	Q	V				
10+10	0.4587	0.77	Q	V				
10+15	0.4640	0.77	Q	V				
10+20	0.4694	0.78	Q	V				
10+25	0.4748	0.79	Q	V				
10+30	0.4803	0.79	Q	V				
10+35	0.4858	0.80	Q	V				

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10+40       0.4914      0.81  Q      V  |          |          |          |
10+45       0.4970      0.82  Q      V  |          |          |          |
10+50       0.5027      0.82  Q      V  |          |          |          |
10+55       0.5084      0.83  Q      V  |          |          |          |
11+ 0       0.5142      0.84  Q      V  |          |          |          |
11+ 5       0.5200      0.85  Q      V  |          |          |          |
11+10       0.5259      0.86  Q      V  |          |          |          |
11+15       0.5319      0.87  Q       V |          |          |          |
11+20       0.5379      0.87  Q       V |          |          |          |
11+25       0.5440      0.88  Q       V |          |          |          |
11+30       0.5501      0.89  Q       V |          |          |          |
11+35       0.5564      0.90  Q       V |          |          |          |
11+40       0.5626      0.91  Q       V |          |          |          |
11+45       0.5690      0.92  Q       V |          |          |          |
11+50       0.5754      0.93  Q       V |          |          |          |
11+55       0.5819      0.94  Q       V |          |          |          |
12+ 0       0.5885      0.96  Q       V |          |          |          |
12+ 5       0.5952      0.97  Q        V|          |          |          |
12+10       0.6018      0.97  Q        V|          |          |          |
12+15       0.6085      0.97  Q        V|          |          |          |
12+20       0.6153      0.98  Q        V|          |          |          |
12+25       0.6222      1.00  Q        V|          |          |          |
12+30       0.6291      1.01  Q        V|          |          |          |
12+35       0.6361      1.02  Q        V|          |          |          |
12+40       0.6433      1.04  Q        V|          |          |          |
12+45       0.6505      1.05  Q        V|          |          |          |
12+50       0.6579      1.07  Q        V|          |          |          |
12+55       0.6654      1.08  Q         V          |          |          |
13+ 0       0.6730      1.10  Q         V          |          |          |
13+ 5       0.6807      1.12  Q         V          |          |          |
13+10       0.6885      1.14  Q         V          |          |          |
13+15       0.6965      1.16  Q         V          |          |          |
13+20       0.7046      1.18  Q         V          |          |          |
13+25       0.7129      1.20  Q         V          |          |          |
13+30       0.7213      1.22  Q         V          |          |          |
13+35       0.7299      1.25  Q          |V         |          |          |
13+40       0.7387      1.27  |Q         |V         |          |          |
13+45       0.7476      1.30  |Q         |V         |          |          |
13+50       0.7568      1.33  |Q         |V         |          |          |
13+55       0.7661      1.36  |Q         |V         |          |          |
14+ 0       0.7757      1.39  |Q         |V         |          |          |
14+ 5       0.7855      1.42  |Q         |V         |          |          |
14+10       0.7955      1.46  |Q         | V        |          |          |
14+15       0.8058      1.50  |Q         | V        |          |          |
14+20       0.8164      1.54  |Q         | V        |          |          |
14+25       0.8273      1.58  |Q         | V        |          |          |
14+30       0.8385      1.63  |Q         | V        |          |          |
14+35       0.8501      1.68  |Q         | V        |          |          |
14+40       0.8621      1.74  |Q         |  V       |          |          |
14+45       0.8744      1.79  |Q         |  V       |          |          |
14+50       0.8873      1.87  |Q         |  V       |          |          |
14+55       0.9006      1.93  |Q         |  V       |          |          |
15+ 0       0.9145      2.02  |Q         |  V       |          |          |
15+ 5       0.9290      2.11  |Q         |   V      |          |          |
15+10       0.9443      2.22  |Q         |   V      |          |          |
15+15       0.9603      2.33  |Q         |   V      |          |          |
15+20       0.9773      2.47  |Q         |   V      |          |          |
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20+10	2.4741	0.65	Q	|	|	|	V |
20+15	2.4785	0.64	Q	|	|	|	V |
20+20	2.4829	0.64	Q	|	|	|	V |
20+25	2.4872	0.63	Q	|	|	|	V |
20+30	2.4915	0.62	Q	|	|	|	V |
20+35	2.4957	0.61	Q	|	|	|	V |
20+40	2.4999	0.61	Q	|	|	|	V |
20+45	2.5041	0.60	Q	|	|	|	V |
20+50	2.5081	0.59	Q	|	|	|	V |
20+55	2.5122	0.59	Q	|	|	|	V |
21+ 0	2.5162	0.58	Q	|	|	|	V |
21+ 5	2.5201	0.57	Q	|	|	|	V |
21+10	2.5241	0.57	Q	|	|	|	V |
21+15	2.5279	0.56	Q	|	|	|	V |
21+20	2.5318	0.56	Q	|	|	|	V |
21+25	2.5356	0.55	Q	|	|	|	V |
21+30	2.5394	0.55	Q	|	|	|	V |
21+35	2.5431	0.54	Q	|	|	|	V |
21+40	2.5468	0.54	Q	|	|	|	V |
21+45	2.5504	0.53	Q	|	|	|	V |
21+50	2.5541	0.53	Q	|	|	|	V |
21+55	2.5577	0.52	Q	|	|	|	V |
22+ 0	2.5612	0.52	Q	|	|	|	V |
22+ 5	2.5648	0.51	Q	|	|	|	V |
22+10	2.5683	0.51	Q	|	|	|	V |
22+15	2.5718	0.50	Q	|	|	|	V |
22+20	2.5752	0.50	Q	|	|	|	V |
22+25	2.5786	0.50	Q	|	|	|	V|
22+30	2.5820	0.49	Q	|	|	|	V|
22+35	2.5854	0.49	Q	|	|	|	V|
22+40	2.5887	0.48	Q	|	|	|	V|
22+45	2.5920	0.48	Q	|	|	|	V|
22+50	2.5953	0.48	Q	|	|	|	V|
22+55	2.5986	0.47	Q	|	|	|	V|
23+ 0	2.6018	0.47	Q	|	|	|	V|
23+ 5	2.6050	0.47	Q	|	|	|	V|
23+10	2.6082	0.46	Q	|	|	|	V|
23+15	2.6114	0.46	Q	|	|	|	V|
23+20	2.6145	0.46	Q	|	|	|	V|
23+25	2.6176	0.45	Q	|	|	|	V|
23+30	2.6208	0.45	Q	|	|	|	V|
23+35	2.6238	0.45	Q	|	|	|	V|
23+40	2.6269	0.44	Q	|	|	|	V|
23+45	2.6299	0.44	Q	|	|	|	V|
23+50	2.6329	0.44	Q	|	|	|	V|
23+55	2.6359	0.44	Q	|	|	|	V|
24+ 0	2.6389	0.43	Q	|	|	|	V|
24+ 5	2.6416	0.39	Q	|	|	|	V|
24+10	2.6429	0.19	Q	|	|	|	V|
24+15	2.6435	0.08	Q	|	|	|	V|
24+20	2.6437	0.04	Q	|	|	|	V|
24+25	2.6438	0.02	Q	|	|	|	V|
24+30	2.6439	0.01	Q	|	|	|	V|
24+35	2.6439	0.01	Q	|	|	|	V

U n i t H y d r o g r a p h A n a l y s i s

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Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA G
10-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 10

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
1.00	6	0.82
Rainfall data for year 2		
1.00	24	1.37
Rainfall data for year 100		
1.00	6	2.34
Rainfall data for year 100		
1.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	1.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
1.00	1.000	69.0	4.49	0.164

Area-averaged catchment yield fraction, Y = 0.164
Area-averaged low loss fraction, Yb = 0.836
++
Watercourse length = 215.00(Ft.)
Length from concentration point to centroid = 120.00(Ft.)
Elevation difference along watercourse = 55.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 1.00(Ac.)
Catchment Lag time = 0.017 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 485.4448
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.836 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.230(In)
Computed peak 30-minute rainfall = 0.515(In)
Specified peak 1-hour rainfall = 0.704(In)
Computed peak 3-hour rainfall = 1.086(In)
Specified peak 6-hour rainfall = 1.427(In)
Specified peak 24-hour rainfall = 2.466(In)

Rainfall depth area reduction factors:
Using a total area of 1.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.230(In)
30-minute factor = 1.000 Adjusted rainfall = 0.515(In)
1-hour factor = 1.000 Adjusted rainfall = 0.704(In)
3-hour factor = 1.000 Adjusted rainfall = 1.086(In)
6-hour factor = 1.000 Adjusted rainfall = 1.427(In)
24-hour factor = 1.000 Adjusted rainfall = 2.466(In)

U n i t H y d r o g r a p h
++

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 12.09 (CFS))

1	72.641	8.785
2	100.000	3.309

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	2.76	0.23	0.23	0.230
2	1.89	0.31	0.31	0.084
3	1.51	0.38	0.38	0.063
4	1.29	0.43	0.43	0.052
5	1.14	0.47	0.47	0.045
6	1.03	0.52	0.52	0.041
7	0.95	0.55	0.55	0.037
8	0.88	0.59	0.59	0.034
9	0.82	0.62	0.62	0.032
10	0.78	0.65	0.65	0.030
11	0.74	0.68	0.68	0.028
12	0.70	0.70	0.70	0.027
13	0.67	0.73	0.73	0.023
14	0.64	0.75	0.75	0.022
15	0.62	0.77	0.77	0.021
16	0.59	0.79	0.79	0.020
17	0.57	0.81	0.81	0.019
18	0.55	0.83	0.83	0.018
19	0.53	0.84	0.84	0.018
20	0.52	0.86	0.86	0.017
21	0.50	0.88	0.88	0.017
22	0.49	0.89	0.89	0.016
23	0.47	0.91	0.91	0.016
24	0.46	0.93	0.93	0.015
25	0.45	0.94	0.94	0.015
26	0.44	0.96	0.96	0.015
27	0.43	0.97	0.97	0.014
28	0.42	0.98	0.98	0.014
29	0.41	1.00	1.00	0.014
30	0.40	1.01	1.01	0.013
31	0.40	1.02	1.02	0.013
32	0.39	1.04	1.04	0.013
33	0.38	1.05	1.05	0.013
34	0.37	1.06	1.06	0.012
35	0.37	1.07	1.07	0.012
36	0.36	1.09	1.09	0.012
37	0.36	1.10	1.10	0.012
38	0.35	1.11	1.11	0.012
39	0.34	1.12	1.12	0.011
40	0.34	1.13	1.13	0.011
41	0.33	1.14	1.14	0.011
42	0.33	1.15	1.15	0.011
43	0.33	1.16	1.16	0.011
44	0.32	1.18	1.18	0.011
45	0.32	1.19	1.19	0.010
46	0.31	1.20	1.20	0.010
47	0.31	1.21	1.21	0.010
48	0.30	1.22	1.22	0.010

49	0.30	1.23	1.23	0.010
50	0.30	1.24	1.24	0.010
51	0.29	1.25	1.25	0.010
52	0.29	1.26	1.26	0.010
53	0.29	1.26	1.26	0.009
54	0.28	1.27	1.27	0.009
55	0.28	1.28	1.28	0.009
56	0.28	1.29	1.29	0.009
57	0.27	1.30	1.30	0.009
58	0.27	1.31	1.31	0.009
59	0.27	1.32	1.32	0.009
60	0.27	1.33	1.33	0.009
61	0.26	1.34	1.34	0.009
62	0.26	1.35	1.35	0.009
63	0.26	1.35	1.35	0.009
64	0.26	1.36	1.36	0.008
65	0.25	1.37	1.37	0.008
66	0.25	1.38	1.38	0.008
67	0.25	1.39	1.39	0.008
68	0.25	1.40	1.40	0.008
69	0.24	1.40	1.40	0.008
70	0.24	1.41	1.41	0.008
71	0.24	1.42	1.42	0.008
72	0.24	1.43	1.43	0.008
73	0.24	1.44	1.44	0.008
74	0.23	1.44	1.44	0.008
75	0.23	1.45	1.45	0.008
76	0.23	1.46	1.46	0.008
77	0.23	1.47	1.47	0.008
78	0.23	1.47	1.47	0.007
79	0.22	1.48	1.48	0.007
80	0.22	1.49	1.49	0.007
81	0.22	1.50	1.50	0.007
82	0.22	1.50	1.50	0.007
83	0.22	1.51	1.51	0.007
84	0.22	1.52	1.52	0.007
85	0.22	1.52	1.52	0.007
86	0.21	1.53	1.53	0.007
87	0.21	1.54	1.54	0.007
88	0.21	1.55	1.55	0.007
89	0.21	1.55	1.55	0.007
90	0.21	1.56	1.56	0.007
91	0.21	1.57	1.57	0.007
92	0.21	1.57	1.57	0.007
93	0.20	1.58	1.58	0.007
94	0.20	1.59	1.59	0.007
95	0.20	1.59	1.59	0.007
96	0.20	1.60	1.60	0.007
97	0.20	1.61	1.61	0.007
98	0.20	1.61	1.61	0.007
99	0.20	1.62	1.62	0.006
100	0.19	1.62	1.62	0.006
101	0.19	1.63	1.63	0.006
102	0.19	1.64	1.64	0.006
103	0.19	1.64	1.64	0.006
104	0.19	1.65	1.65	0.006
105	0.19	1.66	1.66	0.006

106	0.19	1.66	1.66	0.006
107	0.19	1.67	1.67	0.006
108	0.19	1.68	1.68	0.006
109	0.19	1.68	1.68	0.006
110	0.18	1.69	1.69	0.006
111	0.18	1.69	1.69	0.006
112	0.18	1.70	1.70	0.006
113	0.18	1.71	1.71	0.006
114	0.18	1.71	1.71	0.006
115	0.18	1.72	1.72	0.006
116	0.18	1.72	1.72	0.006
117	0.18	1.73	1.73	0.006
118	0.18	1.73	1.73	0.006
119	0.18	1.74	1.74	0.006
120	0.17	1.75	1.75	0.006
121	0.17	1.75	1.75	0.006
122	0.17	1.76	1.76	0.006
123	0.17	1.76	1.76	0.006
124	0.17	1.77	1.77	0.006
125	0.17	1.77	1.77	0.006
126	0.17	1.78	1.78	0.006
127	0.17	1.79	1.79	0.006
128	0.17	1.79	1.79	0.006
129	0.17	1.80	1.80	0.006
130	0.17	1.80	1.80	0.005
131	0.17	1.81	1.81	0.005
132	0.16	1.81	1.81	0.005
133	0.16	1.82	1.82	0.005
134	0.16	1.82	1.82	0.005
135	0.16	1.83	1.83	0.005
136	0.16	1.83	1.83	0.005
137	0.16	1.84	1.84	0.005
138	0.16	1.85	1.85	0.005
139	0.16	1.85	1.85	0.005
140	0.16	1.86	1.86	0.005
141	0.16	1.86	1.86	0.005
142	0.16	1.87	1.87	0.005
143	0.16	1.87	1.87	0.005
144	0.16	1.88	1.88	0.005
145	0.16	1.88	1.88	0.005
146	0.16	1.89	1.89	0.005
147	0.15	1.89	1.89	0.005
148	0.15	1.90	1.90	0.005
149	0.15	1.90	1.90	0.005
150	0.15	1.91	1.91	0.005
151	0.15	1.91	1.91	0.005
152	0.15	1.92	1.92	0.005
153	0.15	1.92	1.92	0.005
154	0.15	1.93	1.93	0.005
155	0.15	1.93	1.93	0.005
156	0.15	1.94	1.94	0.005
157	0.15	1.94	1.94	0.005
158	0.15	1.95	1.95	0.005
159	0.15	1.95	1.95	0.005
160	0.15	1.96	1.96	0.005
161	0.15	1.96	1.96	0.005
162	0.15	1.97	1.97	0.005

163	0.15	1.97	1.97	0.005
164	0.14	1.98	1.98	0.005
165	0.14	1.98	1.98	0.005
166	0.14	1.98	1.98	0.005
167	0.14	1.99	1.99	0.005
168	0.14	1.99	1.99	0.005
169	0.14	2.00	2.00	0.005
170	0.14	2.00	2.00	0.005
171	0.14	2.01	2.01	0.005
172	0.14	2.01	2.01	0.005
173	0.14	2.02	2.02	0.005
174	0.14	2.02	2.02	0.005
175	0.14	2.03	2.03	0.005
176	0.14	2.03	2.03	0.005
177	0.14	2.04	2.04	0.005
178	0.14	2.04	2.04	0.005
179	0.14	2.04	2.04	0.005
180	0.14	2.05	2.05	0.004
181	0.14	2.05	2.05	0.004
182	0.14	2.06	2.06	0.004
183	0.14	2.06	2.06	0.004
184	0.13	2.07	2.07	0.004
185	0.13	2.07	2.07	0.004
186	0.13	2.08	2.08	0.004
187	0.13	2.08	2.08	0.004
188	0.13	2.08	2.08	0.004
189	0.13	2.09	2.09	0.004
190	0.13	2.09	2.09	0.004
191	0.13	2.10	2.10	0.004
192	0.13	2.10	2.10	0.004
193	0.13	2.11	2.11	0.004
194	0.13	2.11	2.11	0.004
195	0.13	2.11	2.11	0.004
196	0.13	2.12	2.12	0.004
197	0.13	2.12	2.12	0.004
198	0.13	2.13	2.13	0.004
199	0.13	2.13	2.13	0.004
200	0.13	2.14	2.14	0.004
201	0.13	2.14	2.14	0.004
202	0.13	2.14	2.14	0.004
203	0.13	2.15	2.15	0.004
204	0.13	2.15	2.15	0.004
205	0.13	2.16	2.16	0.004
206	0.13	2.16	2.16	0.004
207	0.13	2.17	2.17	0.004
208	0.13	2.17	2.17	0.004
209	0.12	2.17	2.17	0.004
210	0.12	2.18	2.18	0.004
211	0.12	2.18	2.18	0.004
212	0.12	2.19	2.19	0.004
213	0.12	2.19	2.19	0.004
214	0.12	2.19	2.19	0.004
215	0.12	2.20	2.20	0.004
216	0.12	2.20	2.20	0.004
217	0.12	2.21	2.21	0.004
218	0.12	2.21	2.21	0.004
219	0.12	2.21	2.21	0.004

220	0.12	2.22	2.22	0.004
221	0.12	2.22	2.22	0.004
222	0.12	2.23	2.23	0.004
223	0.12	2.23	2.23	0.004
224	0.12	2.23	2.23	0.004
225	0.12	2.24	2.24	0.004
226	0.12	2.24	2.24	0.004
227	0.12	2.25	2.25	0.004
228	0.12	2.25	2.25	0.004
229	0.12	2.25	2.25	0.004
230	0.12	2.26	2.26	0.004
231	0.12	2.26	2.26	0.004
232	0.12	2.26	2.26	0.004
233	0.12	2.27	2.27	0.004
234	0.12	2.27	2.27	0.004
235	0.12	2.28	2.28	0.004
236	0.12	2.28	2.28	0.004
237	0.12	2.28	2.28	0.004
238	0.12	2.29	2.29	0.004
239	0.12	2.29	2.29	0.004
240	0.11	2.30	2.30	0.004
241	0.11	2.30	2.30	0.004
242	0.11	2.30	2.30	0.004
243	0.11	2.31	2.31	0.004
244	0.11	2.31	2.31	0.004
245	0.11	2.31	2.31	0.004
246	0.11	2.32	2.32	0.004
247	0.11	2.32	2.32	0.004
248	0.11	2.33	2.33	0.004
249	0.11	2.33	2.33	0.004
250	0.11	2.33	2.33	0.004
251	0.11	2.34	2.34	0.004
252	0.11	2.34	2.34	0.004
253	0.11	2.34	2.34	0.004
254	0.11	2.35	2.35	0.004
255	0.11	2.35	2.35	0.004
256	0.11	2.35	2.35	0.004
257	0.11	2.36	2.36	0.004
258	0.11	2.36	2.36	0.004
259	0.11	2.37	2.37	0.004
260	0.11	2.37	2.37	0.004
261	0.11	2.37	2.37	0.004
262	0.11	2.38	2.38	0.004
263	0.11	2.38	2.38	0.004
264	0.11	2.38	2.38	0.004
265	0.11	2.39	2.39	0.004
266	0.11	2.39	2.39	0.004
267	0.11	2.39	2.39	0.004
268	0.11	2.40	2.40	0.004
269	0.11	2.40	2.40	0.004
270	0.11	2.40	2.40	0.004
271	0.11	2.41	2.41	0.004
272	0.11	2.41	2.41	0.004
273	0.11	2.41	2.41	0.003
274	0.11	2.42	2.42	0.003
275	0.11	2.42	2.42	0.003
276	0.11	2.43	2.43	0.003

277	0.11	2.43	2.43	0.003
278	0.10	2.43	2.43	0.003
279	0.10	2.44	2.44	0.003
280	0.10	2.44	2.44	0.003
281	0.10	2.44	2.44	0.003
282	0.10	2.45	2.45	0.003
283	0.10	2.45	2.45	0.003
284	0.10	2.45	2.45	0.003
285	0.10	2.46	2.46	0.003
286	0.10	2.46	2.46	0.003
287	0.10	2.46	2.46	0.003
288	0.10	2.47	2.47	0.003

Time = 24.00 Hours Total unit rainfall = 2.47(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0034	0.0028	0.0006
2	0.0034	0.0028	0.0006
3	0.0034	0.0028	0.0006
4	0.0034	0.0028	0.0006
5	0.0034	0.0029	0.0006
6	0.0034	0.0029	0.0006
7	0.0034	0.0029	0.0006
8	0.0035	0.0029	0.0006
9	0.0035	0.0029	0.0006
10	0.0035	0.0029	0.0006
11	0.0035	0.0029	0.0006
12	0.0035	0.0029	0.0006
13	0.0035	0.0029	0.0006
14	0.0035	0.0029	0.0006
15	0.0035	0.0030	0.0006
16	0.0035	0.0030	0.0006
17	0.0036	0.0030	0.0006
18	0.0036	0.0030	0.0006
19	0.0036	0.0030	0.0006
20	0.0036	0.0030	0.0006
21	0.0036	0.0030	0.0006
22	0.0036	0.0030	0.0006
23	0.0036	0.0030	0.0006
24	0.0036	0.0030	0.0006
25	0.0037	0.0031	0.0006
26	0.0037	0.0031	0.0006
27	0.0037	0.0031	0.0006
28	0.0037	0.0031	0.0006
29	0.0037	0.0031	0.0006
30	0.0037	0.0031	0.0006
31	0.0037	0.0031	0.0006
32	0.0038	0.0031	0.0006
33	0.0038	0.0032	0.0006
34	0.0038	0.0032	0.0006
35	0.0038	0.0032	0.0006
36	0.0038	0.0032	0.0006
37	0.0038	0.0032	0.0006
38	0.0038	0.0032	0.0006
39	0.0039	0.0032	0.0006

40	0.0039	0.0032	0.0006
41	0.0039	0.0033	0.0006
42	0.0039	0.0033	0.0006
43	0.0039	0.0033	0.0006
44	0.0039	0.0033	0.0006
45	0.0040	0.0033	0.0007
46	0.0040	0.0033	0.0007
47	0.0040	0.0033	0.0007
48	0.0040	0.0033	0.0007
49	0.0040	0.0034	0.0007
50	0.0040	0.0034	0.0007
51	0.0041	0.0034	0.0007
52	0.0041	0.0034	0.0007
53	0.0041	0.0034	0.0007
54	0.0041	0.0034	0.0007
55	0.0041	0.0035	0.0007
56	0.0041	0.0035	0.0007
57	0.0042	0.0035	0.0007
58	0.0042	0.0035	0.0007
59	0.0042	0.0035	0.0007
60	0.0042	0.0035	0.0007
61	0.0042	0.0035	0.0007
62	0.0043	0.0036	0.0007
63	0.0043	0.0036	0.0007
64	0.0043	0.0036	0.0007
65	0.0043	0.0036	0.0007
66	0.0043	0.0036	0.0007
67	0.0044	0.0036	0.0007
68	0.0044	0.0037	0.0007
69	0.0044	0.0037	0.0007
70	0.0044	0.0037	0.0007
71	0.0045	0.0037	0.0007
72	0.0045	0.0037	0.0007
73	0.0045	0.0038	0.0007
74	0.0045	0.0038	0.0007
75	0.0045	0.0038	0.0007
76	0.0046	0.0038	0.0007
77	0.0046	0.0038	0.0008
78	0.0046	0.0039	0.0008
79	0.0046	0.0039	0.0008
80	0.0047	0.0039	0.0008
81	0.0047	0.0039	0.0008
82	0.0047	0.0039	0.0008
83	0.0047	0.0040	0.0008
84	0.0048	0.0040	0.0008
85	0.0048	0.0040	0.0008
86	0.0048	0.0040	0.0008
87	0.0049	0.0041	0.0008
88	0.0049	0.0041	0.0008
89	0.0049	0.0041	0.0008
90	0.0049	0.0041	0.0008
91	0.0050	0.0041	0.0008
92	0.0050	0.0042	0.0008
93	0.0050	0.0042	0.0008
94	0.0050	0.0042	0.0008
95	0.0051	0.0043	0.0008
96	0.0051	0.0043	0.0008

97	0.0052	0.0043	0.0008
98	0.0052	0.0043	0.0009
99	0.0052	0.0044	0.0009
100	0.0052	0.0044	0.0009
101	0.0053	0.0044	0.0009
102	0.0053	0.0044	0.0009
103	0.0054	0.0045	0.0009
104	0.0054	0.0045	0.0009
105	0.0054	0.0045	0.0009
106	0.0055	0.0046	0.0009
107	0.0055	0.0046	0.0009
108	0.0055	0.0046	0.0009
109	0.0056	0.0047	0.0009
110	0.0056	0.0047	0.0009
111	0.0057	0.0047	0.0009
112	0.0057	0.0048	0.0009
113	0.0058	0.0048	0.0009
114	0.0058	0.0048	0.0010
115	0.0058	0.0049	0.0010
116	0.0059	0.0049	0.0010
117	0.0059	0.0050	0.0010
118	0.0060	0.0050	0.0010
119	0.0060	0.0050	0.0010
120	0.0061	0.0051	0.0010
121	0.0061	0.0051	0.0010
122	0.0062	0.0052	0.0010
123	0.0062	0.0052	0.0010
124	0.0063	0.0052	0.0010
125	0.0064	0.0053	0.0010
126	0.0064	0.0053	0.0011
127	0.0065	0.0054	0.0011
128	0.0065	0.0054	0.0011
129	0.0066	0.0055	0.0011
130	0.0066	0.0055	0.0011
131	0.0067	0.0056	0.0011
132	0.0068	0.0057	0.0011
133	0.0069	0.0057	0.0011
134	0.0069	0.0058	0.0011
135	0.0070	0.0058	0.0012
136	0.0070	0.0059	0.0012
137	0.0071	0.0060	0.0012
138	0.0072	0.0060	0.0012
139	0.0073	0.0061	0.0012
140	0.0074	0.0062	0.0012
141	0.0075	0.0063	0.0012
142	0.0075	0.0063	0.0012
143	0.0077	0.0064	0.0013
144	0.0077	0.0065	0.0013
145	0.0079	0.0066	0.0013
146	0.0079	0.0066	0.0013
147	0.0081	0.0067	0.0013
148	0.0081	0.0068	0.0013
149	0.0083	0.0069	0.0014
150	0.0084	0.0070	0.0014
151	0.0085	0.0071	0.0014
152	0.0086	0.0072	0.0014
153	0.0088	0.0073	0.0014

154	0.0089	0.0074	0.0015
155	0.0091	0.0076	0.0015
156	0.0092	0.0077	0.0015
157	0.0094	0.0078	0.0015
158	0.0095	0.0079	0.0016
159	0.0097	0.0081	0.0016
160	0.0098	0.0082	0.0016
161	0.0101	0.0084	0.0017
162	0.0102	0.0085	0.0017
163	0.0105	0.0087	0.0017
164	0.0106	0.0089	0.0017
165	0.0109	0.0091	0.0018
166	0.0111	0.0093	0.0018
167	0.0114	0.0095	0.0019
168	0.0116	0.0097	0.0019
169	0.0120	0.0100	0.0020
170	0.0122	0.0102	0.0020
171	0.0127	0.0106	0.0021
172	0.0129	0.0108	0.0021
173	0.0134	0.0112	0.0022
174	0.0137	0.0115	0.0023
175	0.0143	0.0120	0.0024
176	0.0147	0.0123	0.0024
177	0.0154	0.0129	0.0025
178	0.0158	0.0132	0.0026
179	0.0167	0.0140	0.0028
180	0.0173	0.0144	0.0028
181	0.0184	0.0154	0.0030
182	0.0191	0.0159	0.0031
183	0.0206	0.0172	0.0034
184	0.0216	0.0180	0.0035
185	0.0270	0.0226	0.0044
186	0.0284	0.0237	0.0047
187	0.0319	0.0267	0.0053
188	0.0342	0.0286	0.0056
189	0.0406	0.0339	0.0067
190	0.0454	0.0379	0.0075
191	0.0629	0.0472*	0.0158
192	0.0842	0.0472*	0.0371
193	0.2301	0.0472*	0.1829
194	0.0521	0.0436	0.0086
195	0.0370	0.0309	0.0061
196	0.0300	0.0251	0.0049
197	0.0226	0.0189	0.0037
198	0.0198	0.0166	0.0033
199	0.0178	0.0149	0.0029
200	0.0163	0.0136	0.0027
201	0.0150	0.0126	0.0025
202	0.0140	0.0117	0.0023
203	0.0132	0.0110	0.0022
204	0.0124	0.0104	0.0020
205	0.0118	0.0099	0.0019
206	0.0113	0.0094	0.0019
207	0.0108	0.0090	0.0018
208	0.0103	0.0086	0.0017
209	0.0099	0.0083	0.0016
210	0.0096	0.0080	0.0016

211	0.0093	0.0077	0.0015
212	0.0090	0.0075	0.0015
213	0.0087	0.0073	0.0014
214	0.0084	0.0071	0.0014
215	0.0082	0.0069	0.0013
216	0.0080	0.0067	0.0013
217	0.0078	0.0065	0.0013
218	0.0076	0.0063	0.0012
219	0.0074	0.0062	0.0012
220	0.0073	0.0061	0.0012
221	0.0071	0.0059	0.0012
222	0.0070	0.0058	0.0011
223	0.0068	0.0057	0.0011
224	0.0067	0.0056	0.0011
225	0.0066	0.0055	0.0011
226	0.0064	0.0054	0.0011
227	0.0063	0.0053	0.0010
228	0.0062	0.0052	0.0010
229	0.0061	0.0051	0.0010
230	0.0060	0.0050	0.0010
231	0.0059	0.0049	0.0010
232	0.0058	0.0049	0.0010
233	0.0057	0.0048	0.0009
234	0.0056	0.0047	0.0009
235	0.0056	0.0046	0.0009
236	0.0055	0.0046	0.0009
237	0.0054	0.0045	0.0009
238	0.0053	0.0045	0.0009
239	0.0053	0.0044	0.0009
240	0.0052	0.0043	0.0009
241	0.0051	0.0043	0.0008
242	0.0051	0.0042	0.0008
243	0.0050	0.0042	0.0008
244	0.0049	0.0041	0.0008
245	0.0049	0.0041	0.0008
246	0.0048	0.0040	0.0008
247	0.0048	0.0040	0.0008
248	0.0047	0.0039	0.0008
249	0.0047	0.0039	0.0008
250	0.0046	0.0039	0.0008
251	0.0046	0.0038	0.0008
252	0.0045	0.0038	0.0007
253	0.0045	0.0037	0.0007
254	0.0044	0.0037	0.0007
255	0.0044	0.0037	0.0007
256	0.0044	0.0036	0.0007
257	0.0043	0.0036	0.0007
258	0.0043	0.0036	0.0007
259	0.0042	0.0035	0.0007
260	0.0042	0.0035	0.0007
261	0.0042	0.0035	0.0007
262	0.0041	0.0034	0.0007
263	0.0041	0.0034	0.0007
264	0.0040	0.0034	0.0007
265	0.0040	0.0034	0.0007
266	0.0040	0.0033	0.0007
267	0.0039	0.0033	0.0006

268	0.0039	0.0033	0.0006
269	0.0039	0.0032	0.0006
270	0.0039	0.0032	0.0006
271	0.0038	0.0032	0.0006
272	0.0038	0.0032	0.0006
273	0.0038	0.0031	0.0006
274	0.0037	0.0031	0.0006
275	0.0037	0.0031	0.0006
276	0.0037	0.0031	0.0006
277	0.0037	0.0031	0.0006
278	0.0036	0.0030	0.0006
279	0.0036	0.0030	0.0006
280	0.0036	0.0030	0.0006
281	0.0036	0.0030	0.0006
282	0.0035	0.0030	0.0006
283	0.0035	0.0029	0.0006
284	0.0035	0.0029	0.0006
285	0.0035	0.0029	0.0006
286	0.0034	0.0029	0.0006
287	0.0034	0.0029	0.0006
288	0.0034	0.0028	0.0006
	2.4664	1.8871	0.5793

Total soil rain loss = 1.89(In)
Total effective rainfall = 0.58(In)
Peak flow rate in flood hydrograph = 1.73(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.01	Q				
0+25	0.0002	0.01	Q				
0+30	0.0003	0.01	Q				
0+35	0.0003	0.01	Q				
0+40	0.0004	0.01	Q				
0+45	0.0004	0.01	Q				
0+50	0.0005	0.01	Q				
0+55	0.0005	0.01	Q				
1+ 0	0.0006	0.01	Q				
1+ 5	0.0006	0.01	Q				
1+10	0.0006	0.01	Q				
1+15	0.0007	0.01	Q				
1+20	0.0007	0.01	Q				
1+25	0.0008	0.01	Q				
1+30	0.0008	0.01	Q				
1+35	0.0009	0.01	Q				

1+40	0.0009	0.01	Q				
1+45	0.0010	0.01	Q				
1+50	0.0010	0.01	Q				
1+55	0.0011	0.01	Q				
2+ 0	0.0011	0.01	Q				
2+ 5	0.0012	0.01	Q				
2+10	0.0012	0.01	QV				
2+15	0.0013	0.01	QV				
2+20	0.0013	0.01	QV				
2+25	0.0014	0.01	QV				
2+30	0.0014	0.01	QV				
2+35	0.0015	0.01	QV				
2+40	0.0015	0.01	QV				
2+45	0.0016	0.01	QV				
2+50	0.0017	0.01	QV				
2+55	0.0017	0.01	QV				
3+ 0	0.0018	0.01	QV				
3+ 5	0.0018	0.01	QV				
3+10	0.0019	0.01	QV				
3+15	0.0019	0.01	QV				
3+20	0.0020	0.01	QV				
3+25	0.0020	0.01	QV				
3+30	0.0021	0.01	QV				
3+35	0.0021	0.01	QV				
3+40	0.0022	0.01	QV				
3+45	0.0022	0.01	QV				
3+50	0.0023	0.01	QV				
3+55	0.0023	0.01	QV				
4+ 0	0.0024	0.01	QV				
4+ 5	0.0025	0.01	Q V				
4+10	0.0025	0.01	Q V				
4+15	0.0026	0.01	Q V				
4+20	0.0026	0.01	Q V				
4+25	0.0027	0.01	Q V				
4+30	0.0027	0.01	Q V				
4+35	0.0028	0.01	Q V				
4+40	0.0028	0.01	Q V				
4+45	0.0029	0.01	Q V				
4+50	0.0030	0.01	Q V				
4+55	0.0030	0.01	Q V				
5+ 0	0.0031	0.01	Q V				
5+ 5	0.0031	0.01	Q V				
5+10	0.0032	0.01	Q V				
5+15	0.0032	0.01	Q V				
5+20	0.0033	0.01	Q V				
5+25	0.0034	0.01	Q V				
5+30	0.0034	0.01	Q V				
5+35	0.0035	0.01	Q V				
5+40	0.0035	0.01	Q V				
5+45	0.0036	0.01	Q V				
5+50	0.0037	0.01	Q V				
5+55	0.0037	0.01	Q V				
6+ 0	0.0038	0.01	Q V				
6+ 5	0.0039	0.01	Q V				
6+10	0.0039	0.01	Q V				
6+15	0.0040	0.01	Q V				
6+20	0.0040	0.01	Q V				

6+25	0.0041	0.01	Q	V				
6+30	0.0042	0.01	Q	V				
6+35	0.0042	0.01	Q	V				
6+40	0.0043	0.01	Q	V				
6+45	0.0044	0.01	Q	V				
6+50	0.0044	0.01	Q	V				
6+55	0.0045	0.01	Q	V				
7+ 0	0.0045	0.01	Q	V				
7+ 5	0.0046	0.01	Q	V				
7+10	0.0047	0.01	Q	V				
7+15	0.0047	0.01	Q	V				
7+20	0.0048	0.01	Q	V				
7+25	0.0049	0.01	Q	V				
7+30	0.0049	0.01	Q	V				
7+35	0.0050	0.01	Q	V				
7+40	0.0051	0.01	Q	V				
7+45	0.0052	0.01	Q	V				
7+50	0.0052	0.01	Q	V				
7+55	0.0053	0.01	Q	V				
8+ 0	0.0054	0.01	Q	V				
8+ 5	0.0054	0.01	Q	V				
8+10	0.0055	0.01	Q	V				
8+15	0.0056	0.01	Q	V				
8+20	0.0056	0.01	Q	V				
8+25	0.0057	0.01	Q	V				
8+30	0.0058	0.01	Q	V				
8+35	0.0059	0.01	Q	V				
8+40	0.0059	0.01	Q	V				
8+45	0.0060	0.01	Q	V				
8+50	0.0061	0.01	Q	V				
8+55	0.0062	0.01	Q	V				
9+ 0	0.0062	0.01	Q	V				
9+ 5	0.0063	0.01	Q	V				
9+10	0.0064	0.01	Q	V				
9+15	0.0065	0.01	Q	V				
9+20	0.0065	0.01	Q	V				
9+25	0.0066	0.01	Q	V				
9+30	0.0067	0.01	Q	V				
9+35	0.0068	0.01	Q	V				
9+40	0.0069	0.01	Q	V				
9+45	0.0069	0.01	Q	V				
9+50	0.0070	0.01	Q	V				
9+55	0.0071	0.01	Q	V				
10+ 0	0.0072	0.01	Q	V				
10+ 5	0.0073	0.01	Q	V				
10+10	0.0074	0.01	Q	V				
10+15	0.0074	0.01	Q	V				
10+20	0.0075	0.01	Q	V				
10+25	0.0076	0.01	Q	V				
10+30	0.0077	0.01	Q	V				
10+35	0.0078	0.01	Q	V				
10+40	0.0079	0.01	Q	V				
10+45	0.0080	0.01	Q	V				
10+50	0.0081	0.01	Q	V				
10+55	0.0082	0.01	Q	V				
11+ 0	0.0082	0.01	Q	V				
11+ 5	0.0083	0.01	Q	V				

11+10	0.0084	0.01	Q	V	|	|	|	|
11+15	0.0085	0.01	Q	V	|	|	|	|
11+20	0.0086	0.01	Q	V	|	|	|	|
11+25	0.0087	0.01	Q	V	|	|	|	|
11+30	0.0088	0.01	Q	V	|	|	|	|
11+35	0.0089	0.01	Q	V	|	|	|	|
11+40	0.0090	0.01	Q	V	|	|	|	|
11+45	0.0091	0.01	Q	V	|	|	|	|
11+50	0.0092	0.01	Q	V	|	|	|	|
11+55	0.0093	0.02	Q	V	|	|	|	|
12+ 0	0.0094	0.02	Q	V	|	|	|	|
12+ 5	0.0095	0.02	Q	V	|	|	|	|
12+10	0.0097	0.02	Q	V	|	|	|	|
12+15	0.0098	0.02	Q	V	|	|	|	|
12+20	0.0099	0.02	Q	V	|	|	|	|
12+25	0.0100	0.02	Q	V	|	|	|	|
12+30	0.0101	0.02	Q	V	|	|	|	|
12+35	0.0102	0.02	Q	V	|	|	|	|
12+40	0.0103	0.02	Q	V	|	|	|	|
12+45	0.0105	0.02	Q	V	|	|	|	|
12+50	0.0106	0.02	Q	V	|	|	|	|
12+55	0.0107	0.02	Q	V	|	|	|	|
13+ 0	0.0108	0.02	Q	V	|	|	|	|
13+ 5	0.0110	0.02	Q	V	|	|	|	|
13+10	0.0111	0.02	Q	V	|	|	|	|
13+15	0.0112	0.02	Q	V	|	|	|	|
13+20	0.0113	0.02	Q	V	|	|	|	|
13+25	0.0115	0.02	Q	V	|	|	|	|
13+30	0.0116	0.02	Q	V	|	|	|	|
13+35	0.0118	0.02	Q	V	|	|	|	|
13+40	0.0119	0.02	Q	V	|	|	|	|
13+45	0.0121	0.02	Q	V	|	|	|	|
13+50	0.0122	0.02	Q	V	|	|	|	|
13+55	0.0124	0.02	Q	V	|	|	|	|
14+ 0	0.0125	0.02	Q	V	|	|	|	|
14+ 5	0.0127	0.02	Q	V	|	|	|	|
14+10	0.0129	0.02	Q	V	|	|	|	|
14+15	0.0130	0.02	Q	V	|	|	|	|
14+20	0.0132	0.03	Q	V	|	|	|	|
14+25	0.0134	0.03	Q	|	V	|	|	|
14+30	0.0136	0.03	Q	|	V	|	|	|
14+35	0.0138	0.03	Q	|	V	|	|	|
14+40	0.0140	0.03	Q	|	V	|	|	|
14+45	0.0142	0.03	Q	|	V	|	|	|
14+50	0.0144	0.03	Q	|	V	|	|	|
14+55	0.0146	0.03	Q	|	V	|	|	|
15+ 0	0.0148	0.03	Q	|	V	|	|	|
15+ 5	0.0151	0.04	Q	|	V	|	|	|
15+10	0.0154	0.04	Q	|	V	|	|	|
15+15	0.0156	0.04	Q	|	V	|	|	|
15+20	0.0159	0.04	Q	|	V	|	|	|
15+25	0.0163	0.05	Q	|	V	|	|	|
15+30	0.0167	0.06	Q	|	V	|	|	|
15+35	0.0171	0.06	Q	|	V	|	|	|
15+40	0.0175	0.07	Q	|	V	|	|	|
15+45	0.0181	0.08	Q	|	V	|	|	|
15+50	0.0187	0.09	Q	|	V	|	|	|

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15+55       0.0198      0.16  Q          |     V    |          |          |
16+ 0       0.0224      0.38  |Q         |        V |          |          |
16+ 5       0.0343      1.73  |      Q   |          |        V |          |
16+10       0.0390      0.68  | Q        |          |          | V        |
16+15       0.0396      0.08  Q          |          |          | V        |
16+20       0.0400      0.06  Q          |          |          |  V       |
16+25       0.0403      0.05  Q          |          |          |  V       |
16+30       0.0406      0.04  Q          |          |          |  V       |
16+35       0.0409      0.04  Q          |          |          |  V       |
16+40       0.0411      0.03  Q          |          |          |   V      |
16+45       0.0413      0.03  Q          |          |          |   V      |
16+50       0.0415      0.03  Q          |          |          |   V      |
16+55       0.0417      0.03  Q          |          |          |   V      |
17+ 0       0.0419      0.03  Q          |          |          |   V      |
17+ 5       0.0420      0.02  Q          |          |          |   V      |
17+10       0.0422      0.02  Q          |          |          |   V      |
17+15       0.0423      0.02  Q          |          |          |    V     |
17+20       0.0425      0.02  Q          |          |          |    V     |
17+25       0.0426      0.02  Q          |          |          |    V     |
17+30       0.0427      0.02  Q          |          |          |    V     |
17+35       0.0429      0.02  Q          |          |          |    V     |
17+40       0.0430      0.02  Q          |          |          |    V     |
17+45       0.0431      0.02  Q          |          |          |    V     |
17+50       0.0432      0.02  Q          |          |          |    V     |
17+55       0.0433      0.02  Q          |          |          |    V     |
18+ 0       0.0435      0.02  Q          |          |          |     V    |
18+ 5       0.0436      0.02  Q          |          |          |     V    |
18+10       0.0437      0.02  Q          |          |          |     V    |
18+15       0.0438      0.01  Q          |          |          |     V    |
18+20       0.0439      0.01  Q          |          |          |     V    |
18+25       0.0440      0.01  Q          |          |          |     V    |
18+30       0.0441      0.01  Q          |          |          |     V    |
18+35       0.0442      0.01  Q          |          |          |     V    |
18+40       0.0443      0.01  Q          |          |          |     V    |
18+45       0.0443      0.01  Q          |          |          |     V    |
18+50       0.0444      0.01  Q          |          |          |     V    |
18+55       0.0445      0.01  Q          |          |          |     V    |
19+ 0       0.0446      0.01  Q          |          |          |     V    |
19+ 5       0.0447      0.01  Q          |          |          |      V   |
19+10       0.0448      0.01  Q          |          |          |      V   |
19+15       0.0449      0.01  Q          |          |          |      V   |
19+20       0.0449      0.01  Q          |          |          |      V   |
19+25       0.0450      0.01  Q          |          |          |      V   |
19+30       0.0451      0.01  Q          |          |          |      V   |
19+35       0.0452      0.01  Q          |          |          |      V   |
19+40       0.0452      0.01  Q          |          |          |      V   |
19+45       0.0453      0.01  Q          |          |          |      V   |
19+50       0.0454      0.01  Q          |          |          |      V   |
19+55       0.0455      0.01  Q          |          |          |      V   |
20+ 0       0.0455      0.01  Q          |          |          |      V   |
20+ 5       0.0456      0.01  Q          |          |          |      V   |
20+10       0.0457      0.01  Q          |          |          |      V   |
20+15       0.0457      0.01  Q          |          |          |      V   |
20+20       0.0458      0.01  Q          |          |          |      V   |
20+25       0.0459      0.01  Q          |          |          |       V  |
20+30       0.0459      0.01  Q          |          |          |       V  |
20+35       0.0460      0.01  Q          |          |          |       V  |
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   20+40       0.0461      0.01  Q          |          |          |        V |
   20+45       0.0461      0.01  Q          |          |          |        V |
   20+50       0.0462      0.01  Q          |          |          |        V |
   20+55       0.0463      0.01  Q          |          |          |        V |
   21+ 0       0.0463      0.01  Q          |          |          |        V |
   21+ 5       0.0464      0.01  Q          |          |          |        V |
   21+10       0.0464      0.01  Q          |          |          |        V |
   21+15       0.0465      0.01  Q          |          |          |        V |
   21+20       0.0466      0.01  Q          |          |          |        V |
   21+25       0.0466      0.01  Q          |          |          |        V |
   21+30       0.0467      0.01  Q          |          |          |        V |
   21+35       0.0467      0.01  Q          |          |          |        V |
   21+40       0.0468      0.01  Q          |          |          |        V |
   21+45       0.0469      0.01  Q          |          |          |        V |
   21+50       0.0469      0.01  Q          |          |          |        V |
   21+55       0.0470      0.01  Q          |          |          |        V |
   22+ 0       0.0470      0.01  Q          |          |          |        V |
   22+ 5       0.0471      0.01  Q          |          |          |         V|
   22+10       0.0471      0.01  Q          |          |          |         V|
   22+15       0.0472      0.01  Q          |          |          |         V|
   22+20       0.0472      0.01  Q          |          |          |         V|
   22+25       0.0473      0.01  Q          |          |          |         V|
   22+30       0.0473      0.01  Q          |          |          |         V|
   22+35       0.0474      0.01  Q          |          |          |         V|
   22+40       0.0475      0.01  Q          |          |          |         V|
   22+45       0.0475      0.01  Q          |          |          |         V|
   22+50       0.0476      0.01  Q          |          |          |         V|
   22+55       0.0476      0.01  Q          |          |          |         V|
   23+ 0       0.0477      0.01  Q          |          |          |         V|
   23+ 5       0.0477      0.01  Q          |          |          |         V|
   23+10       0.0478      0.01  Q          |          |          |         V|
   23+15       0.0478      0.01  Q          |          |          |         V|
   23+20       0.0479      0.01  Q          |          |          |         V|
   23+25       0.0479      0.01  Q          |          |          |         V|
   23+30       0.0480      0.01  Q          |          |          |         V|
   23+35       0.0480      0.01  Q          |          |          |         V|
   23+40       0.0481      0.01  Q          |          |          |         V|
   23+45       0.0481      0.01  Q          |          |          |         V|
   23+50       0.0481      0.01  Q          |          |          |         V|
   23+55       0.0482      0.01  Q          |          |          |         V|
   24+ 0       0.0482      0.01  Q          |          |          |         V|
   24+ 5       0.0483      0.00  Q          |          |          |          V
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 07/23/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA G
50-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 50

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
1.00	6	0.82
Rainfall data for year 2		
1.00	24	1.37
Rainfall data for year 100		
1.00	6	2.34
Rainfall data for year 100		
1.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	1.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
1.00	1.000	69.0	4.49	0.277

Area-averaged catchment yield fraction, Y = 0.277
Area-averaged low loss fraction, Yb = 0.723
++
Watercourse length = 215.00(Ft.)
Length from concentration point to centroid = 120.00(Ft.)
Elevation difference along watercourse = 55.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 1.00(Ac.)
Catchment Lag time = 0.017 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 485.4448
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.723 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.336(In)
Computed peak 30-minute rainfall = 0.753(In)
Specified peak 1-hour rainfall = 1.029(In)
Computed peak 3-hour rainfall = 1.579(In)
Specified peak 6-hour rainfall = 2.069(In)
Specified peak 24-hour rainfall = 3.553(In)

Rainfall depth area reduction factors:
Using a total area of 1.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.336(In)
30-minute factor = 1.000 Adjusted rainfall = 0.753(In)
1-hour factor = 1.000 Adjusted rainfall = 1.029(In)
3-hour factor = 1.000 Adjusted rainfall = 1.579(In)
6-hour factor = 1.000 Adjusted rainfall = 2.069(In)
24-hour factor = 1.000 Adjusted rainfall = 3.553(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 12.09 (CFS))

1	72.641	8.785
2	100.000	3.309

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.04	0.34	0.34	0.336
2	2.76	0.46	0.46	0.123
3	2.21	0.55	0.55	0.092
4	1.88	0.63	0.63	0.076
5	1.67	0.69	0.69	0.066
6	1.51	0.75	0.75	0.059
7	1.38	0.81	0.81	0.054
8	1.29	0.86	0.86	0.050
9	1.21	0.90	0.90	0.047
10	1.14	0.95	0.95	0.044
11	1.08	0.99	0.99	0.042
12	1.03	1.03	1.03	0.040
13	0.98	1.06	1.06	0.033
14	0.94	1.09	1.09	0.031
15	0.90	1.12	1.12	0.030
16	0.86	1.15	1.15	0.029
17	0.83	1.18	1.18	0.028
18	0.80	1.21	1.21	0.027
19	0.78	1.23	1.23	0.026
20	0.75	1.26	1.26	0.025
21	0.73	1.28	1.28	0.024
22	0.71	1.30	1.30	0.023
23	0.69	1.33	1.33	0.023
24	0.67	1.35	1.35	0.022
25	0.66	1.37	1.37	0.022
26	0.64	1.39	1.39	0.021
27	0.63	1.41	1.41	0.021
28	0.61	1.43	1.43	0.020
29	0.60	1.45	1.45	0.020
30	0.59	1.47	1.47	0.019
31	0.58	1.49	1.49	0.019
32	0.57	1.51	1.51	0.019
33	0.56	1.53	1.53	0.018
34	0.55	1.54	1.54	0.018
35	0.54	1.56	1.56	0.018
36	0.53	1.58	1.58	0.017
37	0.52	1.60	1.60	0.017
38	0.51	1.61	1.61	0.017
39	0.50	1.63	1.63	0.016
40	0.49	1.65	1.65	0.016
41	0.49	1.66	1.66	0.016
42	0.48	1.68	1.68	0.016
43	0.47	1.69	1.69	0.015
44	0.47	1.71	1.71	0.015
45	0.46	1.72	1.72	0.015
46	0.45	1.74	1.74	0.015
47	0.45	1.75	1.75	0.015
48	0.44	1.77	1.77	0.014

49	0.44	1.78	1.78	0.014
50	0.43	1.80	1.80	0.014
51	0.43	1.81	1.81	0.014
52	0.42	1.82	1.82	0.014
53	0.42	1.84	1.84	0.014
54	0.41	1.85	1.85	0.013
55	0.41	1.86	1.86	0.013
56	0.40	1.88	1.88	0.013
57	0.40	1.89	1.89	0.013
58	0.39	1.90	1.90	0.013
59	0.39	1.91	1.91	0.013
60	0.39	1.93	1.93	0.013
61	0.38	1.94	1.94	0.012
62	0.38	1.95	1.95	0.012
63	0.37	1.96	1.96	0.012
64	0.37	1.98	1.98	0.012
65	0.37	1.99	1.99	0.012
66	0.36	2.00	2.00	0.012
67	0.36	2.01	2.01	0.012
68	0.36	2.02	2.02	0.012
69	0.35	2.04	2.04	0.012
70	0.35	2.05	2.05	0.011
71	0.35	2.06	2.06	0.011
72	0.34	2.07	2.07	0.011
73	0.34	2.08	2.08	0.011
74	0.34	2.09	2.09	0.011
75	0.34	2.10	2.10	0.011
76	0.33	2.11	2.11	0.011
77	0.33	2.12	2.12	0.011
78	0.33	2.13	2.13	0.011
79	0.33	2.15	2.15	0.011
80	0.32	2.16	2.16	0.011
81	0.32	2.17	2.17	0.010
82	0.32	2.18	2.18	0.010
83	0.32	2.19	2.19	0.010
84	0.31	2.20	2.20	0.010
85	0.31	2.21	2.21	0.010
86	0.31	2.22	2.22	0.010
87	0.31	2.23	2.23	0.010
88	0.31	2.24	2.24	0.010
89	0.30	2.25	2.25	0.010
90	0.30	2.26	2.26	0.010
91	0.30	2.27	2.27	0.010
92	0.30	2.28	2.28	0.010
93	0.30	2.29	2.29	0.010
94	0.29	2.30	2.30	0.010
95	0.29	2.31	2.31	0.009
96	0.29	2.31	2.31	0.009
97	0.29	2.32	2.32	0.009
98	0.29	2.33	2.33	0.009
99	0.28	2.34	2.34	0.009
100	0.28	2.35	2.35	0.009
101	0.28	2.36	2.36	0.009
102	0.28	2.37	2.37	0.009
103	0.28	2.38	2.38	0.009
104	0.28	2.39	2.39	0.009
105	0.27	2.40	2.40	0.009

106	0.27	2.41	2.41	0.009
107	0.27	2.41	2.41	0.009
108	0.27	2.42	2.42	0.009
109	0.27	2.43	2.43	0.009
110	0.27	2.44	2.44	0.009
111	0.26	2.45	2.45	0.009
112	0.26	2.46	2.46	0.009
113	0.26	2.47	2.47	0.009
114	0.26	2.48	2.48	0.008
115	0.26	2.48	2.48	0.008
116	0.26	2.49	2.49	0.008
117	0.26	2.50	2.50	0.008
118	0.26	2.51	2.51	0.008
119	0.25	2.52	2.52	0.008
120	0.25	2.53	2.53	0.008
121	0.25	2.53	2.53	0.008
122	0.25	2.54	2.54	0.008
123	0.25	2.55	2.55	0.008
124	0.25	2.56	2.56	0.008
125	0.25	2.57	2.57	0.008
126	0.25	2.57	2.57	0.008
127	0.24	2.58	2.58	0.008
128	0.24	2.59	2.59	0.008
129	0.24	2.60	2.60	0.008
130	0.24	2.61	2.61	0.008
131	0.24	2.61	2.61	0.008
132	0.24	2.62	2.62	0.008
133	0.24	2.63	2.63	0.008
134	0.24	2.64	2.64	0.008
135	0.24	2.64	2.64	0.008
136	0.23	2.65	2.65	0.008
137	0.23	2.66	2.66	0.008
138	0.23	2.67	2.67	0.008
139	0.23	2.67	2.67	0.008
140	0.23	2.68	2.68	0.007
141	0.23	2.69	2.69	0.007
142	0.23	2.70	2.70	0.007
143	0.23	2.70	2.70	0.007
144	0.23	2.71	2.71	0.007
145	0.22	2.72	2.72	0.007
146	0.22	2.73	2.73	0.007
147	0.22	2.73	2.73	0.007
148	0.22	2.74	2.74	0.007
149	0.22	2.75	2.75	0.007
150	0.22	2.75	2.75	0.007
151	0.22	2.76	2.76	0.007
152	0.22	2.77	2.77	0.007
153	0.22	2.78	2.78	0.007
154	0.22	2.78	2.78	0.007
155	0.22	2.79	2.79	0.007
156	0.22	2.80	2.80	0.007
157	0.21	2.80	2.80	0.007
158	0.21	2.81	2.81	0.007
159	0.21	2.82	2.82	0.007
160	0.21	2.83	2.83	0.007
161	0.21	2.83	2.83	0.007
162	0.21	2.84	2.84	0.007

163	0.21	2.85	2.85	0.007
164	0.21	2.85	2.85	0.007
165	0.21	2.86	2.86	0.007
166	0.21	2.87	2.87	0.007
167	0.21	2.87	2.87	0.007
168	0.21	2.88	2.88	0.007
169	0.20	2.89	2.89	0.007
170	0.20	2.89	2.89	0.007
171	0.20	2.90	2.90	0.007
172	0.20	2.91	2.91	0.007
173	0.20	2.91	2.91	0.007
174	0.20	2.92	2.92	0.007
175	0.20	2.93	2.93	0.007
176	0.20	2.93	2.93	0.007
177	0.20	2.94	2.94	0.006
178	0.20	2.95	2.95	0.006
179	0.20	2.95	2.95	0.006
180	0.20	2.96	2.96	0.006
181	0.20	2.96	2.96	0.006
182	0.20	2.97	2.97	0.006
183	0.20	2.98	2.98	0.006
184	0.19	2.98	2.98	0.006
185	0.19	2.99	2.99	0.006
186	0.19	3.00	3.00	0.006
187	0.19	3.00	3.00	0.006
188	0.19	3.01	3.01	0.006
189	0.19	3.01	3.01	0.006
190	0.19	3.02	3.02	0.006
191	0.19	3.03	3.03	0.006
192	0.19	3.03	3.03	0.006
193	0.19	3.04	3.04	0.006
194	0.19	3.05	3.05	0.006
195	0.19	3.05	3.05	0.006
196	0.19	3.06	3.06	0.006
197	0.19	3.06	3.06	0.006
198	0.19	3.07	3.07	0.006
199	0.19	3.08	3.08	0.006
200	0.18	3.08	3.08	0.006
201	0.18	3.09	3.09	0.006
202	0.18	3.09	3.09	0.006
203	0.18	3.10	3.10	0.006
204	0.18	3.11	3.11	0.006
205	0.18	3.11	3.11	0.006
206	0.18	3.12	3.12	0.006
207	0.18	3.12	3.12	0.006
208	0.18	3.13	3.13	0.006
209	0.18	3.14	3.14	0.006
210	0.18	3.14	3.14	0.006
211	0.18	3.15	3.15	0.006
212	0.18	3.15	3.15	0.006
213	0.18	3.16	3.16	0.006
214	0.18	3.16	3.16	0.006
215	0.18	3.17	3.17	0.006
216	0.18	3.18	3.18	0.006
217	0.18	3.18	3.18	0.006
218	0.18	3.19	3.19	0.006
219	0.17	3.19	3.19	0.006

220	0.17	3.20	3.20	0.006
221	0.17	3.20	3.20	0.006
222	0.17	3.21	3.21	0.006
223	0.17	3.22	3.22	0.006
224	0.17	3.22	3.22	0.006
225	0.17	3.23	3.23	0.006
226	0.17	3.23	3.23	0.006
227	0.17	3.24	3.24	0.006
228	0.17	3.24	3.24	0.006
229	0.17	3.25	3.25	0.006
230	0.17	3.25	3.25	0.006
231	0.17	3.26	3.26	0.006
232	0.17	3.27	3.27	0.005
233	0.17	3.27	3.27	0.005
234	0.17	3.28	3.28	0.005
235	0.17	3.28	3.28	0.005
236	0.17	3.29	3.29	0.005
237	0.17	3.29	3.29	0.005
238	0.17	3.30	3.30	0.005
239	0.17	3.30	3.30	0.005
240	0.17	3.31	3.31	0.005
241	0.17	3.31	3.31	0.005
242	0.16	3.32	3.32	0.005
243	0.16	3.32	3.32	0.005
244	0.16	3.33	3.33	0.005
245	0.16	3.34	3.34	0.005
246	0.16	3.34	3.34	0.005
247	0.16	3.35	3.35	0.005
248	0.16	3.35	3.35	0.005
249	0.16	3.36	3.36	0.005
250	0.16	3.36	3.36	0.005
251	0.16	3.37	3.37	0.005
252	0.16	3.37	3.37	0.005
253	0.16	3.38	3.38	0.005
254	0.16	3.38	3.38	0.005
255	0.16	3.39	3.39	0.005
256	0.16	3.39	3.39	0.005
257	0.16	3.40	3.40	0.005
258	0.16	3.40	3.40	0.005
259	0.16	3.41	3.41	0.005
260	0.16	3.41	3.41	0.005
261	0.16	3.42	3.42	0.005
262	0.16	3.42	3.42	0.005
263	0.16	3.43	3.43	0.005
264	0.16	3.43	3.43	0.005
265	0.16	3.44	3.44	0.005
266	0.16	3.44	3.44	0.005
267	0.16	3.45	3.45	0.005
268	0.15	3.45	3.45	0.005
269	0.15	3.46	3.46	0.005
270	0.15	3.46	3.46	0.005
271	0.15	3.47	3.47	0.005
272	0.15	3.47	3.47	0.005
273	0.15	3.48	3.48	0.005
274	0.15	3.48	3.48	0.005
275	0.15	3.49	3.49	0.005
276	0.15	3.49	3.49	0.005

277	0.15	3.50	3.50	0.005
278	0.15	3.50	3.50	0.005
279	0.15	3.51	3.51	0.005
280	0.15	3.51	3.51	0.005
281	0.15	3.52	3.52	0.005
282	0.15	3.52	3.52	0.005
283	0.15	3.53	3.53	0.005
284	0.15	3.53	3.53	0.005
285	0.15	3.54	3.54	0.005
286	0.15	3.54	3.54	0.005
287	0.15	3.55	3.55	0.005
288	0.15	3.55	3.55	0.005

Time = 24.00 Hours Total unit rainfall = 3.55(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0048	0.0035	0.0013
2	0.0048	0.0035	0.0013
3	0.0048	0.0035	0.0013
4	0.0049	0.0035	0.0013
5	0.0049	0.0035	0.0014
6	0.0049	0.0035	0.0014
7	0.0049	0.0035	0.0014
8	0.0049	0.0036	0.0014
9	0.0049	0.0036	0.0014
10	0.0050	0.0036	0.0014
11	0.0050	0.0036	0.0014
12	0.0050	0.0036	0.0014
13	0.0050	0.0036	0.0014
14	0.0050	0.0036	0.0014
15	0.0050	0.0036	0.0014
16	0.0051	0.0037	0.0014
17	0.0051	0.0037	0.0014
18	0.0051	0.0037	0.0014
19	0.0051	0.0037	0.0014
20	0.0051	0.0037	0.0014
21	0.0051	0.0037	0.0014
22	0.0052	0.0037	0.0014
23	0.0052	0.0037	0.0014
24	0.0052	0.0038	0.0014
25	0.0052	0.0038	0.0014
26	0.0052	0.0038	0.0015
27	0.0053	0.0038	0.0015
28	0.0053	0.0038	0.0015
29	0.0053	0.0038	0.0015
30	0.0053	0.0038	0.0015
31	0.0053	0.0039	0.0015
32	0.0054	0.0039	0.0015
33	0.0054	0.0039	0.0015
34	0.0054	0.0039	0.0015
35	0.0054	0.0039	0.0015
36	0.0054	0.0039	0.0015
37	0.0055	0.0039	0.0015
38	0.0055	0.0040	0.0015
39	0.0055	0.0040	0.0015

40	0.0055	0.0040	0.0015
41	0.0056	0.0040	0.0015
42	0.0056	0.0040	0.0015
43	0.0056	0.0040	0.0016
44	0.0056	0.0041	0.0016
45	0.0056	0.0041	0.0016
46	0.0057	0.0041	0.0016
47	0.0057	0.0041	0.0016
48	0.0057	0.0041	0.0016
49	0.0057	0.0041	0.0016
50	0.0058	0.0042	0.0016
51	0.0058	0.0042	0.0016
52	0.0058	0.0042	0.0016
53	0.0058	0.0042	0.0016
54	0.0059	0.0042	0.0016
55	0.0059	0.0043	0.0016
56	0.0059	0.0043	0.0016
57	0.0059	0.0043	0.0016
58	0.0060	0.0043	0.0017
59	0.0060	0.0043	0.0017
60	0.0060	0.0043	0.0017
61	0.0061	0.0044	0.0017
62	0.0061	0.0044	0.0017
63	0.0061	0.0044	0.0017
64	0.0061	0.0044	0.0017
65	0.0062	0.0045	0.0017
66	0.0062	0.0045	0.0017
67	0.0062	0.0045	0.0017
68	0.0062	0.0045	0.0017
69	0.0063	0.0045	0.0017
70	0.0063	0.0046	0.0018
71	0.0064	0.0046	0.0018
72	0.0064	0.0046	0.0018
73	0.0064	0.0046	0.0018
74	0.0064	0.0047	0.0018
75	0.0065	0.0047	0.0018
76	0.0065	0.0047	0.0018
77	0.0066	0.0047	0.0018
78	0.0066	0.0048	0.0018
79	0.0066	0.0048	0.0018
80	0.0066	0.0048	0.0018
81	0.0067	0.0048	0.0019
82	0.0067	0.0049	0.0019
83	0.0068	0.0049	0.0019
84	0.0068	0.0049	0.0019
85	0.0068	0.0049	0.0019
86	0.0069	0.0050	0.0019
87	0.0069	0.0050	0.0019
88	0.0070	0.0050	0.0019
89	0.0070	0.0051	0.0019
90	0.0070	0.0051	0.0020
91	0.0071	0.0051	0.0020
92	0.0071	0.0051	0.0020
93	0.0072	0.0052	0.0020
94	0.0072	0.0052	0.0020
95	0.0073	0.0052	0.0020
96	0.0073	0.0053	0.0020

97	0.0074	0.0053	0.0020
98	0.0074	0.0053	0.0020
99	0.0075	0.0054	0.0021
100	0.0075	0.0054	0.0021
101	0.0076	0.0055	0.0021
102	0.0076	0.0055	0.0021
103	0.0077	0.0055	0.0021
104	0.0077	0.0056	0.0021
105	0.0078	0.0056	0.0022
106	0.0078	0.0056	0.0022
107	0.0079	0.0057	0.0022
108	0.0079	0.0057	0.0022
109	0.0080	0.0058	0.0022
110	0.0080	0.0058	0.0022
111	0.0081	0.0059	0.0022
112	0.0081	0.0059	0.0023
113	0.0082	0.0059	0.0023
114	0.0083	0.0060	0.0023
115	0.0084	0.0060	0.0023
116	0.0084	0.0061	0.0023
117	0.0085	0.0061	0.0024
118	0.0085	0.0062	0.0024
119	0.0086	0.0062	0.0024
120	0.0087	0.0063	0.0024
121	0.0088	0.0063	0.0024
122	0.0088	0.0064	0.0024
123	0.0089	0.0065	0.0025
124	0.0090	0.0065	0.0025
125	0.0091	0.0066	0.0025
126	0.0091	0.0066	0.0025
127	0.0093	0.0067	0.0026
128	0.0093	0.0067	0.0026
129	0.0094	0.0068	0.0026
130	0.0095	0.0069	0.0026
131	0.0096	0.0069	0.0027
132	0.0097	0.0070	0.0027
133	0.0098	0.0071	0.0027
134	0.0099	0.0071	0.0027
135	0.0100	0.0072	0.0028
136	0.0101	0.0073	0.0028
137	0.0102	0.0074	0.0028
138	0.0103	0.0075	0.0029
139	0.0105	0.0076	0.0029
140	0.0105	0.0076	0.0029
141	0.0107	0.0077	0.0030
142	0.0108	0.0078	0.0030
143	0.0110	0.0079	0.0030
144	0.0111	0.0080	0.0031
145	0.0113	0.0081	0.0031
146	0.0114	0.0082	0.0031
147	0.0116	0.0083	0.0032
148	0.0117	0.0084	0.0032
149	0.0119	0.0086	0.0033
150	0.0120	0.0087	0.0033
151	0.0122	0.0088	0.0034
152	0.0123	0.0089	0.0034
153	0.0126	0.0091	0.0035

154	0.0127	0.0092	0.0035
155	0.0130	0.0094	0.0036
156	0.0131	0.0095	0.0036
157	0.0134	0.0097	0.0037
158	0.0136	0.0098	0.0038
159	0.0139	0.0101	0.0039
160	0.0141	0.0102	0.0039
161	0.0144	0.0104	0.0040
162	0.0146	0.0106	0.0041
163	0.0150	0.0109	0.0042
164	0.0152	0.0110	0.0042
165	0.0157	0.0113	0.0044
166	0.0159	0.0115	0.0044
167	0.0164	0.0119	0.0046
168	0.0167	0.0121	0.0046
169	0.0173	0.0125	0.0048
170	0.0176	0.0127	0.0049
171	0.0182	0.0132	0.0051
172	0.0186	0.0134	0.0051
173	0.0193	0.0140	0.0054
174	0.0197	0.0143	0.0055
175	0.0206	0.0149	0.0057
176	0.0211	0.0153	0.0059
177	0.0222	0.0160	0.0062
178	0.0228	0.0165	0.0063
179	0.0241	0.0174	0.0067
180	0.0249	0.0180	0.0069
181	0.0266	0.0192	0.0074
182	0.0275	0.0199	0.0076
183	0.0298	0.0215	0.0083
184	0.0311	0.0225	0.0086
185	0.0395	0.0286	0.0110
186	0.0415	0.0300	0.0115
187	0.0467	0.0337	0.0129
188	0.0500	0.0361	0.0139
189	0.0593	0.0429	0.0165
190	0.0663	0.0472*	0.0191
191	0.0920	0.0472*	0.0448
192	0.1231	0.0472*	0.0760
193	0.3364	0.0472*	0.2892
194	0.0762	0.0472*	0.0291
195	0.0541	0.0391	0.0150
196	0.0439	0.0317	0.0122
197	0.0326	0.0236	0.0091
198	0.0286	0.0207	0.0079
199	0.0257	0.0186	0.0071
200	0.0234	0.0169	0.0065
201	0.0216	0.0156	0.0060
202	0.0202	0.0146	0.0056
203	0.0189	0.0137	0.0053
204	0.0179	0.0129	0.0050
205	0.0170	0.0123	0.0047
206	0.0162	0.0117	0.0045
207	0.0155	0.0112	0.0043
208	0.0148	0.0107	0.0041
209	0.0143	0.0103	0.0040
210	0.0137	0.0099	0.0038

211	0.0133	0.0096	0.0037
212	0.0129	0.0093	0.0036
213	0.0125	0.0090	0.0035
214	0.0121	0.0087	0.0034
215	0.0118	0.0085	0.0033
216	0.0114	0.0083	0.0032
217	0.0112	0.0081	0.0031
218	0.0109	0.0079	0.0030
219	0.0106	0.0077	0.0029
220	0.0104	0.0075	0.0029
221	0.0102	0.0073	0.0028
222	0.0099	0.0072	0.0028
223	0.0097	0.0070	0.0027
224	0.0096	0.0069	0.0027
225	0.0094	0.0068	0.0026
226	0.0092	0.0066	0.0026
227	0.0090	0.0065	0.0025
228	0.0089	0.0064	0.0025
229	0.0087	0.0063	0.0024
230	0.0086	0.0062	0.0024
231	0.0084	0.0061	0.0023
232	0.0083	0.0060	0.0023
233	0.0082	0.0059	0.0023
234	0.0081	0.0058	0.0022
235	0.0079	0.0057	0.0022
236	0.0078	0.0057	0.0022
237	0.0077	0.0056	0.0021
238	0.0076	0.0055	0.0021
239	0.0075	0.0054	0.0021
240	0.0074	0.0054	0.0021
241	0.0073	0.0053	0.0020
242	0.0072	0.0052	0.0020
243	0.0071	0.0052	0.0020
244	0.0071	0.0051	0.0020
245	0.0070	0.0050	0.0019
246	0.0069	0.0050	0.0019
247	0.0068	0.0049	0.0019
248	0.0067	0.0049	0.0019
249	0.0067	0.0048	0.0019
250	0.0066	0.0048	0.0018
251	0.0065	0.0047	0.0018
252	0.0065	0.0047	0.0018
253	0.0064	0.0046	0.0018
254	0.0063	0.0046	0.0018
255	0.0063	0.0045	0.0017
256	0.0062	0.0045	0.0017
257	0.0061	0.0044	0.0017
258	0.0061	0.0044	0.0017
259	0.0060	0.0044	0.0017
260	0.0060	0.0043	0.0017
261	0.0059	0.0043	0.0016
262	0.0059	0.0042	0.0016
263	0.0058	0.0042	0.0016
264	0.0058	0.0042	0.0016
265	0.0057	0.0041	0.0016
266	0.0057	0.0041	0.0016
267	0.0056	0.0041	0.0016

268	0.0056	0.0040	0.0015
269	0.0055	0.0040	0.0015
270	0.0055	0.0040	0.0015
271	0.0055	0.0039	0.0015
272	0.0054	0.0039	0.0015
273	0.0054	0.0039	0.0015
274	0.0053	0.0038	0.0015
275	0.0053	0.0038	0.0015
276	0.0052	0.0038	0.0015
277	0.0052	0.0038	0.0014
278	0.0052	0.0037	0.0014
279	0.0051	0.0037	0.0014
280	0.0051	0.0037	0.0014
281	0.0051	0.0037	0.0014
282	0.0050	0.0036	0.0014
283	0.0050	0.0036	0.0014
284	0.0050	0.0036	0.0014
285	0.0049	0.0036	0.0014
286	0.0049	0.0035	0.0014
287	0.0049	0.0035	0.0014
288	0.0048	0.0035	0.0013
	3.5527	2.3014	1.2513

Total soil rain loss = 2.30(In)
Total effective rainfall = 1.25(In)
Peak flow rate in flood hydrograph = 2.79(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01	Q				
0+10	0.0002	0.02	Q				
0+15	0.0003	0.02	Q				
0+20	0.0004	0.02	Q				
0+25	0.0005	0.02	Q				
0+30	0.0006	0.02	Q				
0+35	0.0008	0.02	Q				
0+40	0.0009	0.02	Q				
0+45	0.0010	0.02	Q				
0+50	0.0011	0.02	Q				
0+55	0.0012	0.02	Q				
1+ 0	0.0013	0.02	Q				
1+ 5	0.0014	0.02	Q				
1+10	0.0016	0.02	Q				
1+15	0.0017	0.02	Q				
1+20	0.0018	0.02	Q				
1+25	0.0019	0.02	Q				
1+30	0.0020	0.02	Q				
1+35	0.0021	0.02	Q				

1+40	0.0023	0.02	Q	|	|	|	|
1+45	0.0024	0.02	Q	|	|	|	|
1+50	0.0025	0.02	Q	|	|	|	|
1+55	0.0026	0.02	QV	|	|	|	|
2+ 0	0.0027	0.02	QV	|	|	|	|
2+ 5	0.0029	0.02	QV	|	|	|	|
2+10	0.0030	0.02	QV	|	|	|	|
2+15	0.0031	0.02	QV	|	|	|	|
2+20	0.0032	0.02	QV	|	|	|	|
2+25	0.0033	0.02	QV	|	|	|	|
2+30	0.0035	0.02	QV	|	|	|	|
2+35	0.0036	0.02	QV	|	|	|	|
2+40	0.0037	0.02	QV	|	|	|	|
2+45	0.0038	0.02	QV	|	|	|	|
2+50	0.0040	0.02	QV	|	|	|	|
2+55	0.0041	0.02	QV	|	|	|	|
3+ 0	0.0042	0.02	QV	|	|	|	|
3+ 5	0.0043	0.02	QV	|	|	|	|
3+10	0.0045	0.02	QV	|	|	|	|
3+15	0.0046	0.02	QV	|	|	|	|
3+20	0.0047	0.02	QV	|	|	|	|
3+25	0.0049	0.02	QV	|	|	|	|
3+30	0.0050	0.02	QV	|	|	|	|
3+35	0.0051	0.02	QV	|	|	|	|
3+40	0.0052	0.02	Q V	|	|	|	|
3+45	0.0054	0.02	Q V	|	|	|	|
3+50	0.0055	0.02	Q V	|	|	|	|
3+55	0.0056	0.02	Q V	|	|	|	|
4+ 0	0.0058	0.02	Q V	|	|	|	|
4+ 5	0.0059	0.02	Q V	|	|	|	|
4+10	0.0060	0.02	Q V	|	|	|	|
4+15	0.0062	0.02	Q V	|	|	|	|
4+20	0.0063	0.02	Q V	|	|	|	|
4+25	0.0064	0.02	Q V	|	|	|	|
4+30	0.0066	0.02	Q V	|	|	|	|
4+35	0.0067	0.02	Q V	|	|	|	|
4+40	0.0068	0.02	Q V	|	|	|	|
4+45	0.0070	0.02	Q V	|	|	|	|
4+50	0.0071	0.02	Q V	|	|	|	|
4+55	0.0073	0.02	Q V	|	|	|	|
5+ 0	0.0074	0.02	Q V	|	|	|	|
5+ 5	0.0075	0.02	Q V	|	|	|	|
5+10	0.0077	0.02	Q V	|	|	|	|
5+15	0.0078	0.02	Q V	|	|	|	|
5+20	0.0080	0.02	Q V	|	|	|	|
5+25	0.0081	0.02	Q V	|	|	|	|
5+30	0.0082	0.02	Q V	|	|	|	|
5+35	0.0084	0.02	Q V	|	|	|	|
5+40	0.0085	0.02	Q V	|	|	|	|
5+45	0.0087	0.02	Q V	|	|	|	|
5+50	0.0088	0.02	Q V	|	|	|	|
5+55	0.0090	0.02	Q V	|	|	|	|
6+ 0	0.0091	0.02	Q V	|	|	|	|
6+ 5	0.0093	0.02	Q V	|	|	|	|
6+10	0.0094	0.02	Q V	|	|	|	|
6+15	0.0096	0.02	Q V	|	|	|	|
6+20	0.0097	0.02	Q V	|	|	|	|

6+25	0.0099	0.02	Q	V				
6+30	0.0100	0.02	Q	V				
6+35	0.0102	0.02	Q	V				
6+40	0.0103	0.02	Q	V				
6+45	0.0105	0.02	Q	V				
6+50	0.0106	0.02	Q	V				
6+55	0.0108	0.02	Q	V				
7+ 0	0.0109	0.02	Q	V				
7+ 5	0.0111	0.02	Q	V				
7+10	0.0113	0.02	Q	V				
7+15	0.0114	0.02	Q	V				
7+20	0.0116	0.02	Q	V				
7+25	0.0117	0.02	Q	V				
7+30	0.0119	0.02	Q	V				
7+35	0.0121	0.02	Q	V				
7+40	0.0122	0.02	Q	V				
7+45	0.0124	0.02	Q	V				
7+50	0.0126	0.02	Q	V				
7+55	0.0127	0.02	Q	V				
8+ 0	0.0129	0.02	Q	V				
8+ 5	0.0131	0.02	Q	V				
8+10	0.0132	0.02	Q	V				
8+15	0.0134	0.02	Q	V				
8+20	0.0136	0.03	Q	V				
8+25	0.0138	0.03	Q	V				
8+30	0.0139	0.03	Q	V				
8+35	0.0141	0.03	Q	V				
8+40	0.0143	0.03	Q	V				
8+45	0.0145	0.03	Q	V				
8+50	0.0146	0.03	Q	V				
8+55	0.0148	0.03	Q	V				
9+ 0	0.0150	0.03	Q	V				
9+ 5	0.0152	0.03	Q	V				
9+10	0.0154	0.03	Q	V				
9+15	0.0156	0.03	Q	V				
9+20	0.0157	0.03	Q	V				
9+25	0.0159	0.03	Q	V				
9+30	0.0161	0.03	Q	V				
9+35	0.0163	0.03	Q	V				
9+40	0.0165	0.03	Q	V				
9+45	0.0167	0.03	Q	V				
9+50	0.0169	0.03	Q	V				
9+55	0.0171	0.03	Q	V				
10+ 0	0.0173	0.03	Q	V				
10+ 5	0.0175	0.03	Q	V				
10+10	0.0177	0.03	Q	V				
10+15	0.0179	0.03	Q	V				
10+20	0.0181	0.03	Q	V				
10+25	0.0183	0.03	Q	V				
10+30	0.0185	0.03	Q	V				
10+35	0.0188	0.03	Q	V				
10+40	0.0190	0.03	Q	V				
10+45	0.0192	0.03	Q	V				
10+50	0.0194	0.03	Q	V				
10+55	0.0196	0.03	Q	V				
11+ 0	0.0199	0.03	Q	V				
11+ 5	0.0201	0.03	Q	V				

```
11+10       0.0203      0.03  Q      V  |          |          |          |
11+15       0.0205      0.03  Q      V  |          |          |          |
11+20       0.0208      0.03  Q      V  |          |          |          |
11+25       0.0210      0.03  Q       V |          |          |          |
11+30       0.0212      0.03  Q       V |          |          |          |
11+35       0.0215      0.03  Q       V |          |          |          |
11+40       0.0217      0.04  Q       V |          |          |          |
11+45       0.0220      0.04  Q       V |          |          |          |
11+50       0.0222      0.04  Q       V |          |          |          |
11+55       0.0225      0.04  Q       V |          |          |          |
12+ 0       0.0227      0.04  Q       V |          |          |          |
12+ 5       0.0230      0.04  Q       V |          |          |          |
12+10       0.0233      0.04  Q       V |          |          |          |
12+15       0.0235      0.04  Q        V|          |          |          |
12+20       0.0238      0.04  Q        V|          |          |          |
12+25       0.0241      0.04  Q        V|          |          |          |
12+30       0.0243      0.04  Q        V|          |          |          |
12+35       0.0246      0.04  Q        V|          |          |          |
12+40       0.0249      0.04  Q        V|          |          |          |
12+45       0.0252      0.04  Q        V|          |          |          |
12+50       0.0255      0.04  Q        V|          |          |          |
12+55       0.0258      0.04  Q        V|          |          |          |
13+ 0       0.0261      0.04  Q         V          |          |          |
13+ 5       0.0264      0.04  Q         V          |          |          |
13+10       0.0267      0.05  Q         V          |          |          |
13+15       0.0270      0.05  Q         V          |          |          |
13+20       0.0274      0.05  Q         V          |          |          |
13+25       0.0277      0.05  Q         V          |          |          |
13+30       0.0280      0.05  Q         V          |          |          |
13+35       0.0284      0.05  Q         V          |          |          |
13+40       0.0287      0.05  Q         |V         |          |          |
13+45       0.0291      0.05  Q         |V         |          |          |
13+50       0.0294      0.05  Q         |V         |          |          |
13+55       0.0298      0.05  Q         |V         |          |          |
14+ 0       0.0302      0.06  Q         |V         |          |          |
14+ 5       0.0306      0.06  Q         |V         |          |          |
14+10       0.0310      0.06  Q         |V         |          |          |
14+15       0.0314      0.06  Q         | V        |          |          |
14+20       0.0318      0.06  Q         | V        |          |          |
14+25       0.0323      0.06  Q         | V        |          |          |
14+30       0.0327      0.07  Q         | V        |          |          |
14+35       0.0332      0.07  Q         | V        |          |          |
14+40       0.0337      0.07  Q         | V        |          |          |
14+45       0.0342      0.07  Q         |  V       |          |          |
14+50       0.0347      0.08  Q         |  V       |          |          |
14+55       0.0353      0.08  Q         |  V       |          |          |
15+ 0       0.0358      0.08  Q         |  V       |          |          |
15+ 5       0.0364      0.09  Q         |  V       |          |          |
15+10       0.0371      0.09  Q         |   V      |          |          |
15+15       0.0377      0.10  Q         |   V      |          |          |
15+20       0.0385      0.10  Q         |   V      |          |          |
15+25       0.0393      0.12  Q         |    V     |          |          |
15+30       0.0403      0.14  Q         |    V     |          |          |
15+35       0.0413      0.15  Q         |    V     |          |          |
15+40       0.0424      0.16  Q         |     V    |          |          |
15+45       0.0438      0.19  Q         |     V    |          |          |
15+50       0.0453      0.22  Q         |      V   |          |          |
```

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15+55       0.0484      0.46  |Q         |        V |          |          |
16+ 0       0.0541      0.82  |  Q       |          V          |          |
16+ 5       0.0733      2.79  |          |Q         |        V |          |
16+10       0.0816      1.21  |   Q      |          |          |V         |
16+15       0.0832      0.23  Q          |          |          |V         |
16+20       0.0843      0.16  Q          |          |          | V        |
16+25       0.0851      0.12  Q          |          |          | V        |
16+30       0.0858      0.10  Q          |          |          | V        |
16+35       0.0864      0.09  Q          |          |          |  V       |
16+40       0.0870      0.08  Q          |          |          |  V       |
16+45       0.0875      0.07  Q          |          |          |  V       |
16+50       0.0879      0.07  Q          |          |          |  V       |
16+55       0.0884      0.06  Q          |          |          |  V       |
17+ 0       0.0888      0.06  Q          |          |          |   V      |
17+ 5       0.0892      0.06  Q          |          |          |   V      |
17+10       0.0896      0.05  Q          |          |          |   V      |
17+15       0.0899      0.05  Q          |          |          |   V      |
17+20       0.0903      0.05  Q          |          |          |   V      |
17+25       0.0906      0.05  Q          |          |          |   V      |
17+30       0.0909      0.05  Q          |          |          |   V      |
17+35       0.0913      0.04  Q          |          |          |    V     |
17+40       0.0916      0.04  Q          |          |          |    V     |
17+45       0.0918      0.04  Q          |          |          |    V     |
17+50       0.0921      0.04  Q          |          |          |    V     |
17+55       0.0924      0.04  Q          |          |          |    V     |
18+ 0       0.0927      0.04  Q          |          |          |    V     |
18+ 5       0.0929      0.04  Q          |          |          |    V     |
18+10       0.0932      0.04  Q          |          |          |    V     |
18+15       0.0934      0.04  Q          |          |          |    V     |
18+20       0.0937      0.04  Q          |          |          |    V     |
18+25       0.0939      0.03  Q          |          |          |     V    |
18+30       0.0941      0.03  Q          |          |          |     V    |
18+35       0.0944      0.03  Q          |          |          |     V    |
18+40       0.0946      0.03  Q          |          |          |     V    |
18+45       0.0948      0.03  Q          |          |          |     V    |
18+50       0.0950      0.03  Q          |          |          |     V    |
18+55       0.0952      0.03  Q          |          |          |     V    |
19+ 0       0.0954      0.03  Q          |          |          |     V    |
19+ 5       0.0956      0.03  Q          |          |          |     V    |
19+10       0.0958      0.03  Q          |          |          |     V    |
19+15       0.0960      0.03  Q          |          |          |     V    |
19+20       0.0962      0.03  Q          |          |          |     V    |
19+25       0.0964      0.03  Q          |          |          |      V   |
19+30       0.0966      0.03  Q          |          |          |      V   |
19+35       0.0968      0.03  Q          |          |          |      V   |
19+40       0.0970      0.03  Q          |          |          |      V   |
19+45       0.0971      0.03  Q          |          |          |      V   |
19+50       0.0973      0.03  Q          |          |          |      V   |
19+55       0.0975      0.03  Q          |          |          |      V   |
20+ 0       0.0977      0.02  Q          |          |          |      V   |
20+ 5       0.0978      0.02  Q          |          |          |      V   |
20+10       0.0980      0.02  Q          |          |          |      V   |
20+15       0.0982      0.02  Q          |          |          |      V   |
20+20       0.0983      0.02  Q          |          |          |      V   |
20+25       0.0985      0.02  Q          |          |          |      V   |
20+30       0.0987      0.02  Q          |          |          |      V   |
20+35       0.0988      0.02  Q          |          |          |      V   |
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   20+40       0.0990      0.02  Q          |          |          |       V  |
   20+45       0.0991      0.02  Q          |          |          |        V |
   20+50       0.0993      0.02  Q          |          |          |        V |
   20+55       0.0994      0.02  Q          |          |          |        V |
   21+ 0       0.0996      0.02  Q          |          |          |        V |
   21+ 5       0.0997      0.02  Q          |          |          |        V |
   21+10       0.0999      0.02  Q          |          |          |        V |
   21+15       0.1000      0.02  Q          |          |          |        V |
   21+20       0.1002      0.02  Q          |          |          |        V |
   21+25       0.1003      0.02  Q          |          |          |        V |
   21+30       0.1005      0.02  Q          |          |          |        V |
   21+35       0.1006      0.02  Q          |          |          |        V |
   21+40       0.1007      0.02  Q          |          |          |        V |
   21+45       0.1009      0.02  Q          |          |          |        V |
   21+50       0.1010      0.02  Q          |          |          |        V |
   21+55       0.1011      0.02  Q          |          |          |        V |
   22+ 0       0.1013      0.02  Q          |          |          |        V |
   22+ 5       0.1014      0.02  Q          |          |          |        V |
   22+10       0.1015      0.02  Q          |          |          |        V |
   22+15       0.1017      0.02  Q          |          |          |         V|
   22+20       0.1018      0.02  Q          |          |          |         V|
   22+25       0.1019      0.02  Q          |          |          |         V|
   22+30       0.1021      0.02  Q          |          |          |         V|
   22+35       0.1022      0.02  Q          |          |          |         V|
   22+40       0.1023      0.02  Q          |          |          |         V|
   22+45       0.1024      0.02  Q          |          |          |         V|
   22+50       0.1026      0.02  Q          |          |          |         V|
   22+55       0.1027      0.02  Q          |          |          |         V|
   23+ 0       0.1028      0.02  Q          |          |          |         V|
   23+ 5       0.1029      0.02  Q          |          |          |         V|
   23+10       0.1030      0.02  Q          |          |          |         V|
   23+15       0.1032      0.02  Q          |          |          |         V|
   23+20       0.1033      0.02  Q          |          |          |         V|
   23+25       0.1034      0.02  Q          |          |          |         V|
   23+30       0.1035      0.02  Q          |          |          |         V|
   23+35       0.1036      0.02  Q          |          |          |         V|
   23+40       0.1037      0.02  Q          |          |          |         V|
   23+45       0.1039      0.02  Q          |          |          |         V|
   23+50       0.1040      0.02  Q          |          |          |         V|
   23+55       0.1041      0.02  Q          |          |          |         V|
   24+ 0       0.1042      0.02  Q          |          |          |         V|
   24+ 5       0.1042      0.00  Q          |          |          |         V|
-------------------------------------------------------------------------------
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U n i t H y d r o g r a p h A n a l y s i s

Copyright (c) CIVILCADD/CIVILDESIGN, 2004, Version 7.0

Study date 05/15/15

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Kern County Synthetic Unit Hydrograph Hydrology Method
Manual date - 1992

Program License Serial Number 6226

AREA G
100-YEAR EVENT
HYDROLOGY STUDY
JOHE RANCH/GF INDUSTRIES

Storm Event Year = 100

English (in-lb) Input Units Used

English Rainfall Data (Inches) Input Values Used

English Units used in output format

RAINFALL DATA INPUT:
Slope of Intensity-Duration Curve Slope = 0.550

Zone Designation: Coast Ranges Latitude = 35.33

Area averaged rainfall intensity isohyetal data:

Sub-Area (Ac.)	Duration (hours)	Isohyetal (In)
Rainfall data for year 2		
1.00	6	0.82
Rainfall data for year 2		
1.00	24	1.37
Rainfall data for year 100		
1.00	6	2.34
Rainfall data for year 100		
1.00	24	4.04

++

COAST RANGES area of study
Log-Log Rainfall Intensity Slope = 0.55

******** Area-averaged max loss rate, Fm ********

SCS curve Number	Area (Ac.)	Area Fraction	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
69.0	1.00	1.000	0.566	1.000	0.566

Area-averaged adjusted loss rate Fm (In/Hr) = 0.566

********* Area-Averaged low loss rate fraction, Yb **********

Area (Ac.)	Area Fract	SCS CN (AMC2)	S	Pervious Yield Fr
1.00	1.000	69.0	4.49	0.320

Area-averaged catchment yield fraction, Y = 0.320
Area-averaged low loss fraction, Yb = 0.680
++
Watercourse length = 215.00(Ft.)
Length from concentration point to centroid = 120.00(Ft.)
Elevation difference along watercourse = 55.00(Ft.)
Mannings friction factor along watercourse = 0.040
Watershed area = 1.00(Ac.)
Catchment Lag time = 0.017 hours
Unit interval = 5.000 minutes
Unit interval percentage of lag time = 485.4448
Hydrograph baseflow = 0.00(CFS)
Average maximum watershed loss rate(Fm) = 0.566(In/Hr)
Average low loss rate fraction (Yb) = 0.680 (decimal)
FOOTHILL S-Graph Selected
Computed peak 5-minute rainfall = 0.384(In)
Computed peak 30-minute rainfall = 0.860(In)
Specified peak 1-hour rainfall = 1.175(In)
Computed peak 3-hour rainfall = 1.793(In)
Specified peak 6-hour rainfall = 2.340(In)
Specified peak 24-hour rainfall = 4.040(In)

Rainfall depth area reduction factors:
Using a total area of 1.00(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000 Adjusted rainfall = 0.384(In)
30-minute factor = 1.000 Adjusted rainfall = 0.860(In)
1-hour factor = 1.000 Adjusted rainfall = 1.175(In)
3-hour factor = 1.000 Adjusted rainfall = 1.793(In)
6-hour factor = 1.000 Adjusted rainfall = 2.340(In)
24-hour factor = 1.000 Adjusted rainfall = 4.040(In)

U n i t H y d r o g r a p h
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Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))

(K = 12.09 (CFS))

1	72.641	8.785
2	100.000	3.309

Rainfall values calculated at 5 minute intervals:

Peak Rainfall Unit Number	Intensity	Depth	Adjusted	Unit Rainfall (In)
1	4.61	0.38	0.38	0.384
2	3.15	0.52	0.52	0.141
3	2.52	0.63	0.63	0.105
4	2.15	0.72	0.72	0.087
5	1.90	0.79	0.79	0.076
6	1.72	0.86	0.86	0.068
7	1.58	0.92	0.92	0.062
8	1.47	0.98	0.98	0.057
9	1.38	1.03	1.03	0.053
10	1.30	1.08	1.08	0.050
11	1.23	1.13	1.13	0.047
12	1.17	1.17	1.17	0.045
13	1.12	1.21	1.21	0.037
14	1.07	1.25	1.25	0.035
15	1.02	1.28	1.28	0.034
16	0.98	1.31	1.31	0.032
17	0.95	1.34	1.34	0.031
18	0.92	1.37	1.37	0.030
19	0.89	1.40	1.40	0.029
20	0.86	1.43	1.43	0.028
21	0.83	1.46	1.46	0.027
22	0.81	1.48	1.48	0.026
23	0.79	1.51	1.51	0.026
24	0.77	1.53	1.53	0.025
25	0.75	1.56	1.56	0.024
26	0.73	1.58	1.58	0.024
27	0.71	1.60	1.60	0.023
28	0.70	1.63	1.63	0.023
29	0.68	1.65	1.65	0.022
30	0.67	1.67	1.67	0.022
31	0.66	1.69	1.69	0.021
32	0.64	1.71	1.71	0.021
33	0.63	1.73	1.73	0.020
34	0.62	1.75	1.75	0.020
35	0.61	1.77	1.77	0.020
36	0.60	1.79	1.79	0.019
37	0.59	1.81	1.81	0.019
38	0.58	1.83	1.83	0.019
39	0.57	1.85	1.85	0.018
40	0.56	1.87	1.87	0.018
41	0.55	1.88	1.88	0.018
42	0.54	1.90	1.90	0.018
43	0.54	1.92	1.92	0.017
44	0.53	1.94	1.94	0.017
45	0.52	1.95	1.95	0.017
46	0.51	1.97	1.97	0.017
47	0.51	1.99	1.99	0.016
48	0.50	2.00	2.00	0.016

49	0.49	2.02	2.02	0.016
50	0.49	2.03	2.03	0.016
51	0.48	2.05	2.05	0.016
52	0.48	2.06	2.06	0.015
53	0.47	2.08	2.08	0.015
54	0.47	2.09	2.09	0.015
55	0.46	2.11	2.11	0.015
56	0.46	2.12	2.12	0.015
57	0.45	2.14	2.14	0.015
58	0.45	2.15	2.15	0.014
59	0.44	2.17	2.17	0.014
60	0.44	2.18	2.18	0.014
61	0.43	2.20	2.20	0.014
62	0.43	2.21	2.21	0.014
63	0.42	2.22	2.22	0.014
64	0.42	2.24	2.24	0.014
65	0.42	2.25	2.25	0.013
66	0.41	2.26	2.26	0.013
67	0.41	2.28	2.28	0.013
68	0.40	2.29	2.29	0.013
69	0.40	2.30	2.30	0.013
70	0.40	2.31	2.31	0.013
71	0.39	2.33	2.33	0.013
72	0.39	2.34	2.34	0.013
73	0.39	2.35	2.35	0.013
74	0.38	2.37	2.37	0.013
75	0.38	2.38	2.38	0.013
76	0.38	2.39	2.39	0.012
77	0.37	2.40	2.40	0.012
78	0.37	2.41	2.41	0.012
79	0.37	2.43	2.43	0.012
80	0.37	2.44	2.44	0.012
81	0.36	2.45	2.45	0.012
82	0.36	2.46	2.46	0.012
83	0.36	2.47	2.47	0.012
84	0.36	2.49	2.49	0.012
85	0.35	2.50	2.50	0.012
86	0.35	2.51	2.51	0.012
87	0.35	2.52	2.52	0.011
88	0.35	2.53	2.53	0.011
89	0.34	2.54	2.54	0.011
90	0.34	2.55	2.55	0.011
91	0.34	2.57	2.57	0.011
92	0.34	2.58	2.58	0.011
93	0.33	2.59	2.59	0.011
94	0.33	2.60	2.60	0.011
95	0.33	2.61	2.61	0.011
96	0.33	2.62	2.62	0.011
97	0.33	2.63	2.63	0.011
98	0.32	2.64	2.64	0.011
99	0.32	2.65	2.65	0.011
100	0.32	2.66	2.66	0.011
101	0.32	2.67	2.67	0.010
102	0.32	2.68	2.68	0.010
103	0.31	2.69	2.69	0.010
104	0.31	2.70	2.70	0.010
105	0.31	2.71	2.71	0.010

106	0.31	2.73	2.73	0.010
107	0.31	2.74	2.74	0.010
108	0.31	2.75	2.75	0.010
109	0.30	2.76	2.76	0.010
110	0.30	2.77	2.77	0.010
111	0.30	2.78	2.78	0.010
112	0.30	2.78	2.78	0.010
113	0.30	2.79	2.79	0.010
114	0.30	2.80	2.80	0.010
115	0.29	2.81	2.81	0.010
116	0.29	2.82	2.82	0.010
117	0.29	2.83	2.83	0.010
118	0.29	2.84	2.84	0.010
119	0.29	2.85	2.85	0.009
120	0.29	2.86	2.86	0.009
121	0.28	2.87	2.87	0.009
122	0.28	2.88	2.88	0.009
123	0.28	2.89	2.89	0.009
124	0.28	2.90	2.90	0.009
125	0.28	2.91	2.91	0.009
126	0.28	2.92	2.92	0.009
127	0.28	2.93	2.93	0.009
128	0.28	2.94	2.94	0.009
129	0.27	2.94	2.94	0.009
130	0.27	2.95	2.95	0.009
131	0.27	2.96	2.96	0.009
132	0.27	2.97	2.97	0.009
133	0.27	2.98	2.98	0.009
134	0.27	2.99	2.99	0.009
135	0.27	3.00	3.00	0.009
136	0.27	3.01	3.01	0.009
137	0.26	3.01	3.01	0.009
138	0.26	3.02	3.02	0.009
139	0.26	3.03	3.03	0.009
140	0.26	3.04	3.04	0.009
141	0.26	3.05	3.05	0.009
142	0.26	3.06	3.06	0.009
143	0.26	3.07	3.07	0.008
144	0.26	3.07	3.07	0.008
145	0.26	3.08	3.08	0.008
146	0.25	3.09	3.09	0.008
147	0.25	3.10	3.10	0.008
148	0.25	3.11	3.11	0.008
149	0.25	3.12	3.12	0.008
150	0.25	3.12	3.12	0.008
151	0.25	3.13	3.13	0.008
152	0.25	3.14	3.14	0.008
153	0.25	3.15	3.15	0.008
154	0.25	3.16	3.16	0.008
155	0.25	3.17	3.17	0.008
156	0.24	3.17	3.17	0.008
157	0.24	3.18	3.18	0.008
158	0.24	3.19	3.19	0.008
159	0.24	3.20	3.20	0.008
160	0.24	3.20	3.20	0.008
161	0.24	3.21	3.21	0.008
162	0.24	3.22	3.22	0.008

163	0.24	3.23	3.23	0.008
164	0.24	3.24	3.24	0.008
165	0.24	3.24	3.24	0.008
166	0.24	3.25	3.25	0.008
167	0.23	3.26	3.26	0.008
168	0.23	3.27	3.27	0.008
169	0.23	3.27	3.27	0.008
170	0.23	3.28	3.28	0.008
171	0.23	3.29	3.29	0.008
172	0.23	3.30	3.30	0.008
173	0.23	3.31	3.31	0.008
174	0.23	3.31	3.31	0.008
175	0.23	3.32	3.32	0.007
176	0.23	3.33	3.33	0.007
177	0.23	3.34	3.34	0.007
178	0.23	3.34	3.34	0.007
179	0.22	3.35	3.35	0.007
180	0.22	3.36	3.36	0.007
181	0.22	3.36	3.36	0.007
182	0.22	3.37	3.37	0.007
183	0.22	3.38	3.38	0.007
184	0.22	3.39	3.39	0.007
185	0.22	3.39	3.39	0.007
186	0.22	3.40	3.40	0.007
187	0.22	3.41	3.41	0.007
188	0.22	3.42	3.42	0.007
189	0.22	3.42	3.42	0.007
190	0.22	3.43	3.43	0.007
191	0.22	3.44	3.44	0.007
192	0.22	3.44	3.44	0.007
193	0.21	3.45	3.45	0.007
194	0.21	3.46	3.46	0.007
195	0.21	3.46	3.46	0.007
196	0.21	3.47	3.47	0.007
197	0.21	3.48	3.48	0.007
198	0.21	3.49	3.49	0.007
199	0.21	3.49	3.49	0.007
200	0.21	3.50	3.50	0.007
201	0.21	3.51	3.51	0.007
202	0.21	3.51	3.51	0.007
203	0.21	3.52	3.52	0.007
204	0.21	3.53	3.53	0.007
205	0.21	3.53	3.53	0.007
206	0.21	3.54	3.54	0.007
207	0.21	3.55	3.55	0.007
208	0.21	3.55	3.55	0.007
209	0.20	3.56	3.56	0.007
210	0.20	3.57	3.57	0.007
211	0.20	3.57	3.57	0.007
212	0.20	3.58	3.58	0.007
213	0.20	3.59	3.59	0.007
214	0.20	3.59	3.59	0.007
215	0.20	3.60	3.60	0.007
216	0.20	3.61	3.61	0.007
217	0.20	3.61	3.61	0.007
218	0.20	3.62	3.62	0.007
219	0.20	3.63	3.63	0.007

220	0.20	3.63	3.63	0.007
221	0.20	3.64	3.64	0.006
222	0.20	3.65	3.65	0.006
223	0.20	3.65	3.65	0.006
224	0.20	3.66	3.66	0.006
225	0.20	3.67	3.67	0.006
226	0.19	3.67	3.67	0.006
227	0.19	3.68	3.68	0.006
228	0.19	3.68	3.68	0.006
229	0.19	3.69	3.69	0.006
230	0.19	3.70	3.70	0.006
231	0.19	3.70	3.70	0.006
232	0.19	3.71	3.71	0.006
233	0.19	3.72	3.72	0.006
234	0.19	3.72	3.72	0.006
235	0.19	3.73	3.73	0.006
236	0.19	3.74	3.74	0.006
237	0.19	3.74	3.74	0.006
238	0.19	3.75	3.75	0.006
239	0.19	3.75	3.75	0.006
240	0.19	3.76	3.76	0.006
241	0.19	3.77	3.77	0.006
242	0.19	3.77	3.77	0.006
243	0.19	3.78	3.78	0.006
244	0.19	3.78	3.78	0.006
245	0.19	3.79	3.79	0.006
246	0.19	3.80	3.80	0.006
247	0.18	3.80	3.80	0.006
248	0.18	3.81	3.81	0.006
249	0.18	3.81	3.81	0.006
250	0.18	3.82	3.82	0.006
251	0.18	3.83	3.83	0.006
252	0.18	3.83	3.83	0.006
253	0.18	3.84	3.84	0.006
254	0.18	3.84	3.84	0.006
255	0.18	3.85	3.85	0.006
256	0.18	3.86	3.86	0.006
257	0.18	3.86	3.86	0.006
258	0.18	3.87	3.87	0.006
259	0.18	3.87	3.87	0.006
260	0.18	3.88	3.88	0.006
261	0.18	3.89	3.89	0.006
262	0.18	3.89	3.89	0.006
263	0.18	3.90	3.90	0.006
264	0.18	3.90	3.90	0.006
265	0.18	3.91	3.91	0.006
266	0.18	3.92	3.92	0.006
267	0.18	3.92	3.92	0.006
268	0.18	3.93	3.93	0.006
269	0.18	3.93	3.93	0.006
270	0.18	3.94	3.94	0.006
271	0.17	3.94	3.94	0.006
272	0.17	3.95	3.95	0.006
273	0.17	3.96	3.96	0.006
274	0.17	3.96	3.96	0.006
275	0.17	3.97	3.97	0.006
276	0.17	3.97	3.97	0.006

277	0.17	3.98	3.98	0.006
278	0.17	3.98	3.98	0.006
279	0.17	3.99	3.99	0.006
280	0.17	4.00	4.00	0.006
281	0.17	4.00	4.00	0.006
282	0.17	4.01	4.01	0.006
283	0.17	4.01	4.01	0.006
284	0.17	4.02	4.02	0.006
285	0.17	4.02	4.02	0.006
286	0.17	4.03	4.03	0.006
287	0.17	4.03	4.03	0.006
288	0.17	4.04	4.04	0.006

Time = 24.00 Hours Total unit rainfall = 4.04(In)

Unit Period (number)	Unit Rainfall (In)	Unit Soil-Loss (In)	Effective Rainfall (In)
1	0.0055	0.0038	0.0018
2	0.0055	0.0038	0.0018
3	0.0056	0.0038	0.0018
4	0.0056	0.0038	0.0018
5	0.0056	0.0038	0.0018
6	0.0056	0.0038	0.0018
7	0.0056	0.0038	0.0018
8	0.0057	0.0038	0.0018
9	0.0057	0.0039	0.0018
10	0.0057	0.0039	0.0018
11	0.0057	0.0039	0.0018
12	0.0057	0.0039	0.0018
13	0.0058	0.0039	0.0018
14	0.0058	0.0039	0.0018
15	0.0058	0.0039	0.0019
16	0.0058	0.0039	0.0019
17	0.0058	0.0040	0.0019
18	0.0058	0.0040	0.0019
19	0.0059	0.0040	0.0019
20	0.0059	0.0040	0.0019
21	0.0059	0.0040	0.0019
22	0.0059	0.0040	0.0019
23	0.0060	0.0041	0.0019
24	0.0060	0.0041	0.0019
25	0.0060	0.0041	0.0019
26	0.0060	0.0041	0.0019
27	0.0060	0.0041	0.0019
28	0.0061	0.0041	0.0019
29	0.0061	0.0041	0.0019
30	0.0061	0.0041	0.0020
31	0.0061	0.0042	0.0020
32	0.0061	0.0042	0.0020
33	0.0062	0.0042	0.0020
34	0.0062	0.0042	0.0020
35	0.0062	0.0042	0.0020
36	0.0062	0.0042	0.0020
37	0.0063	0.0043	0.0020
38	0.0063	0.0043	0.0020
39	0.0063	0.0043	0.0020

40	0.0063	0.0043	0.0020
41	0.0064	0.0043	0.0020
42	0.0064	0.0043	0.0020
43	0.0064	0.0044	0.0021
44	0.0064	0.0044	0.0021
45	0.0065	0.0044	0.0021
46	0.0065	0.0044	0.0021
47	0.0065	0.0044	0.0021
48	0.0066	0.0045	0.0021
49	0.0066	0.0045	0.0021
50	0.0066	0.0045	0.0021
51	0.0066	0.0045	0.0021
52	0.0067	0.0045	0.0021
53	0.0067	0.0046	0.0021
54	0.0067	0.0046	0.0022
55	0.0068	0.0046	0.0022
56	0.0068	0.0046	0.0022
57	0.0068	0.0046	0.0022
58	0.0068	0.0047	0.0022
59	0.0069	0.0047	0.0022
60	0.0069	0.0047	0.0022
61	0.0069	0.0047	0.0022
62	0.0070	0.0047	0.0022
63	0.0070	0.0048	0.0022
64	0.0070	0.0048	0.0023
65	0.0071	0.0048	0.0023
66	0.0071	0.0048	0.0023
67	0.0071	0.0049	0.0023
68	0.0072	0.0049	0.0023
69	0.0072	0.0049	0.0023
70	0.0072	0.0049	0.0023
71	0.0073	0.0050	0.0023
72	0.0073	0.0050	0.0023
73	0.0074	0.0050	0.0024
74	0.0074	0.0050	0.0024
75	0.0074	0.0051	0.0024
76	0.0075	0.0051	0.0024
77	0.0075	0.0051	0.0024
78	0.0075	0.0051	0.0024
79	0.0076	0.0052	0.0024
80	0.0076	0.0052	0.0024
81	0.0077	0.0052	0.0025
82	0.0077	0.0052	0.0025
83	0.0078	0.0053	0.0025
84	0.0078	0.0053	0.0025
85	0.0078	0.0053	0.0025
86	0.0079	0.0054	0.0025
87	0.0079	0.0054	0.0025
88	0.0080	0.0054	0.0025
89	0.0080	0.0055	0.0026
90	0.0081	0.0055	0.0026
91	0.0081	0.0055	0.0026
92	0.0082	0.0055	0.0026
93	0.0082	0.0056	0.0026
94	0.0083	0.0056	0.0026
95	0.0083	0.0057	0.0027
96	0.0084	0.0057	0.0027

97	0.0084	0.0057	0.0027
98	0.0085	0.0058	0.0027
99	0.0085	0.0058	0.0027
100	0.0086	0.0058	0.0027
101	0.0086	0.0059	0.0028
102	0.0087	0.0059	0.0028
103	0.0088	0.0060	0.0028
104	0.0088	0.0060	0.0028
105	0.0089	0.0060	0.0028
106	0.0089	0.0061	0.0029
107	0.0090	0.0061	0.0029
108	0.0091	0.0062	0.0029
109	0.0091	0.0062	0.0029
110	0.0092	0.0062	0.0029
111	0.0093	0.0063	0.0030
112	0.0093	0.0063	0.0030
113	0.0094	0.0064	0.0030
114	0.0095	0.0064	0.0030
115	0.0096	0.0065	0.0031
116	0.0096	0.0065	0.0031
117	0.0097	0.0066	0.0031
118	0.0098	0.0066	0.0031
119	0.0099	0.0067	0.0032
120	0.0099	0.0068	0.0032
121	0.0100	0.0068	0.0032
122	0.0101	0.0069	0.0032
123	0.0102	0.0069	0.0033
124	0.0103	0.0070	0.0033
125	0.0104	0.0071	0.0033
126	0.0105	0.0071	0.0033
127	0.0106	0.0072	0.0034
128	0.0107	0.0072	0.0034
129	0.0108	0.0073	0.0035
130	0.0109	0.0074	0.0035
131	0.0110	0.0075	0.0035
132	0.0111	0.0075	0.0035
133	0.0112	0.0076	0.0036
134	0.0113	0.0077	0.0036
135	0.0115	0.0078	0.0037
136	0.0115	0.0078	0.0037
137	0.0117	0.0080	0.0037
138	0.0118	0.0080	0.0038
139	0.0120	0.0081	0.0038
140	0.0121	0.0082	0.0039
141	0.0122	0.0083	0.0039
142	0.0123	0.0084	0.0039
143	0.0125	0.0085	0.0040
144	0.0126	0.0086	0.0040
145	0.0126	0.0085	0.0040
146	0.0127	0.0086	0.0041
147	0.0129	0.0088	0.0041
148	0.0130	0.0088	0.0042
149	0.0132	0.0090	0.0042
150	0.0134	0.0091	0.0043
151	0.0136	0.0093	0.0044
152	0.0138	0.0094	0.0044
153	0.0141	0.0096	0.0045

154	0.0142	0.0097	0.0045
155	0.0145	0.0099	0.0046
156	0.0147	0.0100	0.0047
157	0.0150	0.0102	0.0048
158	0.0152	0.0103	0.0049
159	0.0155	0.0106	0.0050
160	0.0157	0.0107	0.0050
161	0.0161	0.0110	0.0052
162	0.0164	0.0111	0.0052
163	0.0168	0.0114	0.0054
164	0.0170	0.0116	0.0055
165	0.0175	0.0119	0.0056
166	0.0178	0.0121	0.0057
167	0.0184	0.0125	0.0059
168	0.0187	0.0127	0.0060
169	0.0193	0.0131	0.0062
170	0.0197	0.0134	0.0063
171	0.0204	0.0139	0.0065
172	0.0208	0.0141	0.0067
173	0.0216	0.0147	0.0069
174	0.0221	0.0150	0.0071
175	0.0231	0.0157	0.0074
176	0.0237	0.0161	0.0076
177	0.0249	0.0169	0.0080
178	0.0256	0.0174	0.0082
179	0.0271	0.0184	0.0087
180	0.0279	0.0190	0.0089
181	0.0299	0.0203	0.0096
182	0.0310	0.0210	0.0099
183	0.0335	0.0228	0.0107
184	0.0350	0.0238	0.0112
185	0.0451	0.0307	0.0144
186	0.0474	0.0323	0.0152
187	0.0533	0.0362	0.0171
188	0.0571	0.0388	0.0183
189	0.0677	0.0461	0.0217
190	0.0757	0.0472*	0.0285
191	0.1050	0.0472*	0.0578
192	0.1406	0.0472*	0.0934
193	0.3840	0.0472*	0.3369
194	0.0870	0.0472*	0.0399
195	0.0618	0.0420	0.0198
196	0.0501	0.0341	0.0160
197	0.0367	0.0250	0.0118
198	0.0322	0.0219	0.0103
199	0.0288	0.0196	0.0092
200	0.0263	0.0179	0.0084
201	0.0243	0.0165	0.0078
202	0.0226	0.0154	0.0072
203	0.0212	0.0144	0.0068
204	0.0200	0.0136	0.0064
205	0.0190	0.0129	0.0061
206	0.0181	0.0123	0.0058
207	0.0173	0.0118	0.0055
208	0.0166	0.0113	0.0053
209	0.0159	0.0108	0.0051
210	0.0154	0.0104	0.0049

211	0.0148	0.0101	0.0047
212	0.0144	0.0098	0.0046
213	0.0139	0.0095	0.0045
214	0.0135	0.0092	0.0043
215	0.0131	0.0089	0.0042
216	0.0128	0.0087	0.0041
217	0.0127	0.0087	0.0041
218	0.0124	0.0085	0.0040
219	0.0121	0.0083	0.0039
220	0.0119	0.0081	0.0038
221	0.0116	0.0079	0.0037
222	0.0114	0.0077	0.0036
223	0.0111	0.0076	0.0036
224	0.0109	0.0074	0.0035
225	0.0107	0.0073	0.0034
226	0.0105	0.0072	0.0034
227	0.0103	0.0070	0.0033
228	0.0102	0.0069	0.0032
229	0.0100	0.0068	0.0032
230	0.0098	0.0067	0.0031
231	0.0097	0.0066	0.0031
232	0.0095	0.0065	0.0030
233	0.0094	0.0064	0.0030
234	0.0092	0.0063	0.0030
235	0.0091	0.0062	0.0029
236	0.0090	0.0061	0.0029
237	0.0088	0.0060	0.0028
238	0.0087	0.0059	0.0028
239	0.0086	0.0059	0.0028
240	0.0085	0.0058	0.0027
241	0.0084	0.0057	0.0027
242	0.0083	0.0056	0.0027
243	0.0082	0.0056	0.0026
244	0.0081	0.0055	0.0026
245	0.0080	0.0054	0.0026
246	0.0079	0.0054	0.0025
247	0.0078	0.0053	0.0025
248	0.0077	0.0053	0.0025
249	0.0076	0.0052	0.0024
250	0.0076	0.0051	0.0024
251	0.0075	0.0051	0.0024
252	0.0074	0.0050	0.0024
253	0.0073	0.0050	0.0023
254	0.0073	0.0049	0.0023
255	0.0072	0.0049	0.0023
256	0.0071	0.0048	0.0023
257	0.0071	0.0048	0.0023
258	0.0070	0.0048	0.0022
259	0.0069	0.0047	0.0022
260	0.0069	0.0047	0.0022
261	0.0068	0.0046	0.0022
262	0.0067	0.0046	0.0022
263	0.0067	0.0045	0.0021
264	0.0066	0.0045	0.0021
265	0.0066	0.0045	0.0021
266	0.0065	0.0044	0.0021
267	0.0065	0.0044	0.0021

268	0.0064	0.0044	0.0021
269	0.0064	0.0043	0.0020
270	0.0063	0.0043	0.0020
271	0.0063	0.0043	0.0020
272	0.0062	0.0042	0.0020
273	0.0062	0.0042	0.0020
274	0.0061	0.0042	0.0020
275	0.0061	0.0041	0.0019
276	0.0060	0.0041	0.0019
277	0.0060	0.0041	0.0019
278	0.0059	0.0040	0.0019
279	0.0059	0.0040	0.0019
280	0.0059	0.0040	0.0019
281	0.0058	0.0040	0.0019
282	0.0058	0.0039	0.0018
283	0.0057	0.0039	0.0018
284	0.0057	0.0039	0.0018
285	0.0057	0.0039	0.0018
286	0.0056	0.0038	0.0018
287	0.0056	0.0038	0.0018
288	0.0056	0.0038	0.0018
	4.0400	2.4443	1.5957

Total soil rain loss = 2.44(In)
Total effective rainfall = 1.60(In)
Peak flow rate in flood hydrograph = 3.27(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q				
0+10	0.0003	0.02	Q				
0+15	0.0004	0.02	Q				
0+20	0.0006	0.02	Q				
0+25	0.0007	0.02	Q				
0+30	0.0009	0.02	Q				
0+35	0.0010	0.02	Q				
0+40	0.0012	0.02	Q				
0+45	0.0013	0.02	Q				
0+50	0.0015	0.02	Q				
0+55	0.0016	0.02	Q				
1+ 0	0.0018	0.02	Q				
1+ 5	0.0019	0.02	Q				
1+10	0.0021	0.02	Q				
1+15	0.0022	0.02	Q				
1+20	0.0024	0.02	Q				
1+25	0.0025	0.02	Q				
1+30	0.0027	0.02	Q				
1+35	0.0028	0.02	Q				

1+40	0.0030	0.02	Q				
1+45	0.0032	0.02	Q				
1+50	0.0033	0.02	Q				
1+55	0.0035	0.02	QV				
2+ 0	0.0036	0.02	QV				
2+ 5	0.0038	0.02	QV				
2+10	0.0040	0.02	QV				
2+15	0.0041	0.02	QV				
2+20	0.0043	0.02	QV				
2+25	0.0044	0.02	QV				
2+30	0.0046	0.02	QV				
2+35	0.0048	0.02	QV				
2+40	0.0049	0.02	QV				
2+45	0.0051	0.02	QV				
2+50	0.0053	0.02	QV				
2+55	0.0054	0.02	QV				
3+ 0	0.0056	0.02	QV				
3+ 5	0.0058	0.02	QV				
3+10	0.0059	0.02	QV				
3+15	0.0061	0.02	QV				
3+20	0.0063	0.02	QV				
3+25	0.0064	0.02	QV				
3+30	0.0066	0.02	QV				
3+35	0.0068	0.02	Q V				
3+40	0.0069	0.02	Q V				
3+45	0.0071	0.03	Q V				
3+50	0.0073	0.03	Q V				
3+55	0.0075	0.03	Q V				
4+ 0	0.0076	0.03	Q V				
4+ 5	0.0078	0.03	Q V				
4+10	0.0080	0.03	Q V				
4+15	0.0082	0.03	Q V				
4+20	0.0083	0.03	Q V				
4+25	0.0085	0.03	Q V				
4+30	0.0087	0.03	Q V				
4+35	0.0089	0.03	Q V				
4+40	0.0091	0.03	Q V				
4+45	0.0092	0.03	Q V				
4+50	0.0094	0.03	Q V				
4+55	0.0096	0.03	Q V				
5+ 0	0.0098	0.03	Q V				
5+ 5	0.0100	0.03	Q V				
5+10	0.0102	0.03	Q V				
5+15	0.0103	0.03	Q V				
5+20	0.0105	0.03	Q V				
5+25	0.0107	0.03	Q V				
5+30	0.0109	0.03	Q V				
5+35	0.0111	0.03	Q V				
5+40	0.0113	0.03	Q V				
5+45	0.0115	0.03	Q V				
5+50	0.0117	0.03	Q V				
5+55	0.0119	0.03	Q V				
6+ 0	0.0121	0.03	Q V				
6+ 5	0.0123	0.03	Q V				
6+10	0.0125	0.03	Q V				
6+15	0.0127	0.03	Q V				
6+20	0.0129	0.03	Q V				

6+25	0.0131	0.03	Q	V				
6+30	0.0133	0.03	Q	V				
6+35	0.0135	0.03	Q	V				
6+40	0.0137	0.03	Q	V				
6+45	0.0139	0.03	Q	V				
6+50	0.0141	0.03	Q	V				
6+55	0.0143	0.03	Q	V				
7+ 0	0.0145	0.03	Q	V				
7+ 5	0.0147	0.03	Q	V				
7+10	0.0149	0.03	Q	V				
7+15	0.0151	0.03	Q	V				
7+20	0.0153	0.03	Q	V				
7+25	0.0155	0.03	Q	V				
7+30	0.0157	0.03	Q	V				
7+35	0.0160	0.03	Q	V				
7+40	0.0162	0.03	Q	V				
7+45	0.0164	0.03	Q	V				
7+50	0.0166	0.03	Q	V				
7+55	0.0168	0.03	Q	V				
8+ 0	0.0171	0.03	Q	V				
8+ 5	0.0173	0.03	Q	V				
8+10	0.0175	0.03	Q	V				
8+15	0.0177	0.03	Q	V				
8+20	0.0180	0.03	Q	V				
8+25	0.0182	0.03	Q	V				
8+30	0.0184	0.03	Q	V				
8+35	0.0187	0.03	Q	V				
8+40	0.0189	0.03	Q	V				
8+45	0.0191	0.03	Q	V				
8+50	0.0194	0.03	Q	V				
8+55	0.0196	0.03	Q	V				
9+ 0	0.0199	0.03	Q	V				
9+ 5	0.0201	0.04	Q	V				
9+10	0.0203	0.04	Q	V				
9+15	0.0206	0.04	Q	V				
9+20	0.0208	0.04	Q	V				
9+25	0.0211	0.04	Q	V				
9+30	0.0213	0.04	Q	V				
9+35	0.0216	0.04	Q	V				
9+40	0.0218	0.04	Q	V				
9+45	0.0221	0.04	Q	V				
9+50	0.0224	0.04	Q	V				
9+55	0.0226	0.04	Q	V				
10+ 0	0.0229	0.04	Q	V				
10+ 5	0.0232	0.04	Q	V				
10+10	0.0234	0.04	Q	V				
10+15	0.0237	0.04	Q	V				
10+20	0.0240	0.04	Q	V				
10+25	0.0242	0.04	Q	V				
10+30	0.0245	0.04	Q	V				
10+35	0.0248	0.04	Q	V				
10+40	0.0251	0.04	Q	V				
10+45	0.0254	0.04	Q	V				
10+50	0.0257	0.04	Q	V				
10+55	0.0260	0.04	Q	V				
11+ 0	0.0263	0.04	Q	V				
11+ 5	0.0266	0.04	Q	V				

```
11+10       0.0269      0.04  Q       V |         |         |         |
11+15       0.0272      0.04  Q       V |         |         |         |
11+20       0.0275      0.04  Q       V |         |         |         |
11+25       0.0278      0.05  Q       V |         |         |         |
11+30       0.0281      0.05  Q       V |         |         |         |
11+35       0.0284      0.05  Q       V |         |         |         |
11+40       0.0287      0.05  Q       V |         |         |         |
11+45       0.0291      0.05  Q       V |         |         |         |
11+50       0.0294      0.05  Q       V |         |         |         |
11+55       0.0297      0.05  Q       V |         |         |         |
12+ 0       0.0300      0.05  Q        V|         |         |         |
12+ 5       0.0304      0.05  Q        V|         |         |         |
12+10       0.0307      0.05  Q        V|         |         |         |
12+15       0.0311      0.05  Q        V|         |         |         |
12+20       0.0314      0.05  Q        V|         |         |         |
12+25       0.0318      0.05  Q        V|         |         |         |
12+30       0.0321      0.05  Q        V|         |         |         |
12+35       0.0325      0.05  Q        V|         |         |         |
12+40       0.0328      0.05  Q        V|         |         |         |
12+45       0.0332      0.05  Q        V|         |         |         |
12+50       0.0336      0.05  Q         V         |         |         |
12+55       0.0340      0.06  Q         V         |         |         |
13+ 0       0.0344      0.06  Q         V         |         |         |
13+ 5       0.0348      0.06  Q         V         |         |         |
13+10       0.0352      0.06  Q         V         |         |         |
13+15       0.0356      0.06  Q         V         |         |         |
13+20       0.0360      0.06  Q         V         |         |         |
13+25       0.0364      0.06  Q         V         |         |         |
13+30       0.0369      0.06  Q          |V        |         |         |
13+35       0.0373      0.06  Q          |V        |         |         |
13+40       0.0378      0.07  Q          |V        |         |         |
13+45       0.0382      0.07  Q          |V        |         |         |
13+50       0.0387      0.07  Q          |V        |         |         |
13+55       0.0392      0.07  Q          |V        |         |         |
14+ 0       0.0397      0.07  Q          |V        |         |         |
14+ 5       0.0402      0.07  Q          | V       |         |         |
14+10       0.0407      0.08  Q          | V       |         |         |
14+15       0.0412      0.08  Q          | V       |         |         |
14+20       0.0418      0.08  Q          | V       |         |         |
14+25       0.0424      0.08  Q          | V       |         |         |
14+30       0.0429      0.09  Q          | V       |         |         |
14+35       0.0436      0.09  Q          |  V      |         |         |
14+40       0.0442      0.09  Q          |  V      |         |         |
14+45       0.0448      0.10  Q          |  V      |         |         |
14+50       0.0455      0.10  Q          |  V      |         |         |
14+55       0.0462      0.10  Q          |  V      |         |         |
15+ 0       0.0470      0.11  Q          |   V     |         |         |
15+ 5       0.0477      0.11  Q          |   V     |         |         |
15+10       0.0486      0.12  Q          |   V     |         |         |
15+15       0.0494      0.13  Q          |   V     |         |         |
15+20       0.0504      0.13  Q          |    V    |         |         |
15+25       0.0515      0.16  Q          |    V    |         |         |
15+30       0.0527      0.18  Q          |    V    |         |         |
15+35       0.0541      0.20  Q          |     V   |         |         |
15+40       0.0556      0.22  Q          |     V   |         |         |
15+45       0.0573      0.25  |Q         |      V  |         |         |
15+50       0.0596      0.32  |Q         |      V  |         |         |
```

```
15+55       0.0637      0.60  | Q       |         V|          |          |
16+ 0       0.0707      1.01  |   Q     |          |V         |          |
16+ 5       0.0932      3.27  |         |  Q       |       V  |          |
16+10       0.1033      1.46  |    Q    |          |          |V         |
16+15       0.1054      0.31  |Q        |          |          |V         |
16+20       0.1068      0.21  Q         |          |          | V        |
16+25       0.1079      0.16  Q         |          |          | V        |
16+30       0.1088      0.13  Q         |          |          | V        |
16+35       0.1096      0.12  Q         |          |          | V        |
16+40       0.1103      0.10  Q         |          |          |  V       |
16+45       0.1109      0.10  Q         |          |          |  V       |
16+50       0.1116      0.09  Q         |          |          |  V       |
16+55       0.1121      0.08  Q         |          |          |  V       |
17+ 0       0.1127      0.08  Q         |          |          |  V       |
17+ 5       0.1132      0.07  Q         |          |          |   V      |
17+10       0.1137      0.07  Q         |          |          |   V      |
17+15       0.1141      0.07  Q         |          |          |   V      |
17+20       0.1146      0.06  Q         |          |          |   V      |
17+25       0.1150      0.06  Q         |          |          |   V      |
17+30       0.1154      0.06  Q         |          |          |   V      |
17+35       0.1158      0.06  Q         |          |          |   V      |
17+40       0.1162      0.06  Q         |          |          |   V      |
17+45       0.1166      0.05  Q         |          |          |    V     |
17+50       0.1169      0.05  Q         |          |          |    V     |
17+55       0.1173      0.05  Q         |          |          |    V     |
18+ 0       0.1176      0.05  Q         |          |          |    V     |
18+ 5       0.1180      0.05  Q         |          |          |    V     |
18+10       0.1183      0.05  Q         |          |          |    V     |
18+15       0.1186      0.05  Q         |          |          |    V     |
18+20       0.1190      0.05  Q         |          |          |    V     |
18+25       0.1193      0.05  Q         |          |          |    V     |
18+30       0.1196      0.04  Q         |          |          |    V     |
18+35       0.1199      0.04  Q         |          |          |     V    |
18+40       0.1202      0.04  Q         |          |          |     V    |
18+45       0.1205      0.04  Q         |          |          |     V    |
18+50       0.1207      0.04  Q         |          |          |     V    |
18+55       0.1210      0.04  Q         |          |          |     V    |
19+ 0       0.1213      0.04  Q         |          |          |     V    |
19+ 5       0.1216      0.04  Q         |          |          |     V    |
19+10       0.1218      0.04  Q         |          |          |     V    |
19+15       0.1221      0.04  Q         |          |          |     V    |
19+20       0.1223      0.04  Q         |          |          |     V    |
19+25       0.1226      0.04  Q         |          |          |     V    |
19+30       0.1228      0.04  Q         |          |          |     V    |
19+35       0.1231      0.04  Q         |          |          |      V   |
19+40       0.1233      0.03  Q         |          |          |      V   |
19+45       0.1235      0.03  Q         |          |          |      V   |
19+50       0.1238      0.03  Q         |          |          |      V   |
19+55       0.1240      0.03  Q         |          |          |      V   |
20+ 0       0.1242      0.03  Q         |          |          |      V   |
20+ 5       0.1245      0.03  Q         |          |          |      V   |
20+10       0.1247      0.03  Q         |          |          |      V   |
20+15       0.1249      0.03  Q         |          |          |      V   |
20+20       0.1251      0.03  Q         |          |          |      V   |
20+25       0.1253      0.03  Q         |          |          |      V   |
20+30       0.1255      0.03  Q         |          |          |      V   |
20+35       0.1258      0.03  Q         |          |          |      V   |
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   20+40       0.1260      0.03  Q          |          |          |       V  |
   20+45       0.1262      0.03  Q          |          |          |       V  |
   20+50       0.1264      0.03  Q          |          |          |        V |
   20+55       0.1266      0.03  Q          |          |          |        V |
   21+ 0       0.1268      0.03  Q          |          |          |        V |
   21+ 5       0.1270      0.03  Q          |          |          |        V |
   21+10       0.1272      0.03  Q          |          |          |        V |
   21+15       0.1273      0.03  Q          |          |          |        V |
   21+20       0.1275      0.03  Q          |          |          |        V |
   21+25       0.1277      0.03  Q          |          |          |        V |
   21+30       0.1279      0.03  Q          |          |          |        V |
   21+35       0.1281      0.03  Q          |          |          |        V |
   21+40       0.1283      0.03  Q          |          |          |        V |
   21+45       0.1285      0.03  Q          |          |          |        V |
   21+50       0.1286      0.03  Q          |          |          |        V |
   21+55       0.1288      0.03  Q          |          |          |        V |
   22+ 0       0.1290      0.03  Q          |          |          |        V |
   22+ 5       0.1292      0.03  Q          |          |          |        V |
   22+10       0.1293      0.03  Q          |          |          |        V |
   22+15       0.1295      0.03  Q          |          |          |        V |
   22+20       0.1297      0.02  Q          |          |          |         V|
   22+25       0.1299      0.02  Q          |          |          |         V|
   22+30       0.1300      0.02  Q          |          |          |         V|
   22+35       0.1302      0.02  Q          |          |          |         V|
   22+40       0.1304      0.02  Q          |          |          |         V|
   22+45       0.1305      0.02  Q          |          |          |         V|
   22+50       0.1307      0.02  Q          |          |          |         V|
   22+55       0.1309      0.02  Q          |          |          |         V|
   23+ 0       0.1310      0.02  Q          |          |          |         V|
   23+ 5       0.1312      0.02  Q          |          |          |         V|
   23+10       0.1313      0.02  Q          |          |          |         V|
   23+15       0.1315      0.02  Q          |          |          |         V|
   23+20       0.1316      0.02  Q          |          |          |         V|
   23+25       0.1318      0.02  Q          |          |          |         V|
   23+30       0.1320      0.02  Q          |          |          |         V|
   23+35       0.1321      0.02  Q          |          |          |         V|
   23+40       0.1323      0.02  Q          |          |          |         V|
   23+45       0.1324      0.02  Q          |          |          |         V|
   23+50       0.1326      0.02  Q          |          |          |         V|
   23+55       0.1327      0.02  Q          |          |          |         V|
   24+ 0       0.1329      0.02  Q          |          |          |         V|
   24+ 5       0.1329      0.01  Q          |          |          |          V
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APPENDIX “C”:
Culvert & Rip-Rap Calculations

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Hydraulic Analysis Report

Project Data

Project Title: Culvert 1 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Channel Analysis: 1

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 3.5000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0240

Flow: 40.0000 cfs

Result Parameters

Depth: 2.2280 ft

Area of Flow: 6.4626 ft^2

Wetted Perimeter: 6.4661 ft

Hydraulic Radius: 0.9995 ft

Average Velocity: 6.1895 ft/s

Top Width: 3.3669 ft

Froude Number: 0.7873

Critical Depth: 1.9670 ft

Critical Velocity: 7.1836 ft/s

Critical Slope: 0.0146 ft/ft

Critical Top Width: 3.47 ft

Calculated Max Shear Stress: 1.3903 lb/ft^2

Calculated Avg Shear Stress: 0.6237 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Culvert 2 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Channel Analysis: 2

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 1.5000 ft

Longitudinal Slope: 0.0150 ft/ft

Manning's n: 0.0240

Flow: 2.8000 cfs

Result Parameters

Depth: 0.6614 ft

Area of Flow: 0.7510 ft^2

Wetted Perimeter: 2.1786 ft

Hydraulic Radius: 0.3447 ft

Average Velocity: 3.7282 ft/s

Top Width: 1.4895 ft

Froude Number: 0.9253

Critical Depth: 0.6350 ft

Critical Velocity: 3.9339 ft/s

Critical Slope: 0.0174 ft/ft

Critical Top Width: 1.48 ft

Calculated Max Shear Stress: 0.6191 lb/ft^2

Calculated Avg Shear Stress: 0.3227 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Culvert 3 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Channel Analysis: 3

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 3.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0240

Flow: 19.0000 cfs

Result Parameters

Depth: 1.5456 ft

Area of Flow: 3.6709 ft^2

Wetted Perimeter: 4.8035 ft

Hydraulic Radius: 0.7642 ft

Average Velocity: 5.1758 ft/s

Top Width: 2.9986 ft

Froude Number: 0.8244

Critical Depth: 1.3975 ft

Critical Velocity: 5.8880 ft/s

Critical Slope: 0.0141 ft/ft

Critical Top Width: 2.99 ft

Calculated Max Shear Stress: 0.9644 lb/ft^2

Calculated Avg Shear Stress: 0.4769 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Culvert 4 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Channel Analysis: 4

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter: 5.0000 ft

Longitudinal Slope: 0.0100 ft/ft

Manning's n: 0.0240

Flow: 82.0000 cfs

Result Parameters

Depth: 2.7371 ft

Area of Flow: 11.0013 ft^2

Wetted Perimeter: 8.3289 ft

Hydraulic Radius: 1.3209 ft

Average Velocity: 7.4537 ft/s

Top Width: 4.9775 ft

Froude Number: 0.8835

Critical Depth: 2.5659 ft

Critical Velocity: 8.0812 ft/s

Critical Slope: 0.0124 ft/ft

Critical Top Width: 5.00 ft

Calculated Max Shear Stress: 1.7080 lb/ft^2

Calculated Avg Shear Stress: 0.8242 lb/ft^2

Hydraulic Analysis Report

Project Data

Project Title: Culvert 1 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units Notes:

Riprap Analysis: Riprap Analysis 1

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection

Flow: 40 cfs

Culvert Diameter: 3.5 ft

Normal Depth in Culvert: 2.22803 ft

Tailwater Depth: 1.4 ft

If tailwater is unknown, use 0.4D

flow is sbcritical

Result Parameters

Tailwater Depth Used in Computations: 1.4 ft

Culvert Diameter Used in Computations: 3.5 ft

Computed D50: 4.3625 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 14 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 19.8333 ft

Name of Selected Channel: 1

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Culvert 2 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Riprap Analysis: Riprap Analysis 2

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection

Flow: 2.8 cfs

Culvert Diameter: 1.5 ft

Normal Depth in Culvert: 0.661428 ft

Tailwater Depth: 6 ft

If tailwater is unknown, use 0.4D

flow is sbcritical

Result Parameters

Tailwater Depth Used in Computations: 6 ft

Culvert Diameter Used in Computations: 1.5 ft

Computed D50: 0.0908822 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 6 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 8.5 ft

Name of Selected Channel: 2

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Culvert 3 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Riprap Analysis: Riprap Analysis 3

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection

Flow: 19 cfs

Culvert Diameter: 3 ft

Normal Depth in Culvert: 1.54555 ft

Tailwater Depth: 1.2 ft

If tailwater is unknown, use 0.4D

flow is sbcritical

Result Parameters

Tailwater Depth Used in Computations: 1.2 ft

Culvert Diameter Used in Computations: 3 ft

Computed D50: 2.3167 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 12 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 17 ft

Name of Selected Channel: 3

No channel used in calculations

Hydraulic Analysis Report

Project Data

Project Title: Culvert 4 - Johe Ranch Mine

Designer: SEL

Project Date: Tuesday, June 16, 2015

Project Units: U.S. Customary Units

Notes:

Riprap Analysis: Riprap Analysis 4

Notes:

Input Parameters

Riprap Type: Culvert Outlet Protection

Flow: 82 cfs

Culvert Diameter: 5 ft

Normal Depth in Culvert: 2.73711 ft

Tailwater Depth: 2 ft

If tailwater is unknown, use 0.4D

flow is sbcritical

Result Parameters

Tailwater Depth Used in Computations: 2 ft

Culvert Diameter Used in Computations: 5 ft

Computed D50: 4.94276 in

Riprap Class

Riprap Name: CLASS I

Riprap Class: I

The following values are an 'average' of the size fraction range for the selected riprap class.

d100: 12 in

d85: 9 in

d50: 6.5 in

d15: 4.5 in

Layout Recommendations

Apron Length: 20 ft

Apron Depth: 1.89583 ft

Apron Width (at end): 28.3333 ft

Name of Selected Channel: 4

No channel used in calculations

Appendix J

Noise Impact Assessment

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Appendix J.1

Noise Impact Assessment

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WZI INC.

GF Industries
Noise Impact Assessment
Kern County, California

January 2019
(Revised June 2019)

Submitted to:
GF Industries
122 North Harbor, Blvd
Fullerton, CA 92831

Prepared by:
WZI Inc.
1717 28th Street
Bakersfield, California 93301

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Attachment 1 Kern County General Plan Noise Element

1 EXECUTIVE SUMMARY

WZI Inc. (WZI) was asked to prepare a noise assessment for GF Industries for their Kern County, CA mining site. The proposed project (Proposed Action) is a surface mining operation. This assessment examines the potential impact on ambient noise resulting from the proposed project located in the southern portion of Kern County, California. This noise assessment uses the applicable portions of the Kern County Noise Element for threshold criteria.

The GF Industries mining site is located in the northwest portion of Section 7, Township 30 South, Range 21 East MDBM. Specifically, the site is located just north of SR 58 3 miles west of Reward Road, **Figure 1-1, Project Location Map**.

WZI is a professional consulting firm with experience in regulatory compliance, environmental engineering and geology. The members of WZI are State of California Registered Environmental Assessors, Registered Engineers and Geologists. WZI expresses no opinion as to disciplines, subjects and practices outside those specifically enumerated below. Further, WZI expresses no opinion herein as to any matters of California or federal law. This Noise Impact Assessment is based on the foregoing and subject to limitations, qualifications, exceptions and assumptions set forth herein.

1.1 Project Description

GF Industries, as operator, proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres within the 331 acre project site. Mining will be conducted within three mine areas at the site. As proposed, no more than twenty (20) acres are planned to be disturbed at any given time. Maximum annual production is anticipated to be 330,000 tons of diatomaceous earth and 20,000 tons of overburden material. It is anticipated that a total of 6,600,000 tons of diatomaceous earth and 400,000 tons of overburden material will be removed during the 20-year life of the mining operation. Surface mining operations will be conducted from 6:00 am to 7:30 pm, Monday through Friday. Four employees will be the maximum number on site at any given time.

1.2 Proposed Action

The project proponent is seeking a Conditional Use Permit for a proposed 93.67 acre surface mining operation and development of a reclamation plan on the approximately 331 acre project site, in accordance with the Surface Mining and Reclamation Act (SMARA) of 1975. The proposed project and the **Proposed Action** includes the construction, operations and reclamation of the proposed project.

1.3 Results

1.3.1 CEQA

For CEQA, the measured data and the noise modeling indicate that the noise resulting from **Proposed Action** will have *less than significant impact.*

2 PROJECT SETTING

The current project setting consists of an undeveloped 331 acre plot of land situated near one currently occupied residential receptor (the proposed project's owner) directly adjacent to project boundary to the south of SR 58, **Figure 2-1, Site Plan**. There is a ranching facility and residential receptor 0.7 miles to the east of the project boundary, **Figure 2-2, Sensitive Receptor Locations**.

As far as the noise study and specifically vibration is concerned, the mining operation is intended to excavate a surface outcrop of diatomite a soft earth; no hard rock drilling or blasting is anticipated to occur. [1] A sandy loam is the only overburden at the proposed project site.

As far as the noise study is concerned the project construction phase, the mining phase and the restoration phase are identical in terms of noise generating equipment, equipment location and or movement and time of use.

[1] "Diatomite is a chalk-like, soft, friable, earthy, very fine-grained, siliceous sedimentary rock, usually light in color (white if pure, commonly buff to gray in situ, and rarely black). It is very finely porous, very low in density (floating on water at least until saturated), and essentially chemically inert in most liquids and gases. It also has low thermal conductivity and a rather high fusion point. Diatomite is now used principally as a filter aid; but it has many other applications, such as an absorbent for industrial spills and as pet litter, a filler in a variety of products from paints to dry chemicals, an insulation material as sawn and molded shapes as well as loose granular, a mild abrasive in polishes, and a silica additive in cement and various other compounds." (USGS)

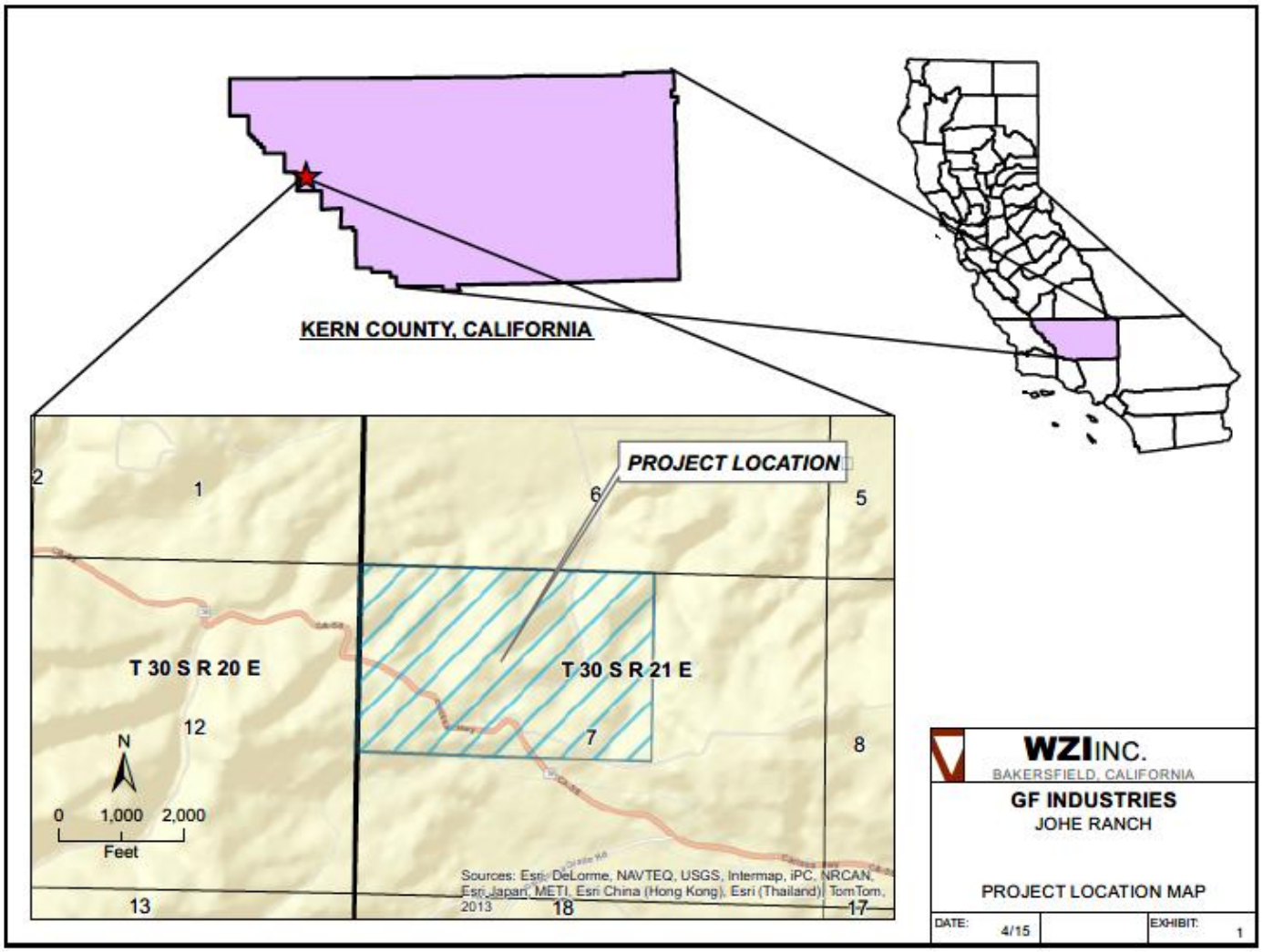


Figure1-1: Project Location Map

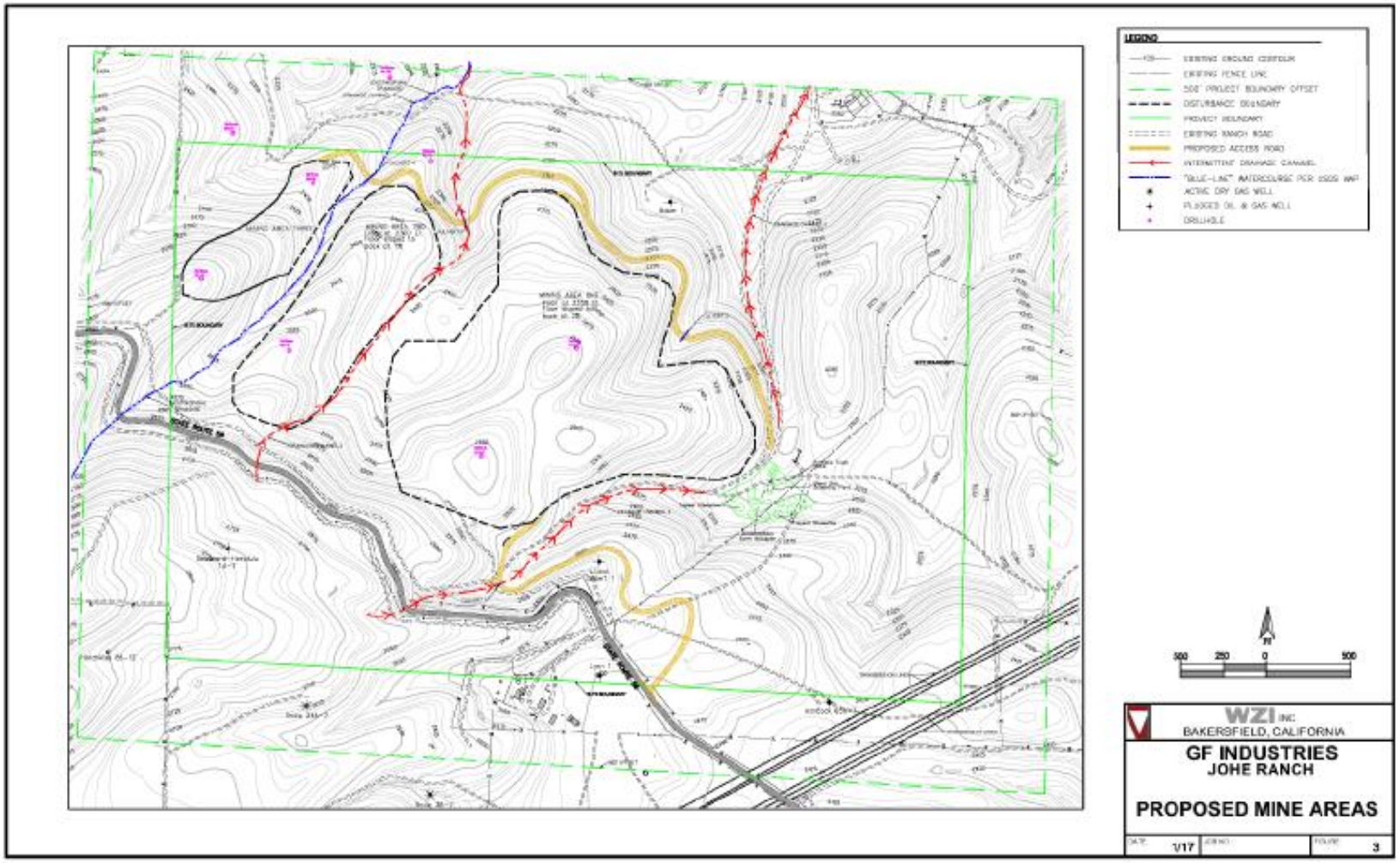


Figure 2-1: Site Plan

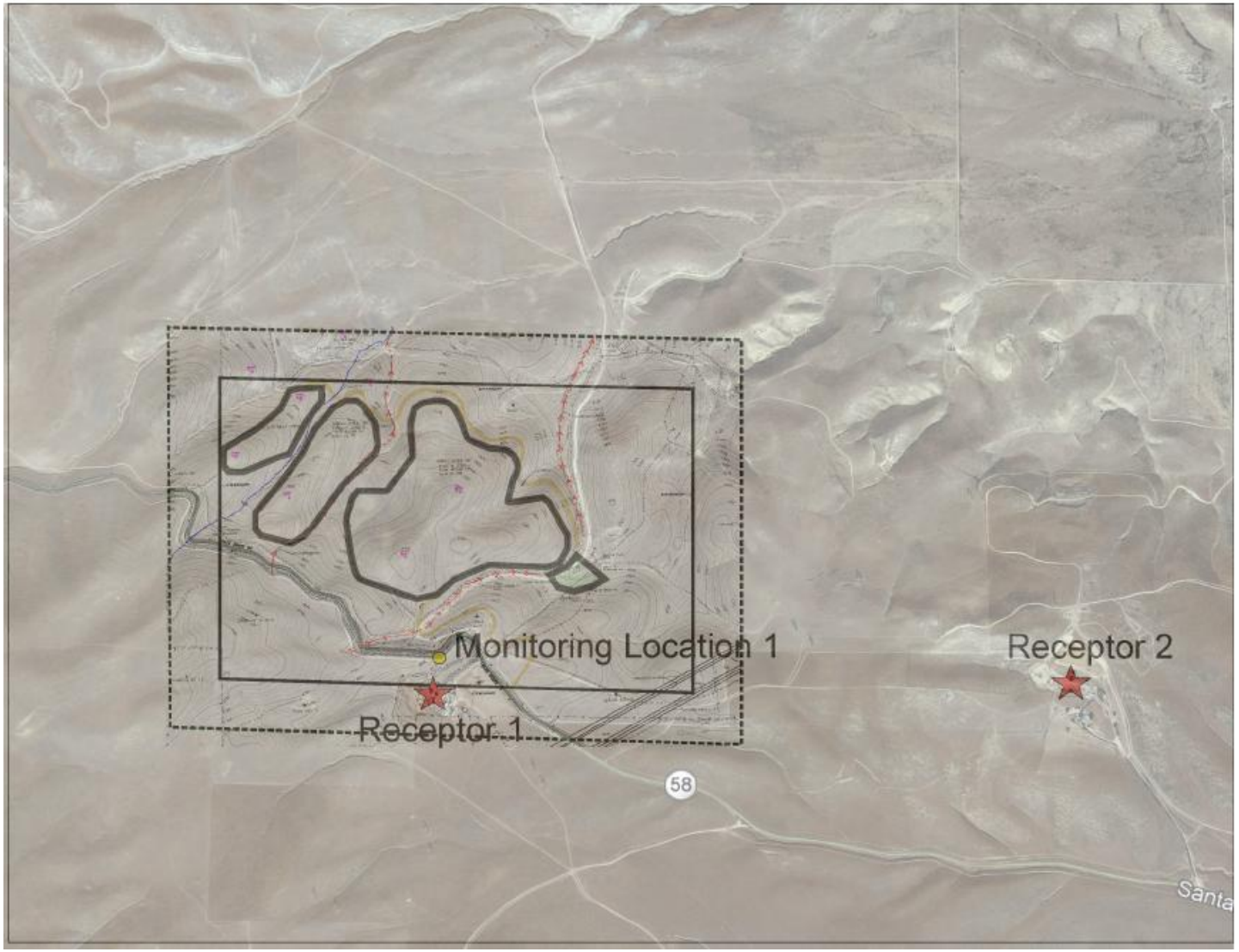


Figure 2-2: Receptor Locations

2.1 Concepts and Terminology

The following is a brief discussion of common noise terminology and descriptors used in the subsequent evaluation.

- Sound: A vibratory disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism like human ears or a microphone.
- Noise: Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- Decibel (dB): A measure of sound or vibration amplitude on a logarithmic scale that indicates the squared ratio of sound pressure or vibration velocity root-mean-squared amplitude to a reference sound pressure or vibration amplitude. For sound, the reference pressure is 20 micropascals.
- A-weighted decibel (dB(A)): An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- Equivalent sound level (L_{eq}): The equivalent steady-state sound or vibration level that would contain the same acoustical or vibration energy in a stated period of time.
- Day-night level (Ldn) is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m. A noise source that has an L_{eq} that is constant throughout a 24-hour period would have an L_{dn} that is 6 dB higher than the L_{eq}. For example, a noise source that operates is 60 L_{eq} and operates 24 hours a day would have an L_{dn} of 66 dB.
- Community noise equivalent level (CNEL) is the energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m.

Ldn and CNEL values rarely differ by more than 1 dB. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving the sound level. Noise is a by-product of human activities.

Noise is generally defined as unwanted sound. The range of sound pressure perceived as sound is extremely large. The decibel is the preferred unit for measuring sound, since it accounts for these variations using a relative scale adjusted to the range of hearing (referred to as the A-weighted decibel of dB(A). The A-weighted decibel is a method of sound measurement which assigns weighted values to selected frequency bands in an attempt to reflect how the human ear responds to sound. The range of human hearing is from 0 dBA (the threshold of hearing) to about 140 dB(A) (the threshold for pain). Examples of noise and their A-weighted decibel levels are shown in **Table 2-1**.

Table 2-1: Typical Noise Levels		
Noise Level (dBA)	Outdoor Activity	Indoor Activity
90+	Gas lawn mower at 3 feet, jet flyover at 1,000 feet	Rock Band
80–90	Diesel truck at 50 feet	Loud television at 3 feet
70–80	Gas lawn mower at 100 feet, noisy urban area	Garbage disposal at 3 feet, vacuum cleaner at 10 feet
60–70	Commercial area	Normal speech at 3 feet
40–60	Quiet urban daytime, traffic at 300 feet	Large business office, dishwasher next room
20–40	Quiet rural, suburban nighttime	Concert hall (background), library, bedroom at night
10–20		Broadcast / recording studio

3 REGULATIONS and STANDARDS

3.1 Federal Highway Administration

The Federal Highway Administration has established noise abatement criteria that must be considered in the design of federal funded highway projects. Federal regulations set noise limits for medium trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 db(A) at 15 meters. These controls are implemented through regulatory controls on truck manufacturers. These FHA values were compared to the empirical data for the adjacent roadway for analysis.

3.2 State Noise Standards

According to California Noise Law, the state is to encourage the enactment and enforcement of local ordinances in those areas which are most properly the responsibility of local government. It is further the purpose to insure that the state is of maximum assistance to local agencies in the discharge of those responsibilities, furnishing technical and legal expertise to assist local agencies in the enactment and enforcement of meaningful and technically sufficient noise abatement measures.

3.3 Kern County General Plan Noise Element

The Noise Element of the Kern County General Plan sets forth policies and recommendations applicable to the proposed project. Kern County General Plan Noise Element requires that indoor noise levels be limit to 45 db(A) Ldn. The typical attenuation factor for structures with closable windows be 20 dB, the maximum noise levels in outside living areas, such as yards, is

required to be 65 dB(A). A noise level of 65dB(A) Ldn is considered the upper limit for noise-sensitive receptors such as homes, schools, hospitable and churches.

Kern County considers noise levels to be satisfactory in outdoor agricultural areas when they are at or below, an Ldn of 65 dB(A). CEQA does not define the noise level increase that would be considered substantial. However, Table 3.5-1, "Perceived Change in Decibel Level" shows commonly accepted effects in perception stemming in changes from sound level.

Table 3.5-1
Perceived Change in Decibel Level[2]

Change in Sound Level (dB)	Perceived Change to the Human Ear
1	Not Perceptible
3	Threshold of Perception
5	Clearly Noticeable
10	Twice (or Half) as Loud
20	Fourfold (4X) Change

Parks and Recreational Areas

Kern County considers noise levels to be satisfactory in outdoor areas when they are at, or below 65 dB[(A)].

The relevant Kern County General Plan Noise Element policies follow:

Policy #1: Review discretionary industrial, commercial, or other noise-generating land use projects for compatibility with nearby noise-sensitive land uses.

Policy #2: Require noise level criteria applied to all categories of land uses to be consistent with the recommendations of California Division of Occupational Safety and Health (DOSH).

Policy #5 Prohibit new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design. Such mitigation shall be designed to reduce noise to the following levels:

A) 65 dB L_{dn} or less in outdoor activity areas.

[2] A Guide to Noise Control In Minnesota, (Acoustical Properties, Measurement, Analysis, Regulation), Minnesota Pollution Control Agency

B) 45 dB L_{dn} or less within interior living spaces or other noise sensitive interior spaces.

Policy #7 Employ the best available methods of noise control.

The relevant implementation of the policies is as follows:

C) Review discretionary development plans, programs and proposals, including those initiated by both the public and private sectors, to ascertain and ensure their conformance to the policy framework outlined in this element.

D) Review discretionary development plans for proposed residential or other noise sensitive land uses in noise-impacted areas to ensure their conformance with the noise standards of 65 dB L_{dn} or less in outdoor activity areas and 45dB L_{dn} or less within interior living spaces.

3.4 Noise Monitoring Data

For county requirements noise measurements were obtained within the analysis area to judge the impact of construction-related noise on sensitive receptors in the immediate vicinity of the project location. WZI recorded and documented sound levels at the location as shown on **Figure 3.4-1, Background Noise Data Monitoring Location**. These data were gathered for the vicinity over a 1-hour duration. These data shown in **Figure 3.4-1, Noise Monitoring Results** are found in **Exhibit 1**, "Background Noise Data".



Figure 3.4-1: Background Noise Monitoring Location

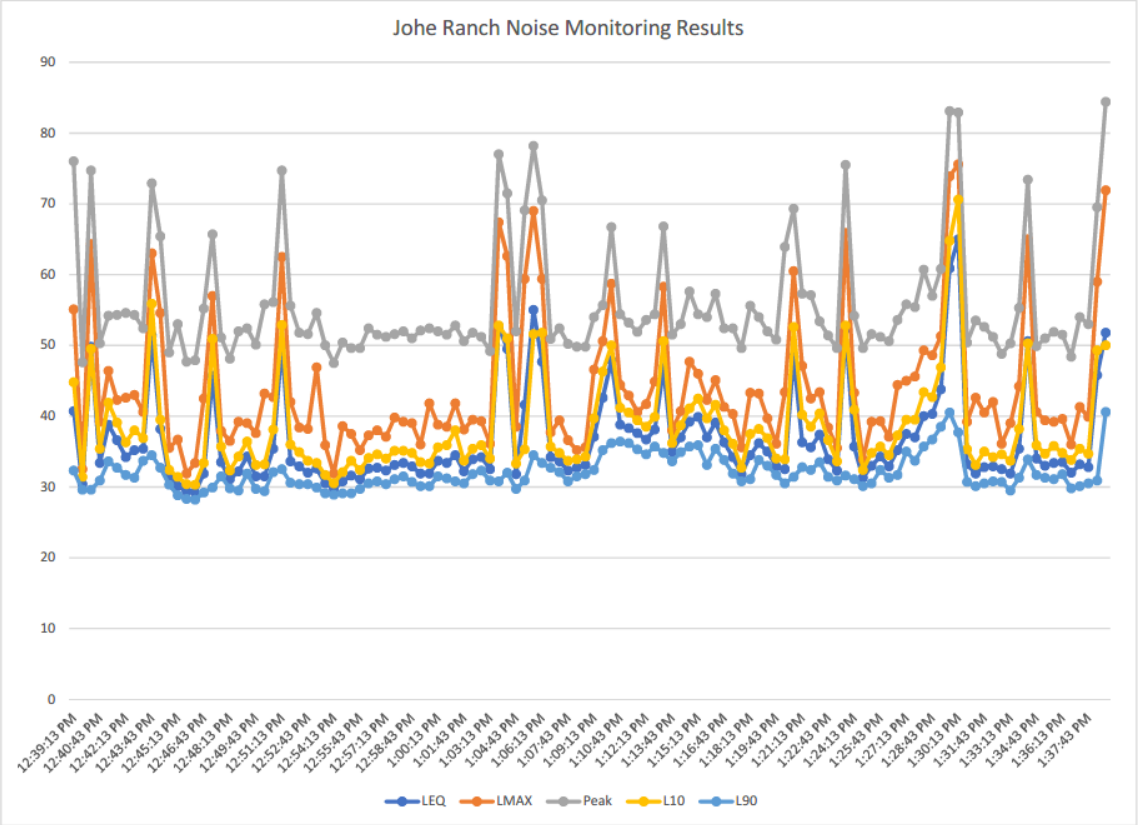


Figure 3.4-2: Noise Monitoring Results

Table 3.4-1 shows the summary of the noise data results used for this analysis.

Table 3.4-1 Noise Monitoring Results

Background Location	Date	L_{50}	L_{10}	L5	L_{MAX}	L_{EQ}	L_{dn}	CNEL
Alongside Highway 58 at Lookout Point	12/26/2018	33.3	40.1	44.2	75.6	47.3	54	54.7

The monitoring data indicate typical road noise and other contributing noise sources such as passing vehicles and aircraft are typical for the area. Noise modeling for the traffic specified road noise levels of 48.5 dBA Leq 1h for Receptor Location 1 based on a receptor location 120 feet from SR58, however the low empirical value Leq = 47.3 dBA was used for baseline in the impact analysis.[3]

[3] FHWA TNM 2.5

Table 4.1-2 Proposed Project-Specific Traffic

4 PROJECT IMPACTS

4.1 Traffic

No major increase in regional traffic is expected due to additional regional development therefore, no additional sources of non-project related noise will contribute to the existing noise profile as measured.

Table 4.1-1 Regional Traffic Data

Rte	County	Post	Description	**Back Peak Hour**	**Back Peak Month**	**Back AADT**	**Ahead Peak Hour**	**Ahead Peak Month**	**Ahead AADT**
058	KER	0	SAN LUIS OBISPO/KERN COUNTY LINE				30	190	160
058	KER	1.35	KERN/SAN LUIS OBISPO COUNTY LINE	30	190	160			
058	KER	2.7	SAN LUIS OBISPO/KERN COUNTY LINE				30	190	160
058	KER	9.44	REWARD ROAD (ROAD 230)	30	190	160	30	190	160
058	KER	15.42	JCT. RTE. 33	30	190	160	410	2450	1750
058	KER	23.748	LOKERN ROAD	410	2450	1750	650	4700	4100
058	KER	24.76	CORN CAMP ROAD	650	4700	4100	630	4600	4000

The traffic count by CalTrans (320) closely matches Kern County's Traffic Census (338) of which 17% are HHDT.

Traffic associated with the build-out of the proposed project is provided below:

Vehicle/Equipment	Vehicles Activity
Haul trucks,	50 per day
Employee vehicles,	4 per day
Contractor vehicles servicing portable toilet,	1 per week

4.2 Computer Modeling

WZI assessed the Audible Noise Impacts using Finite Element Analysis. In order to assess the potential noise impacts from this specific project, WZI uses a multi-tiered approach to noise assessment.

Construction noise is modeled using a finite element model, ENM.

The program "ENM" was used to generate a noise contour plot for the given construction sources, with consideration given to the topography and terrain conditions. The topography of the project for the model consists of open foothill and two existing residential structures near the site (one directly adjacent to the south, south of SR58 and the other approximately one-mile to the east. The model results are based on the given wind directions and specified speed. Prevailing wind conditions are from the west-south west quadrant (250 degrees) at 10 ft/s (measured at 30 feet above ground). The second diurnal shift direction indicates winds can come from 45 degrees and are modeled at the same speed. **Figure 4.2-1, Area Windrose,** comes from air modeling data for the general area, Fellows, Ca.

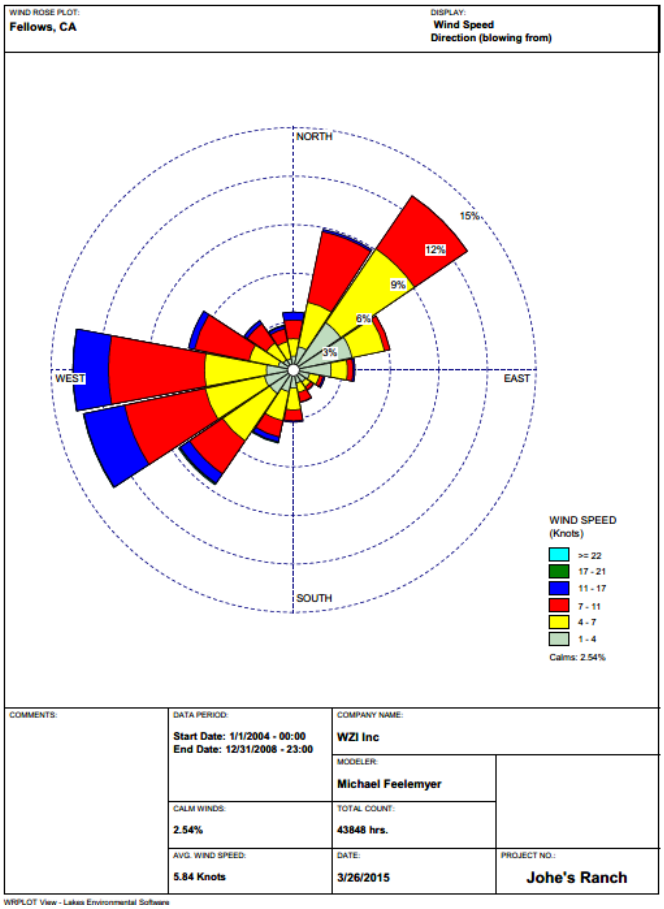


Figure 4.2-1: Regional Windrose

4.2.1 Equipment

The off-highway truck noise data was used by WZI to define the off-highway truck noise profile for each source, **Exhibit 2, Noise Source Data**.

Haul/Dump Truck Noise Profile *Sound Power Level*											
Sound Pressure Level dB	***1/3 Octave centerline noise level (L_{50}) dB***										***dB(A)***
	31.5	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***16k***	
	109.0	109.0	114.0	117.0	112.0	110.0	107.0	101.0	95.0	95.0	*115.3*

The loader/backhoe noise data was used by WZI to define the tractor/loader/backhoe noise profile for each source during the construction phase, **Exhibit 2, Noise Source Data**.

Loader Noise Profile *Sound Power Level*											
Sound Pressure Level	*1/3 Octave centerline noise level (L_{50}) dB*										
dB	***31.5***	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***16k***	***dB(A)***
	104	*104*	*109*	*112*	*107*	*105*	*102*	*96*	*90*	*90*	*110.3*

The screener/stockpile noise data was used by WZI to define the tractor/loader/backhoe noise profile for each source during the construction phase **Exhibit 2, Noise Source Data**.

Screened Stockpile Noise Profile *Sound Power Level*											
Sound Pressure Level	*1/3 Octave centerline noise level (L_{50}) dB*										
dB	***31.5***	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***16k***	***dB(A)***
	112	*109*	*107*	*112*	*107*	*104*	*98*	*94*	*90*	*90*	*109.3*

Equipment locations for the modeling are shown below in **Figure 4.2-2, Modeled Equipment Locations**. The proposed project area centrus of Mining Area one was selected for the two heavy trucks to represent the various configuration of mining road layouts as the proposed project is "built out". Most if not all small mining operations occur during daytime. The haul equipment centrus is considered to be representative of the statistical likelihood of the noise center at any reasonably specified duration: hourly, daily (as related to Ldn), monthly or otherwise. The location of two mobile sources effectively creates a single equivalent source with an SPL of 120 dBA at the centrus. The model results are calculated to be instantaneous noise level based on the SPL defined by the L50; however, these results are then used to check against the Kern County Threshold Ldn value as if all noise sources occurred 24 hours a day. The conservative combination of two sources at the same location is highly unlikely to occur for more than several minutes at any time. These two trucks can randomly be at any location on the site, safely following the designated haul roads, as the mine is developed. However, the most likely

routes will reflect the entrance location and mining activity.[4] The model also assumes that both the Stockpiler and Loader are running concurrently with the Haul Trucks. The noise modeling reasonably addresses the potential impacts with a conservative assumption. Locating mining activity to non-scheduled sites not part of the planned activity (such as moving the Loader and Stockpiler further east to the fence adjacent to the nearest receptor) would simply mislead the stakeholders who rely on the SMARA as presented. The modeling of an L50 is conservatively used to address the activity as Ldn which is a 24 hour-based threshold. The wind direction is also conservatively assumed to be sustained towards the receptor. Any potential field measurement taken to verify the Ldn value would be gathered for 24 hours at the receptor, the fence line or any alternate accessible location if selected by the county, based on actual equipment locations and movement.

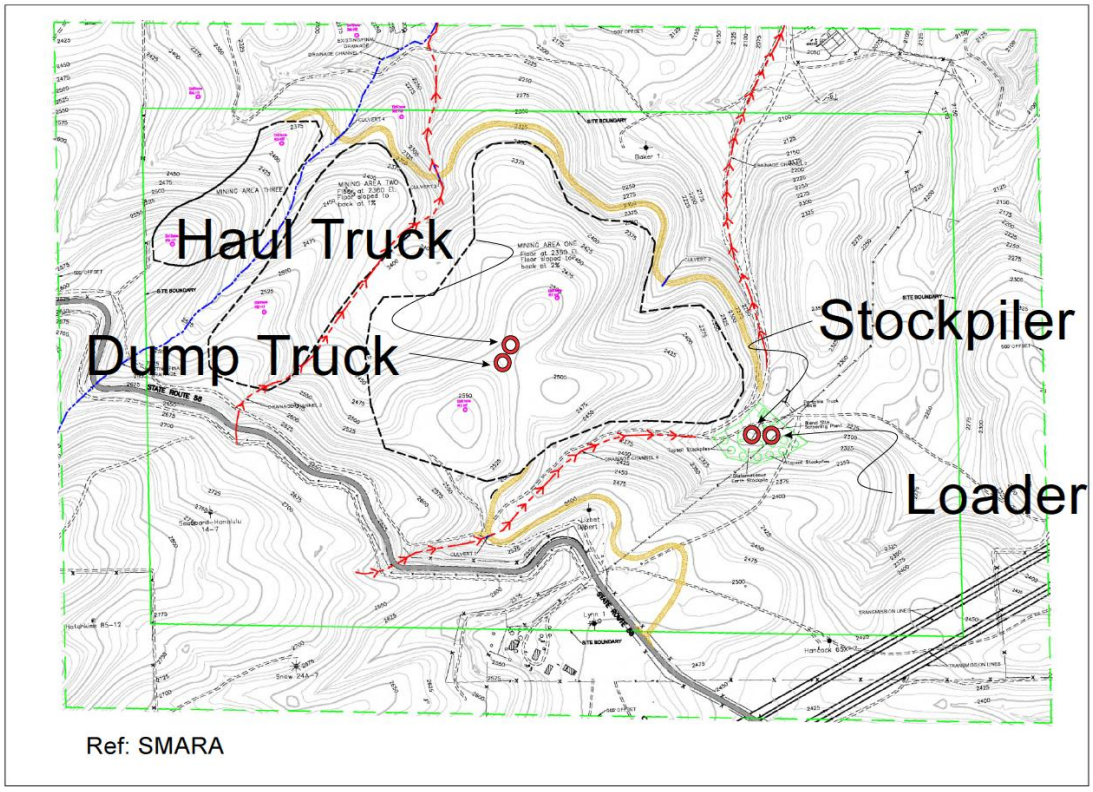


Figure 4.2-2: Modeled Equipment Locations

[4] If one were to modify FHWA modeling (TNM) to address off-road activity for a mining operation (in place of the centrus) one would use 50 truck per day for 8 hours per day as the annual average vehicle traffic. 50 truck over 8 hours implies that approximately 12 trucks pass a hypothetical receptor location per hour. A truck traveling 15 miles an hour will travel 1320 feet per minute; the passing vehicle will conservatively impact the nearby receptor (600 feet away on the other side of SR 58) with a conservative peak noise level of approximately 65 dBA for approximately 10 seconds at which point the noise level drops to background (as is the case with shorter duration randomly passing vehicles on SR 58). 12 off-road vehicle passes imply 2 minutes of 65 dBa with a remainder of the 1-hour period (48 minutes at a background noise level of 47 dBA) resulting in approximately 49 dBA for the hour or a projected 56 dBA Ldn. The centrus-based modeling results place the same estimated noise level at 55 dBA Ldn, thus there is no significant variation in results.

4.3 Mining Impacts

4.3.1 Winds from 250 degrees

The modeling results for mining are shown in **4.3-1, Noise Effect, Winds from 250 degrees.** The modeling shows that the potential operation impact on ambient noise from the tractors/loaders/backhoes and off-highway trucks is significantly less than the Kern County Noise Element 65dB(A).

Table 4.3-1: Receptor Impacts
Winds from 250 degrees

	Modeling, Instant	Background, Leq	Combined
Receptor 1	<43 dBA	47.3 dBA	48.6 dBA
Receptor 2	<43 dBA	47.3 dBA	48.6 dBA

The incremental noise levels will approach ambient conditions and are expected to range from less than 43 dB(A) to a combined high of 48.6 dB(A). In order to have the impacts exceed the Kern County Threshold the conservative modeling results at Receptor #2 would have to be 58.5 dBA L50, thus requiring the unrealistic placement of two haul trucks only at the east-most property boundary for 24 hours a day. The modeled daytime noise impact results are all under the county standard.

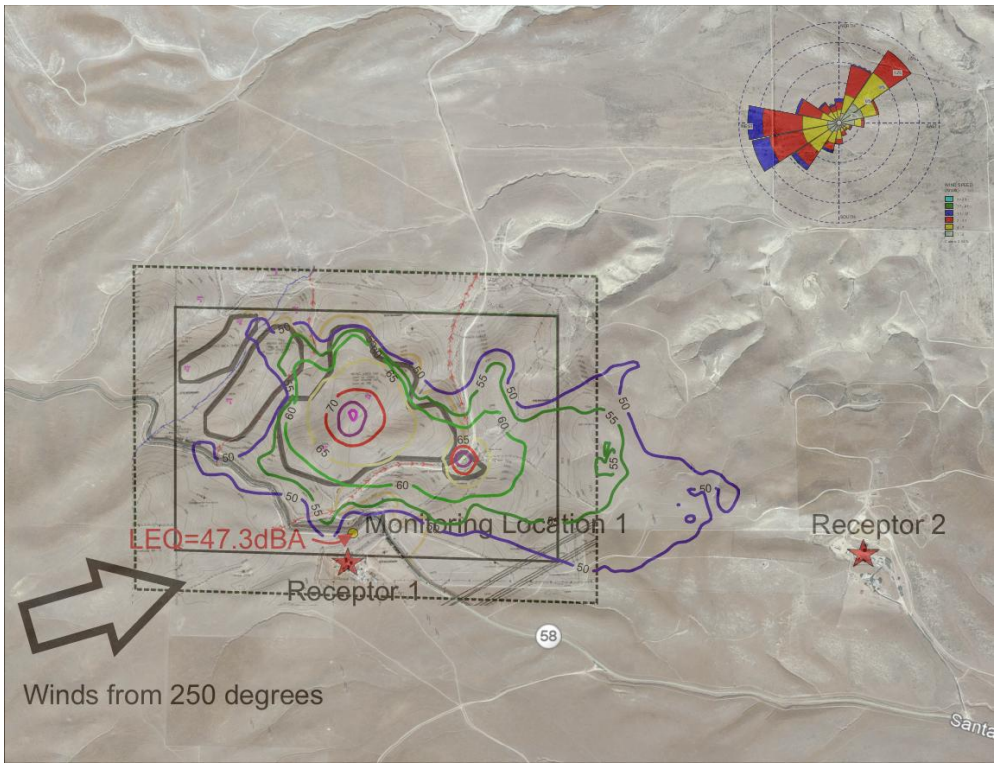


Figure 4.3-1

4.3.2 Winds from 45 degrees

The modeling results for mining are shown in **4.3-2, Noise Effect, Winds from 45 degrees.** The modeling shows that the potential operation impact on ambient noise from the tractors/loaders/backhoes and off-highway trucks is significantly less than the Kern County Noise Element 65dB(A).

Table 4.3-2: Receptor Impacts Winds from 45 degrees			
	Modeling, Instant	Background, Leq	Combined
Receptor 1	<43 dBA	47.3 dBA	48.6 dBA
Receptor 2	<43 dBA	47.3 dBA	48.6 dBA

The incremental noise levels will approach ambient conditions and are expected to range from less than 43 dB(A) to a combined high of 48.6 dB(A). The conversion of 48.6 dB L50 to CNEL results in a noise level of 56 (55.3) dBA Ldn. In order to have the impacts exceed the Kern County Threshold the conservative modeling results at Receptor #1 would have to be 58.5 dBA L50, thus requiring the unrealistic placement of two haul trucks only at the north-most location of the access road or at the entrance for 24 hours a day; both of which directly north of SR 58. The modeled daytime noise impact results are all under the county standard.

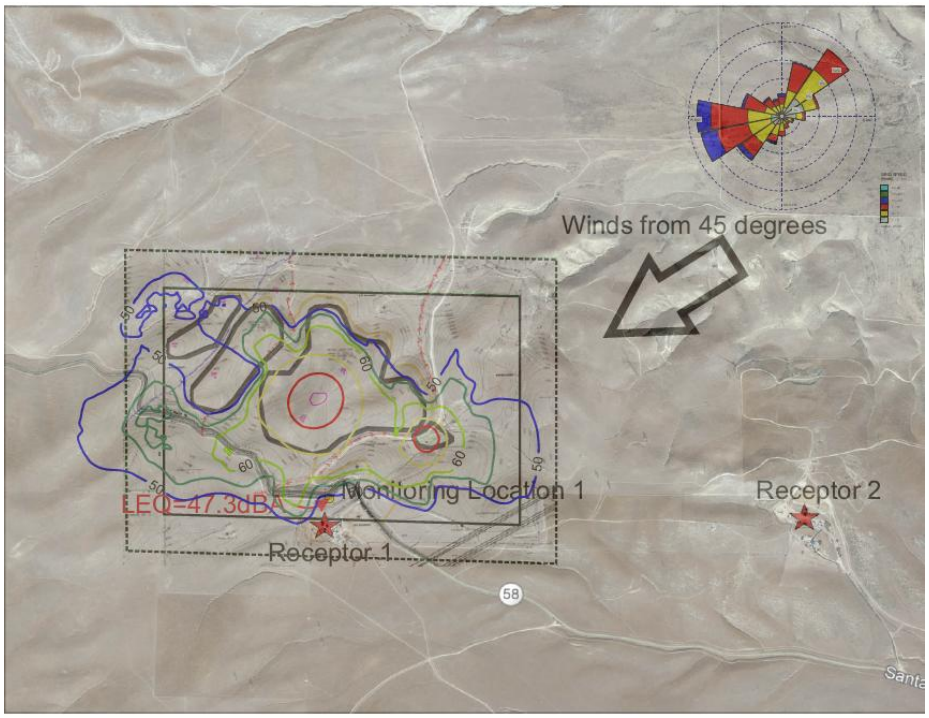


Figure 4.3-2

4.3.3 Groundborne Noise and Vibration

The noise source related to the project are typical of soft material mining, no hard rock overburden exists. Therefore the mine construction, the mining operation and the reclamation will not require the use of impact or detonation. Scraping and haul truck noise will be similar to any off-road activity involving the movement of the "soft, friable, earthy, very fine-grained, siliceous sedimentary rock".[5]

4.4 Recommendations and Conclusions

It is recommended that no mining activities not take place during the nighttime hours (10pm to 7am). The equipment associated with these activities generate the greatest amount of noise at the project site. Limiting their operation limits the noise generation to product hauling and one loader. The following mitigations will help minimize any noise related issues for the project. These recommendations including the mitigations apply to mine construction, mining of product, and reclamation.

4.4.1 Mitigations

Noise -1: Project construction and mining operations should only occur between 5:30 a.m. and 9:00 p.m., Monday through Saturday.

Noise -2: No construction or mining operation will occur at the project site within 1,000 feet of an occupied residential dwelling between 9:00 p.m. and 6:00 a.m. weekdays and 9:00 p.m. and 8:00 a.m. on weekends.

Noise -3: The Developer shall cover equipment engines and ensure that mufflers are in good working conditions.

Noise -4: The Developer shall locate all stationary equipment such as compressors and welding machines away from noise receptors to the extent practicable.

4.4.2 Impacts

The noise impacts of the **Proposed Action** (i.e., mine construction, mining and reclamation) are below the Kern County specified criteria and are considered *less than significant.*

The mining phase and the restoration phase locations and equipment movement are identical to mining operations in terms of noise generating equipment and daily time-of-use. The progressive staging of new equipment and the removal of the same equipment will be defined by the scheduled topsoil removal, road grading, and laydown area grading. The site restoration equipment removal will be

[5] "Operation of construction equipment and construction techniques **such as blasting generate ground vibration**. Maintenance operations and traffic traveling on roadways can also be a source of such vibration. If its amplitudes are high enough, ground vibration has the potential to damage structures, cause cosmetic damage (e.g., crack plaster), or disrupt the operation of vibration-sensitive equipment such as electron microscopes and advanced technology production and research equipment. Ground vibration and groundborne noise can also be a source of annoyance to individuals who live or work close to vibration-generating activities. Pile driving, demolition activity, blasting, and crack-and-seat operations are the primary sources of vibration addressed by Caltrans. Traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage."[**emph.**](CalTrans)

defined by the re-contouring as well as the return of the top soil/revegetation. The mining operation impact analysis is the most conservative and any progressive equipment staging during construction and restoration would be less than during the actual mining. Therefore, the *less than significant* finding applies to all three phases.

Specifically-

Mine Construction

The noise impacts of the **Proposed Action** as it relates to the mine construction are below the Kern County specified criteria and are considered *less than significant.*

Mining Activity

The noise impacts of the **Proposed Action** as it relates to mining are below the Kern County specified criteria and are considered less than significant.

Reclamation Activity

The noise impacts of the **Proposed Action** as it relates to mine reclamation are below the Kern County specified criteria and are considered less than significant.

5 REFERENCES

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California Department of Transportation, Transportation and Construction Vibration Guidance Manual, September 2013

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EXHIBITS

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Exhibit 1

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JOHE1 Exhibit 1

Time	LEQ	LMAX	Peak	L10	L90	
12:39:13	PM	40.7	55.1	76	44.8	32.3
12:39:43	PM	30.4	32.5	47.6	31.4	29.6
12:40:13	PM	49.8	64.3	74.7	49.5	29.6
12:40:43	PM	33.4	39.2	50.3	35.4	30.9
12:41:13	PM	38.8	46.4	54.2	41.9	33.6
12:41:43	PM	36.6	42.3	54.3	39.1	32.7
12:42:13	PM	34.2	42.6	54.6	36.3	31.7
12:42:43	PM	35.2	43	54.3	38	31.3
12:43:13	PM	35.4	40.6	52.4	36.9	33.7
12:43:43	PM	51.4	63	72.9	55.9	34.5
12:44:13	PM	38.2	54.6	65.4	39.5	32.7
12:44:43	PM	31.4	35.5	49	32.4	30.3
12:45:13	PM	30.1	36.7	53	31.4	28.8
12:45:43	PM	29.4	31.9	47.7	30.4	28.3
12:46:13	PM	29.2	33.4	47.9	30.3	28.2
12:46:43	PM	31.9	42.5	55.2	33.4	29.2
12:47:13	PM	45.7	57	65.7	50.9	29.9
12:47:43	PM	33.5	37.9	51.1	35.7	31.5
12:48:13	PM	31.1	36.5	48.1	32.3	29.8
12:48:43	PM	32.2	39.2	52	34.3	29.5
12:49:13	PM	34.3	39	52.4	36.4	31.9
12:49:43	PM	31.5	37.6	50.1	33.1	29.7
12:50:13	PM	31.5	43.2	55.8	33.2	29.4
12:50:43	PM	35.4	42.7	56.1	38.1	32.1
12:51:13	PM	50	62.5	74.7	52.9	32.5
12:51:43	PM	33.6	42	55.6	36	30.6
12:52:13	PM	32.9	38.4	51.8	34.9	30.4
12:52:43	PM	32	38.2	51.6	33.7	30.4
12:53:13	PM	32.6	46.9	54.6	33.4	29.9
12:53:43	PM	30.5	35.9	50	31.7	29.1
12:54:13	PM	29.7	31.9	47.5	30.5	28.9
12:54:43	PM	30.8	38.6	50.4	32.1	29.1
12:55:13	PM	31.6	37.5	49.6	33.7	29.1
12:55:43	PM	31.1	35.2	49.6	32.4	29.7
12:56:13	PM	32.6	37.3	52.4	34.1	30.5
12:56:43	PM	32.7	38	51.5	34.6	30.8
12:57:13	PM	32.3	37.1	51.2	34	30.4
12:57:43	PM	33.1	39.8	51.6	35.1	31.1
12:58:13	PM	33.4	39.2	52	35.1	31.5
12:58:43	PM	32.9	39	51	34.8	30.7
12:59:13	PM	31.9	36	52.1	33.5	30.1
12:59:43	PM	31.9	41.8	52.4	33.3	30.1
1:00:13	PM	33.7	38.8	52	35.6	31.5
1:00:43	PM	33.4	38.5	51.5	35.9	31.2
1:01:13	PM	34.5	41.8	52.8	38	30.8
1:01:43	PM	32.2	38.1	50.6	33.7	30.5
1:02:13	PM	33.9	39.5	51.8	35.4	31.8
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1:03:13	PM	32.5	36.1	49.2	34	30.9
1:03:43	PM	52.7	67.4	77	52.8	30.8
1:04:13	PM	49.5	62.6	71.5	51	32
1:04:43	PM	31.8	38.5	52	33.3	29.7
1:05:13	PM	41.6	59.4	69.1	35.3	30.9
1:05:43	PM	55	69	78.2	51.6	34.5
1:06:13	PM	47.7	59.4	70.5	51.8	33.4
1:06:43	PM	34.2	37.7	50.9	35.7	32.7
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1:07:43	PM	32.3	36.6	50.2	33.7	30.8
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1:08:43	PM	33.1	35.6	49.8	34.3	31.8
1:09:13	PM	37.1	46.6	54	39.7	32.4
1:09:43	PM	42.6	50.6	55.7	46.3	35.2

1:10:13 PM	47.9	58.7	66.7	50	36.2
1:10:43 PM	38.8	44.4	54.4	41.2	36.4
1:11:13 PM	38.3	42.9	53.2	40.5	36.2
1:11:43 PM	37.6	40.6	51.9	39.4	35.3
1:12:13 PM	36.7	41.7	53.6	38.5	34.6
1:12:43 PM	38.1	44.9	54.4	39.9	35.7
1:13:13 PM	46.8	58.3	66.8	50.6	34.8
1:13:43 PM	35	38	51.5	36.2	33.6
1:14:13 PM	37	40.7	53	38.7	34.9
1:14:43 PM	39.2	47.7	57.6	41.1	35.7
1:15:13 PM	39.9	46	54.4	42.5	35.9
1:15:43 PM	37	42.3	54	39.7	33.1
1:16:13 PM	39.1	45.1	57.3	41.6	35.4
1:16:43 PM	36.3	41.3	52.4	38	33.8
1:17:13 PM	34.2	40.3	52.4	36.1	31.9
1:17:43 PM	31.8	35.6	49.6	32.7	30.8
1:18:13 PM	34.5	43.3	55.6	37.5	31.1
1:18:43 PM	36.2	43.2	54	38.2	33.8
1:19:13 PM	35	39.7	52	36.9	33
1:19:43 PM	32.9	36.1	50.8	34	31.7
1:20:13 PM	32.5	43.4	63.9	33.9	30.5
1:20:43 PM	48.4	60.5	69.3	52.6	31.4
1:21:13 PM	36.3	47.1	57.3	40.2	32.8
1:21:43 PM	35.6	42.5	57.1	38.5	32.4
1:22:13 PM	37.4	43.4	53.4	40.4	33.5
1:22:43 PM	33.9	38.4	51.4	36.6	31.4
1:23:13 PM	32.3	35.5	49.6	33.6	30.9
1:23:43 PM	52.3	65.9	75.5	52.8	31.6
1:24:13 PM	35.7	43.3	54.2	40.9	31.1
1:24:43 PM	31.3	33.9	49.6	32.4	30.1
1:25:13 PM	33	39.2	51.6	34.8	30.5
1:25:43 PM	34.3	39.3	51.2	35.7	32.4
1:26:13 PM	32.9	37.1	50.6	34.5	31.3
1:26:43 PM	35.2	44.4	53.6	37.3	31.7
1:27:13 PM	37.5	45	55.8	39.5	35
1:27:43 PM	37	45.6	55.4	39.5	33.7
1:28:13 PM	40	49.3	60.7	43.4	35.7
1:28:43 PM	40.3	48.6	57	42.7	36.7
1:29:13 PM	43.8	51.3	60.8	46.9	38.5
1:29:43 PM	60.9	73.9	83.1	64.8	40.5
1:30:13 PM	65	75.6	82.9	70.6	37.7
1:30:43 PM	33.2	39.2	50.4	35.3	30.7
1:31:13 PM	31.9	42.6	53.5	33.1	30.1
1:31:43 PM	32.8	40.5	52.6	35	30.5
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1:32:43 PM	32.5	36.1	48.8	34.6	30.7
1:33:13 PM	31.9	39	50.3	33.7	29.5
1:33:43 PM	35.4	44.2	55.3	38.2	31.3
1:34:13 PM	50.6	65	73.4	50.3	33.9
1:34:43 PM	34	40.6	49.9	35.9	31.7
1:35:13 PM	33	39.4	51	34.7	31.3
1:35:43 PM	33.4	39.2	51.9	35.8	31.1
1:36:13 PM	33.5	39.6	51.5	34.8	31.8
1:36:43 PM	32	36	48.4	33.8	29.8
1:37:13 PM	33.2	41.3	54	35.4	30.1
1:37:43 PM	32.8	39.9	53	34.7	30.5
1:38:13 PM	45.8	59	69.5	49.3	30.9
1:38:43 PM	51.8	71.9	84.4	50	40.6

Exhibit 2

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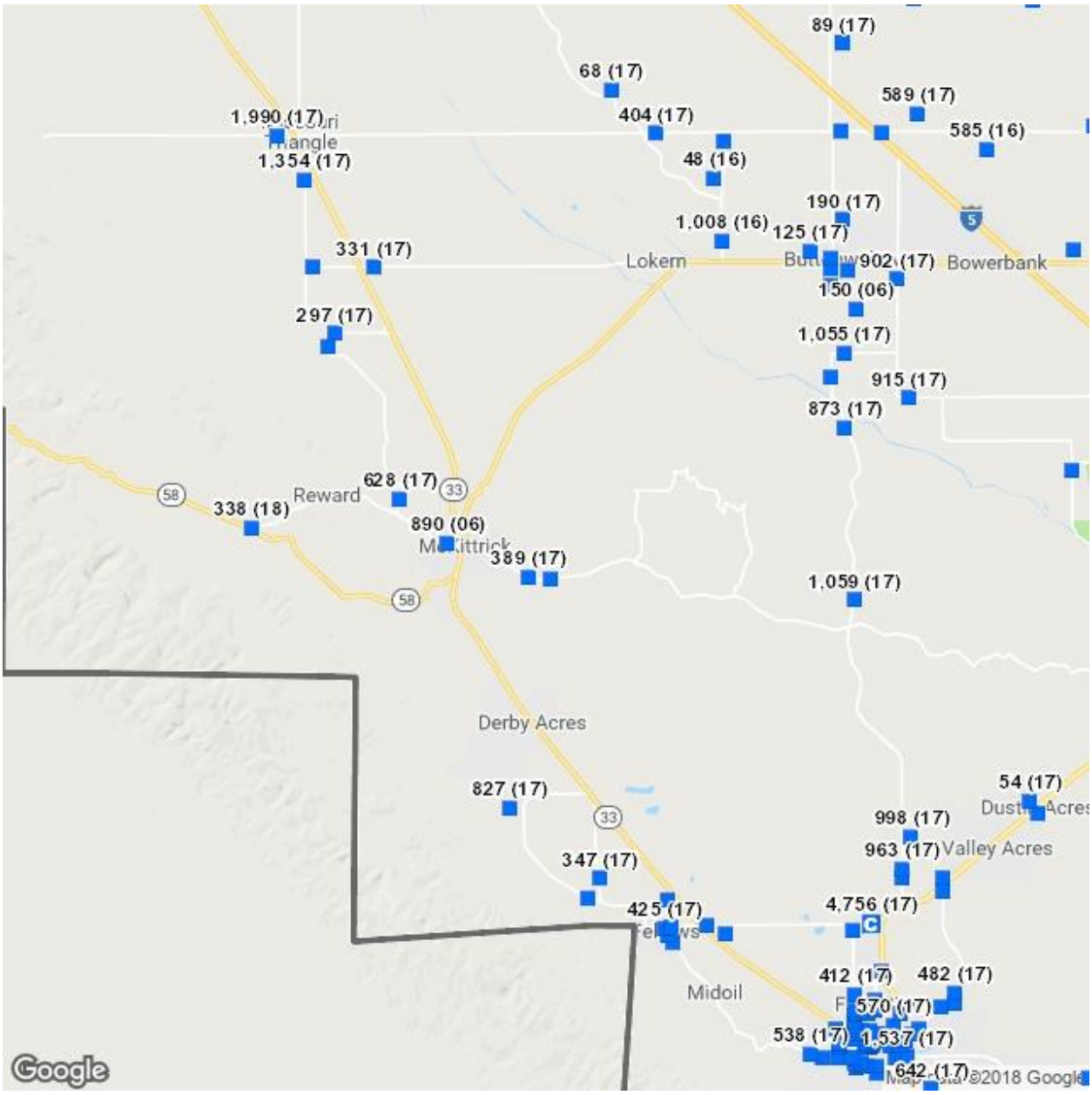
Exhibit 3

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CalTrans Traffic Census 2017

http://www.dot.ca.gov/trafficops/census/volumes2016/Route51-59.html

Rte	County	Post	Description	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
058	SLO	0	JCT. RTE. 101				760	5400	4950
058	SLO	1.54	SANTA MARGARITA, PINAL AVENUE	760	5400	4950	680	4800	4450
058	SLO	1.87	SANTA MARGARITA, J STREET	470	3300	3050	410	2900	2650
058	SLO	3.139	POZO ROAD	430	3000	2800	290	2100	1900
058	SLO	5.44	PARK HILL ROAD	270	1900	1750	150	1100	1000
058	SLO	6.889	JCT. RTE. 229 NORTHEAST	150	1100	1000	150	1100	1000
058	SLO	24.544	CAMMATTI CREEK	140	970	900	140	970	900
058	SLO	45.2	SODA LAKE ROAD	90	650	600	60	430	400
058	SLO	57.15	SAN LUIS OBISPO/KERN COUNTY LINE	30	190	160			
058	KER	0	SAN LUIS OBISPO/KERN COUNTY LINE				30	190	160
058	KER	1.35	KERN/SAN LUIS OBISPO COUNTY LINE	30	190	160			
058	KER	2.7	SAN LUIS OBISPO/KERN COUNTY LINE				30	190	160
058	KER	9.44	REWARD ROAD (ROAD 230)	30	190	160	30	190	160
058	KER	15.42	JCT. RTE. 33	30	190	160	410	2450	1750
058	KER	23.748	LOKERN ROAD	410	2450	1750	650	4700	4100
058	KER	24.76	CORN CAMP ROAD	650	4700	4100	630	4600	4000


89 (17)
68 (17)
589 (17)
1,990 (17)
404 (17)
585 (16)
1,354 (17)
48 (16)
190 (17)
1,008 (16)
125 (17)
331 (17)
Lokern
902 (17)
Bowerbank
150 (06)
297 (17)
1,055 (17)
915 (17)
873 (17)
628 (17)
Reward
338 (18)
890 (06)
389 (17)
1,059 (17)
Derby Acres
827 (17)
54 (17)
998 (17)
963 (17)
Valley Acres
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425 (17)
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Midoil
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Attachments

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Attachment 1

Kern County General Plan Noise Element

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Noise Element

Chapter 3

3. NOISE ELEMENT

3.1 INTRODUCTION

The Noise Element is a mandatory element of the General Plan (California Government Code Section 65302 (f)). The State, recognizing the effects of noise upon people's health and well being, required that local jurisdictions prepare statements of policy indicating their intentions regarding noise and noise sources, establish desired maximum noise levels according to land use categories, set standards for noise emission from transportation facilities and fixed-point sources, and prepare a program for implementation of noise control measures. Noise Elements are prepared in accordance with Guidelines for the Preparation and Content of Noise Elements of the General Plan published by the California Office of Noise Control in 1976. Those Guidelines are found in Appendix A of the General Plan Guidelines prepared by the State Office of Planning and Research (OPR).

The major purpose of the Noise Element is to: (1) establish reasonable standards for maximum desired noise levels in Kern County, and; (2) develop an implementation program which could effectively deal with the noise problem.

Considerable research has been done to determine the effects of various sound pressure levels on human health and on the successful performance of various human activities. It is known that noises of 120 dB(A) and higher will cause ear pain in most people; much lower levels may have permanent adverse effects on hearing.

The federal standards for industrial safety regulate the amount of time workers may be exposed to sound levels above 90 dB(A). This level was selected on the assumption that inability to hear at frequencies above 2,000 Hz is unimportant to speech communication. Tests show, however, that hearing loss of this extent will have an adverse effect on hearing low-level conversation and on hearing ordinary speech in the presence of background noise levels which commonly occur in everyday listening conditions.

It is desirable to control ambient noise level to reduce the adverse effects of noise. Ambient noise is the all-encompassing noise associated with a given environment; it usually is a composite of sounds from many sources, near and far.

The U.S. Environmental Protection Agency and the California Department of Health have suggested standards for ambient noise. These suggestions have been utilized in developing noise standards in Kern County.

Of primary importance in controlling noise in Kern County is protection of the public health, particularly insuring against hearing loss resulting from community noise. Next in importance is minimization of adverse effects of noise on the economic well-being of the community, and third, minimization of annoyance caused by noise.

Good land use planning should be employed to insure that the quality of the noise environment in Kern County does not deteriorate, and whenever practical be improved. Where noise sensitive uses are proposed, appropriate noise control measures shall be required as a condition of approval for discretionary projects. Measures to control the quality of the noise environment could include architectural design to reduce noise impact, acoustical insulation of exterior walls and construction of sound barriers.

The following major noise sources were considered in the preparation of the Noise Element:

- Highways and freeways
- Primary arterial and major local streets
- Railroad operations
- Aircraft and airport operations
- Local industrial facilities
- Other stationary sources

Railroad noise, although louder than highway noise, generally affects smaller areas. Railroad yards and rail alignments adjacent to residential areas should have noise barriers. Acoustical noise barriers could reduce existing rail noise up to 20 dB (A).

Little can be done to control airport noise. Through Federal standards more rigid noise controls are being required on aircraft. By adjusting the times of arrival and departure, flight patterns, and the time of day that high noise levels occur, noise levels from airports can be made more tolerable.

Noise contours have been prepared for all airports in the County, major railroad and highways within urban areas. Airport noise contours should be used to determine where noise insulation might be required and are located in the Airport Land Use Compatibility Plan (ALUCP). Any new airport or airport extension will be required to provide estimates of noise impact in conjunction with the required Master Plan updates to the ALUCP. The highway noise contours are contained in Appendix G. Noise contours for Interstate 5; State Route 14, 33, 43, 58, 99, 119, 155, 166, 178, 184, 202, 204, 223, and 395 are shown in Appendix G. Noise contours for the AT & SF Railroad, Southern Pacific Railroad, and Sunset Railroad are shown in Appendix G. The highway and railroad contours are not intended to provide distinct boundaries between noise levels, but as approximations of noise levels that can serve as the basis for further studies. As

these studies are completed, noise treatment may be needed to compensate for higher noise levels.

Definitions

1. Community Noise Equivalent Level (CNEL) – A measure of the cumulative noise exposure in the community, with greater weights applied to evening and nighttime periods. For CNEL calculations, day is defined as 7 a.m. to 7 p.m., and this period has a weighting factor of one; evening is 7 p.m. to 10 p.m. and has a weighting factor of three; and night is from 10 p.m. to 7 a.m. and has a weighting factor of ten. Noises occurring at night are given a substantially heavier weight, since for most people, this is the time when noise is most disturbing.

2. Day Night Average Sound Level, Ldn – The same as CNEL except that the evening time period is not considered separately, but instead it is included as part of the daytime period. Noise contours developed using CNEL and Ldn procedures will normally agree within one dB(A), which is an insignificant difference. The Ldn is a computational simplification of the CNEL.

3.2 NOISE SENSITIVE AREAS

The following noise sensitive land uses have been identified in the County:

- Residential areas
- Schools
- Convalescent and acute care hospitals
- Parks and recreational areas
- Churches

Goals

1) Ensure that residents of Kern County are protected from excessive noise and that moderate levels of noise are maintained.

2) Protect the economic base of Kern County by preventing the encroachment of incompatible land uses near known noise producing roadways, industries, railroads, airports, oil and gas extraction, and other sources.

Policies

1) Review discretionary industrial, commercial, or other noise-generating land use projects for compatibility with nearby noise-sensitive land uses.

2) Require noise level criteria applied to all categories of land uses to be consistent with the recommendations of the California Division of Occupational Safety and Health (DOSH).

3) Encourage vegetation and landscaping along roadways and adjacent to other noise sources in order to increase absorption of noise.

4) Utilize good land use planning principles to reduce conflicts related to noise emissions.

5) Prohibit new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design. Such mitigation shall be designed to reduce noise to the following levels:

    a) 65 dB L_{dn} or less in outdoor activity areas;
    b) 45 dB L_{dn} or less within interior living spaces or other noise sensitive interior spaces.

6) Ensure that new development in the vicinity of airports will be compatible with existing and projected airport noise levels as set forth in the ALUCP.

7) Employ the best available methods of noise control.

8) Enforce the State Noise Insulation Standards (California Administrative Code, Title 24) and Chapter 35 of the Uniform Building Code concerning the construction of new multiple-occupancy dwellings such as hotels, apartments, and condominiums.

Implementation Measures

The following are programs to be carried out by the Kern County to implement the goals and policies of the Noise Element.

A) Utilize zoning regulations to assist in achieving noise-compatible land use patterns.

B) Require proper acoustical treatment of transportation facilities, including highways, airports, and railroads.

C) Review discretionary development plans, programs and proposals, including those initiated by both the public and private sectors, to ascertain and ensure their conformance to the policies outlined in this element.

D) Review discretionary development plans for proposed residential or other noise sensitive land uses in noise-impacted areas to ensure their conformance with the noise standards of 65 dB L_{dn} or less in outdoor activity areas and 45 dB L_{dn} or less within interior living spaces.

E) Review discretionary development plans to ensure compatibility with adopted Airport Land Use Compatibility Plans.

F) Require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB L_{dn} and interior noise levels in excess of 45 dB L_{dn}.

G) At the time of any discretionary approval, such as a request for a General Plan Amendment, zone change or subdivision, the developer may be required to submit an acoustical report indicating the means by which the developer proposes to comply with the noise standards. The acoustical report shall:

   a) Be the responsibility of the applicant.

b) Be prepared by a qualified acoustical consultant experienced in the fields of environmental noise assessment and architectural acoustics.

c) Be subject to the review and approval of the Kern County Planning Department and the Environmental Health Services Department. All recommendations therein shall be complied with prior to final approval of the project.

H) Encourage cooperation between the County and the incorporated cities within the County to control noise.

I) Noise analyses shall include recommended mitigation, if required, and shall:

a) Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.
b) Include estimated noise levels, in terms of CNEL, for existing and projected future (10 – 20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element.
c) Include recommendations for appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element.
d) Include estimates of noise exposure after the prescribed mitigation measures have been implemented. If compliance with the adopted standards and policies of the Noise Element will not be achieved, a rationale for acceptance of the project must be provided.

J) Develop implementation procedures to ensure that requirements imposed pursuant to the findings of an acoustical analysis are conducted as part of the project permitting process.

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Appendix J.2

Noise Impact Assessment Supplemental Memo

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WZI INC.

September 23, 2020

Mr. Randall Cates
Kern County Planning and Natural Resources
2700 M Street, #100
Bakersfield, CA 93301

CUP 17, Map117

Re: Johe Ranch Project — Noise Impact Assessment (Noise Study) Supplemental Memo

Dear Mr. Cates,

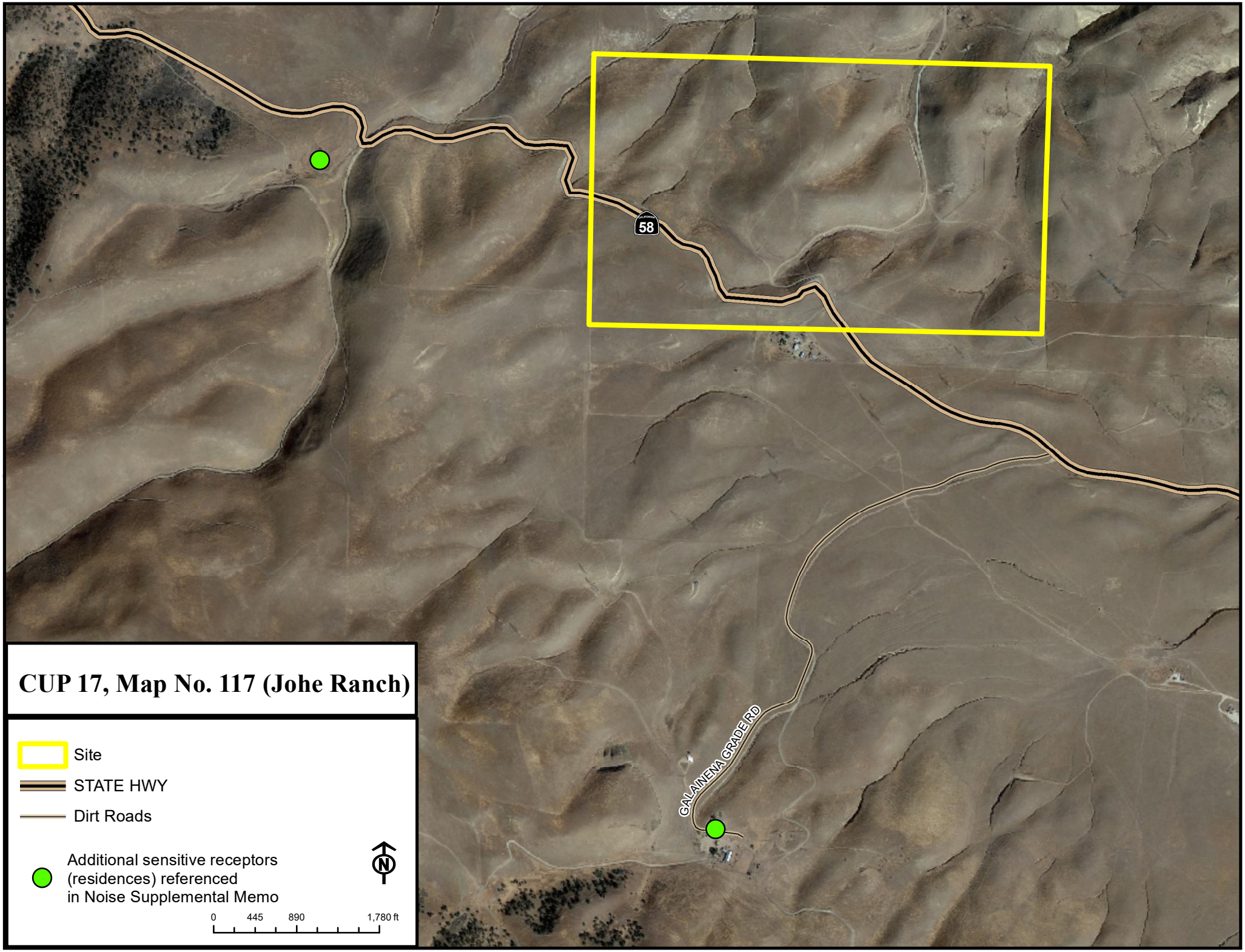
This memo is to serve as a supplement to the GF Industries Noise Impact Assessment (January 2019, revised June 2019) prepared by WZI Inc. for the Johe Ranch Project. This memo provides the following additional information:

Additional sensitive receptors were identified, approximately one mile south of the project site, and approximately one-half mile west of the project site. The receptors were confirmed to be residences (see attached map). The Noise Study concluded that the impact to sensitive receptors that were closer to the project site would be less than significant. Consequently, the impact from the project on the recently identified additional sensitive receptors is considered to be less than significant and does not impact the conclusions of the Noise Study.

Respectfully,

Richard B Wilson, PE
Vice President of Engineering

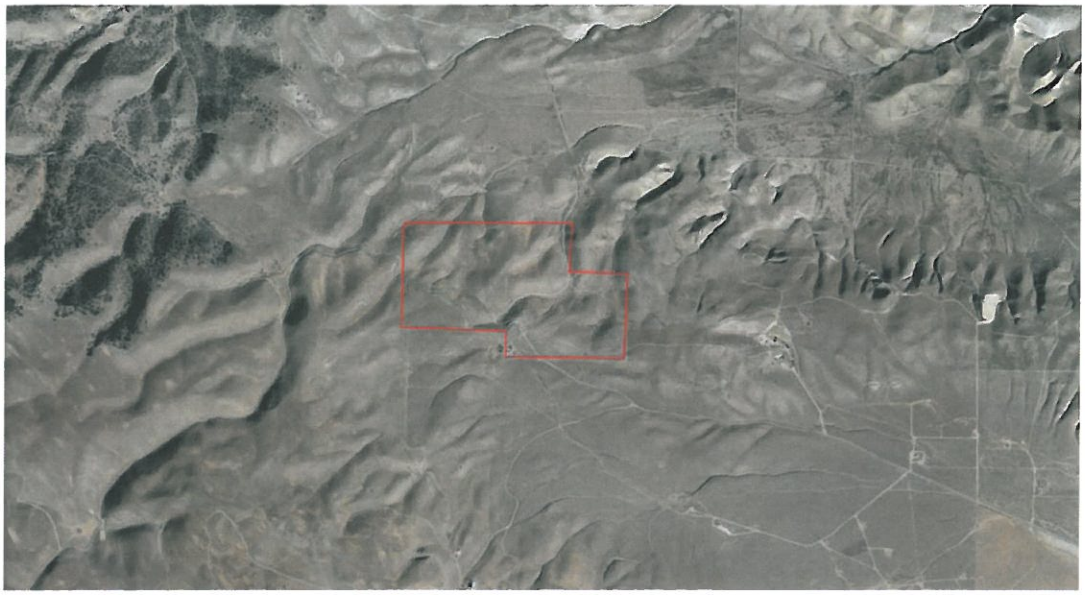
1717 28th Street Bakersfield, California 93301 (661) 326-1112 FAX: (661) 326-0191


58
GALAVENA GRADE RD
CUP 17, Map No. 117 (Johe Ranch)
Site
STATE HWY
Dirt Roads
Additional sensitive receptors
(residences) referenced
in Noise Supplemental Memo
N
0
445
890
1,780 ft

Appendix K

Traffic Impact Study

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Traffic Impact Study

for

Johe Ranch Mine at 68501 Highway 58,

Kern County, California

November 5, 2018

Project No. 15-654

REGISTERED PROFESSIONAL ENGINEER
MATTHEW K. VOVILLA
RCE 43130
Exp. 3-30-2020
11-5-18
CIVIL
STATE OF CALIFORNIA

Submitted by: Matthew K VoVilla 11-5-18

Matthew K. VoVilla, R.C.E. 43130 ***Date***

***LAV//Pinnacle* Engineering**
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Appendix "A" Exhibit and Figures:

Exhibit "A" – Location Map
Exhibit "B" – Vicinity Map

Figure 1: Project Location and Existing Street Network
Figure 2: Year 2018 Existing A.M. Peak Hour Volumes & Turning Movements
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APPENDIX "B" – Level of Service Calculations

I. INTRODUCTION

This traffic impact study was prepared as a component of the environmental document for the proposed Johe Ranch Mine located at 68501 Highway 58 in the County of Kern, California.

A. Project Description

The Project proposes to mine diatomaceous earth within a 331 acre site within the following Assessor's Parcel Numbers: 156-070-01, 156-070-02, and 156-070-10. Mined diatomaceous soils will be transported in dump trucks on public roadways to various locations in the State.

The site is within western Kern County and within a portion of Section 7, Township 30 South, Range 21 East, MD Base and Meridian, and is shown on Exhibit "A" herein. From the nearest town of McKittrick, the site can be accessed by traveling 8.5 miles west on State Highway 58 to the Project entrance gate on the north side of the road.

The Project will have roughly 2,000 feet of frontage along State Highway 58; however, all ingress and egress will be from the single improved entrance and gate. As discussed in further detail later in this report, this entrance is planned to be improved to accommodate Project traffic.

Although the site comprises 331 acres, only 93.67 acres will be disturbed by the mining operation. Most of the disturbed area, 93.42 acres will be within Assessor's Parcel 156-070-01, and the 0.25 acre balance of disturbance will be within Assessor's Parcel 156-070-02.

In accordance with the Surface Mining and Reclamation Act (SMARA), a Surface Mining Permit and Reclamation Plan has been submitted to the County of Kern. Kern County is the designated lead agency for SMARA applications.

The Project site is currently Zoned "A" – Exclusive Agriculture, and is currently used for cattle grazing.

Exhibit "B" herein shows the Project site and its vicinity.

B. Existing and Surrounding Land Use

The Project site, and all adjacent property is entirely Zoned "A" – Exclusive Agriculture, and is currently used for cattle grazing. There are no lands under cultivation in the vicinity of the Project.

The Project site is very remote, with McKittrick being the closest town at 8.5 miles to the east. McKittrick is an unincorporated Kern County enclave with a population of roughly 115.

There are occasional agricultural related buildings such as barns and corrals in the Project's vicinity; and there is an operating ranch on the south side of S.R. 58 directly opposite the Project entrance that includes a single-family home.

II. EXISTING LOCAL STREET NETWORK

The following is a description of streets in the vicinity of the site, which may be impacted to some extent by the Project.

State Route (S.R.) 58 is a designated east-west highway that is a two-lane road in the vicinity of the Project. As Stated, S.R. 58 is the only point of ingress and egress for the Project. In the vicinity of the project, the alignment of SR 58 is very curvy and has numerous hills and sags. Generally the road has a double-yellow center stripe to prohibit passing. In most segments, sight distance is not sufficient for safe passing. Again, the roadway has two paved lanes without shoulders; however an occasional turn-out is provided. Although S.R. 58 does connect populated areas along S.R. 99 with S.R. 101, it is a less preferred route to and from the California Coast due to limited laneage and said curvy alignment.

The westerly terminus of Highway 58 is at its junction with S.R. 101 near San Luis Obispo, which is roughly 117 miles west of its intersection with State Route (S.R.) 99. The easterly terminus of Highway 58 is at Interstate 15 (I-15) in Barstow roughly 125 miles east of S.R. 99.

In addition to S.R. 101, S.R. 58 also connects S.R. 43, S.R. 33 Interstate 5 (I-5), S.R. 99, S.R. 14, and U.S. Route 395.

Reward Road is a designated east-west arterial that is a two-lane road in the vicinity of the Project and passes through McKittrick, CA. Reward Road intersected S.R. 58 roughly 3.5 miles east of the Project.

State Route 33 (S.R. 33) is a designated two-lane, north-south highway with its northerly terminus at Interstate 5 near Tracy and its southerly terminus at State Route 1/ U.S. Route 101 in Ventura. Highway 33 also connects S.R.132, S.R. 152, S.R. 180, S.R. 198S.R. 46, S.R. 58, S.R. 166, and S.R. 126.

S.R. 33 and S.R. 58 share one mile of their alignment through McKittrick.

III. METHOD OF ANALYSIS & TRAFFIC ESTIMATES

A. General

Additional detailed descriptions of methods and “findings” are provided in the appropriate sections herein. However, as a preface to the following sections, a brief step-by-step description used for analysis in this report, as follows:

1. Existing conditions of the Project and surrounding area are surveyed, including traffic volumes, laneage, and intersection control.

2. Project-generated traffic, based on the proposed land use, is estimated and distributed onto the existing street network.

3. Using growth rates extracted from Kern Council of Governments (Kern COG) computer traffic model, Future Traffic Volumes are estimated for Year 2040 and any earlier year that is considered "opening day" for the Project. However, in this case, mining operations are intended to commence as soon as possible upon regulatory approvals. There present day conditions were considered "opening day", and therefore no interim analysis was performed.

4. The estimated Project-generated traffic is added to existing traffic volumes, and to future traffic volumes (estimated as described in Item 3 above), to determine the total traffic for present and future years.

5. Street segments and intersections are then analyzed for "Level of Service" (LOS) for the various scenarios: A) Existing conditions with No Project; B) Existing Conditions with Project; C) Year 2040 with No Project; D) Year 2040 with Project, and as discussed in following items, E) And if necessary, Year 2040 with Project and proposed mitigation improvements. If warranted, street and intersections, with the addition of Project Traffic, are analyzed for an "opening day" scenario. However, since the mine intends to commence operation as soon as permitting is approved, existing conditions were considered representative of "opening" day.

   Mitigation or capacity/level of service improvements are then determined for any of the above scenarios which result in an unacceptable "Level of Service" (LOS). Resultant or "after mitigation" LOS's are determined for proposed mitigation improvements. If improvements to the facility are funded by the RTIF, they are evaluated for adequacy under future traffic conditions. The Project's obligation for funding of any needed mitigation improvements that not already funded by the RTIF program is also determined. The Project's obligation, in very simplified terms, is the ratio of Project-generated traffic to total estimate future year traffic volume.

Again, in the following sections, methodology, findings, and mitigation are discussed in further detail.

B. Traffic Counts

Traffic counts were performed over the existing street network to determine existing intersection volumes, turning movements, and traffic flow patterns. As discussed in the following section, future year traffic volumes are estimated by applying annual growth rates derived from Kern COG modeling to existing counts.

Traffic counts were performed during the morning and evening peak periods during weekdays, excluding Mondays, Fridays, holidays, and days preceding or following holidays. Weekdays before or after holidays are not representative of normal traffic patterns and thus are not counted or included in the database.

Counts were performed during the morning peak period between 6:30 A.M. and 8:30 A.M. as well as the evening peak period between 4:00 P.M. and 6:00 P.M. The peak one-hour period within window counted was determined as well as the peak hour volume. Often the peak hour for one intersection or street is slightly different than others. In this study, conservatively, the highest one-hour volumes for each intersection or street segment within the peak periods were used for analysis in this report.

The evening peak hour, as opposed to the morning peak hour, yielded the highest one-hour volume. Therefore, the intersection of SR 58 and Reward Road was analyzed for the evening peak periods. It should be noted that the evening existing peak hour traffic volume counts were as much as 30% higher than the morning peak hour field counts.

Figures 2 & 3, included in Appendix "A" of this study, show the peak hour volumes during the morning and evening peak period, respectively, for all facilities counted. These figures also show the actual turning movements at all counted intersections.

C. Future Year Traffic Volumes

Future traffic for Year 2040 was estimated by applying growth rates derived from the Kern Council of Governments (Kern COG) computer traffic model. (Kern COG is an association of city and county governments created to address regional transportation issues. Kern COG maintains a computer traffic model for Kern County, which includes monitoring of demographic trends).

Table 1 herein shows the Kern COG traffic model projections for State Route 58 (SR 58) in the Project's vicinity for Years 2015 and 2042. As shown in Table 1, the average annual growth rate was calculated to be 1.6% for SR 58.

Table 1: Projected Average Annual Growth Rates

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Item No.	**Road Segment**	**From**	**To**	**Year 2015 Average Daily Volume**	**Year 2042 Average Daily Volume**	**Average Annual Growth Rate (%)**	**Factor: Year 2018 to Year 2040**
1.	SR 58	SR 33	Reward Road	146	227	1.6%	1.4328

Figures 6 and 7, included in Appendix "A", show the Year 2040 peak hour volumes and turning movements that were extrapolated using a 1.6% average annual growth rate (with and without Project-generated traffic) for the evening peak hour period.

D. Project Generated Traffic

In typical traffic studies, Project generated vehicular trips are estimated using the *Institute of Transportation Engineers Trip Generation Manual*, 9th Edition, hereinafter referred to as the ITE Manual. The ITE Manual provides mathematical correlations between various land uses and trip generation. The ITE Manual provides average rates for each land use type and in some cases a fitted mathematical curve. However, the ITE Manual does not provide trip generation rates for mining operations.

In this case, the origins of trips to the mine, as well as destination of trips from the mine are well documented. Trip generation from the mining operation will consist of arrivals and departures of employees, arrivals and departures of a water trucks, and arrivals and departures of dump trucks that pick up and transport diatomaceous earth to various destinations.

The following Table 2 indicates the Project is estimated to generate 118 average daily trips (ADT), 26 evening peak hour trips and 26 morning peak hour trips. Again, these include the arrivals and departures of 3 employees, a water truck, and dump trucks that pick up and haul the mined product to various destinations.

Table 2: Johe Ranch Mine – Project Trip Generation: Average Daily Traffic, AM & PM Peak Hour & Breakdown of Arrivals and Departures

Item	Origin to Destination	*24 Hour Trips - ADT*		*Peak Hour Trips - AM & PM*			
		Arrivals	Depart's	AM Peak Hour		PM Peak Hour	
				Arrivals	Depart's	Arrivals	Depart's
1	National Cement in Lebec ***to*** Johe Ranch Mine	10	0	2	0	2	0
2	Johe Ranch Mine ***to*** National Cement in Lebec	0	10	0	2	0	2
3	Johe Ranch Mine Employees arriving and departing same day	3	3	3	0	0	3
4	Water Trucks arriving and departing same day	6	6	1	1	1	1
5	Southbound Trucks Stopping at Johe Ranch Mine & continuing ***to*** Southern Cal Destinations on same day.	10	10	2	2	2	2
6	Northbound Trucks Stopping at Johe Ranch Mine & continuing ***to*** various northerly destinations on same day.	10	10	2	2	2	2
7	Lehigh Cement in Tehachapi to Johe Ranch Mine	10	0	2	0	2	0
8	Johe Ranch Mine to Lehigh Cement in Tehachapi	0	10	0	2	0	2
9	Cal Portland Cement in Mojave ***to*** Johe Ranch Mine	10	0	2	0	2	0
10	Johe Ranch Mine ***to*** Cal Portland Cement in Mojave	0	10	0	2	0	2
	Totals:	59	59	14	12	12	14
	Totals- ADT, AM Peak Hr., PM Peak Hr.:	118		26		26	
	Percentage of ADT	100%		22%		22%	

Note: Since the above trip quantities are taken from transportation logs, there was no reason or other justification to take reductions due to the phenomena known as “capture”, “pass-bys” or diverted link trips.

E. Trip Distribution and Assignment

A significant portion of the weekday trips to and from the Project during the peak hour of adjacent street traffic are anticipated to be primary trips. Therefore, Project-generated trips were distributed onto the street networks based on the mines existing transportation records.

Figure 4, included in Appendix "A" of this report, shows the distribution of Project traffic generated during the peak hour of the adjacent street network. Again, Figure 4 represents known transportation routes from or to the known destinations shown in Table 2.

F. Trip Assimilation

Since trip generation and distribution are based on reliable data, with known destinations, there was no justification to take reductions due to assimilation.

IV. IMPACT OF PROJECT TRAFFIC

A. Level of Service (LOS)

Operational analysis of streets and intersections were performed using methods outlined in the *Transportation Research Board, National Research Council* *Highway Capacity Manual*, HCM, 2010.

Level of Service (LOS) is the generally accepted gauge for describing the quality of operation of either a road segment or street intersection. Other attributes of operational quality associated with each Level of Service are v/c - volume to capacity ratio, vehicle delay through an intersection, and reserve capacity of an intersection approach. For each type of street segment or intersection analysis, the Level of Service criteria varies slightly. Levels of Service for every type of roadway or intersection are described thoroughly in the *Highway Capacity Manual*, however, the following brief descriptions have been provided:

Table 3: Level of Service for Signalized Intersections

Level of Service	Stopped Delay per Vehicle (sec.)
A	< 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	> 60.0

Table 4: Level of Service for Un-Signalized Intersections

Level of Service	Reserve Capacity (DCPH)	Expected Delay to Minor Street Traffic
A	≥ 400	Little or no delay
B	300-399	Short traffic delay
C	200-299	Average traffic delay
D	100-199	Long traffic delay
E	0-99	Very long traffic delay
F	Note 1	See Note 1

Note 1: When demand volume exceeds the capacity of the lane, extreme delays will be encountered. This condition usually warrants improvement to the intersection.

Table 5: Level of Service for Highways and Arterials

Level of Service	Description
A	Free flow conditions, unimpeded ability to maneuver and pass, very little delay, no platoons, highest average travel speeds.
B	Mostly free flow conditions; presence of other vehicles begins to be noticeable. Passing is required to maintain speeds, slightly less average travel speeds than Level of Service "A".
C	Traffic density clearly affects the ability to pass and maneuver within the stream. Speeds are reduced to about 50 mph on highways and to about 50% of the average on urban arterials.
D	Unstable flow. Speeds are reduced from 40% to 60% of normal. Passing demand is high although mostly impossible on 2-Lane Highways. Traffic disruptions usually cause extensive queues.
E	Very unstable flow at or near capacity. Passing and maneuvering virtually impossible. Extensive platooning on highways and queuing on arterials. Speeds range from 20 mph or less on arterials and 2-Lane Highways, and up to 50 mph on Multi-Lane Highways.
F	Forced or breakdown flow. Demand exceeds capacity. Vehicles experience short spurts of movement followed by stoppages. Intersection congestion, long queues and delays are common.

B. Traffic Impact Analysis

As discussed in Section III herein, Project-generated traffic was distributed onto the existing street network based on existing patterns. In accordance with Kern County criteria, any street segment or intersection, currently operating at or above a "C" Level of Service, must be analyzed if it receives 50 or more Project-generated peak hour trips. If the facility currently operates at a "D", "E" or "F", the analysis threshold drops to 40, 20 and 10 trips, respectively.

The following lists the various scenarios that were analyzed for Level of Service (LOS).

1. **Existing Year 2018 A.M. Peak Hour without Project – ("No Project" Scenario).** These volumes are actual traffic counts, as discussed in Section III, and are shown in Figure 2 herein.

2. **Existing Year 2018 P.M Peak Hour without Project – ("No Project" Scenario).** These volumes are actual traffic counts, as discussed in Section III, and are shown in Figure 3 herein.

3. **Year 2018 P.M. Peak Hour Volumes with the addition of Project-Generated traffic.** These volumes can be referenced in Figure 5 of this report.

4. **Year 2040 P.M. Peak Hour Volumes without the addition of Project-Generated Traffic ("No Project" Scenario).** These volumes can be referenced in Figure 6 of this report.

5. **Year 2040 P.M. Peak Hour Volumes plus Project-Generated Traffic.** These volumes can be referenced in Figure 7 of this report.

6. If warranted, Level of Service calculations were performed for the facility with proposed mitigation improvements. The criteria for mitigation have been discussed in Section V of this report.

Again, it is noted that the morning peak hour field count for SR 58 and Reward Road yielded volumes that were as much as 30% less than the evening peak hour traffic count. The P.M. peak hour was considered the "worst case" scenario, and used for the analysis.

Level of Service calculation methods were taken from the above referenced *Highway Capacity Manual*. Computer software from "McTrans Highway Capacity" package was used to facilitate extensive calculations. All computer-generated reports have been included in Appendix "B" of this report.

Summaries of the Level of Service calculations for the various scenarios described have been included in the following tables:

- Table 6 shows the results of the intersection Level of Service calculations.

- Tables 7 shows the results of Level of Service calculations for various street segments within the scope of this study.

It is noted that Level of Service calculations yielded an “A” for any and all scenarios.

TABLE 6: Intersection Level of Service (LOS)

Legend: **S = Signalized** **1W = One Way Stop Control** **2W = Two Way Stop Control** **4W = All Way Stop**

				Northbound			Southbound			Eastbound			Westbound					
No.	**Intersection**	**Time Period**	**Control**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Left**	**Thru**	**Right**	**Comp LOS**	**Intersection Delay (sec/veh)**	**Peak Hour Warrant Met (Yes/No)**
1)	SR 58 and Reward Road	Year 2018 P.M. Existing	1W	-	-	-	A	-	A	A	A	-	-	-	-	A	8.6	No
		Year 2018 P.M. with Project	1W	-	-	-	A	-	A	A	A	-	-	-	-	A	8.7	No
		Year 2040 P.M. without Project	1W	-	-	-	A	-	A	A	A	-	-	-	-	A	8.6	No
		Year 2040 P.M. with Project	1W	-	-	-	A	-	A	A	A	-	-	-	-	A	8.8	No

TABLE 7: Street Segment Level of Service

				(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
				Year 2018 Existing P.M. Volumes (Figure 3)		**Year 2018 P.M. Plus Project Traffic (Figure 5)**		**Year 2040 P.M. Without Project Traffic (Figure 6)**		**Year 2040 P.M. Plus Project Traffic (Figure 7)**	
(1)	**(2)**	**(3)**	**(4)**								
Item	**Street Segment**	**Limits**	**Existing Laneage - Both Directions**	**PH Vol (vph) (wb/eb) or (sb/nb)**	**Level of Service (LOS)**	**PH Vol (vph) (wb/eb) or (sb/nb)**	**Level of Service (LOS)**	**PH Vol (vph) (wb/eb) or (sb/nb)**	**Level of Service (LOS)**	**PH Vol (vph) (wb/eb) or (sb/nb)**	**Level of Service (LOS)**
1)	SR 58	Project Location/Reward Road	2	6/13	A	16/26	A	9/19	A	20/32	A

C. Traffic Signal Warrant Analysis

Non-signalized intersections within the Project vicinity were analyzed for satisfaction of the Peak Hour Volume Warrant as described in Section 9 of the Caltrans Traffic Manual and the **Manual of Uniform Traffic Control Devices**. A brief explanation of the intersection warrant analysis is provided as follows:

The Manual of Uniform Traffic Control Devices (MUTCD) prescribes "tests" which are conducted to determine the need for installation of a traffic signal. These "tests" are referred to as "warrants". The MUTCD list minimum signal "warrants", which have been adopted by the California Department of Transportation and most California agencies, including the City of Bakersfield and the County of Kern. These "warrants" consist of evaluation of various criteria that have been determined as critical for the installation of a signal. The warrant criterion has been derived empirically.

In actual practice, justification for signal installation is usually based on satisfaction of a number of warrants as well as poor Levels of Service for multiple movements. In keeping within the scope of this traffic study, non-signalized intersections were evaluated for signalization, including expansion of the intersection, based solely on satisfaction of the Peak Hour Signal Warrant described in The Manual of Uniform Traffic Control Devices (MUTCD).

Table 8 herein provides intersection volumes and indicates whether or not the Peak Hour Warrant is satisfied for all existing and future scenarios. In the single case analyzed, the intersection of S.R. 58 and Reward Road, a traffic signal was not warranted.

Table 6 herein provides also provides a column indicating whether or not the Peak Hour Warrant was satisfied for each scenario. Again, there was not an intersection scenario, present day or future that met the minimum thresholds to warrant a traffic signal.

Table 8: Peak Hour Warrant Analysis

		Year 2018 Existing P.M. Volumes (Figure 3)			Year 2018 Existing P.M. Volumes Plus Project (Figure 5)			Year 2040 P.M. Volumes (Figures 6)			Year 2040 P.M. Volumes Plus Project (Figure 7)		
No.	**Existing Non-Signalized Intersection**	**Highest Minor Approach Volume (vph)**	**Total Major Approach Volume (vph)**	**Peak Hour Warrant Satisfied**	**Highest Minor Approach Volume (vph)**	**Total Major Approach Volume (vph)**	**Peak Hour Warrant Satisfied**	**Highest Minor Approach Volume (vph)**	**Total Major Approach Volume (vph)**	**Peak Hour Warrant Satisfied**	**Highest Minor Approach Volume (vph)**	**Total Major Approach Volume (vph)**	**Peak Hour Warrant Satisfied**
1)	SR 58 and Reward Road	5	15	No	5	38	No	7	22	No	7	45	No

V. TRAFFIC MITIGATION

A. Requirements for Mitigation

Mitigation is normally considered necessary if a particular intersection or street segment, under any existing or future scenario, (with or without the addition of Project-generated traffic), is anticipated to function at a less than Level of Service (LOS) "C". Generally, the objective of traffic mitigation is to restore the Level of Service to a "C" or better.

B. Funding for Mitigation Improvements

A more complicated issue is funding for traffic mitigation improvements, and the Project's obligation or share of those costs. If mitigation is warranted, and degradation of the facility is direct result of anticipated Project traffic, the Project will usually have an obligation to fund all or part of required mitigation improvements. Funding from the project can be a pro-rata amount, based on a formula of percentage of traffic to total traffic. However, there are variations on this formula depending on the governing agency. The Project's obligation for funding mitigation can also adjusted based on other factors to include agency traffic impact fees and contributions from other projects. In this case, the Project will likely pay a Kern County Transportation Impact fee. However, the analysis indicated no roadway or intersection improvements were needed to mitigate Level of Service.

C. Warranted Mitigation

As discussed in detail earlier in this report, a poor operational Level of Service for multiple movements, and satisfaction of the Peak Hour Warrant were considered justification for installation of a traffic signal or upgrading an existing signalized intersection (to full expansion in accordance with all local standards).

Degradation of the LOS of a street segment to less than "C", whether or not attributable to Project-traffic, was considered justification for mitigation. However, as indicated by the Level of Service Calculations results shown in both Table 6 and 7, there were no scenarios, present or future that warranted mitigation. All facilities are estimated to function at a very good LOS well into the future.

VI. CONCLUSIONS & RECOMMENDATIONS

Under all present and future traffic scenarios, including the impact of the Project, this study has shown that all intersections and street segments, in their present form, are estimated to operate at a Level of Service of "A". Therefore the Project has no obligation to fund any improvements that enhance or better LOS.

However, as part of the engineering design process for the Project entrance, an analysis of sight distance is needed to determine a safe speed for S.R. 58 at this location. As can be seen on Figure 1, the curve immediately to the west of the Project entrance has a radii of roughly 180

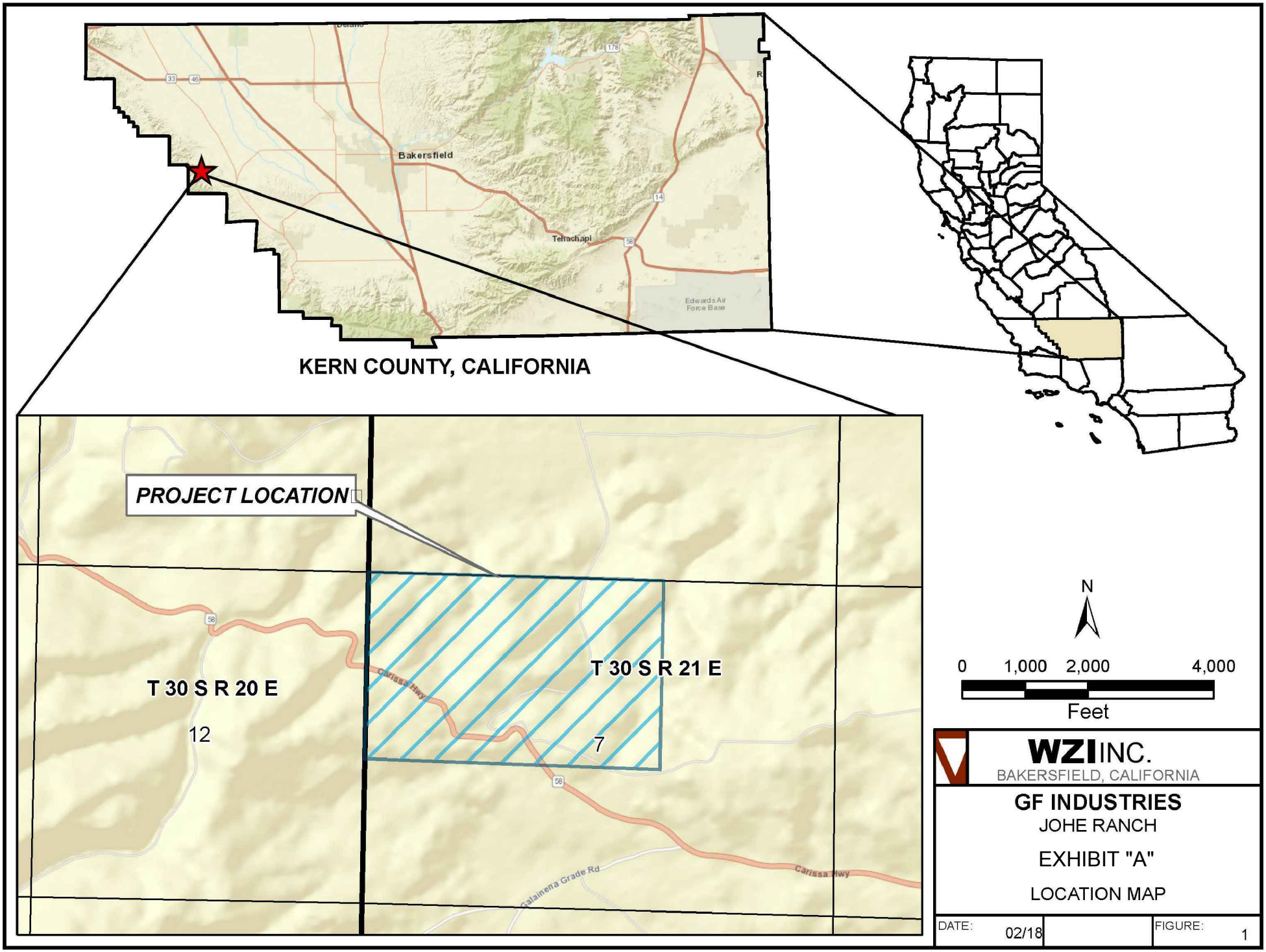
feet. This analysis may prove the need for speed reduction signing and/or trucks entering signing.

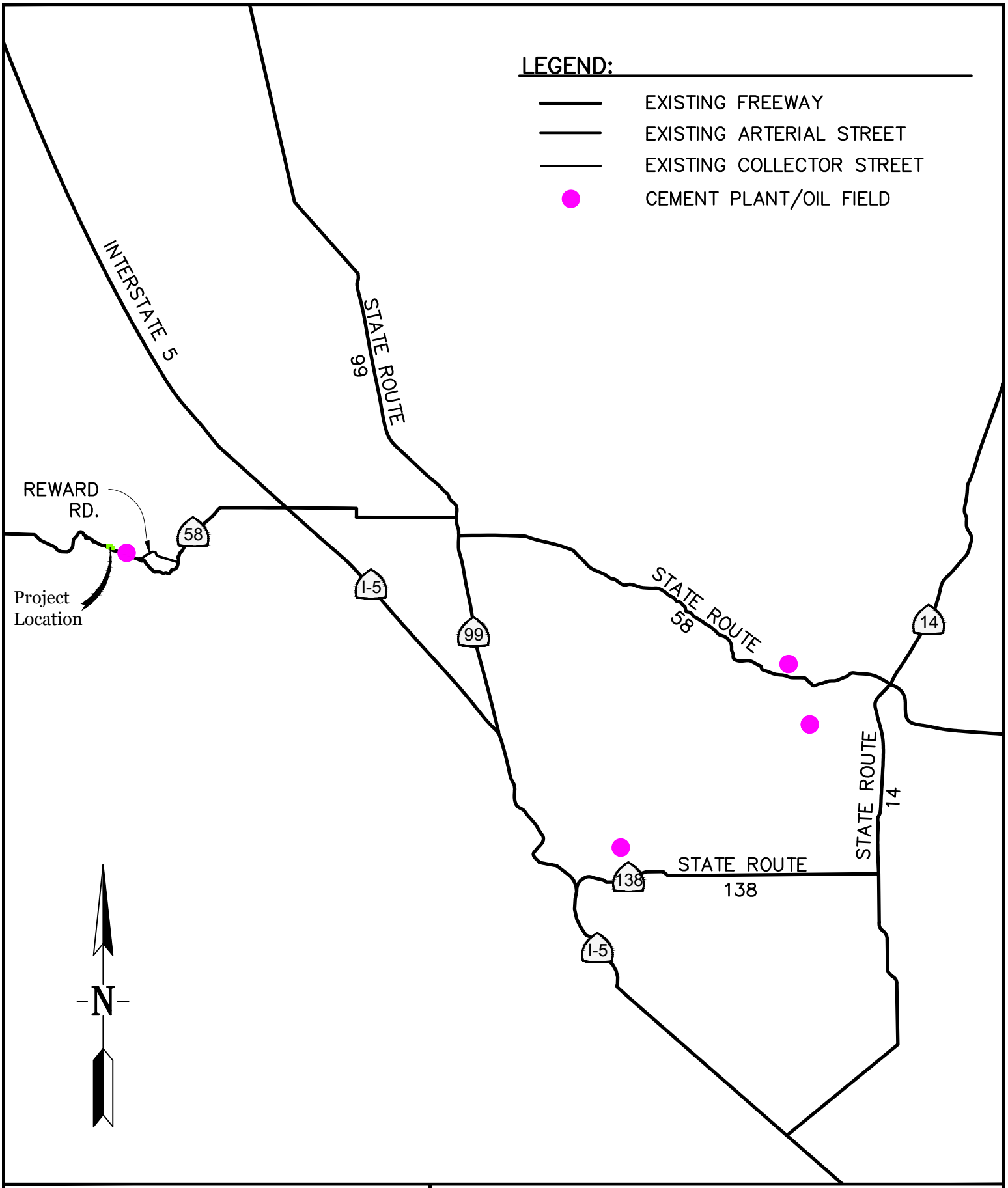
Finally, the calculations and "findings" of this report have shown the impact of the Project to its surrounding street network will be "less-than-significant".

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Appendix “A”
Exhibit and Figures

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Bakersfield
Tehachapi
Edwards Air Force Base
KERN COUNTY, CALIFORNIA
PROJECT LOCATION
T 30 S R 20 E
12
T 30 S R 21 E
7
Carissa Hwy
Galaineno Grade Rd
N
0 1,000 2,000 4,000
Feet
WZI INC.
BAKERSFIELD, CALIFORNIA
GF INDUSTRIES
JOHE RANCH
EXHIBIT "A"
LOCATION MAP
DATE: 02/18
FIGURE: 1



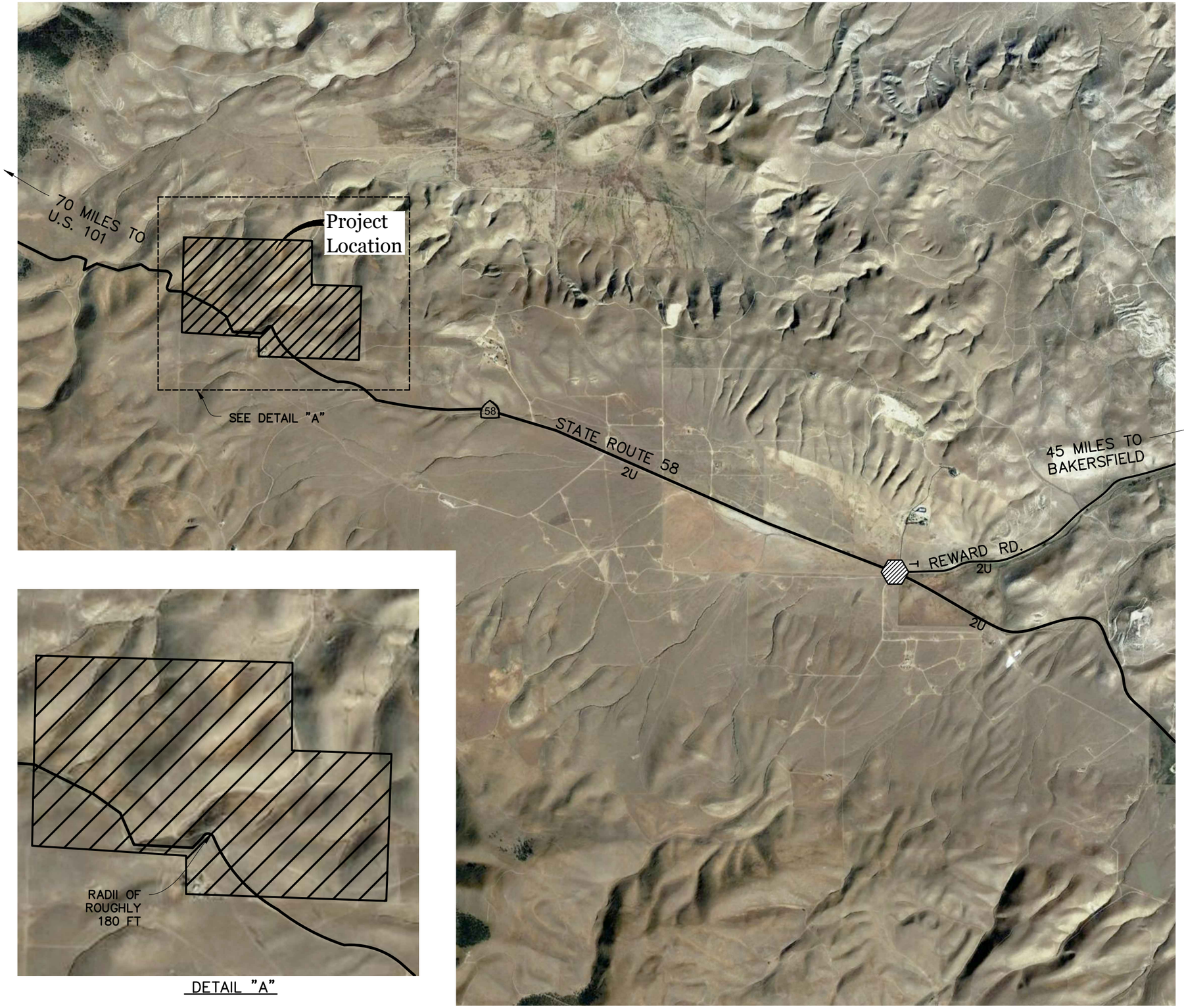
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Exhibit "B" - Vicinity Map
Traffic Impact Study for Johe Ranch Mine
Bakersfield, California

JOB No.: 15-654	DWG No.: EXHIBIT "B"	DATE: NOVEMBER 2018

FIGURE 1

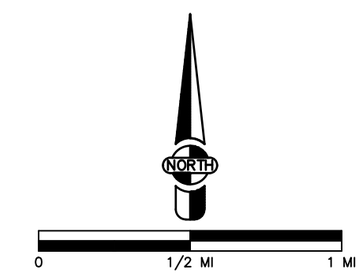
PROJECT LOCATION AND EXISTING STREET NETWORK



DETAIL "A"

LEGEND:

———	EXISTING FREEWAY
———	EXISTING ARTERIAL STREET
———	EXISTING COLLECTOR STREET
58	STATE ROUTE 58
T	EXISTING STOP SIGN
	EXISITNG TRAFFIC SIGNAL
2U	TWO LANE UNDIVIDED
2D	TWO LANE DIVIDED
	INTERSECTION STUDIED

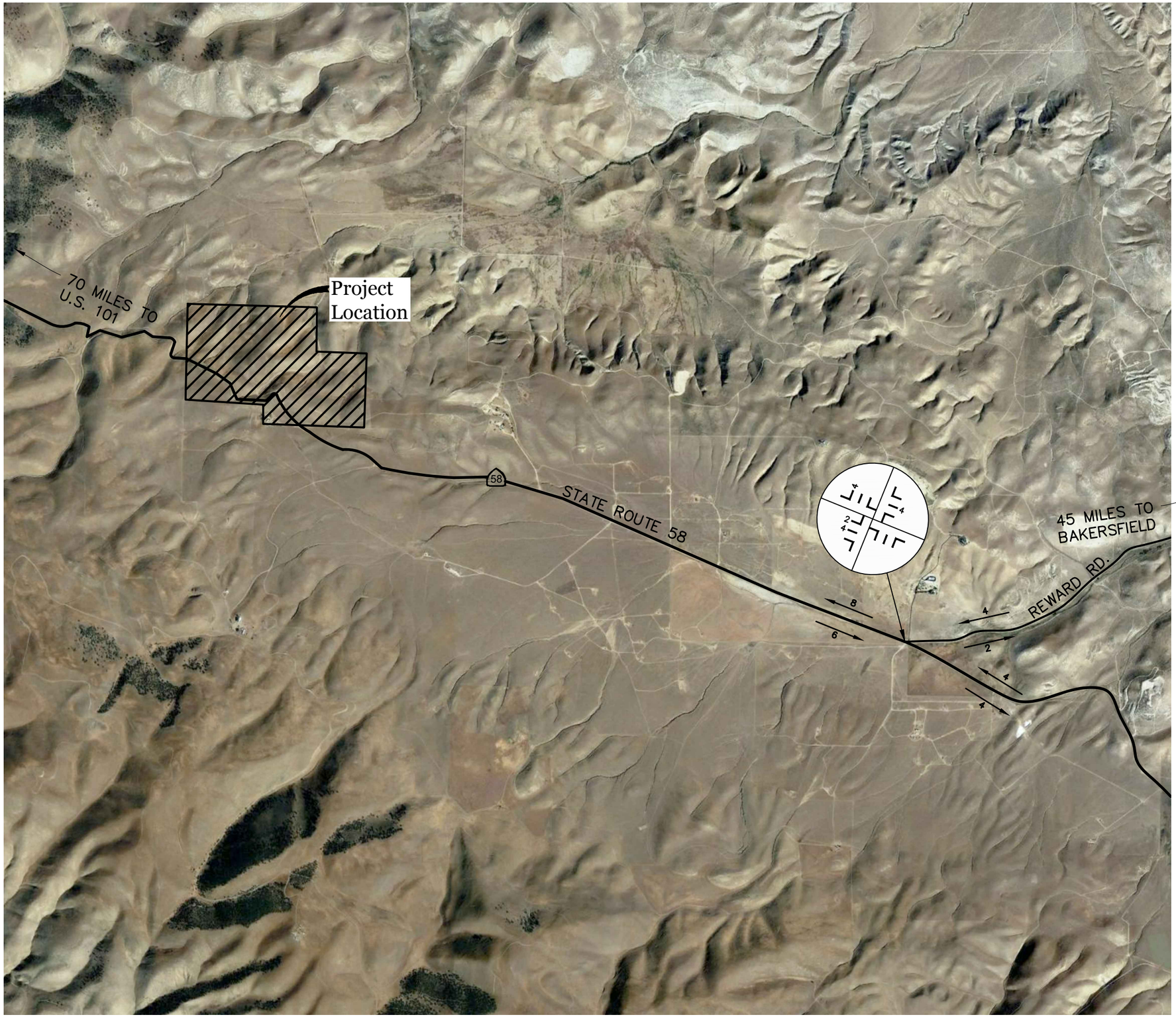


DATE: NOVEMBER 2018

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FIGURE 2

YEAR 2018 EXISTING A.M. PEAK HOUR VOLUMES AND TURNING MOVEMENTS



LEGEND:

- EXISTING FREEWAY
- EXISTING ARTERIAL STREET
- EXISTING COLLECTOR STREET
- xx — SEGMENT VOLUME – PEAK HOUR

INTERSECTION TURNING MOVEMENTS

NORTH

0 1/2 MI 1 MI

DATE: NOVEMBER 2018

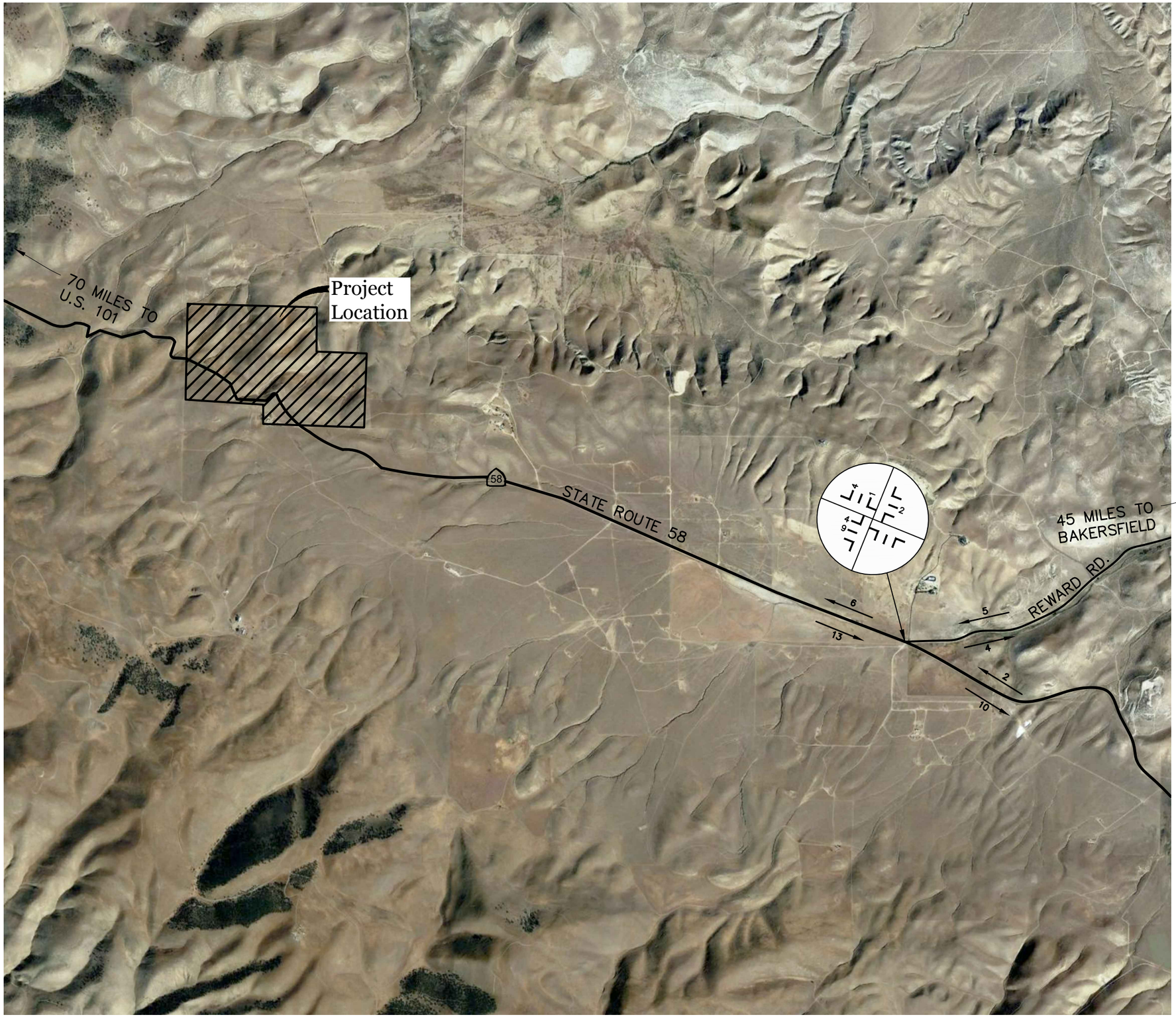
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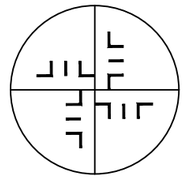
FIGURE 3

YEAR 2018 EXISTING P.M. PEAK HOUR VOLUMES AND TURNING MOVEMENTS

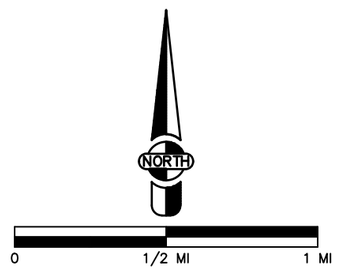


LEGEND:

- EXISTING FREEWAY
- EXISTING ARTERIAL STREET
- EXISTING COLLECTOR STREET
- XX — SEGMENT VOLUME – PEAK HOUR



INTERSECTION TURNING MOVEMENTS

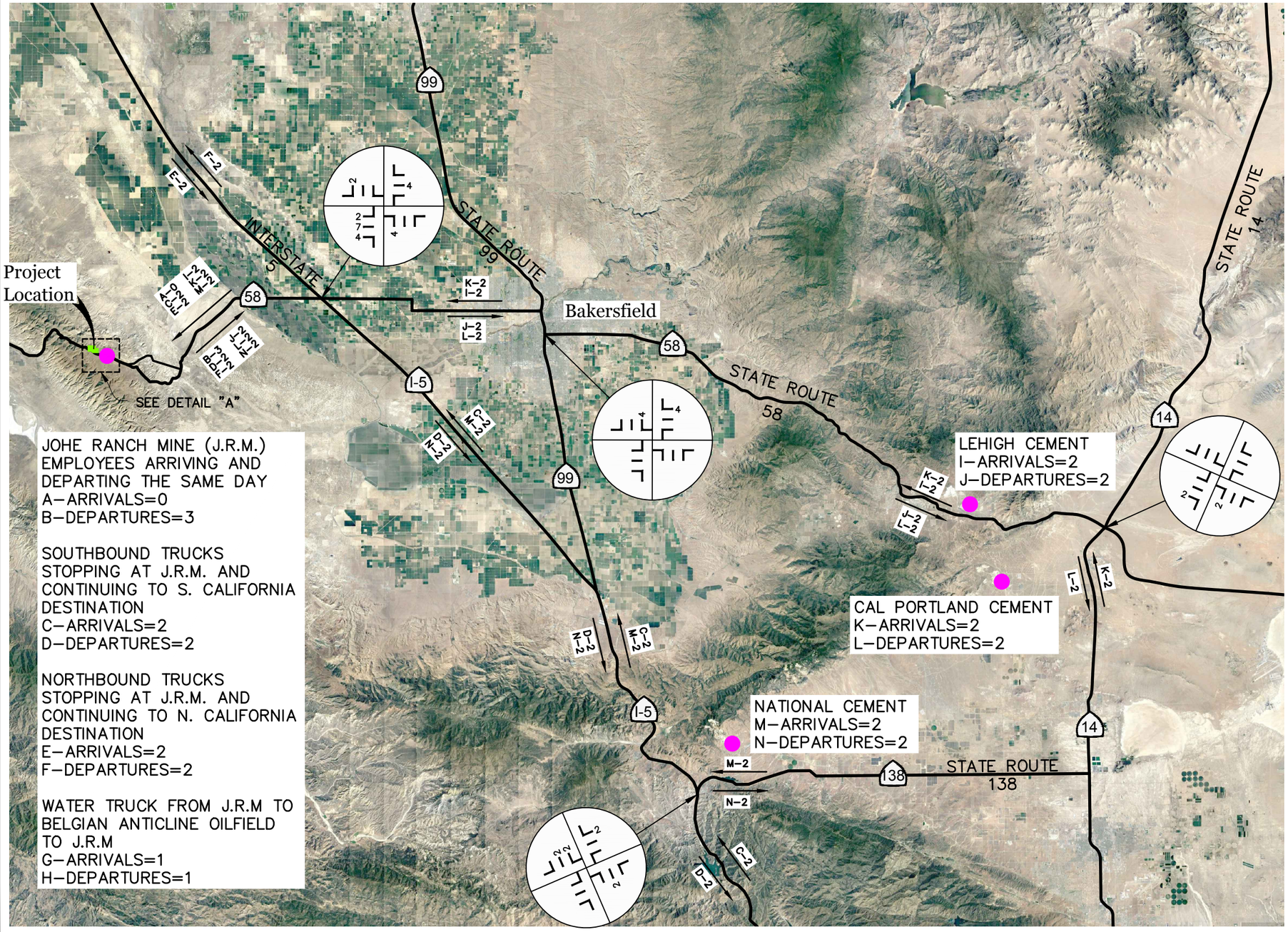


DATE: NOVEMBER 2018

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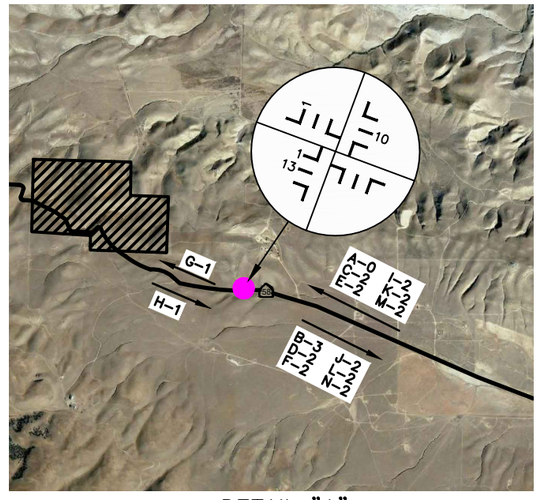
FIGURE 4

P.M. PROJECT GENERATED TRAFFIC

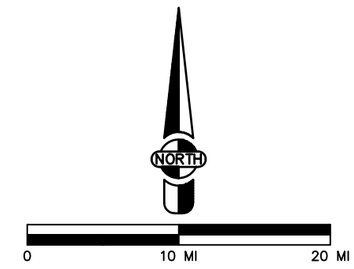


LEGEND:

- EXISTING FREEWAY
- EXISTING ARTERIAL STREET
- EXISTING COLLECTOR STREET
- XX — SEGMENT VOLUME – AVERAGE DAILY TRAFFIC
- CEMENT PLANT/OIL FIELD



DETAIL "A"



DATE: NOVEMBER 2018

NOTE: ARRIVALS AND DEPARTURES ARE REFERRING TO VEHICLES ARRIVING AND DEPARTING FROM JOHE RANCH MINE.

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FIGURE 5

YEAR 2018 EXISTING P.M. PEAK HOUR VOLUMES AND TURNING MOVEMENTS PLUS PROJECT GENERATED TRAFFIC



LEGEND:

- EXISTING FREEWAY
- EXISTING ARTERIAL STREET
- EXISTING COLLECTOR STREET
- xx — SEGMENT VOLUME – PEAK HOUR

INTERSECTION TURNING MOVEMENTS

NORTH

0 1/2 MI 1 MI

DATE: NOVEMBER 2018

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FIGURE 6

YEAR 2040 EXISTING P.M. PEAK HOUR VOLUMES AND TURNING MOVEMENTS



LEGEND:

- EXISTING FREEWAY
- EXISTING ARTERIAL STREET
- EXISTING COLLECTOR STREET
- XX — SEGMENT VOLUME – PEAK HOUR

INTERSECTION TURNING MOVEMENTS

NORTH

0 1/2 MI 1 MI

DATE: NOVEMBER 2018

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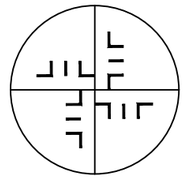
FIGURE 7

YEAR 2040 EXISTING P.M. PEAK HOUR VOLUMES AND TURNING MOVEMENTS PLUS PROJECT GENERATED TRAFFIC

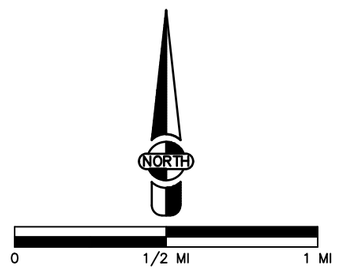


LEGEND:

- EXISTING FREEWAY
- EXISTING ARTERIAL STREET
- EXISTING COLLECTOR STREET
- XX — SEGMENT VOLUME – PEAK HOUR



INTERSECTION TURNING MOVEMENTS



DATE: NOVEMBER 2018

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Appendix “B”
LOS Calculations

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Intersections

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HCS7 Two-Way Stop-Control Report

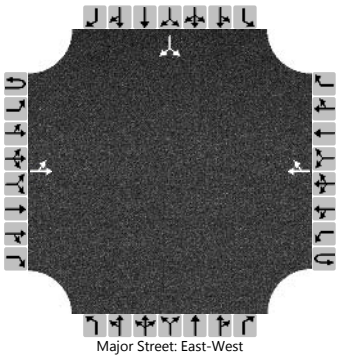
General Information

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/15/18
Analysis Year	2018
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	TIS for Proposed Mine

Site Information

Intersection	SR 58 and Rewards Road
Jurisdiction	County
East/West Street	SR 58
North/South Street	Rewards Road
Peak Hour Factor	0.88
Analysis Time Period (hrs)	1.00

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		4	9				2	0						4		1
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5													6	
Capacity, c (veh/h)		1633													1014	
v/c Ratio		0.00													0.01	
95% Queue Length, Q_{95} (veh)		0.0													0.0	
Control Delay (s/veh)		7.2													8.6	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)		2.2												8.6		
Approach LOS														A		

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HCS7 Two-Way Stop-Control Report

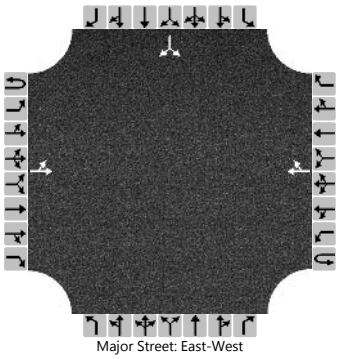
General Information

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/29/18
Analysis Year	2018
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	TIS for Proposed Mine

Site Information

Intersection	SR 58 and Rewards Road
Jurisdiction	County
East/West Street	SR 58
North/South Street	Rewards Road
Peak Hour Factor	0.88
Analysis Time Period (hrs)	1.00

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		4	22				12	0						4		1
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5													6	
Capacity, c (veh/h)		1618													984	
v/c Ratio		0.00													0.01	
95% Queue Length, Q_{95} (veh)		0.0													0.0	
Control Delay (s/veh)		7.2													8.7	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)		1.1												8.7		
Approach LOS														A		

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HCS7 Two-Way Stop-Control Report

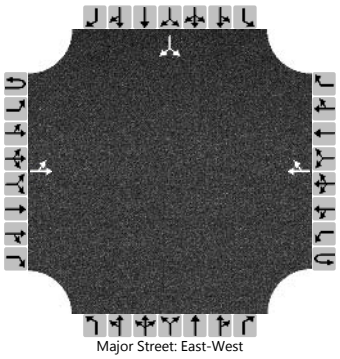
General Information

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/30/18
Analysis Year	2040
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	TIS for Proposed Mine

Site Information

Intersection	SR 58 and Rewards Road
Jurisdiction	County
East/West Street	SR 58
North/South Street	Rewards Road
Peak Hour Factor	0.88
Analysis Time Period (hrs)	1.00

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		6	13				3	0						6		1
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		7													8	
Capacity, c (veh/h)		1632													997	
v/c Ratio		0.00													0.01	
95% Queue Length, Q_{95} (veh)		0.0													0.0	
Control Delay (s/veh)		7.2													8.6	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)		2.3												8.6		
Approach LOS														A		

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HCS7 Two-Way Stop-Control Report

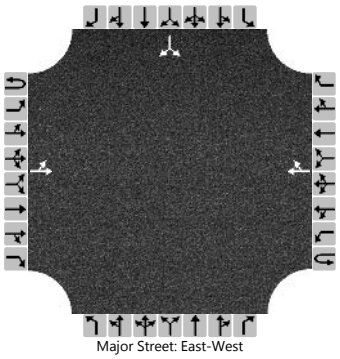
General Information

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/30/18
Analysis Year	2040
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	TIS for Proposed Mine

Site Information

Intersection	SR 58 and Rewards Road
Jurisdiction	County
East/West Street	SR 58
North/South Street	Rewards Road
Peak Hour Factor	0.88
Analysis Time Period (hrs)	1.00

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		6	26				13	0						6		1
Percent Heavy Vehicles (%)		0												0		0
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage					Undivided											

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.10												6.40		6.20
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.20												3.50		3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		7													8	
Capacity, c (veh/h)		1616													966	
v/c Ratio		0.00													0.01	
95% Queue Length, Q_{95} (veh)		0.0													0.0	
Control Delay (s/veh)		7.2													8.8	
Level of Service (LOS)		A													A	
Approach Delay (s/veh)		1.4												8.8		
Approach LOS														A		

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HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/15/18
Analysis Time Period	PM Peak Hour
Highway	SR 58
From/To	Project entrance/Reward Rd.
Jurisdiction	County
Analysis Year	2018
Description	TIS for Johe Ranch Mine

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	0	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	20	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	6	veh/h
Opposing direction volume, Vo	13	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	2.7		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fg	0.67		0.67	
Directional flow rate,(note-2) vi	10	pc/h	22	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	43.0	mi/h
Adjustment for no-passing zones, fnp	0.1	mi/h
Average travel speed, ATSd	42.7	mi/h
Percent Free Flow Speed, PFFS	99.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.9	1.9
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	0.73	0.73
Directional flow rate,(note-2) vi	9 pc/h	20 pc/h
Base percent time-spent-following,(note-4) BPTSFd	1.2 %	
Adjustment for no-passing zones, fnp	28.5	
Percent time-spent-following, PTSFd	10.0 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.00	
Peak 15-min vehicle-miles of travel, VMT15	6	veh-mi
Peak-hour vehicle-miles of travel, VMT60	20	veh-mi
Peak 15-min total travel time, TT15	0.1	veh-h
Capacity from ATS, CdATS	1693	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1693	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.7	mi/h
Percent time-spent-following, PTSFd (from above)	10.0	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	6.8
Effective width of outside lane, We	41.46
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	-5.11
Bicycle LOS	A

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/30/18
Analysis Time Period	PM Peak Hour
Highway	SR 58
From/To	Project entrance/Reward Rd.
Jurisdiction	County
Analysis Year	2018+PROJ
Description	TIS for Johe Ranch Mine

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	0	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	20	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	16	veh/h
Opposing direction volume, Vo	26	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	2.7		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fg	0.67		0.67	
Directional flow rate,(note-2) vi	27	pc/h	44	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	43.0	mi/h
Adjustment for no-passing zones, fnp	0.1	mi/h
Average travel speed, ATSd	42.3	mi/h
Percent Free Flow Speed, PFFS	98.5	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.9	1.9
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	0.73	0.73
Directional flow rate,(note-2) vi	25 pc/h	40 pc/h
Base percent time-spent-following,(note-4) BPTSFd	3.2 %	
Adjustment for no-passing zones, fnp	30.1	
Percent time-spent-following, PTSFd	14.8 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.01	
Peak 15-min vehicle-miles of travel, VMT15	15	veh-mi
Peak-hour vehicle-miles of travel, VMT60	54	veh-mi
Peak 15-min total travel time, TT15	0.4	veh-h
Capacity from ATS, CdATS	1693	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1693	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.3	mi/h
Percent time-spent-following, PTSFd (from above)	14.8	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	18.2
Effective width of outside lane, We	40.56
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	-4.26
Bicycle LOS	A

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/30/18
Analysis Time Period	PM Peak Hour
Highway	SR 58
From/To	Project entrance/Reward Rd.
Jurisdiction	County
Analysis Year	2040
Description	TIS for Johe Ranch Mine

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	0	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	20	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	9	veh/h
Opposing direction volume, Vo	19	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	2.7		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fg	0.67		0.67	
Directional flow rate,(note-2) vi	15	pc/h	32	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	43.0	mi/h
Adjustment for no-passing zones, fnp	0.1	mi/h
Average travel speed, ATSd	42.5	mi/h
Percent Free Flow Speed, PFFS	98.9	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.9	1.9
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	0.73	0.73
Directional flow rate,(note-2) vi	14 pc/h	30 pc/h
Base percent time-spent-following,(note-4) BPTSFd	1.8 %	
Adjustment for no-passing zones, fnp	28.6	
Percent time-spent-following, PTSFd	10.9 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.01	
Peak 15-min vehicle-miles of travel, VMT15	9	veh-mi
Peak-hour vehicle-miles of travel, VMT60	31	veh-mi
Peak 15-min total travel time, TT15	0.2	veh-h
Capacity from ATS, CdATS	1693	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1693	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.5	mi/h
Percent time-spent-following, PTSFd (from above)	10.9	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	10.2
Effective width of outside lane, We	41.19
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	-4.81
Bicycle LOS	A

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

HCS7: Two-Lane Highways Release 7.5

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	KN
Agency/Co.	LAV Consulting
Date Performed	5/30/18
Analysis Time Period	PM Peak Hour
Highway	SR 58
From/To	Project entrance/Reward Rd.
Jurisdiction	County
Analysis Year	2040+PROJ
Description	TIS for Johe Ranch Mine

Input Data

Highway class	Class 3		Peak hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	0	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	3.4	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Rolling		% Recreational vehicles	4	%
Grade: Length	-	mi	% No-passing zones	20	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd	20	veh/h
Opposing direction volume, Vo	32	veh/h

Average Travel Speed

Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	2.7		2.7	
PCE for RVs, ER	1.1		1.1	
Heavy-vehicle adj. factor,(note-5) fHV	0.996		0.996	
Grade adj. factor,(note-1) fg	0.67		0.67	
Directional flow rate,(note-2) vi	34	pc/h	54	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed,(note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h
Free-flow speed, FFSd	43.0	mi/h
Adjustment for no-passing zones, fnp	0.1	mi/h
Average travel speed, ATSd	42.2	mi/h
Percent Free Flow Speed, PFFS	98.2	%

Percent Time-Spent-Following

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.9	1.9
PCE for RVs, ER	1.0	1.0
Heavy-vehicle adjustment factor, fHV	1.000	1.000
Grade adjustment factor,(note-1) fg	0.73	0.73
Directional flow rate,(note-2) vi	31 pc/h	50 pc/h
Base percent time-spent-following,(note-4) BPTSFd	3.9 %	
Adjustment for no-passing zones, fnp	30.2	
Percent time-spent-following, PTSFd	15.5 %	

Level of Service and Other Performance Measures

Level of service, LOS	A	
Volume to capacity ratio, v/c	0.01	
Peak 15-min vehicle-miles of travel, VMT15	19	veh-mi
Peak-hour vehicle-miles of travel, VMT60	68	veh-mi
Peak 15-min total travel time, TT15	0.5	veh-h
Capacity from ATS, CdATS	1693	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1693	veh/h

Passing Lane Analysis

Total length of analysis segment, Lt	3.4	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSd (from above)	42.2	mi/h
Percent time-spent-following, PTSFd (from above)	15.5	
Level of service, LOSd (from above)	A	

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-	mi
Adj. factor for the effect of passing lane on average speed, fpl	-	
Average travel speed including passing lane, ATSpl	-	
Percent free flow speed including passing lane, PFFSpl	0.0	%

Percent Time-Spent-Following with Passing Lane

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

Level of Service and Other Performance Measures with Passing Lane

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	-	veh-h

Bicycle Level of Service

Posted speed limit, Sp	55
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	22.7
Effective width of outside lane, We	40.20
Effective speed factor, St	4.79
Bicycle LOS Score, BLOS	-3.99
Bicycle LOS	A

Notes:
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only.
5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

Appendix L

Water Supply Assessment and West Kern Water District Will-Serve Letter

Appendix L.1

Water Supply Assessment

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WZI INC.

Johe Ranch Mine
Section 7, Township 30 South, Range 21 East
Kern County, CA

Water Supply Assessment

November 2018

Submitted to:
GF Industries
122 North Harbor Blvd., #201
Fullerton, CA 92832

Prepared by:
WZI Inc.
1717 28th Street
Bakersfield, California 93301

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EXHIBITS

Exhibit 1 Location Map
Exhibit 2 Detailed Site Map

APPENDICES

Appendix 1 West Kern Water District Will Serve Letter
Appendix 2 TRC Operating Company Will Serve Letter
Appendix 3 TRC Operating Company Produced Water Analysis

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1.0 INTRODUCTION

Senate Bill (SB) 610 amended the California Water Code (see §10910, et seq.), to promote collaborative planning to "improve the link between information on water supply availability and certain land use decisions made by cities and counties" (California Department of Water Resources [DWR] 2003). SB 610 requires the preparation of a Water Supply Assessment (WSA) for any project that is subject to the California Environmental Quality Act (CEQA), provided it qualifies as a "project" and is not otherwise exempt under the relevant provisions of the Water Code. A WSA must examine the availability of an identified water supply under normal year, single-dry year, and multiple-dry year conditions over a 20-year projection, accounting for the projected water demand of the project in addition to other existing and planned future uses of the identified water supply.

1.1 Project Location and Description

The Johe Ranch Mine project is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA in the northwestern portion of Section 7, Township 30 South, Range 21 East, Mount Diablo Base & Meridian. The property is identified by Kern County Assessor's Parcel Number 156-070-01 and portions of parcel numbers 156-070-02 and 156-070-10 and contains approximately 331 acres. A location map is included as **Exhibit 1**. A Conditional Use Permit (CUP) was requested for a new surface mining operation and development of a reclamation plan, on the project site which is approximately 331 acres in size. The applicant proposes to mine diatomite at the site. Within the approximate 331-acre project site, disturbance would be confined to 93.67 acres. Approximately 1.4 acres of the proposed 93.67-acre disturbance area has already been disturbed as a result of existing roads.

The site consists primarily of rolling topography with some steep slopes and incised drainages. The elevation of the property varies from approximately 2,800 feet above sea level near the southwestern corner to approximately 2,075 feet above sea level near the northeast corner. Historically, the site has been used for farming, grazing, and some gas production. Historically, the vicinity has been used for farming, grazing, some oil and gas production, and diatomaceous earth mining. There are two approved surface mining operations located in the vicinity (State Mine ID #91-15-0036 and 91-15-0038).

GF Industries, as operator, proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres within the 331acre project site. Mining will be conducted within three mine areas at the site (**Exhibit 2**). As proposed, no more than twenty (20) acres are planned to be disturbed at any given time. Maximum annual production is anticipated to be 330,000 tons of diatomaceous earth and 20,000 tons of overburden material. It is anticipated that a total of 6,600,000 tons of diatomaceous earth and 400,000 tons of overburden material will be removed during the 20 year life of the mining operation.

Produced water from adjacent oil field operations will be utilized for dust control during onsite road grading and mining operations. Prior to application of produced water from oilfield operations on the project site, all necessary permits and approvals will be obtained from the California Regional Water Quality Control Board, Central Valley Region. Upon completion of mining in each of the mining areas, potable water will be utilized for dust control during reclamation activities; this water will be obtained from the West Kern Water District, in

accordance with a will serve letter, from a nearby water supply line, and will be conveyed to the project site by water truck. The project site will be reclaimed to its current use as grazing land.

2.0 REGULATORY SETTING

2.1 Senate Bill 610 Applicability

Water Code §10910 et seq. requires preparation of a WSA for a project that is subject to CEQA and is considered a project as defined in Water Code §10912. The Project is subject to CEQA and may be considered a project requiring preparation of a WSA because it is a proposed industrial facility occupying more than 40 acres of land.

The DWR published a Guidebook for implementation of SB 610 and an accompanying bill, SB 221, to assist water suppliers, cities and counties in integrating water and land use planning (DWR 2003). While the DWR has no regulatory authority concerning WSAs, this WSA is organized following the suggestions provided in the guidebook to ensure the information required under SB 610 is provided in this document to inform a future WSA.

2.1.1 Existing Public Water Systems

A public water system is defined in Water Code §10912 as "a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections." The Project site is not connected to a public water system and there are no public water systems near the site.

The West Kern Water District (WKWD) has indicated that it will provide up one acre/foot per year in a will serve letter dated August 25, 2016 (**Appendix 1**). The WKWD is a retail agency providing water directly to customers. In 2015 the WKWD served 6,712 active residential, commercial, and industrial connections. About 80% of water is delivered to industrial customers, primarily oil companies and power plants. The WKWD's primary water supply is from the State Water Project. The WKWD also participates in several exchanges and transfers that provide supplemental water. The district recharges most of their surface water and pumps water from two well fields. The WKWD has banked approximately 200,000 acre feet of surplus water.

2.1.2 Existing Water Management Plans

Public water systems are required by the California Water Code to prepare Urban Water Management Plans (UWMP) to carry out "long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water" (Water Code §10610.2). UWMPs are prepared using input from multiple water systems operating in the region and include assessment of the reliability of water supply over a 20-year period and account for known and projected water demands during that time, including during normal, single-dry, and multiple-dry water years. WSAs commonly incorporate assessment of project-related water demands from UWMPs and other assessments and plans.

The project proponent has received a will serve letter from the WKWD indicating a commitment provide up one acre/foot of water per year. The project area is located approximately four miles to the west of the WKWD service area. The WKWD is a retail agency, providing water directly to customers. In 2015 they served 6,712 active residential, commercial and industrial connections. About 80% of water is delivered to industrial customers, primarily oil exploration companies and power plants. The District's primary water supply is from the State Water Project Water. The District also participates in several exchanges and transfers that provide

supplemental water. The District recharges most of their surface water and pumps it from two District well fields. Over time, the District has banked approximately 200,000 AF of surplus water. The most recent UWMP for the WKWD was prepared in 2015 and provides a comprehensive overview of the District's water system as well as meeting the requirements of the Urban Water Management Planning Act (Assembly Bill 797).

3.0 PROPOSED PROJECT WATER DEMAND

Water will primarily be used for dust control on the project site. It is estimated that approximately 30,000 gallons per day will be required. According to the approved Surface Mining and Reclamation Act (SMARA) application for the project, produced water from adjacent oil field operations will be utilized for dust control during onsite road grading and mining operations. Prior to application of produced water from oilfield operations on the project site, all necessary permits and approvals will be obtained from the California Regional Water Quality Control Board, Central Valley Region. Upon completion of mining in each of the mining areas, potable water will be utilized for dust control during reclamation activities; this water will be obtained from the West Kern Water District, in accordance with a will serve letter, from a nearby water supply line, and will be conveyed to the project site in a water truck.

The following summarizes the estimated water usage for the project:

Johe Ranch Mining Project Estimated Water Usage		
	Annual Water Usage (gallons)	**Total Water Usage (gallons)**
Produced Water From Adjacent Oil Field Operations	7,800,000	156,000,000 total gallons (over project lifespan) obtained from produced water from adjacent oil field operations.
West Kern Water District	325,780	6,515,600 total gallons (over the project lifespan) obtained from West Kern Water District.
Total	8,125,780	162,515,600 total gallons (over project lifespan).

3.1 Produced Oil Field Water

The project is located approximately five miles to the southwest of oil and gas leases operated by TRC Operating Company, Inc. (TRC) at the Cymric Oil Field. TRC has indicated that they can supply the necessary water for dust control from their Cymric Oil Field production facility. A will serve letter from TRC is included in **Appendix 2.**

3.2 Ground Water / Surface Water

At the completion of mining in any of the mining areas, potable water will be used for dust control during reclamation for each area. Potable water utilized during reclamation activities will be provided in accordance with a will serve letter from the WKWD. Though it is estimated that

the average annual volume of potable needed for the project is approximately 326,000 gallons, the water will only be utilized periodically at the completion of mining activities in a particular area.

4.0 WATER SUPPLY AVAILABILITY

Mining at the site will be conducted within three mine areas (**Exhibit 2**). The water demand for the project can be divided among two sources which will be utilized for two separate stages of the project. Within each mining area, produce water from oil field operations will be utilized for dust control during mining operations. Upon completion of operations within a mine area, potable water will be utilized for dust control during reclamation activities.

4.1 Produced Oil Field Water

Produced water from oil field operations at the Cymric Oil Field will be utilized for dust control during mining operations. According to the approved SMARA application, approximately 30,000 gallons per day of produced water will be utilized for dust control at the site.

4.1.1 Oil Field Water Source

Produced oil field water will be obtained from the TRC production facilities at the Cymric Oil Field located approximately five miles northeast of the project site. A will serve letter from TRC is included in **Appendix 2**. The water will be trucked to the site.

The TRC leases include approximately 1,760 acres located in the northwest area of the Cymric Oil Field within Sections 20, 21, 22, and 27, Township 29 South, Range 21 East, MDB&M. The TRC property produces approximately 2,150 barrels (90,000 gallons) of water per day associated with oil production which greatly exceeds the project water use of the Johe Ranch mining project of 30,000 gallons per day. The water currently is subject to a primary treatment to separate associated hydrocarbons and then reinjected into the producing zone.

Oil producing zones in the area range from the Pleistocene age Amnicola zone at depths ranging from approximately 1,200 to 1,500 feet to the Miocene age Carneros and Phacoides sands at a depth of approximately 5,000 feet. The TRC leases have historically produced a large volume of water and will continue to produce significant volumes of produced water in the future. Oil production with associated produced water is anticipated to continue at the TRC leases throughout the life of the Johe Ranch mining project.

4.1.2 Oil Field Water Quality

Oil field produced waters typically contain high concentrations of total dissolved solids and salts. A typical analysis of produced water from the TRC leases is included in **Appendix 3**.

4.2 Ground Water / Surface Water

The subject property is located on the western edge of the Kern County subbasin (5-22.14) of the Tulare Lake Groundwater Basin as defined by the California Department of Water Resources (**Figure 3**). This essentially closed basin is situated in the topographic horseshoe formed by the Diablo and Temblor Ranges on the west, by the San Emigdio and Tehachapi Mountains on the south, by the Sierra Nevada Mountains on the east and southeast, and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The basin setting is described in Department of Water Resources Bulletin 118, (California Department of Water Resources

(DWR), 2016). The southern portion of the valley is internally drained by the Kings, Kaweah, Tule, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes. These rivers, which drain the west face of the Sierra Nevada Mountains, are of excellent quality and provide the bulk of the surface water supply native to the Basin. Imported surface supplies, which are also of good quality, enter the Basin through the San Luis Canal/California Aqueduct System, Friant-Kern Canal, and the Delta-Mendota Canal. Besides the main rivers, the basin also contains numerous mountain streams. The west-side streams drain areas of low precipitation in the San Emigdio Mountains and the Temblor Range that are primarily underlain by sedimentary rocks. This resulting stream drainage is highly mineralized, characterized by water high in sulfate, (Wood & Dale, Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California, 1964).

The subject property is located in the western area of Kern County within the foothills of the Temblor Range. The majority of the property is underlain by marine sediments consisting of diatomite of the Miocene age Monterey Formation which outcrops throughout much of western Kern County. These deposits trend northwest, are moderately to tightly folded and locally faulted. The diatomite is overlain by a small area of Quaternary age non-marine sediments in the northwestern portion of the property which are identified as landslide deposits. The site is located to the west of the San Joaquin Valley Groundwater Basin within outcrops of the Miocene diatomite of the Monterey Formation. There is no known groundwater at the site and no water wells have been drilled on the property.

There are no surface water features in WKWD, largely due to the arid conditions. Surface water used in WKWD is imported from the SWP in Northern California, or the Kern River.

4.2.1 Ground Water Supplies

The WKWD supplies groundwater from 15 wells, with 5 wells located in the north well field and 8 wells located in the south well field. The south well field is located approximately 15 miles northeast of the City of Taft while the north well field is located approximately three miles northwest of the south well field.

The District has a contract for surface water from the SWP. The SWP is the largest state-built, multi-purpose water project in the country. Water purchased from the SWP through the Kern County Water Agency is utilized to replenish the groundwater basin beneath the vicinity of the WKWDs groundwater banking area. KCWA (according to DWR Bulletin 118) estimates total groundwater in storage in the Kern Groundwater Subbasin to be nearly 40,000,000 AF and dewatered storage to be 10,000,000 AF. Water banking by WKWD is performed in the Kern River Fan area and began in 1966. All the surface water deliveries to WKWD are banked and later recovered from wells, except for direct industrial water deliveries to La Paloma Power Plant.

In addition to current sources, the WKWD plans to evaluate the economic and technical feasibility of a recycled water program. This could provide 400 AF/year. The District also has several banking and exchange programs that provide a regular supply to the District. The following table shows the existing and anticipated future water supplies for the WKWD:

West Kern Water District Water Supplies — Current and Projected

Water Source	2015		2020	2025	2030	2035	2040
	Actual Volume	Level of Treatment of Source Water					
Purchased Water	0	-	0	0	0	0	0
Groundwater (recovered from local bank)	12,700	Disinfection	0	0	0	0	0
Imported Surface water[1]	1,300	None	19,200	19,200	19,200	19,200	19,200
Recycled Water	0	Tertiary	400	400	400	400	400
Desalinated Water	0	-	0	0	0	0	0
Stormwater Use	-	-	0	0	0	0	0
Transfers	0	-	0	0	0	0	0
Buena Vista WSD	5,000	None	6,500	6,500	6,500	6,500	6,500
Exchanges							
Rosedale-Rio Bravo WSD	0	None	5,300	-	-	-	-
Kern Tulare WD	2,000	None	650	650	650	650	-
Total	21,000		32,050	26,750	26,750	26,750	26,100
Estimated Demands[2]	21,000		20,400	20,500	20,600	20,700	20,800

Notes:

1. For years 2020 to 2040, imported surface water based on 61% reliability of 31,500 SWP contract supply
2. Demands based on 2020 goal of 189 gpcd and population growth of 0.4% per year. Industrial demands are assumed to be 1,000 AF/year lower than 2015 value (due to recent cancellation of some water purchases) and no assumed growth in future industrial demand.

(Provost & Pritchard Consulting Group, 2016)

5.0 CONCLUSIONS

The Johe Ranch Mine project is located in an unincorporated area of the western part of Kern County, approximately 8.5 miles west of the town of McKittrick, CA and contains approximately 331 acres. The site consists primarily of rolling topography with some steep slopes and incised drainages. GF Industries, as operator, proposes to mine diatomaceous earth and overburden material in an open pit mining operation that will disturb approximately 93.67 acres during the 20 year life of the mining operation.

The primary need for water at the project site will be for dust control during mining operations. It is estimated that approximately 30,000 gallons per day will be required.

Produced water from adjacent oil field operations will be utilized for dust control during onsite road grading and mining operations. The produced oil field water will be obtained from the TRC production facilities at the Cymric Oil Field located approximately five miles northeast of the project site in accordance with a will serve letter from TRC to provide 30,000 gallons of water per day. The water will be trucked to the site. Upon completion of mining in each of the mining areas, potable water will be utilized for dust control during reclamation activities. This water will be obtained from the West Kern Water District, in accordance with a will serve letter for up to one acre/foot of water per year. Since the West Kern Water District's primary water supply is from the State Water Project and the West Kern Water District has banked approximately

200,000 AF of surplus water, they will have the capacity to provide up to 1 AF/Y during single-dry and multiple-dry years.

Based on this assessment, it is determined that long term water demands for the project are relatively minor and can be met primarily by available produced oil field water sources with a minor contribution of surface/groundwater from the WKWD.

6.0 REFERENCES

Provost & Pritchard Consulting Group, 2016, *West Kern Water District – Urban Water Management Plan*.

Wood, P. R., and Dale, R. H., 1964, *Geology and Groundwater Features of the Edison-Maricopa Area Kern County, California*, Geological Survey Water-Supply Paper 1656, United States Department of the Interior, Geological Survey.

7.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS CONDUCTING INVESTIGATION

WZI was formed in 1987 and employs a staff of geologists and engineers with extensive experience across a wide range of environmental site assessment and remediation projects. Relevant experience of key personnel includes conducting environmental site assessments of properties and development of remedial action groundwater and vadose-zone programs for a wide variety of contaminated sites including service stations, landfills, refineries, bulk fuel storage plants, agricultural sites and industrial facilities.

Ms. Mary Jane Wilson, President

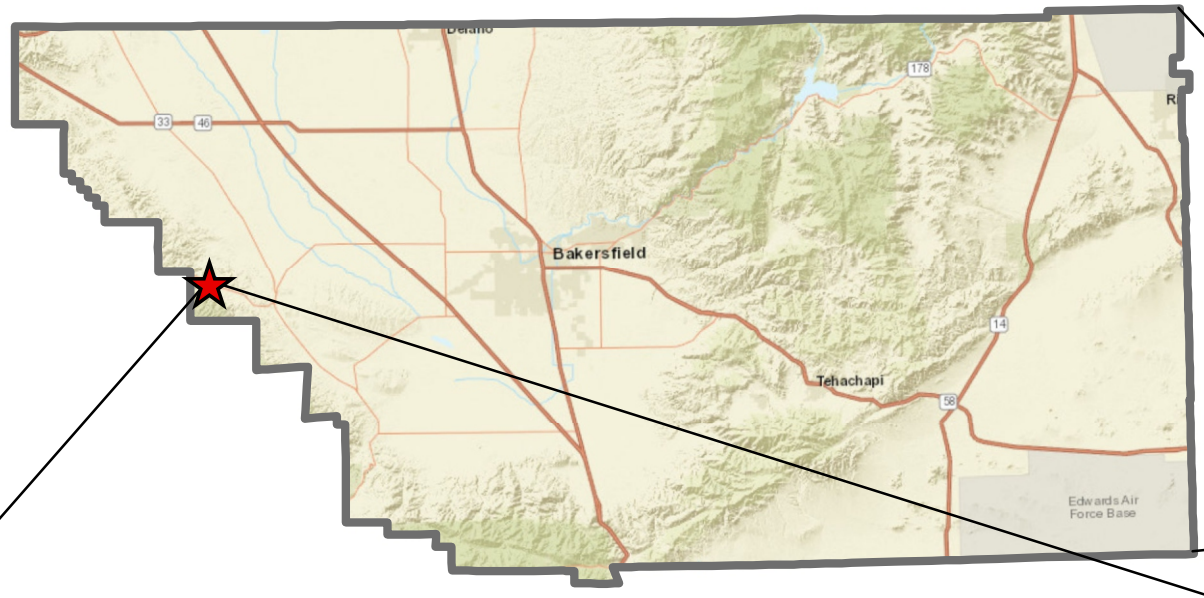
Mary Jane Wilson is a National Registered Environmental Property Assessor experienced in managing environmental activities. She has interfaced extensively with local, state and federal agencies. Her knowledge of environmental site assessments is unique because she has been involved in the development of environmental regulations as well as representing clients at public hearings. Her technical expertise in the field of reservoir engineering greatly enhances her ability to assess the impacts of environmental decisions. Ms. Wilson's published papers have given her national recognition as an expert in hazardous waste management.

James Allen Waggoner, PG, CEG, CHG

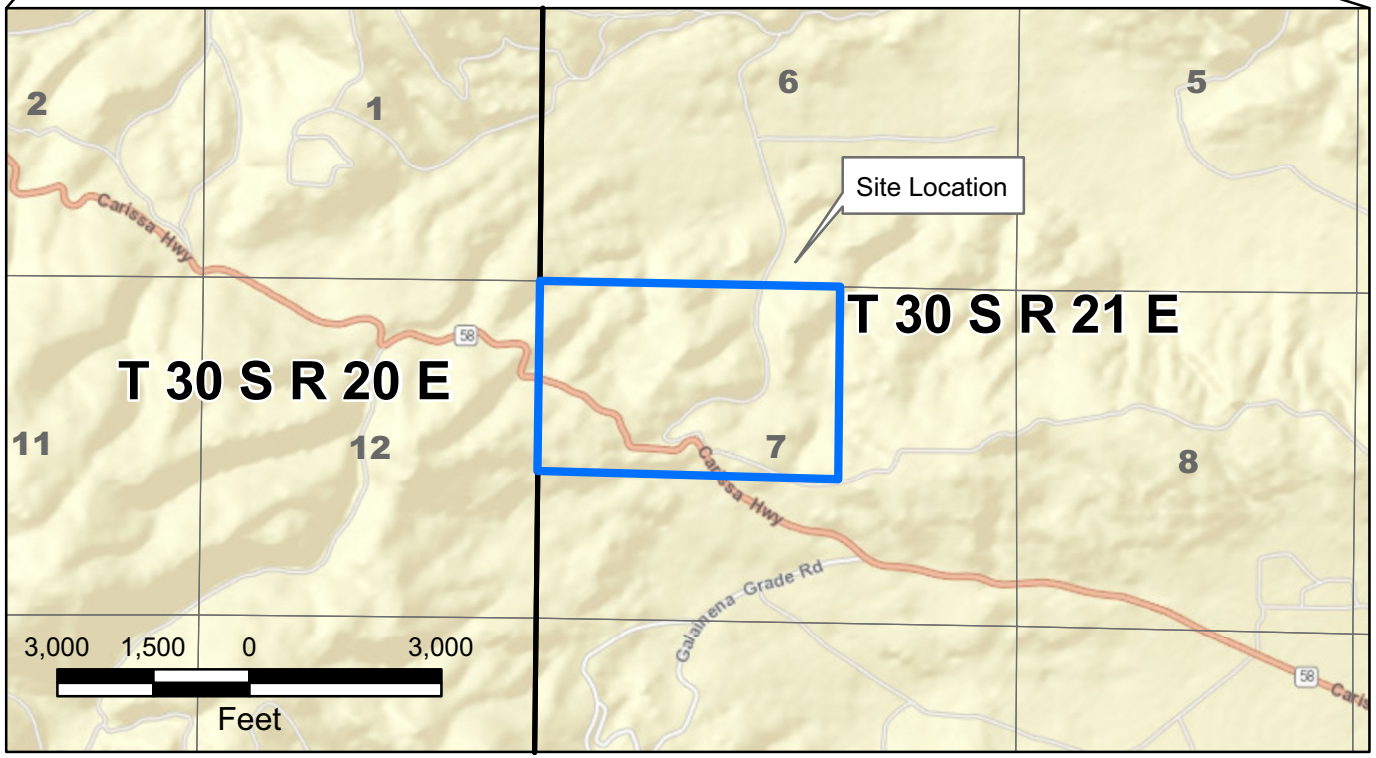
Mr. Waggoner earned his Bachelors and Masters degrees in geology from San Diego State University. He is a Senior Professional Geologist with over 39 years of experience in various aspects of geologic, hydrogeologic, and engineering geology investigations in California. Mr. Waggoner has extensive experience conducting projects that involve environmental investigation, groundwater, and regulatory compliance. He has also provided technical review and assistance for many additional environmental projects. He has extensive experience in conducting environmental site assessments, subsurface investigations, sample collection, and remedial action. Professional responsibilities have included project management and oversite, technical support, and report preparation and review for a wide variety of private sector entities including oil, mining, and industrial clients. Mr. Waggoner is a registered professional geologist, certified engineering geologist, and certified hydro geologist with the State of California.

EXHIBITS

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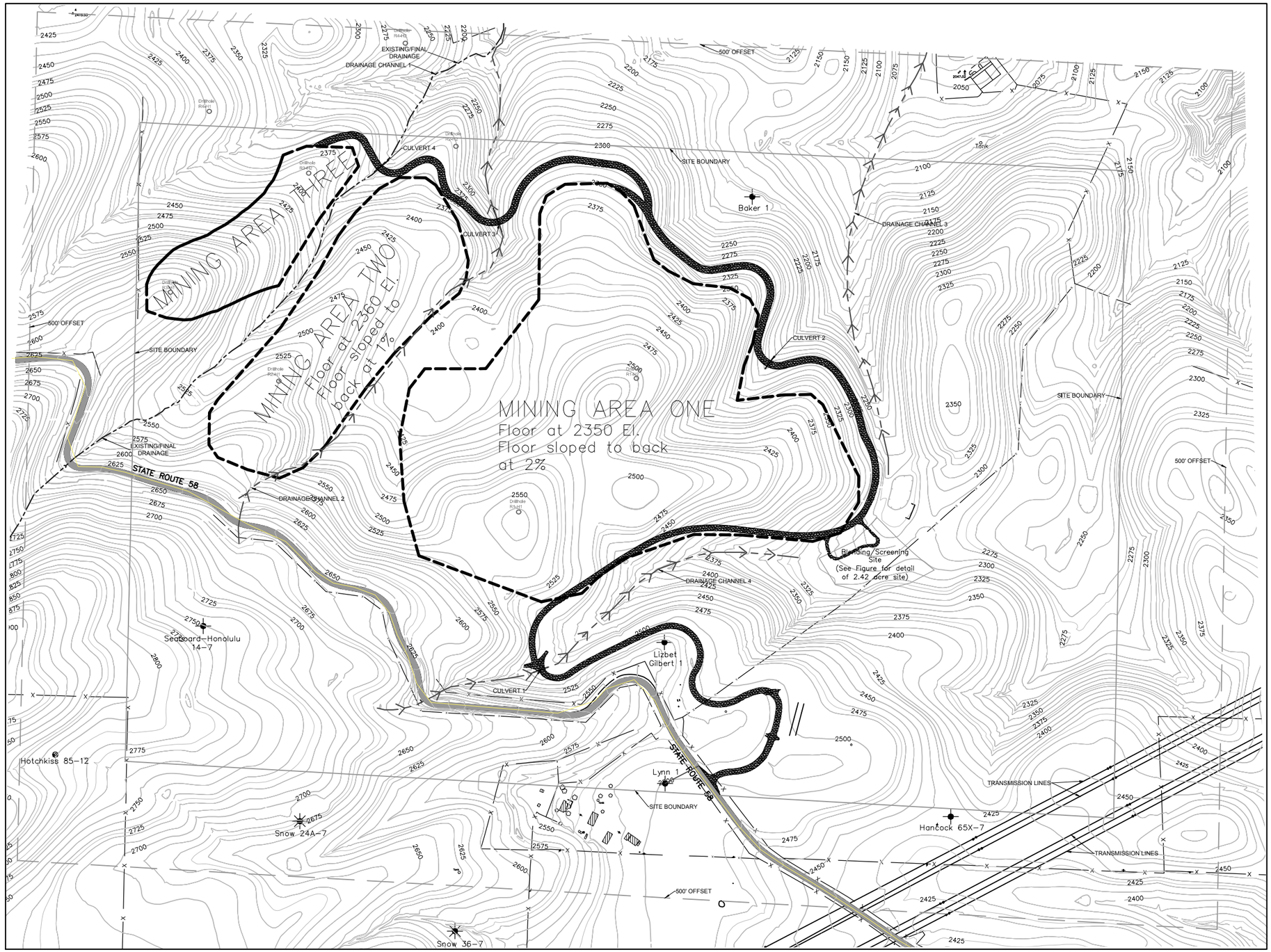
WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH MINE
WATER SUPPLY ASSESSMENT

LOCATION MAP

DATE: 11/18		EXHIBIT: 1

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LEGEND

- 100 — EXISTING GROUND CONTOUR
- EXISTING FENCE LINE
- 500' PROJECT BOUNDARY OFFSET
- DISTURBANCE BOUNDARY
- PROJECT BOUNDARY
- EXISTING RANCH ROAD
- PROPOSED ACCESS ROAD
- INTERMITTENT DRAINAGE CHANNEL
- "BLUE–LINE" WATERCOURSE PER USGS MAP
- ACTIVE DRY GAS WELL
- PLUGGED OIL & GAS WELL
- DRILLHOLE

N

500 250 0 500

WZI INC.
BAKERSFIELD, CALIFORNIA

GF INDUSTRIES
JOHE RANCH

DETAILED SITE PLAN

DATE:	JOB NO.:	EXHIBIT:
11/18		2

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APPENDIX 1

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West Kern water district

Via Email Only

Board of Directors
Barry M. Jameson
President

David A. Wells
Vice President

Roger Miller
Gary J. Morris
Scott Niblett

Harry O. Starkey
General Manager

J.D. Bramlet
Director of Operations

Sanjay "Sunny" Kapoor
Director of Finance

August 25, 2016

Mr. Steve Gentile
GF Industries
Email: steve.gentile@gfindustries.net

RE: Water Service to HWY 33 & 58, Johe Ranch Mine Site (CP17, Map 117)
Account #71-0540-0

Dear Mr. Gentile:

This letter shall confirm that West Kern Water District is in compliance with all Federal and State Drinking Water Standards. West Kern has the capacity to serve GF Industries 1 AF/year and currently provides water service, in GF Industries name, to the above referenced location through an existing 3" water service connection. If at any time GF Industries ceases payment on this account service will be discontinued.

If you should have any questions, or require any further information, please do not hesitate to contact my office.

Sincerely,

J.D. Bramlet
Director of Operations

JDB:tm

cc: Accounting Clerks, emailed

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APPENDIX 2

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November 1, 2018

Mr. Steve Gentile
GF Industries
122 N. Harbor Blvd., #201
Fullerton, CA 92832
Bakersfield, CA 93311

Re: Will Serve Letter for Produced Oil Field Water, Johe Ranch Mining Project, Conditional Use Permit 17, Map 117

Dear Mr. Gentile,

TRC Operating Company, Inc., (TRC) is a Taft based Independent oil producer and we currently produce approximately 33 million gallons of water per year (approximately 90,000 gallons per day) as a byproduct of our oil production.

The purpose of this letter is to confirm that TRC has the capacity to provide a minimum of 30,000 gallons per day to the Johe Ranch Mine for use as dust control at the proposed mining site.

Please feel free to contact me if you have any questions or need any additional information.

Very Truly Yours,

By: Charlie Comfort
Secretary/Treasurer

TRC OPERATING COMPANY, INC.
phone: 661.763.0081 | fax: 661.763.5028 | mail: P.O. Box 227, Taft, CA 93268

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APPENDIX 3

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Midway Laboratory, Inc

315 Main Street ♦ P.O. Box 1151 ♦ Taft, California 93268
Phone 661.765.2364 ♦ Fax 661.765.6920 ♦ midwaylab@verizon.net ♦ www.midwaylaboratory.com ♦ Facebook
State Certification Number: 1396A
Petroleum ♦ Industrial ♦ Environmental

Member: American Society for Testing and Materials (ASTM), Gas Processors Association (GPA), American Petroleum Institute (API), Society of Petroleum Engineers (SPE) member # 3564829

Laboratory Report

ELAP Cert. 1396A

Geo-Chemical Water Analysis

Rev 01-13-15

Customer: TRC Operating Company
Address: P.O. Box 277, Taft, CA 93268
Attention: Gary Grillette
Sample Description: 22-91

Log # : 28546-1
Date In: 3/24/15
Date Completed: 4/2/15
Date Reported: 4/2/15

Anions	mg/L	meq/L	Method #.	MDL
Bicarbonate, HCO_3^{-1}	1,315 .	21.5	SM2320 B	0.20
Carbonate, CO_3^{-2}	0.00 .	0.00	SM2320 B	0.20
Chloride, Cl^{-1}	6,400 .	181	SM4500-Cl^{-1}	0.01
Hydroxide, OH^{-1}	0.00 .	0.00	SM2320 B	0.20
Sulfate, SO_4^{-2}	32.0 .	0.67	SM4500-$SO4^{-2}$	0.05

Calculations	Results	Units	Method #	MDL
Alkalinity, as CaCO3 (Total)	1,078	mg/l	SM 2320 B	NA
as CaCO3 (less Org. Alk.)	1,078	mg/l	SM 2320 B	NA
Hardness, as $CaCO_3$ (Calc.)	622	mg/l	SM 2340 B	NA
Salinity, calc. Na+Cl	11,837	mg/l	(Calc.)	NA
Salinity, from Chlorosity	11,562	mg/l	(Calc.)	NA
Calcium Carbonate				
Stability Index (Langlier)	0.96	(Notes)	SM 2330 B	NA
Stability Index (Stiff Davis)	0.87	NA	Ref. 4	NA

Cations	mg/L	meq/L	Method #.	MDL
Barium, Ba^{+2}	3.46 .	0.05	EPA 200.7	0.01
Boron, B^{+3}	74.9 .	20.8	EPA 200.7	0.01
Calcium, Ca^{+2}	104 .	5.19	EPA 200.7	0.01
Iron, Fe^{+3}	0.76 .	0.04	EPA 200.7	0.01
Magnesium, Mg^{+2}	87.8 .	7.23	EPA 200.7	0.01
Potassium, K^{+1}	52.4 .	1.34	EPA 200.7	0.05
Sodium, Na^{+1}	4,170 .	181	EPA 200.7	5.00

Physical Data	Results		Method #	MDL
Temperature	68.0	°F	SM 2550 B	± 0.20
Conductivity (Measured)	20,400	µmho's	SM 2510 B	2.00
Resistivity	0.490	ohm's	(Calc.)	NA
Specific Gravity (60/60)	1.0061	units	API RP 45	±0.0001
Ionic strength	0.21	IS (µ)	(Calc.)	NA
pH	7.61	units	SM 4500 H B	± 0.01
Total Diss. Solids (TDS)*	12,241	mg/L	(An-Cat Sum.)	NA
Total Diss. Solids @ 180 °c	NA	mg/L	SM 2540 C	NA

Other	mg/L	meq/L	Method #.	MDL
Silica, as SiO2	103 .	14.9	EPA 200.7	0.01
Sodium, Na^{+1} (Calc.)	4,172 .	181	API RP 45	NA
Chloride, Cl^{-1} (Calc.)	6,380 .	180	API RP 45	NA

QC (Quality Control)	Results		Criteria	Limits
Meas EC - Calc EC =	0.9	*Note	(0.9 - 1.1) EC	>2500
TDS - EC Ratio =	0.60	**Note	(0.55 - 0.70)	>2500
Measured EC - Ion Sum =	1.0	Cation	(0.9 - 1.1) EC	
	1.0	Anion	(0.9 - 1.1) EC	
Calc. Na - Actual Na =	1.00	Na/Na	(0.98 - 1.02)	
NaCl/(NaCl Calc.) =	1.00	Na:Cl	(0.98 - 1.02)	

QC - Anion - Cation Balance Criteria

Anion Sum meq/L	meq/L SUM	Acceptable % Difference
0 - 3.0	NA	± 0.2 meq
3.0 - 10.0	NA	± 2 %
10.0 - 800	405	± 2 - 5 %
Anion - Cation Balance =	-0.1	%

"The Quality of the Analysis is Only as Good as the Quality of the Sample"

Notes:

MDL - Method Detection Limit .
PQL - Practical Quantitation Limit - The lowest level that can be reliably achieved within specific limits of precision and accuracy of the analytical methodology (5X MDL).
N.D. - Not Detected (below PQL)
TDS* - Cation and anion sum..
NA - Not applicable to report.
∑ = Sum
** Dissociated ions may elevate this value (Ca^{+2}, $SO4^{-2}$ etc.)
X = Not Analyzed for
Calcium Carbonate
Stability Index
(+) =CaCO3 will tend to precipitate.
(-) = CaCO3 will tend to dissolve.
(±) = CaCO3 is at equilibrium.

References:

1. APHA-AWWA; "Standard Methods for the Examination of Water and Waste Water," 18-20 th. Ed. 1992-98
2. ASTM; "Water," 2007 American Society for Testing and Material Vol. 11.01-02
3. EPA;"Methods for Chemical Anallysis of Water and Waste," 1983 EPA-600/4-73-020
4. API; "Analysis of Oil-Field Waters," 1981 2nd. Ed. American Petroleum Insitiute, API RP 45.
5. Patton, C.C.; "Applied Water Technology," 1986 Campbell Petroleum Series.

Comments:

QC: S.H Date: 4-2-15

cc: RW Date: 4/2/15

Kurt R. Buckle Laboratory Director — Midway Laboratory, Inc

Date: 4-2-15

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Appendix L.2

West Kern Water District Will-Serve Letter

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West Kern water district

Via Email Only

Board of Directors
Barry M. Jameson
President

David A. Wells
Vice President

Roger Miller
Gary J. Morris
Scott Niblett

Harry O. Starkey
General Manager

J.D. Bramlet
Director of Operations

Sanjay "Sunny" Kapoor
Director of Finance

August 25, 2016

Mr. Steve Gentile
GF Industries
Email: steve.gentile@gfindustries.net

RE: Water Service to HWY 33 & 58, Johe Ranch Mine Site (CP17, Map 117)
Account #71-0540-0

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If you should have any questions, or require any further information, please do not hesitate to contact my office.

Sincerely,

J.D. Bramlet
Director of Operations

JDB:tm

cc: Accounting Clerks, emailed

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