DRAFT FINAL
REMEDIAL ACTION PLAN



Oro De Amador Property
Jackson, California

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCE CONTROL
OFFCE OF BROWNFIELDS, PROJECT MANAGEMENT UNIT
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CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S9959-07-03
March 22, 2024

California Department of Toxic Substances Control
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Attention: Meghan Hearne, Project Manager

Subject: DRAFT FINAL REMEDIAL ACTION PLAN
ORO DE AMADOR PROPERTY
JACKSON, CALIFORNIA

Ms. Hearne:

Geocon Consultants Inc. (Geocon) prepared the enclosed Remedial Action Plan (RAP) on behalf of the City of Jackson (the City) to describe the proposed cleanup and reuse of the Oro de Amador property (the site). Preparation of the RAP was funded by Equitable Community Revitalization Grant (ECRG) #2022-00962 (July 7, 2022) awarded to the City by the California Department of Toxic Substances Control (DTSC).

We prepared the RAP pursuant to a Voluntary Cleanup Agreement (March 26, 2015; Docket No. HSA-VCA 14/15/093) between the DTSC and the City. The RAP incorporates the DTSC's comments (February 11, 2022) on a 2018 *Removal Action Workplan* (RAW; Geocon, November 28, 2018); the results of supplemental site investigation (SSI) performed in accordance with our *Final Site Characterization Summary and SSI Workplan* dated April 25, 2023; and the DTSC's comments on our Draft RAP dated August 30, 2023. The DTSC comments and corresponding document revisions are summarized in Section 1.5 of this RAP.

The 160-acre site is located between North Main Street and New York Ranch Road, immediately north of downtown Jackson. The site includes a former mine tailings impoundment, cyanide treatment plant, and tailings disposal area associated with the Kennedy Mine, a historical lode gold mining operation located approximately ½ mile northwest of the site. The proposed remedial action includes waste capping, land use restriction, and controlled reuse for public open space, sports, and recreation.

Geocon appreciates the opportunity to prepare this RAP, and we look forward to working with the DTSC towards efficient cleanup and revitalization of the Oro de Amador property. Please contact the undersigned with any comments or questions regarding this RAP or the site in general.

Sincerely,

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ACRONYMS

ABA	acid-base accounting
ABS	absorption fraction of chemical from soil
AF	soil to skin adherence factor
APCD	Amador County Air Pollution Control District
AGP	acid generation potential
AMSL	above mean sea level
ANP	acid-neutralizing potential
APN	assessor's parcel number
AR	air rotary
ARAR	applicable or relevant and appropriate requirement
AT	averaging time
AWS	Amador Water System
BERA	baseline ecological risk assessment
BGS	below ground surface
BLM	United States Bureau of Land Management
BMP	best management practice
BTAG	Biological Technical Advisory Group
BTOC	below top of casing
BTV	background threshold value
BW	body weight
C	coarse
Ca	concentration in air
Cs	concentration in soil
CAB	California Arsenic Bioaccessibility
CAM	California Assessment Manual
CAMP	community air monitoring plan
Cal/EPA	California Environmental Protection Agency
Cal/OSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
Carlton	Carlton Engineering
CCC	criterion continuous concentration
C_{COC}	contaminant concentration in soil
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CF	conversion factor
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
City	City of Jackson
CLS	California Laboratory Services
cm^2	square centimeter
CNDDB	California Natural Diversity Database
COC	contaminant of concern
COPEC	constituent of potential ecological concern
CQA	construction quality assurance
CSE	Cal State Engineering, Inc.
CSM	conceptual site model

CTR	California Toxics Rule
CV	coefficient of variation
CWA	Clean Water Act
CWC	California Water Code
CWHR	California Wildlife Habitat Relationships
cy	cubic yard
D&M	Dames & Moore
DCL	dust concentration limit
detect	detection
DHS	Department of Health Services
DI	deionized water
DLM	Designated Level Methodology
DTSC	Department of Toxic Substances Control
DSTS-SL	DTSC Screening Level
DMP	dust mitigation plan
DO	dissolved oxygen
DQI	data quality indicator
DQO	data quality objective
dup	duplicate
DWR	California Department of Water Resources
E&E	Ecology and Environment
EA	environmental assessment
EC	electrical conductivity
Eco-SSL	ecological soil screening level
ECRG	Equitable Community Revitalization Grant
ED	exposure duration
EE/CA	Engineering Evaluation/Cost Analysis
EF	exposure frequency
EMSHP	Empire Mine State Historic Park
ELAP	Environmental Laboratory Accreditation Program
EPC	exposure point concentration
ERA	ecological risk assessment
ERAS	Ecological Risk Assessment Section
ESA	Environmental Site Assessment
ESPO	Engineering and Special Projects Office
ET	exposure time
F	fine
FA	financial assurance
FAAS	flame atomic absorption spectroscopy
Fs	fourth spread
ft	feet
g	gram
GE	Geotechnical Engineer
Geocon	Geocon Consultants, Inc.
GIS	geographic information system
gpm	gallon per minute
GSB	Geological Services Branch
GSU	Geological Services Unit
HAZWOPER	Hazardous Waste and Emergency Response Standard
HERO	Human and Ecological Risk Office
Hg	mercury

HHRA	human health risk assessment
HI	hazard index
HSA	hollow stem auger
HSC	California Health And Safety Code
HSP	health and safety plan
HQ	hazard quotient
IIPP	injury and illness prevention plan
in	inch
IRa	inhalation rate
IRs	incidental soil ingestion rate
ITRC	Interstate Technology and Regulatory Council
IUR	inhalation unit risk
KM	Kaplan-Meier
kg	kilogram
Kp	dermal permeability coefficient from water
LOAEL	Lowest Observed Adverse Effect Level
LUC	land use covenant
M	molarity
MAI	McCampbell Analytical, Inc.
McClelland	McClelland Laboratories, Inc.
MCL	Maximum Contaminant Level
MDL	method detection limit
mg/cm^2	milligram per square centimeter
mg/day	milligram per day
mg/kg	milligram per kilogram
mg/l	milligram per liter
mg/m^3	milligram per cubic meter
ml	milliliter
ML	low-plasticity silt
mm	millimeter
MND	Mitigated Negative Declaration
MQO	measurement quality objective
MRP	monitoring and reporting plan
MS	matrix spike
MSD	matrix spike duplicate
mya	million years ago
na	not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	not detected
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act
NNP	net neutralizing potential
NOA	naturally occurring asbestos
NOAEL	No Observed Adverse Effect Level
NOI	Notice of Intent
NP	neutralization potential
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List
NOI	Notice of Intent
NTR	National Toxics Rule
NTU	nephelometric turbidity unit

NWI	National Wetlands Inventory
O&M Agreement	operation and maintenance agreement
O&M Plan	operation and maintenance plan
OEHHA	Office of Environmental Health Hazard Assessment
OHP	Office of Historic Preservation
ORP	oxidation-reduction potential
OSHA	Federal Occupational Safety and Health Administration
PA	preliminary assessment
PE	Professional Engineer
PEA	Preliminary Endangerment Assessment
PEC	probable effect concentration
PEF	particulate emission factor
PFAS	per- and polyfluoroalkyl substances
PG	Professional Geologist
PHG	California Public Health Goal
PPE	personal protective equipment
Prima	Prima Environmental, Inc.
PTFE	polytetrafluoroethylene
PQL	practical quantitation limit
PVC	polyvinyl chloride
Q1	first quartile
Q3	third quartile
QA	quality assurance
QC	quality control
Q-Q	quantile-quantile
RA	remedial action
RACR	remedial action completion report
RAGS	Risk Assessment Guidance for Superfund
RAO	removal action objective
RAP	Remedial Action Plan
RAW	Removal Action Workplan
RBA	relative bioavailability
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act
RDIP	Remedial Design and Implementation Plan
RfC	reference concentration
RfD	reference dose
RL	reporting limit
RME	reasonable maximum exposure
RPD	relative percent difference
RSL	Regional Screening Level
RWQCB	California Regional Water Quality Control Board
SA	skin surface area
SDL	soluble designated level
SDMP	scientific/management decision point
SEM	scanning electron microscopy
SF	slope factor
SHPO	State Historic Preservation Office
site	Oro de Amador Property
SL	screening level
SLERA	screening-level ecological risk assessment

SM	silty sand
SMARA	Surface Mining and Reclamation Act
SMP	soil management plan
SOP	standard operating procedure
SPI	site presence index
SPLP	Synthetic Precipitation Leaching Procedure
SQG	sediment quality guideline
SSAL	site-specific action limit
SSI	supplemental site investigation
START	Superfund Technical Assessment and Response Team
STLC	Soluble Threshold Limit Concentration
SU	standard pH unit
SWPPP	storm water pollution prevention program
SWRCB	California State Water Resources Control Board
TBA	Targeted Brownfields Assessment
TCLP	Toxicity Characteristic Leaching Procedure
TCR	California Toxicity Criteria Rule
TDS	total dissolved solids
TEC	threshold effect concentration
TMDL	Total Maximum Daily Load
TOC	top of casing
TRV	toxicity reference value
TSD	treatment, storage and disposal
TSI	targeted site investigation
TTLC	Total Threshold Limit Concentration
UCL	upper confidence limit
UDP	unanticipated discovery plan
UPL	upper prediction limit
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USL	upper simultaneous limit
UTL	upper tolerance limit
VCA	voluntary cleanup agreement
VCP	voluntary cleanup program
VSAP	verification sampling and analysis plan
WAD	weak acid dissociable
Walsh	Walsh & Associates, Inc.
WET	waste extraction test
WGS	world geodetic system
WMW	Wilcoxon-Mann-Whitney
XRF	X-ray fluorescence
µg/dL	microgram per deciliter
$\mu g/m^3$	microgram per cubic meter
µg/l	microgram per liter
µm	micrometer
µmhos/cm	micromhos per centimeter
ºC	degree Celsius
%	percent

DISTRIBUTION LIST

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EXECUTIVE SUMMARY

Geocon Consultants Inc. (Geocon) prepared this *Remedial Action Plan* (RAP) on behalf of the City of Jackson (the City) to describe the proposed cleanup and reuse of the Oro de Amador property (the site). Preparation of the RAP was funded by Equitable Community Revitalization Grant (ECRG) #2022-00962, awarded to the City by the California Department of Toxic Substances Control (DTSC) in July 2022. The DTSC is the lead regulatory agency overseeing the remedial action. The regulations governing the proposed remedial action are described in Section 1.0 of this RAP.

ES 1 Purpose

The purpose of the RAP is to evaluate remedial alternatives and select remedial measures that effectively reduce the human health risks and water quality risks associated with mine tailings and contaminated soil and water at the site. The evaluation considers the effectiveness, practicality, and cost associated with the remedial alternatives and presents the recommended remedial action based upon the results of risk assessment and the proposed land reuse.

The funding provided by the DTSC's ECRG program is intended to provide public benefit to the community of Jackson and to the foothills region, to develop a healthier and safer community, and to promote environmental justice. Jackson is a rural community with median household income of $55,485, which is $10,000 below the median household income of Amador County and $23,000 below the median household income for California. Jackson bears a heavy pollution burden as a result of historical mining, as evidenced by the approximately 1.5 million cubic yards of mine tailings at the site and the Argonaut Mine federal superfund site located on the western edge of Jackson ½ mile southwest of the site.

The site is a valuable community viewshed but is currently fenced to restrict public access due to the historical mining contamination. The proposed land revitalization includes cleanup of the mining impacts and development of a regional sports facility, including sports fields and public open space, paved access roads and parking, and amenities to support regional sporting events. Revitalization will allow the public to enjoy the site's beauty and natural diversity via public trails for hiking and biking.

The remedial action will create both temporary construction jobs and permanent operation and maintenance jobs for the community. The City's proposed revitalization of the Oro de Amador property is supported by the Amador County Recreation Agency, a regional joint powers authority. Local organizations such as Amador Trail Stewardship and the Mother Lode Land Trust support the proposed public open space and trails.

The City expects that the public open space and sports facility will be visited by 500 people per day on average and will relieve pressure and community concerns regarding other local sports facilities that are undersized for tournament events. In addition, the proposed public trail system will tie into the open greenspace and developing trail system on land to the north of the site managed by the Mother Lode Land Trust. Site cleanup and revitalization also presents an opportunity for sustainable energy creation via "brightfields" solar energy installation on the historically mine-scarred land.

ES 2 Site Description

The 160-acre site is located between North Main Street and New York Ranch Road, immediately north of downtown Jackson. The site includes a former mine tailings impoundment, cyanide treatment plant, and tailings disposal area associated with the Kennedy Mine, a historical lode gold mining operation located approximately ½ mile northwest of the site. Site features are described in Section 2.0 and are depicted on Sheet 1. The proposed remedial action includes waste capping, land use restriction, and controlled reuse for public open space, sports, and recreation.

Land surrounding the site is used primarily for residential purposes. Adjoining land uses include residential properties along North Main Street, the St. Seva Serbian Orthodox Church, Amador Senior Center, the Rollingwood Estates residential subdivision, and Jackson Hills Apartments. Land uses within 400 to 1,400 feet from the site include Jackson Elementary School, Amador Residential Care, Jackson Gardens assisted living facility, and Oak Manor Retirement Complex.

The site is in the Mother Lode region of the Sierra Nevada Foothills, which is geologically rich in gold deposits and other hydrothermal mineral deposits. Gold-bearing ore was mined extensively in the region from circa 1850 to 1950 using underground mining methods. The Melones Fault Zone is represented by a narrow band of highly altered rocks that forms a north-northwest-trending ridge through the site. The off-site Kennedy Mine, as well as the on-site Cyanide Process Area at the site, are within this naturally mineralized zone, which contains naturally occurring arsenic, chromium, cobalt, copper, and nickel at naturally elevated background concentrations as a result of the geological conditions.

ES 3 Environmental Conditions

The site has been investigated by the DTSC, the United States Environmental Protection Agency (USEPA), the City, and private parties during the past three decades. The investigations are summarized in Sections 2.0, 3.0, and 4.0. Assessment locations are depicted on Sheet 2. The site contains three contaminated areas:

- the Lakebed Area where mine tailings from the off-site Kennedy Mine were impounded;
- the Cyanide Process Area where the mine tailings were reprocessed; and
- the Tailings Pile where the reprocessed mine tailings were disposed to land.

Naturally-mineralized gold-bearing ore materials, mine waste materials (waste rock), and processed mining waste (tailings) commonly contain heavy metals and metalloids such as arsenic and lead at elevated concentrations. These naturally mineralized materials are transported from subsurface mine workings to the ground surface by underground mining operations. The processing of naturally mineralized ore materials for gold extraction, including crushing and chemical treatment, tends to make the heavy metals more available for human exposure. In addition, heavy metals in mine waste can be transported to adjacent locations by wind, surface water, or mechanical means.

The processing of mined ore materials also released other chemicals to the site that do not naturally occur at the site at elevated concentrations. These imported chemicals include elemental mercury (quicksilver), which was imported for use at the off-site Kennedy Mine, and cyanide, which was imported to the site for use at the on-site Cyanide Process Area.

Naturally occurring heavy metals and metalloids such as arsenic and lead, as well as imported chemicals such as mercury and cyanide, present water quality concerns. They also pose potential health concerns in the case of routine, long-term exposure to the soil, such as inhalation of soil dust, ingestion, and/or dermal contact with the soil.

ES 4 Risk Assessment

The conceptual site model is described in Section 4.0, and the risk assessment is presented in Section 5.0. Findings of the human health risk assessment indicate that the Lakebed Area, Tailings Pile, and Cyanide Process Area are not suitable for unrestricted land use, and that engineering controls are required for worker protection if soil-disturbing activity is to take place in these areas.

Arsenic is the primary contributor to cancer risk and non-cancer chronic health hazard. Mercury contributes significantly to the hazard for unrestricted (residential) exposures but does not present a significant hazard for other exposure scenarios such as industrial, commercial, and recreational use. Therefore, the remedial action is based primarily on cleanup goals for arsenic, which include benchmark concentrations for non-mineralized background soil (20.7 milligrams per kilogram [mg/kg]) and naturally mineralized background soil (120 mg/kg). Arsenic concentrations detected at the site are plotted on Sheet 3.

The highest arsenic concentration (1,300 mg/kg) detected at the site was in a sample of naturally mineralized bedrock at a depth of 3 feet. Some arsenic concentrations detected in naturally mineralized soil and bedrock are significantly higher than those detected in mine tailings at the site, which range up to approximately 500 mg/kg. Although the highly mineralized natural background concentrations of arsenic in soil are not regulated as a waste and therefore are not subject to “cleanup” as part of this RAP, they present a potential cancer risk and chronic health hazard in the case of routine, long-term exposure and therefore should be avoided.

The maximum detected concentrations of arsenic, iron, manganese, and cyanide in groundwater, groundwater seeps, and surface water downgradient of the Tailings Pile present a risk and hazard that are not acceptable for unrestricted (residential) use. No uses of groundwater, groundwater seeps, or surface water immediately downgradient of the Tailings Pile are known. Groundwater resources will not likely be developed as a future potable water source because drinking water is supplied by the City of Jackson through the Amador Water Agency. A water distribution pipeline crosses east to west and north to south through the site. The maximum detected concentration of arsenic in seasonal surface water in the Lakebed Area is also not acceptable for unrestricted use. Access to the Lakebed Area is restricted by the City of Jackson, and no human uses of the seasonal surface water are known.

Arsenic, iron, and manganese concentrations in seasonal surface water at the Lakebed Area and in shallow groundwater in contact with the Lakebed Area tailings exceed water quality objectives. Concentrations of these constituents detected in deeper groundwater beneath the Lakebed Area and in surface water downgradient of the Lakebed Area do not exceed water quality objectives, suggesting that the contaminant concentrations are attenuated during downgradient transport. Therefore, remedial action does not appear to be required to protect water quality downgradient of the Lakebed Area.

Arsenic, iron, manganese, and cyanide concentrations in groundwater in the Tailings Pile, groundwater seepage at the toe of the Tailings Pile, and surface water downgradient of the Tailings Pile exceed water quality objectives. Downgradient surface water is impacted by seepage that originates from rainfall and surface water runoff that infiltrates into the Tailings Pile and seeps out of the base of the Tailings Pile near the southern and western site boundaries. Therefore, remedial action is appropriate to reduce the infiltration and leaching of surface water into the Tailings Pile.

ES 5 Evaluation of Remedial Alternatives

Remedial action objectives are described in Section 6.0, and the evaluation of remedial action alternatives is presented in Section 7.0. The remedial alternatives are summarized in the following table.

Remedial Alternatives and Evaluation Criteria		
No Action	**On-Site Consolidation Under Land Use Controls**	**Off-Site Disposal**
Threshold Criteria		
(1) Overall Protection of Human Health and the Environment		
The No Action alternative does not provide adequate protection of human health or water quality.	Consolidation and deed restriction effectively reduces potential direct exposure pathways. Risk to water quality is reduced by capping and drainage routing to reduce surface water infiltration into the Tailings Pile. Long-term maintenance, monitoring and reporting are required.	Landfill disposal effectively reduces the chance of future contact and protects water quality. Excavation of tailings from the Lakebed Area would impact the wetland habitat.
(2) Compliance with ARARs		
The No Action alternative does not comply with the ARARs.	On-Site Consolidation Under Land Use Controls complies with the ARARs.	Off-Site Disposal complies with the ARARs. Mitigation would be required for removal of mine tailings from wetlands and other sensitive areas.
Primary Balancing Criteria		
(3) Long-term Effectiveness and Performance		
Does not control contaminated materials and does not provide long-term effectiveness.	Effective in the long term by consolidation of contaminated materials under institutional controls with long-term monitoring and reporting. Long-term performance relies upon compliance with institutional controls.	Effective in the long term by removal of contaminated materials from the site.
(4) Reduction of Toxicity, Mobility, or Volume through Treatment		
None.	None.	None.

Remedial Alternatives and Evaluation Criteria		
No Action	**On-Site Consolidation Under Land Use Controls**	**Off-Site Disposal**
(5) Short-term Effectiveness		
The No Action alternative does not affect baseline conditions in the short term.	Short-term impacts to human health are mitigated by provisions set forth in a HSP, DMP and CAMP.	Short-term impacts to human health are mitigated by provisions set forth in a HSP, DMP and CAMP.
(6) Implementability		
No implementation required.	Readily implemented. Labor, material, and equipment readily available. Requires land use controls to reduce the chance of future contact. Off-site disposal will be required for excavated materials that exceed hazardous waste criteria.	Readily implemented. Labor, material, and equipment readily available. Requires significant truck traffic through city streets and generates greenhouse gasses.
(7) Cost		
No direct costs, unknown future costs.	Moderate direct costs associated with excavation, dust control, on-site transport, placement, and compaction. Monitoring, reporting and regulatory oversight costs are required in the future.	Very high direct costs associated with off-site transport and landfill disposal. No ongoing costs anticipated.
Modifying Criteria		
(8) State Acceptance		
To be determined.	To be determined.	To be determined.
(9) Community Acceptance		
To be determined.	To be determined.	To be determined.

ARAR = applicable or relevant and appropriate requirement, CAMP = Community Air Monitoring Plan, HSP = Health and Safety Plan, DMP = Dust Mitigation Plan

The No Action alternative does not provide adequate protection of human health and water quality and does not comply with regulatory requirements. Therefore, the No Action alternative was eliminated from further consideration. The Off-Site Disposal alternative is not practical based on cost and presents potential concerns related to truck traffic and greenhouse gas emissions.

ES 6 Proposed Remedial Action

On-Site Consolidation Under Land Use Controls is the preferred remedial alternative because this option is protective of human health and the environment while mitigating the cost, traffic impacts and greenhouse gas impacts associated with off-site disposal. The proposed remedial action is described in Section 9.0, and Sheet 4 presents an overview of the proposed remedial action. The proposed remedial action and quantity estimates are summarized in the following table.

Area	**Description**	**Materials**	**Proposed Remedial Action**	**Size of Area** (acres)	**Volume of Impacted Material** (cubic yards)
Lakebed Area	Central southern portion of the site, former tailings impoundment comprising approximately 16 acres at the historical high-water line and containing a seasonally inundated, marshy wetland. Historically stored more than 1 million tons of mine tailings (sand and silt) resulting from gold ore extraction (stamp milling and mercury amalgamation) performed off-site at the historical Kennedy Mine north of the site. Currently contains approximately 250,000 cubic yards of tailings.	Mine tailings	Fencing, posting, and land use controls.	15.5	250,000
Cyanide Process Area	Located on the north-south ridge through the central portion of the site, west of the Lakebed Area and east of the Tailings Pile. Tailings from the Lakebed Area were processed in this area to extract additional gold.	Contaminated surface soil	Fencing, posting, and land use controls.	4.2	6,700
Tailings Pile	Land disposal area in the southwestern portion of the site for approximately one million cubic yards of tailings processed in the cyanide plant. The deck (upper surface) of the Tailings Pile typically slopes gently to the southwest at gradients of 1 to 3 %. The south-facing and west-facing slopes are up to approximately 50 to 60 feet tall.	Mine tailings	Capping with clean soil and land use controls.	29.0	1,000,000
Western Area and Southern Area	The Western Area and Southern Area are between the toe of the Tailings Pile and the site boundary, are to be included in the Tailings Pile LUC, and will be subject to an O&M Agreement and SMP to restrict unauthorized disturbance. No cap is proposed. Recreational trails must be constructed in soil representative of non-mineralized background arsenic conditions unless an alternative benchmark value is approved by the DTSC.	Mine tailings and contaminated soil	Land use controls	5.3	28,741
Isolated Tailings Areas to be Excavated	Tailings are present at the ground surface at isolated areas, typically less than 2 feet deep, as a result of historical erosion, surface water transport, mechanical transport, and track out. Tailings that do not meet the remedial action goals are to be excavated, transported within the site, and consolidated at the Tailings Pile.	Mine tailings	Excavation, verification sampling and analysis, and consolidation at the Tailings Pile.	7.9	13,904

Area	Description	Materials	Proposed Remedial Action	Size of Area (acres)	Volume of Impacted Material (cubic yards)
Naturally Mineralized Shear Zone	A band of highly altered bedrock, typically 450 to 600 feet wide, forms a ridge trending north-northwest through the center of the site (Sheet 1; Photos 17 through 24) and represents the Melones Fault Zone, which juxtaposes the Calaveras Formation (to the east) to the younger Mariposa Formation (to the west). Jurassic (201 to 145 mya) hydrothermal emplacement processes altered this band of bedrock and the adjoining bedrock.	Naturally mineralized soil and bedrock	None. Avoidance of highly mineralized soil is recommended.	54	not applicable
Remainder of Site	Annual grassland and blue oak woodland.	None	None.	62	not applicable

The remedial action is intended to reduce the potential for routine contact with waste having elevated metals concentrations, and to reduce the potential for leaching and erosion of tailings. The proposed remedy includes:

1. Excavation of isolated tailings deposits, transport within the site, and placement of the tailings at the Tailings Pile as engineered fill;
2. Post-excavation sampling and analysis to verify that the isolated tailings deposits were removed;
3. Re-grading of the Tailings Pile and capping of the Tailings Pile with clean fill;
4. Routing of surface water drainage away from the Tailings Pile to reduce meteoric water infiltration;
5. Fencing and posting of the Lakebed Area and Cyanide Process Area to restrict public use; and
6. Recordation of a Land Use Covenant (LUC) and Operation and Maintenance (O&M) Agreement to specify long-term monitoring and maintenance requirements for the cap and fencing.

ES 7 Remedial Design

Plans and specifications for the remedial action will be set forth in a *Remedial Design and Implementation Plan* (RDIP) for DTSC review and approval. The RDIP will contain the following elements:

1. *Civil Engineering Design* – including topographical survey, slope stability analysis, grading and drainage plans, clean soil cover specifications, and erosion control plans.
2. *Site Management Plan* – including site preparation and permitting, equipment decontamination, surveying and grade control, traffic control, noise control, dust control, dust monitoring, and management of contaminated soil.
3. *Operation And Maintenance Plan* – specifying procedures and frequencies for surface water and groundwater monitoring and reporting, and surface cover inspection, repair, and reporting.
4. *Community Air Monitoring Plan* – addressing procedures to control and monitor fugitive dust emissions.
5. *Health And Safety Plan* – addressing worker safety.

ES 8 Health and Safety

Health and safety planning is described in Section 8.0, and the appended *Health and Safety Plan* provides information regarding potential chemical and physical hazards that may exist at the site and describes safety measures to be followed by field personnel during remedial activities. The remediation contractor selected to perform the work will be responsible for consulting with a Certified Industrial Hygienist to determine the appropriate levels of protection and monitoring for the remediation workers.

During the remedial activities, soil moisture content is to be maintained to reduce the potential for dust generation and the need for respiratory protection, and real-time dust monitoring is to be performed to verify that the engineering controls are effective in controlling dust emissions. Airborne dust levels are to be monitored using active, real-time, data-logging aerosol monitors.

A *Community Air Monitoring Plan* (CAMP) is required to describe the details of air monitoring related to specific work activities and their frequency, schedule, and duration. A CAMP is required whenever cleanup activities have the potential to release contaminants into the air. The CAMP is intended to describe air monitoring protocols and best management practices to mitigate fugitive dust emissions containing contaminated material during the authorized work.

A CAMP focuses on air monitoring at the perimeter of the site to verify the protection of the surrounding community. Air monitoring for worker protection will also be performed at the work locations within the site pursuant to the *Health and Safety Plan* prepared by the remediation contractor to protect their workers.

The monitoring results will be routinely reported to the DTSC. At no time is visible dust allowed to leave the site perimeter. If visible dust is observed leaving the work site, then work must cease immediately, the source of the visible dust must be controlled, and site activities must be re-evaluated.

The remedial action includes significant truck traffic for import of clean cover soil to cap the Tailings Pile. Trucks would access the site via State Route (SR) 49, turning northeast on SR 88 and after ½ mile left on Court Street and then right on New York Ranch Road. The trucks would travel ½ mile north on New York Ranch Road before turning left into the site. Empty trucks would follow the reverse route.

No off-site transport is proposed as part of the remedial action unless the excavated waste materials are classified as hazardous waste. If hazardous waste is identified, it will be transported from the site to a licensed solid waste disposal facility using the local route described above. Trucks would exit the site at its eastern boundary, turning right (south) on New York Ranch Road, left (east) onto Court Street, and then right (southwest) onto SR 88, continuing ½ mile to the junction of SR 88 and SR 49.

ES 9 Land Use Controls

Land use controls, as described in Section 9.0, are required where waste remains in place at the Lakebed Area, Cyanide Process Area, and Tailings Pile to limit contact with mine tailings and contaminated soil that are to remain on-site, and to restrict future residential use of portions of the site that are remediated to non-residential standards:

1. A LUC is required to memorialize the land use controls.
2. An O&M Agreement is required to set forth procedures for routine visual monitoring and reporting.
3. Where recreational use is proposed (the Tailings Pile), the waste must be covered with clean engineered fill and protected from erosion using storm water best management practices.
4. Where waste remains in place without an engineered cover (the Lakebed Area and Cyanide Process Area), fencing and posting are required to restrict public access.
5. Routine monitoring and reporting are to be performed after the remedial action is completed to verify the ongoing protectiveness of the remedial action in the long term.

ES 10 California Environmental Quality Act

The *California Environmental Quality Act* (CEQA) is a statute that requires State and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. Where a State agency is the lead agency or a responsible/trustee agency, CEQA documents are submitted to the State Clearinghouse within the Governor's Office of Planning and Research for processing State agency review. As required by California law, the DTSC reviewed this RAP in accordance with CEQA. Based on the DTSC's review, and contingent upon the results of the public comment period, the DTSC anticipates that a CEQA *Mitigated Negative Declaration* (MND) will be appropriate for the proposed remedial action.

ES 11 Public Participation

The site is visible from neighboring residential and commercial properties in all directions, and the site history is common knowledge to many Jackson residents. The Kennedy Tailing Wheels Park adjoins the site to the northwest and is operated by the City of Jackson to commemorate the area's rich mining history.

Public interest in the site predates the City's acquisition in 2006. A study group was convened in 2010, and the City prepared a conceptual development plan in 2011 that was presented to the public and to City Council. The City presented an overview of the proposed site cleanup and revitalization, and the ECRG funding program, to the public during a City Council meeting on January 23, 2023. The City held a second, site-specific public meeting and presentation on July 26, 2023, at the Amador County Board of Supervisors chambers. The meeting was well attended by site neighbors, local residents, and representatives of local organizations including the Amador Trail Stewardship and the Mother Lode Land Trust. The attendees provided valuable input regarding community needs for site revitalization. An additional meeting will be held to facilitate the public's review of this RAP, if requested.

The DTSC will conduct the appropriate and necessary public participation activities prior to and during the proposed remedial action. Public participation requirements include:

1. The development of a public fact sheet and community profile;
2. Publishing a notice of the availability of the RAP for public review and comment;
3. Making the RAP and other supporting documents available at DTSC's office and at a local repository for at least 30 days;
4. Holding a public meeting upon request;
5. Responding to public comments received on the RAP; and
6. Providing a community update once the remedial action is completed.

Once the public comment period is completed, the DTSC will review and respond to the comments received. The RAP will be revised, if necessary, to address the comments received. The modified RAP will be reviewed, and if deemed adequate, approved by the DTSC for implementation.

Any interested individuals have the opportunity to learn more about the Oro de Amador property or the RAP by submitting comments to Meghan Hearne with the DTSC by telephone at 714-484-5463, or by email at Meghan.Hearne@dtsc.ca.gov. DTSC's Administrative Record for the site is available for public inspection during office hours at the following DTSC location:

California Department of Toxic Substances Control
Office of Brownfields, Project Management Unit
5796 Corporate Avenue
Cypress, California 90630
Attention: Meghan Hearne, Project Manager
meghan.hearne@dtsc.ca.gov
(714) 484-5463

Record documents are available online at the DTSC's EnviroStor data management system:

Website address: https://www.envirostor.dtsc.ca.gov/public/
EnviroStor ID: 03100004
DTSC Site Code: 102258

REMEDIAL ACTION PLAN

1.0 INTRODUCTION

Geocon Consultants Inc. (Geocon) prepared this *Remedial Action Plan* (RAP) on behalf of the City of Jackson (the City) to describe the proposed cleanup and reuse of the Oro de Amador property (the site). Preparation of this RAP was funded by Equitable Community Revitalization Grant (ECRG) #2022-00962, awarded to the City on July 7, 2022, by the California Department of Toxic Substances Control (DTSC).

The 160-acre site is located between North Main Street and New York Ranch Road, immediately north of downtown Jackson and adjacent to residential development. The site includes a former mine tailings impoundment, cyanide treatment plant, and tailings disposal area associated with the Kennedy Mine, a historic lode gold mining operation located approximately ½ mile northwest of the site.

This RAP was prepared pursuant to a *Voluntary Cleanup Agreement* (VCA; March 26, 2015, Docket No. HSA-VCA 14/15/093) between the DTSC and the City and incorporates DTSC comments (February 11, 2022) on a 2018 *Removal Action Workplan* (RAW; Geocon, November 28, 2018) and DTSC comments (December 12, 2023) on the Draft RAP (August 30, 2023). The DTSC comments and corresponding document revisions are summarized in Section 1.5 of this RAP.

This RAP presents the results of supplemental site investigation (SSI) performed in accordance with our *Final Site Characterization Summary and SSI Workplan* (SSI Workplan) dated April 25, 2023. The Final SSI Workplan incorporates comments on the draft workplan presented in the DTSC's conditional approval letter dated April 6, 2023.

1.1 Purpose

The purpose of the RAP is to evaluate remedial alternatives and select remedial measures that effectively reduce, to the extent feasible, the human health risks and water quality risks associated with mine processing waste and environmental media (soil, water, air) impacted by the mine processing waste. The evaluation considers the effectiveness, implementability, and cost associated with the remedial alternatives and presents the recommended remedial actions based upon the results of risk assessment and the proposed land reuse.

1.2 Proposed Remedial Action and Land Revitalization

The proposed remedial action includes waste capping, land use restriction, and controlled reuse for public open space, sports, and recreation. This RAP presents a conceptual design for the remedial action and requires the preparation of a *Remedial Design and Implementation Plan* (RDIP) containing engineering plans and specifications for the proposed waste capping and procedures for fugitive dust mitigation, air monitoring, verification sampling and analysis, and site restoration. A land use covenant (LUC) is proposed for portions of the site where waste remains in place, and the RDIP is to include an *Operation*

and Maintenance Plan (O&M Plan) and *Monitoring and Reporting Plan* (MRP) to specify future operation, maintenance, and monitoring requirements. This RAP presents a *Remedial Action Cost Estimate* (RA Cost Estimate) for the proposed remedial action and a *Financial Assurance Cost Estimate* (FA Cost Estimate) for costs associated with post-remediation operation, maintenance, and monitoring.

1.3 Basis for Remedial Action

This RAP is based on the findings of our site investigation and risk assessment as presented herein, and the findings of previous site characterization performed by others. The remedy selection presented in this RAP is based on our 2018 RAW and our 2023 SSI performed in response to the DTSC's comments on the 2018 RAW.

A RAW and RAP are remedy selection documents that may be prepared for a hazardous substance release site pursuant to Section 25356.1 of the *California Health and Safety Code* (HSC). A RAP was chosen in lieu of a RAW because the estimated cost of the recommended non-emergency remedial action is projected to be greater than the threshold cost of $2,000,000.

The remedial action (response action) outlined in this RAP is to be conducted in a manner consistent with the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP, 40 *Code of Federal Regulations* (CFR) 300.400, et seq.). The NCP requires the use of an Engineering Evaluation/Cost Analysis (EE/CA) or equivalent. This RAP is to serve as the equivalent of an EE/CA.

Pursuant to HSC Section 25356.1.5, the remedial action is to be based on, and is to be no less stringent than:

- Requirements pertaining to remedial action and the selection of remedial alternatives established under federal regulation pursuant to Subpart E of the NCP;
- Regulations pertaining to state and regional water quality control established pursuant to Division 7 (Section 13000, et seq.) of the *California Water Code* (CWC);
- Applicable water quality control plans adopted pursuant to Section 13170 of the CWC including the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan, California Regional Water Quality Control Board (RWQCB), 2018);
- Regulations pertaining to water quality control plans and waste discharge requirements set forth in CWC Section 13240, et seq.;
- Applicable state policies for water quality control adopted pursuant to CWC Section 13140, et seq., to the extent that those policies are consistent with the federal regulation;
- Applicable provisions of the California HSC, to the extent those provisions are consistent with the federal regulations; and
- The risk assessment findings.

HSC Section 25356.1 outlines public participation requirements, which include the preparation of a community profile report to determine public interest in the remedial action, notice of the RAP in a newspaper of general circulation, provision of a minimum 30-day public comment period, and preparation of a responsiveness summary.

1.4 Organization of this Document

Pursuant to HSC Section 25323.1, a RAP must include a plan for conducting the remedial action, a description of the on-site contamination, the goals to be achieved by the remedial action, and the rationale for consideration of alternative removal options. This RAP contains components required by DTSC's Removal Action Workplans memorandum (September 23, 1998) and is organized in the following sections:

1. *Introduction* – includes an overview of the proposed remedial action and associated regulations, describes the purpose of the RAP and its organization, summarizes agency review, and describes the general limitations of the work.
2. *Background* – describes the site, its ownership and operational history, the nature and extent of contamination, previous investigations, and previous response actions.
3. *Supplemental Site Investigation* – presents the results of our supplemental site investigation performed in May 2023 to address data gaps identified during our review of the previous investigation findings.
4. *Data Evaluation* – describes the apparent problem, develops a conceptual model, evaluates the site investigation data, provides information regarding background metals concentrations, and presents the results of bioaccessibility testing for arsenic.
5. *Risk Assessment* – presents the updated human and ecological risk assessment and water quality evaluation.
6. *Remedial Action Objectives* – describes regulatory requirements, estimates material quantities, and develops remedial action goals.
7. *Evaluation of Remedial Action Alternatives* – describes alternative remedial measures, presents RA cost estimates, and provides a basis for selection of the recommended remedial measures.
8. *Health and Safety Planning* – describes methods that will be employed during the remedial action to address the health and safety of workers and the public, including engineering controls for fugitive dust emissions and protocols for air monitoring.
9. *Remedial Procedures and Implementation* – describes the proposed remedial action and general procedures and protocols for verification sampling and analysis.
10. *Public Participation* – outlines public participation requirements for the remedial action.
11. *Remedial Action Reporting* – outlines procedures for recordkeeping and describes the report that will summarize the remedial action and document compliance with this RAP.
12. *References* – lists references associated with the site assessment and cleanup planning.

Appendix A presents a list of administrative record documents for the remedial action. A *Responsiveness Summary*, *Statement of Reasons*, and *Preliminary Nonbinding Allocation of Responsibility* are presented as Appendices B through D, respectively.

1.5 Summary of Agency Review

Comments from the DTSC on the 2018 RAW and the Draft RAP are summarized below. The comments are followed by references to the sections of this RAP that address the comments.

1.5.1 DTSC Comments on the 2018 RAW

Comments from the DTSC (February 11, 2022) on the 2018 RAW (Geocon, November 28, 2018) are summarized below.

1.5.1.1 Project Manager Comments

The following comments from the DTSC Project Manager and California Environmental Quality Act (CEQA) Unit are presented in the DTSC's letter of February 11, 2022.

1. *The updated RAW must commit to the submittal of a Remedial Design and Implementation Plan (RDIP), to capture the missing elements such as the excavation plan, soil management plan, and engineering specifications for the proposed cap(s) (See GSU Comment #3 and ESPO Comments #1-4), or you can provide the detailed design information in the updated RAW.*

Section 9.1 describes requirements associated with the RDIP.

2. *Section 7.0 Applicable or Relevant and Appropriate Requirements (ARARs) contains several missing or incorrect items:*
    a. *The 7.2 ARAR Section regarding the California Environmental Quality Act (CEQA) is missing from the document. Please add a Section regarding CEQA requirement for the Project.*
    b. *Please add the California Toxicity Rule (CTR) [stet] to your list of ARARs.*
    c. *Section 7.2.1 of the RAW describes the public participation process. Please provide more information in this Section such as the DTSC process regarding a public fact sheet, community profile, community update, 30-day public notice period, and the potential for a public meeting upon request. In addition, please include the following regarding the public Envirostor website and Project Manager contact information:*

        "Any interested individual(s) have the opportunity to learn more about the case or the proposed RAW by submitting comments to Ms. Melessia Downham with the DTSC at 916-255-3745, or via email at Melessia.Downham@dtsc.ca.gov."
    d. *Section 7.2.4 of the RAW states that because the project will not involve the offsite movement or handling of arsenic, that hazardous waste management requirements do not apply. Please revise this Section to clarify that this does not exempt the project from Title 22 proper waste handling, as soils at the Site exceed the Title 22 Total Threshold Limit Concentration (TTLC) for arsenic.*
    e. *Section 7.2.6 of the RAW indicates that a Health and Safety Plan is not required for this project. Please provide more information in this Section regarding "Pre-Fieldwork Activities" and revise this Section to commit to having a Health and Safety Plan and certification of workers. The following is an example of the required language:*

"A site health and safety plan (HSP) will be prepared in accordance with Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (National Institute for Occupational Safety and Health Administration, U.S. Coast Guard and U.S. Environmental Protection Agency, 1985). Prior to excavation work, all on-site personnel will be briefed on the HSP. Furthermore, the anticipated area of excavation will be clearly marked, and a utility clearance obtained through Underground Service Alert. The DTSC will be notified a minimum of 30 days prior to conducting excavation, sampling and/or disposal field work activities to effectively plan, coordinate and arrange for inspection(s)."

f. The California Occupational Safety and Health Administration (Cal-OSHA) Hazardous Waste and Emergency Response Standard (HAZWOPER) standard Title 8, California Code of Regulations, Section 5192(a)(1)(A-E) states that, unless the employer can demonstrate that the operation does not involve employee exposure to or the reasonable possibility for employee exposure to safety or health hazards, the following operations are covered:

- *Clean-up operations or hazardous substance removal work required by a governmental body, whether Federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the Environmental Protection Agency's (EPA) National Priority List (NPL) Site, state priority site lists, sites recommended for the EPA, NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);*
- *Corrective actions involving hazardous waste clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901. et seq.) and Chapters 6.5 and 6.8 of Division 20 of the California Health and Safety Code;*
- *Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;*
- *Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or facilities regulated by Chapter 6.5 of Division 20 of the California Health and Safety Code; or by agencies under agreement with USEPA to implement RCRA regulations; and*
- *Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.*

Section 6.1 addresses ARARs, and Section 6.1.4 addresses CEQA requirements. Section 8.0 addresses health and safety planning, and Sections 2.2.5 and 10.0 address public participation.

3. *The RAW states that a screening level concentration of arsenic in soil of 46 mg/kg was used in the Community-wide Assessment Report completed for the Cities of Jackson and Sutter Creek (Cal-EPA, 2011b). This DTSC Study was only intended to provide ambient concentrations for the area, not background concentrations that should be applied to a site. DTSC requires a graphical analysis and statistical evaluation of the data in order to determine a site-specific background level for arsenic. Please see HERO Comment #4.*

Section 4.5 presents the background metals evaluation.

1.5.1.2 CEQA Unit Comment

1. *As discussed in the March 23, 2017 DTSC Comment Letter, additional information regarding the Draft Negative Declaration is required for the Project and any changes to the project description since 2018 must be included in the updated CEQA Document for the RAW.*

The City of Jackson is preparing a CEQA document under DTSC oversight. Section 6.1.4 was written anticipating that the CEQA document is a MND. This section may need to be modified in the draft final RAP prior to public review if another CEQA document is prepared.

1.5.1.3 GSU Comments

The following comments were presented in a DTSC Geological Services Unit (GSU) memorandum dated January 5, 2022.

1. *Submittal of Background Concentration Determination. Geocon Consultants, Inc. should prepare a report for DTSC's review and approval to determine site-specific background concentrations of metals in soil. Approval of background concentrations prior to the revision of the RAW is needed because the selected removal action will need to address site contaminants that exceed residential screening levels or background concentrations. The report should include data analysis, and a justification of how the background area was determined, including a site history of the area to demonstrate background samples were not impacted by site operations.*

Section 4.5 presents the background metals evaluation.

2. *Expansion of Removal Action Footprint. The RAW should be revised to include removal actions to address contaminants in areas across the entire site. Currently, the RAW only addresses the small portion of the site where redevelopment is planned, leaving mine tailings, the tailings dam, cyanide plant tank pad and footings and mine shaft unaddressed. Either the RAW should be revised to include evaluation of removal action alternatives for the entire site, or the RAW should be revised to clearly identify the portion of the Site that will be addressed and commit to the submittal of a subsequent RAW to address the remainder of the Site.*

This RAP addresses the entire site including all assessment areas. Sheet 4 depicts the decision units and summarizes the proposed remedial action.

3. *Removal Action Details. Section 9.0 of the RAW should be revised to commit to the submittal of a Removal Action Design and Implementation Plan (RDIP) for DTSC's review and approval. The RAW should state that the RDIP will include an excavation plan, soil management plan, and engineering specifications of each proposed cap.*

Section 9.1 describes requirements associated with the RDIP.

4. *Figures Needed to Demonstrate the Extent of Contamination. The RAW should be revised to include figures to demonstrate site characterization and contaminant delineation is complete. This work is needed so that fate and transport of contaminants can be evaluated and to support removal action decisions. Needed revisions are described below.*

    - *The location of the former cyanide plant should be shown on all figures. Figure 4 should be revised to include isoconcentration contours for arsenic in soil.*
    - *The RAW should be revised to include figures with isoconcentration contours depicting the extent of thallium, lead, mercury, manganese, and iron in soil above residential screening levels (SLs).*
    - *The RAW should be revised to include a figure showing the location of all soil samples analyzed for cyanide and the concentrations of cyanide detected at those locations. The figure should also indicate the location where the tailings were deposited on the western slope of the process area ridge after they had been processed through the cyanide leaching plant.*

- *The RAW should be revised to include a groundwater elevation map with arrows to indicate the direction of groundwater flow.*
- *The RAW should be revised to include a figure depicting the extent of cyanide and arsenic in groundwater at concentrations above California Maximum Contaminant Levels (MCLs).*
- *A figure should be provided in Appendix B to demonstrate the location of the Seep samples.*

Sheet 2 depicts the extent of contamination, decision unit boundaries, assessment locations including seep samples, and the locations of the historical cyanide plant foundations.

Figure 2 depicts groundwater elevations and a generalized groundwater gradient. Section 5.3 evaluates groundwater quality. Section 5.3.4 and Tables 8 through 12 and 14 through 17 describe contaminant of concern (COC) concentrations in water.

Decision units are delineated based on comparison to background concentrations, and post plots are used in lieu of isoconcentration contours for metals in soil. Sheet 3 depicts assessment locations and detected concentrations for arsenic. Figures 6 and 7 depict assessment locations for cyanide and thallium, respectively, and their distributions are described in Sections 4.3.1.1 and 4.3.1.4, respectively.

5. *Mine Waste Should be Considered Potentially Hazardous Waste. The RAW should be revised to remove statements that assert mine waste would not be classified as hazardous waste if it were to be removed from the Site. Site soils have exceeded the Title 22 total threshold limit concentration (TTLC) for arsenic of 500 milligram per kilogram (mg/kg). The RAW should be revised to explain that mine waste should be treated as potentially hazardous waste, characterized and disposed properly.*

Section 6.1.1 describes chemical-specific ARARs. Section 9.4 outlines procedures for classification and off-site disposal of excavated materials designated as Class I (hazardous) waste.

6. *Mine Waste Excavated from Utility Corridors. Section 8.4 of the RAW should be revised to state that mine waste removed from utility corridors will be transported to an appropriate, permitted off-site facility for disposal. Further, the RAW should state that soil handling, sampling and transport will be addressed in the soil management plan to be included in the RDIP. Currently, Section 8.4 states that mine waste excavated from utility corridors will likely be placed with other mine waste in areas of the Site not accessible to site visitors. This plan is unacceptable to DTSC as it is not protective of human health.*

Section 9.1 describes requirements associated with the RDIP. Section 9.4 outlines procedures for classification and off-site disposal of excavated materials designated as Class I waste.

7. *Health and Safety Plan and Hazardous Waste and Emergency Response Standard (HAZWOPER) Certification of Workers. Section 7.2.6 of the RAW should be revised to commit to the provision of a health and safety plan and state that any workers in contact with mine waste must be HAZWOPER trained and certified. See Comment #5.*

Section 8.0 describes health and safety planning.

1.5.1.4 HERO Comments

The following comments were presented in a DTSC Human and Ecological Risk Office (HERO) memorandum dated December 14, 2021.

General Comments:

1. *HERO notes that subsequent to the 2016 Removal Action Workplan, the California Toxicity Criteria Rule (TCR) was promulgated. The TCR requires that human health risk assessments, risk-based screening levels and remediation goals use the specific toxicity criteria as listed in Appendix I of the TCR, pursuant to the Hazardous Substances Account Act (Health and Safety Code [HSC] §25300 et seq., "Chapter 6.8" and California Code of Regulations (CCR) §69021). This can be done using HHRA Note 3 (screening levels) or Note 10 (toxicity values). HERO notes that Section 4.2.2 of the document states that all "cancer slope factors that have been adopted by USEPA" were used in the evaluation. HERO recommends updating the risk assessment to ensure that the appropriate toxicity criteria were utilized. Additionally, the TCR should be added to the list of ARARs.*

Section 6.1.1.4 identifies the TCR as applicable, and the risk assessment presented in Section 5.1 uses toxicity criteria set forth by the TCR.

2. *Conceptual Site Exposure Model: HERO does not concur that the incidental ingestion of surface soils is "minor" as indicated in Figure 5. HERO considers this to be a complete and significant pathway for all human receptors (recreator, outdoor workers, and construction worker), and the potential risk associated with this pathway should inform risk management decisions.*

The risk assessment presented in Section 5.1 identifies soil ingestion as a significant exposure pathway.

3. *Recreational User Scenario:*
    a. *HERO does not concur with the decision to modify exposure based on the time of day spent in the proposed park. The equations in the Preliminary Endangerment Assessment Manual for assessing risk and non-cancer hazard to soils do not have an hours/day factor. Rather, exposure frequency is in days/year and exposure duration is in years. By including a fractional day in the equation, it ultimately reduces the estimated soil ingestion. HERO notes that an outing to a park likely has the highest soil contact intensity in an individual's day so the full ingestion rate of 100 mg/day and 200 mg/day should be considered for adult and child receptors, respectively.*
    b. *HERO recommends including exposure to surface water via wading/swimming to the risk assessment. This pathway is currently marked as "might be complete but is judged to be minor" in the Conceptual Site Exposure Model and is not evaluated in the risk assessment.*

The risk assessment presented in Section 5.1 addresses recreational use and water exposure.

4. *Arsenic Background: HERO requires additional information to appropriately evaluate the proposed background arsenic concentration of 48 mg/kg. Appendix A provides a graphical presentation of the data that shows a clear inflection point at 48 mg/kg. However, per DTSCs 2009 Arsenic Strategies Guidance, the evaluation requires both the graphical analysis and a statistical evaluation of the data. HERO recommends using the fourth spread technique to evaluate potential outliers in the data set. This process should be done iteratively until no outliers are identified. HERO recommends performing the statistical analysis only on the samples that fall under the inflection point (i.e., less than or equal to 48 mg/kg) as the other detections are clearly indicative of contamination (maximum concentration 550 mg/kg). HERO used US EPA's ProUCL 5.1 Software and the fourth spread analysis to evaluate the reduced dataset (147 samples with arsenic <48 mg/kg) for potential outliers. Once outliers were identified, the summary statistics were recalculated, and the fourth spread analysis was repeated to identify additional outliers.*

This process was done iteratively a total of 9 times until no additional outliers were identified. This process identified 40 outliers (all samples greater than 22.525 mg/kg. The remaining 107 samples were evaluated using ProUCL to estimate a background threshold value (BTV), using the 95% Upper Threshold Level (UTL) with 95% coverage, of 22 mg/kg.

Section 4.5 presents the background metals evaluation.

5. *Arsenic bioavailability: HERO concurs that there is a high potential for reduced bioavailability of arsenic associated with these mining soils. However, in the absence of site-specific data on arsenic bioavailability, the risk assessment equations should not be adjusted for bioavailability. HERO recommends the California Arsenic Bioaccessibility (CAB) method as outlined in HHRA Note 6 to determine the site-specific arsenic bioavailability.*

Sections 4.3.9 and 5.1.7 address arsenic bioavailability.

6. *Evaluation of Lead: HERO does not concur with the conclusions from the recreational scenario regarding lead. The LeadSpread model does not have an adjustment for number of days exposed or hours of the day exposed. The model is based on a 90-day steady state exposure. As such, there is no increased allowable concentration of lead in soils for the recreational scenario, which assumes 200 days/year. HERO does not concur with the proposed clean up value for lead of 475 mg/kg. Furthermore, the justification for this clean up value is stated to be provided in Appendix D, however the printouts provided (actually in Appendix C) are the default spreadsheets for the established residential screening level of 80 mg/kg. There is no site-specific data entered into the spreadsheet nor any calculation of blood lead due to site conditions. This Appendix does not provide the necessary information to support the elevated lead cleanup value of 475 mg/kg for lead presented in the document.*

Section 5.1.8 presents the lead hazard assessment.

7. *Off-site Exposures: HERO notes that the Site is surrounded by residential development. Given that part of the proposed remedy is to leave mine tailings in place but fenced, HERO recommends including an evaluation of the potential for contaminated soils to travel off-site via wind-blown dust and surface water run-off. Additionally, DTSC's Community Air Monitoring Plan (CAMP) Guidance should be referenced to develop monitoring plans during any soil remediation activities.*

Sections 5.3 and 5.3.5 address the potential for off-site surface water and sediment transport. Section 8.0 describes the CAMP guidance. A CAMP and post-remediation MRP are to be prepared as part of the RDIP.

<u>Specific Comments:</u>

1. *Appendices: HERO notes that the appendices at the end of the document do not match the appendices listed in the table of contents. There are four appendices at the end of the document HERO was provided to review: A,B,C, and D. The table of contents lists five appendices. The table of contents and the text of the document indicates that Appendix C has the ProUCL Outputs, however no ProUCL outputs are provided. Appendix C in the document has the Lead Risk Assessment Spreadsheets that were supposed to be in Appendix D.*

Appendices G and H, respectively, present the statistical data and risk assessment data.

1.5.1.5 ERAS Comments

The following comments were presented in a DTSC Ecological Risk Assessment Section (ERAS) memorandum dated December 6, 2021.

General Comments:

1. *The expected measures to mitigate human exposure to arsenic in mine wastes is capping mine wastes with clean base material, soil, or asphalt, and controlling public access to subareas within the Site. While capping is intended as a human-health- protective mitigative measure, the action would also eliminate exposures of ecological receptors to elevated concentrations of soil-borne arsenic in those areas and reduce the overall exposures for mobile ecological receptors that may roam across the entire Site.*

Comment acknowledged.

2. *The SLERA [Screening Level Ecological Risk Assessment] addition to the RAW presents an analysis that, overall, is satisfactory to ERAS. ERAS could challenge some specific methods and interpretations in the SLERA, but further evaluation of those associated concerns would not significantly change the broader conclusions of the screening-level assessment.*

Comment acknowledged.

3. *The U.S. Environmental Protection Agency's guidance for ERA presents an eight-stepped process. There are "Scientific/Management Decision Points" (SMDPs) at critical stages in that overall process where basic decisions can be made about continuing or stopping further ecological-risk evaluation. For the Site, Step 1 of the ERA process is the scoping-level assessment which identified complete pathways for exposure of ecological receptors to COPECs. Step 2 of the ERA process is the SLERA, completion of which leads to the first SMDP: is information sufficient to conclude that ecological risks are negligible, or should the ERA process continue to a baseline ERA (BERA, i.e., a Step 3 ERA) or directly to consideration of remedial options?*

   The quantitative SLERA results do not universally indicate negligible ecological risks; a few of the COPEC's concentrations exceed "no-adverse-effect" screening concentrations, notably arsenic, copper, and selenium in soil, while arsenic and mercury in sediment exceed toxicity-threshold concentrations. Surface-water results are inconclusive. However, exceedances of screening concentrations do not indicate that ecological risks are necessarily present but instead prompt further consideration. SLERAs incorporate a wide range of assumptions and their accompanying uncertainties, which complicates remedial decision-making based on SLERA results.

   The SLERA mentions a few of those underlying uncertainties, including:

   - *Applicability of generic screening concentrations to Site-specific conditions;*
   - *Exposure concentrations (individual maximum concentrations versus upper-bound estimates of mean exposure concentrations for mobile receptors);*
   - *Frequencies and spatial occurrence of elevated COPEC concentrations and existing habitat quality; and*
   - *Bioavailability of inorganic COPECs (from soil or sediment to the receptor, from soil or sediment to the food web, and from the food web to higher-order wildlife consumers).*

   While these are valid qualitative considerations, the available conclusions of a SLERA are limited and in this situation, Site-wide ecological risks are not demonstrably negligible.

Comment acknowledged.

4. *Based on review of the data for the inorganic COPECs in soil, coupled with ERAS's institutional knowledge and expectations for a supplemental evaluation of toxicity- threshold concentrations in a "Step 3a BERA" (also known as COPEC refinement), ERAS expects that concentrations of inorganic COPECs in soil (except arsenic) would not pose a risk to populations of ecological receptors. For arsenic, the ceiling concentration of 48 mg/kg is essentially equal to the no-effect screening concentrations for birds and mammals and the mitigative measures for protection of human health are also protective of wildlife receptors.*

Comment acknowledged.

5. *Arsenic concentrations in lakebed sediment and downstream of the dam exceed the "probable effect [threshold] concentration" (PEC), and mercury concentrations exceed the PEC for inorganic mercury at three locations, two immediately downstream of the dam. Additionally, there is potential for the presence in sediment of the more-toxic organic mercury compound methylmercury, and this is a data gap. The exceedances of the PECs are approximately 2- to 3-fold and don't suggest widespread high levels of contamination, but these Site-specific data are still exceedances of a generic threshold concentration. Whether these compounds and concentrations present a significant ecological risk to sediment organisms or to wildlife that use the aquatic environment is, therefore, highly uncertain.*

Comment acknowledged.

Conclusions:

ERAS reviewed the 2016 RAW for content related to ecological risk assessment. The SLERA cannot conclude that Sitewide ecological risks are negligible, but whether there are significant adverse ecological effects is an uncertain conclusion and may require collection of additional data. Soil concentrations of inorganic COPECs and mitigative measures to achieve a Sitewide ceiling concentration of arsenic are not suggestive of adverse ecological effects. However, sediment and surface-water data are limited and interpretation of the significance of those data is speculative. "Next step" options for ERA could be:

- *Collect additional data to address limitations in the sediment and surface-water data sets and/or to better characterize bioavailability from soil; or*
- *Progress to a Step 3a BERA with existing data; or*
- *Conduct a "virtual" post-reutilization SLERA (and BERA?) by modifying exposure concentrations and assuming that the cap is in place, although this primarily addresses soil-borne COPECs; or*
- *Proceed with reutilization plans and monitor future conditions, given the uncertainties of the screening-level assessment (particularly for sediment and surface water); or*
- *Consider other environmental-management options that meet the project-team's objectives.*

Section 5.2 presents a baseline ecological risk assessment.

1.5.1.6 ESPO Comments

The following comments were presented in a DTSC Engineering and Special Projects Office (ESPO) memorandum dated February 3, 2022.

A. *Remedial Design and Implementation Plan (RDIP): Many of the elements of the design and implementation of the surface cover proposed for the Site appear to be missing from the last version of the RAW. For this reason, ESPO recommends the preparation and submittal of a RDIP for DTSC review and approval. The RDIP should detail the following elements:*

1. *Remedial Design: A remedial design of the Site surface cover needs to be included in the RDIP to provide the necessary details related to the grading plans, properties of materials to be utilized in creating the cover, compaction rates, slope stabilization methodologies, and erosion control measures including surface water management and drainage design.*

2. *Site Management Plan (SMP): While no contaminated soil is anticipated to leave the Site, earthwork at the Site such as grading, trenching (e.g., for utility lines), compaction, and relocation of contaminated soil within the Site, require careful planning and execution during the implementation of the Site remedy. The SMP should also cover related activities such as Site preparation and permitting, equipment decontamination, surveying, traffic control, noise control, and dust control monitoring (especially at the Site perimeter to protect surrounding communities).*

3. *Operation and Maintenance Plan (O&MP): An O&MP is needed to document surface cover inspection and repair procedures and their frequency.*

4. *Health and Safety Plan (HASP): Contrary to what is stated in section 7.2.6 of the RAW, a Health and Safety Plan (HASP) should be prepared for this project in compliance with Federal and California Occupational Safety and Health Administration (OSHA) requirements in order to protect worker safety during earthwork conducted in soils that have elevated levels of metals. For example, the OSHA and Cal OSHA arsenic time weighted (8 hours) permissible exposure limit is only 10 µg/m^3 and is likely to be exceeded without any site controls given that the arsenic concentrations in Site soils are as high as 550 mg/kg (95% upper confidence level [UCL] of 83.2 mg/kg based on 311 analyzed samples, page 15, RAW). ESPO recommends that a HASP be included as an appendix to the RDIP.*

B. *RAW Update: Language in the RAW needs to reflect that further details on the design and implementation of the remedy will be documented in an RDIP that will be submitted to the DTSC for review. Additionally, Section 11.1 (Project Schedule) should be updated and the Toxicity Criteria Rule (TCR) should be added to Section 7.1 (Applicable or Relevant and Appropriate Requirements [ARARs]).*

Section 6.1.1.4 identifies the TCR as applicable. Section 9.1 describes requirements associated with the RDIP. Section 9.12 presents a schedule for the remedial action.

1.5.2 DTSC Comments on the Draft RAP

Comments from the DTSC (December 12, 2023) on the Draft RAP (Geocon, September 30, 2023) are summarized below. Our responses following each comment are based on our preliminary responses to DTSC comments presented in our *Response to Comments on Draft Remedial Action Plan* dated November 10, 2023, modified to address the final DTSC comments dated December 12, 2023. The responses reference the sections of this RAP that have been revised to address the comments.

1.5.2.1 GSB Comments

The following comments were presented in a DTSC Geological Services Branch (GSB) memorandum dated October 26, 2023, and an email confirmation dated November 29, 2023.

1. *Lateral Delineation of Soil Impacts/Offsite Impacts – GSB notes elevated concentrations of arsenic on Sheet 3 in samples SOIL40, SOIL41, and SOIL42 on the southeast portion of the Site, in samples SURF-09 and SED-02 on the southwest portion of the Site (which appears to be outside of the Site boundary), and in samples TP-02, TP-03, and HA-03 on the west side of the Site.*

   Additionally based on Figure 6, it does not appear that an adequate number of soil samples have been collected in the Cyanide Process Area, and that cyanide detections are noted in soil outside of or along the Site boundary (to the west and south of the Tailings Pile).

GSB recommends the extent of metals in soil is delineated in the areas described above, and beyond the Site boundary where necessary, to better understand any existing risks to off-Site residents or other potential receptors.

Our evaluation of the site investigation data pursuant to GSB Comment 1 identified two changes to the proposed cleanup areas:

1. We included a new "Southeast Area" decision unit containing exploratory locations SOIL40, SOIL41, and SOIL42 near the southeastern corner of the site, southeast of the Lakebed Area in the mineralized area.
2. We expanded the previously identified hot spot at location HA-74 to include the adjacent location SOIL30.

These areas and other isolated tailings areas, including exploratory locations TP-02, TP-03, and HA-03 on the west side of the site (the Western Area and Southern Area), are described in Section 4.6.5 of the RAP.

Dames & Moore (1995) detected arsenic at the ground surface at off-site location SURF-09 in coarse and fine soil fractions at concentrations of 66 and 110 mg/kg, respectively. Arsenic was detected in surface sediment at off-site location SED-02 at a concentration of 89 mg/kg. The sample locations are approximately 100 feet south of the site in the drainage course extending south from the southwestern toe of the tailings pile. Off-site contamination was not fully characterized in the RAP. The characterization of off-site properties could be performed as a subsequent phase of investigation and is not likely to alter the remedial actions for the site as proposed in the Draft RAP.

Based on moderate contaminant concentrations detected in the Cyanide Process Area, we do not anticipate that further characterization would significantly change the proposed remedial actions, which include restriction of access by fencing and posting and restriction of unauthorized disturbance under a LUC. No cyanide was detected at the Cyanide Process Area, nor is cyanide likely to be encountered in the shallow, oxygen-rich environment presented by the native soil and shallow weathered bedrock typical of the decision unit. The frequency and extent of soil sampling in the Cyanide Process Area was presented in the draft and final *Site Characterization Summary and Supplemental Site Investigation (SSI) Workplan* dated April 25, 2023, which was approved by the DTSC in April 2023.

2. *Groundwater Impacts from Mining Activity – The Draft RAP identifies that the hydrogeology at the Site is complex, yet the Site currently comprises only two wells screened in perched water (MW-01 & MW-02), and three wells (MW-03 – MW-05) installed in fractured bedrock. Considering the size of the Site and because wells are installed in different water bearing zones that are not in communication, the monitoring network is not sufficient to demonstrate current conditions, nor will it be sufficient to demonstrate the effectiveness and performance of the remedial action.*
    a. *Based on Figure 2, GSB requests clarification as to why MW-02 and MW-04 were not used for contouring.*
    b. *GSB recommends well construction data is tabulated and added as a new table in the RAP.*

c. *GSB recommends additional shallow groundwater monitoring wells be installed in the expected downgradient position of wells MW-01 and MW-02 to delineate the extent of arsenic and cyanide detected above maximum contaminant levels in groundwater at these locations.*

d. *Analysis of groundwater data from MW-01 indicates a likelihood that mining waste placed in the lakebed area is currently leaching arsenic into groundwater at levels approximately six-fold higher than its maximum contaminant level (MCL). Accordingly, GSB requests an explanation of how this threat will be mitigated or addressed to ensure the proposed remedy will be protective of groundwater in the future (see also GSU comment #11 below).*

We revised Figure 2 to depict a generalized groundwater gradient of 0.05 to the south-southeast based on groundwater elevations measured in MW-3, MW-4, and MW-5, which are screened in bedrock. Groundwater elevations measured in MW-1 (screened in Lakebed Area tailings) and MW-2 (screened in Tailings Pile tailings) were not used to calculate the generalized groundwater gradient.

We added a table presenting groundwater monitoring well construction data to Section 2.3.5.

The installation of off-site groundwater monitoring wells downgradient of the existing groundwater monitoring wells MW-01 and MW-02 would (1) provide additional information regarding groundwater flow direction in fractured bedrock, (2) help to delineate the extent of arsenic and cyanide concentrations detected above maximum contaminant levels in groundwater, and (3) help to evaluate the long-term groundwater impact of tailings remaining in the Lakebed Area and Tailings Pile. Design details for proposed downgradient wells are to be presented in the RDIP, as noted in Sections 9.1 and 9.11.3.

3. *Decision Units/Areas Aligned with Reuse – While specific areas of contamination have been identified, consider dividing the Site into decision units or areas based on the proposed reuse (accessible to the public/ not accessible to the public, etc.) including proposed recreational trails. Additional figures should be generated that display the proposed areas of public access with arsenic concentrations in soil. The overlays are necessary to evaluate the spatial relationship of the public access areas and determine: 1) whether contaminated soils extend into these areas or not and 2) whether additional sampling is warranted to demonstrate soils in the public access areas are below health protective screening levels. These figures should include the proposed background threshold value (BTV) for metals.*

We added Table 26 to list decision units, background conditions, proposed land uses, and applicable cleanup goals. Sheet 3 depicts the decision units, background conditions, and proposed land use controls. The following remedial actions are depicted on Sheet 4 of the Draft RAP:

- Public access to the Lakebed Area and Cyanide Process Area is to be restricted by fencing and posting, and unauthorized disturbance is to be prohibited under a LUC.
- Isolated areas of shallow tailings are to be excavated and moved to the Tailings Pile. Cleanup goals for excavation areas are dependent upon the background condition:
    - Excavation areas in non-mineralized background locations are to be cleaned up to unrestricted land use standards and the non-mineralized arsenic BTV.
    - Excavation areas in mineralized background locations are to be cleaned up to commercial/ industrial land use standards and the mineralized arsenic BTV, and residential use is to be restricted.

- The Tailings Pile is to be capped to eliminate direct exposure pathways and reduce meteoric water infiltration. Future disturbance of the cap and underlying tailings will be restricted under a LUC. Soil imported for the Tailings Pile cap must meet unrestricted use criteria, including the site-specific non-mineralized arsenic BTV.
- The Western Area and Southern Area, downslope of the Tailings Pile, are to remain in place under the Tailings Pile LUC, and unauthorized disturbance is to be restricted. Based on the modest COC concentrations detected in the Western and Southern Area, no cap is proposed. Recreational trails proposed downslope of the Tailings Pile must be constructed in soil representative of non-mineralized background arsenic conditions unless an alternative benchmark value is approved by the DTSC for recreational trail use.

We modified Sheet 3 to depict the areas of proposed land use restriction. In addition, the existing fencing around the collapsed Bellwether Mine excavation portals is to remain to address potential physical hazards.

No access restriction is proposed for the naturally mineralized area (Sheet 3), although future residential use is to be restricted and the proposed recreational trails (Sheet 5) are to be routed in areas with surface arsenic concentrations below the mineralized arsenic BTV. The soil arsenic data presented on Sheet 3 indicate that naturally occurring arsenic concentrations in the northern end of the mineralized area (north and upslope from the Cyanide Process Area) may exceed the mineralized arsenic BTV. Therefore, sampling of surface soil along the proposed trial alignments in this area and analysis of the soil samples for total arsenic are required prior to trail construction, as stated in Section 9.11.4.

4. *Measures to Prevent Public Access – GSB requests clarification regarding any measures planned to prevent public access to areas off-trail as follows:*
    a. *Provide a description of Site reconnaissance and how publicly accessible areas were or will determined to be free of surface tailings (i.e. walking transects)*
    b. *Provide a discussion of why a method like incremental sampling may not have been used to screen such a large Site.*
    c. *Additional surface sampling along proposed public trails may be necessary to ensure no unacceptable risk to receptors goes unidentified.*

We performed a thorough surface reconnaissance as part of the supplemental site investigation, but we did not walk transects. Transecting the site in search of surface tailings and/or collection of surface samples along the proposed trail alignments could be performed as part of RDIP development if necessary.

Our supplemental investigation used authoritative (targeted) sampling to address data gaps. We performed statistical analysis of the pooled data set (consisting of our supplemental data set and the substantial existing data set) to provide conservative estimates of central-tendency values, and we compared discrete arsenic concentrations to BTVs established by statistical analysis. Incremental sampling would likely provide a less conservative (more accurate) central-tendency value but would necessitate significant additional sample collection and is not considered necessary to inform the remedy selection.

5. *Proposed Remedial Action – GSB generally concurs with the proposed remedial action "On-Site Consolidation Under Land Use Controls" and agrees that physical extraction and removal of mine tailings would likely be cost prohibitive and carries a potential of recontamination of other areas.*

   However, GSB recommends the RAP alternatives analysis be enhanced to evaluate the following:

   - *A hybrid approach to the proposed capping and consolidation which includes the removal of a portion of the waste which has been found to be more toxic and/or to retain a higher leachability threat. Doing so will reduce the volume of waste and increase the protectiveness of the proposed remedy addressing our concerns regarding threat to groundwater and surface water.*
   - *A longer-term remedial measure that could be included or coupled to the capping and consolidation remedy to immobilize, destroy, or reduce the volume or toxicity of contaminants. Examples include phytoextraction or mycoremediation which may allow for additional land to be made available and safe for reuse. Consider exploring partnerships with universities and using areas of this site as a case study, specifically in areas where public access is planned to be restricted, which would not impact the redevelopment schedule.*

Comment acknowledged and appreciated. The Lakebed Area may be a good candidate for future exploration of longer-term remedial measures. Although the evaluation of a hybrid approach to capping and consolidation can be performed, its implementation would be difficult because the site characterization findings indicate that the waste is relatively homogenous. One exception is cyanide, which is present only in areas that remain saturated near the bottom of the Tailings Pile.

6. *Soil Management Plan – No earth moving activities should take place until a Soil Management Plan is submitted, preferably as a standalone document, for review and approval by DTSC. This recommendation is made because much of the protectiveness claims of the proposed remedy (capping and consolidation) depend on how site contaminated soils will be handled, placed, and managed in the future. Foremost of our concerns is ensuring contaminated soil designated in the RAP for capping and consolidation in waste management units at the site are not later, during post-RAP earth moving activities, somehow reused elsewhere on site, shipped offsite, or sold. This will ensure all soil management activities including excavation, handling, reuse, and disposal of contaminated soil are conducted appropriately.*

Comment acknowledged. Unless a stand-alone soil management plan is preferred, an O&M Plan will be appended to the RDIP with a Soil Management Plan and a Monitoring and Reporting Plan.

7. *Background Area – GSB notes that tailings have been identified in the area where background samples were collected. Specifically, background sample BKRD-10 was collected adjacent to an isolated tailings hot spot at sample SOIL25. GSB requests clarification as to whether this, and other potentially impacted locations, were included in BTV calculations. In the absence of a sufficient explanation, the background calculations should be revised to exclude this sample and/or to include additional new soil sampling locations positioned away from mining impacted areas.*

The arsenic concentration detected at location BKRD-10 (13 mg/kg) is part of the culled background data set despite its proximity to the impacted SOIL25 location. Its inclusion in the background data set is not expected to jeopardize the background evaluation. Regulatory guidance, procedures and results of the background evaluation are presented in Section 4.5. We performed the following procedures as part of the background determination:

- used ProUCL Version 5.2 (USEPA, 2022) to perform outlier tests on the arsenic data and to prepare box plots and normality plots;
- culled outlying data identified by the outlier tests and visual interpretation of the plots;
- reviewed the normality plot to identify the inflection point nearest the graphical (X,Y) origin and culled the data to the right of the graphical inflection point;
- further culled the single population nearest the graphical origin using fourth spread analysis; and
- determined the upper threshold limit of the culled dataset, which is considered representative of the site-specific BTV (20.7 mg/kg).

8. *Soil Cover Thickness and Design of the Proposed Waste Management Unit – GSB defers to the Engineering and Special Projects Office regarding the adequacy and protectiveness of the preliminary design of the waste management unit proposed onsite, including the cap design and thickness.*

Comment acknowledged.

9. *Soil Leachability – GSB recommends a figure be generated that displays the locations, results, and type of leaching tests performed to assist in GSB's evaluation of whether an adequate assessment of leaching potential has been conducted in all areas of the Site where anthropogenic sources are being left in place.*

Extraction test results are presented in Table 4 of the Draft RAP, and Sheet 3 identifies the locations where samples were collected for extraction testing. The frequency and type of extraction testing were discussed during preparation of the draft and final *Site Characterization Summary and SSI Workplan* dated April 25, 2023, which was approved by the DTSC in April 2023.

10. *New York Ranch Creek, Potential Impacts – Section 2.3.4 states that the shallow, flat-lying ephemeral drainage course extending south from the dam empties into the New York Ranch Creek.*
    a. *Please clarify how the proposed remedial action will prevent additional contamination to the creek.*
    b. *Considering operations at the Site likely occurred prior to the construction of the dam on-Site, GSB is concerned that the contamination in surface water and sediment may have extended beyond the Site boundary (specifically to the south) based on the drainage patterns/topography of the Site. As described in Comment #1, additional sampling is necessary to determine whether impacts have extended off-Site to the south.*

Section 4.6.5 describes the isolated tailings areas. The proposed remedial action is intended to prevent future downgradient contaminant transport by removing or capping potentially erodible materials and routing surface water drainage into appropriate conveyance and detention facilities. This includes construction of a closure cap on the Tailings Pile and the removal of a thin layer of tailings (or possibly mineralized, weathered bedrock) from the Dam Area decision unit (Sheet 3; Section 4.6.5) south of the Lakebed Area dam. The tailings remaining in the Lakebed Area are hydraulically contained by the dam and are not expected to discharge. The characterization of off-site properties could be performed as a subsequent phase of investigation but is not likely to alter the remedial actions for the site as proposed in the RAP.

11. *Rainfall and Surface Water Management, Remedy Protectiveness – Section 2.3.7 states the City of Jackson generally has a cool and wet winter with 25 to 40 inches of rain per year and that the wetland area immediately upstream of the concrete arch dam in the Lakebed Area is seasonally inundated. Accordingly, GSB has concerns with sediment and surface water runoff, rainfall infiltration and contaminant leaching to groundwater in the Lakebed Area and elsewhere on the Site. GSB recommends the RAP is revised to provide a discussion demonstrating how each of these concerns are addressed with the proposed remedy and how they would be managed or mitigated if encountered. The management and mitigation of these risks should be included as part of the proposed remedy.*

Water quality is evaluated in Section 5.3. In addition, the site is currently regulated under the State Water Resources Control Board (SWRCB) *Industrial General Permit* (Order 2014-0057-DWQ) and will continue to be regulated under this permit until the closure cap is constructed. Coverage under the *Construction General Permit* (Order No. 2009-0009-DWQ) issued by the SWRCB is required for the proposed remedial action. A MRP will be prepared as part of the RDIP to specify periodic post-closure monitoring.

12. *Pre-Design Soil Sampling – Section 9.3.5 states that "Pre-excavation sampling and analysis may happen…" What factors will determine if pre-excavation sampling and analysis will be performed to refine the boundaries of the proposed excavation areas? The RAP should be revised to state that any pre-excavation sampling that occurs will be completed prior to the development and submittal of the RDIP.*

We revised Section 9.3.5 to state that the results of pre-excavation sampling will be presented in the RDIP.

13. *Verification Sampling and Analysis Plan (VSAP) – Section 9.7 – GSB appreciates that the excavation size and number of verification samples are to be established in a VSAP prepared as part of a future RDIP. GSB recommends confirmation/verification samples are collected at every 30 linear feet for one sidewall sample, and every 1,000 square feet for one bottom sample.*

We revised Section 9.7.3 to increase the minimum perimeter sampling frequency from one per 50 feet to one per 30 feet, and to increase the minimum base sampling frequency of from per 5,000 square feet to one per 1,000 square feet. The revised sampling frequencies will result in the collection of approximately 554 verification soil samples. Alternative sampling frequencies for large areas may be proposed in the RDIP for DTSC review.

14. *X-ray fluorescence (XRF) – Section 9.7.2 – GSB has concerns with the proposed use of XRF for verification sampling, specifically when Section 2.6.6 states, "…the XRF data were not used to support the arsenic screening evaluation due to poor correlation between XRF and laboratory results at low concentrations". Ultimately, representative data is needed to determine whether the remedial action is complete in areas where tailings are to be excavated.*

Section 9.7.2 of the Draft RAP sets forth stringent acceptance criteria for use of field XRF results as final verification data (i.e., for verification of the limits of excavation with a minimum of 10% of the field XRF results confirmed by laboratory analysis). The correlation coefficient for the regression analysis must be 0.9 or greater, and inferential statistics (e.g., the Wilcoxon-Mann-Whitney [WMW] test [Bain and Englehart, 1992; also known as the Wilcoxon Rank Sum test]) must demonstrate that the central tendency values of the field XRF data and confirmatory laboratory data are statistically equivalent at a 99 percent confidence level

15. *Perimeter Verification Sampling – Section 9.7.3 states that if an excavation extends to a site boundary, no perimeter verification sampling will be conducted for those locations. GSB does not agree with this approach and recommends that samples are collected at the site boundary to understand potential impacts that may extend off- Site.*

We revised Section 9.7.3 to require perimeter verification sampling if an excavation extends to the site boundary.

16. *Characterization for On-Site Placement – Section 9.7.5 states, "Characterization of affected mine waste and soil was performed as part of the site investigation. Mine waste and affected soil that is to be placed on-site will not require further characterization". It is unclear if this refers only to waste that is to be consolidated on-Site or if it is to be reused for other purposes on-Site. Any soil included within areas found to be contaminated during the remedial investigation work should not be reused for any other on-site placement at locations outside of the waste management unit where contaminated waste is proposed to be entombed, capped, and consolidated. The RAP should be revised to state this, as should the SMP once developed. If however, Section 9.7.5 is indicating soil from other locations at the site are to be sampled to ensure they are below screening levels, the RAP and the SMP should say this. GSB recommends the section is revised to include more specific information.*

We revised Section 9.7.5 to state that soil included within areas found to be contaminated should not be reused for any other on-site placement at locations outside of the waste management unit (Tailings Pile) where contaminated waste is proposed to be consolidated and capped.

17. *Sheet 3 Soil Arsenic Concentrations – It is unclear on the figure at what depths samples have been collected. GSB is requesting that sample depths are indicated or that Sheet 3 is separated into multiple figures by depth or depth range. GSB is also open to receiving KML or shape files for use in Nearmap or Google Earth to help with the assessment.*

The color-coded arsenic concentrations depicted on Figure 3 represent the maximum detected arsenic concentration for each location (both surface and subsurface). The GIS data can be provided to facilitate review and can likely be exported in other formats.

1.5.2.2 HERO Comments

The following comments were presented in a HERO memorandum dated October 17, 2023. Additional HERO responses were presented in a memorandum dated December 11, 2023, and are noted after each comment under "HERO Response."

1. *Cleanup Goal for Recreational Trail Use: HERO cannot evaluate the appropriateness of the cleanup goal for the recreational trail user based on the limited information provided. Section 5.1.5.4 (pdf page 122) cites a 2006 HERO memo for Empire Mine as the basis for the recreational scenario. HERO notes that the current understanding of arsenic and its toxicity has changed since 2006, for example, the toxicity values used at that time have been updated now with the 2018 Toxicity Criteria Rule.*

    a. *Trail Runner Versus Recreational User: The trail runner scenario from the 2006 memo is not the same as the "recreational scenario", such as for other types of recreational uses. HERO has previously commented on this for the Empire Mine Site (see HERO correspondence from V. Hanley to P. Myers, dated September 9, 2019).*

b. *Recreational User Exposure Factors: HERO recommends performing a risk assessment using recreational-specific exposure factors to develop the clean-up goal.*

   i. *Please include a justification for the exposure factors utilized in the assessment.*

   ii. *HERO notes that the recreational user should account for both adult and child receptors.*

   iii. *Comments 3a and 3b from the HERO memo (V. Hanley to M. Downham, dated December 14, 2021) have not been sufficiently addressed. HERO does not recommend adjusting the soil ingestion rate. Please also evaluate the wading scenario for this Site.*

Section 9.3.6 of the Draft RAP specifies that soil to be imported to the site for use as the Tailings Pile closure cap must meet criteria for unrestricted land use pursuant to the DTSC *Information Advisory – Clean Imported Fill Material* (2001). The closure cap is intended to provide a physical barrier above the tailings that is suitable for park use, including but not limited to sports fields. A recreational exposure scenario appears to be applicable to the proposed park area.

For evaluation of future trail use, the Draft RAP used adult recreational exposure parameters established by the 2006 memo for the Empire Mine. The 2006 memo is presented in Appendix H of the Draft RAP. Section 5.1.5.4 states that the remedial goal has been updated based on current toxicity values, which are presented in Appendix H, Table 2. The remedial goal (60 mg/kg) is calculated in Appendix H, Table 7d.

We were not able to locate the referenced 2019 memo on EnviroStor but would like to review it if available. We would like to discuss site-specific exposure factors for recreational park use, trail use, and wading so that we can update the risk assessment in the Draft Final RAP.

HERO Response to Item 1

The RTCs noted that more information was needed to address HERO's comment. Therefore, HERO provided additional details via email on November 30, 2023 (2019 HERO memo shared with J. Muir) and on December 7, 2023 (recommendations for wading scenario). The November 30, 2023 email with the 2019 memo attached specifically provided details regarding a child exposure to soil/dust scenario.

HERO provided recommendations regarding the recreational wading scenario, which are summarized below.

Parameters for Adolescents Swimming/Wading Scenario	**Value**
Incidental Intake Rate, Surface Water, Adolescent	0.137 liter/event, assuming 52 events/year
Dermal Contact, Surface Water, Exposure Time, Recreational and Trespasser Youths	2 hrs/day, 52 days/year
Body Surface Area, Youth (6-16 yr old), Wading in Surface Water	9,800 cm2
Skin Surface Area (water contact, 1 event per day)	13,400 cm2/day
Exposure Frequency	52 days/yr
Exposure Duration (cancer)	12 yr
Exposure Duration (non-cancer)	12 yr
Body weight	44.3 kilogram (kg)
Averaging Time (cancer)	25,550 days
Averaging Time (non-cancer)	4,380 days

HERO is open to further refinement of the above wading exposure parameters and requests a rationale to be provided for any additional changes. For any remaining HERO comments from Comment 1 that cannot be addressed via the 2019 HERO memo or the wading scenario exposure parameters, HERO recommends scheduling an additional Teams call.

We revised Section 5.2.5, *Exposure Parameters*, to evaluate child and adult recreational use and wading using the exposure provided. Results are presented in Sections 5.1.7.5 (adult recreational runner), 5.1.7.6 (child and adult recreational use), 5.1.8 (lead hazard assessment), and 5.1.9.2 (surface water wading). Calculations are presented in Appendix H.

Risk and hazard under the recreational use scenarios are governed by soil arsenic concentrations. The risk assessment demonstrates that benchmark values for commercial/industrial use for lead (500 mg/kg) and mercury (4.4 mg/kg) in soil are acceptable under the recreational use scenarios. However, an arsenic concentration of 5.1 mg/kg yields a risk of one-per-million under the child and adult recreational use scenario. Therefore, trail use downslope of the Tailings Pile will be governed by the non-mineralized BTV for arsenic (20.7 mg/kg) unless an alternative benchmark value is approved by the DTSC for recreational trail use.

Risk under the surface water wading scenario exceeds one-per-million based on the maximum detected arsenic concentration in seasonal surface water at the Lakebed Area (10 µg/l), which is equal to the MCL for arsenic in drinking water. Routine wading in the seasonal surface water is not acceptable under this exposure scenario, and the Lakebed Area is also not suitable for use under the child and adult recreational scenario when it is dry.

2. *Arsenic Background Threshold Value (BTV): HERO recommends describing in more detail the approach to the evaluation of naturally occurring background including a discussion of how background threshold value BTVs were selected and calculated. For example, please present a figure showing polygons with the different arsenic BTVs based on soil mineralization. This information will help HERO understand how exposure to arsenic in soil in different areas across the Site is represented in the conceptual site model and considered in the risk assessment.*

We revised Sheet 3 to depict the mineralized area and the areas subject to proposed land use controls. Table 26 lists the decision units, background conditions, proposed uses, and applicable cleanup goals.

Regulatory guidance, procedures and results of the background evaluation are presented in Section 4.5. BTVs for the contaminants of concern (arsenic, lead, mercury, selenium, and silver) are developed in Sections 4.5.3.1 and 4.5.3.2, respectively, for non-mineralized and mineralized conditions.

HERO Response to Item 2

HERO has no further comment.

3. *Bioaccessibility Study: HERO recommends considering conducting a bioaccessibility study for the Site to refine the risk assessment. Please see HERO Note 6 for more details.*

Section 4.3.9 presents the arsenic bioavailability study procedures and the results of gastric-phase bioaccessibility testing using the California Arsenic Bioaccessibility (CAB) method pursuant to HERO Human Health Risk Assessment (HHRA) Note 6. Section 5.1.7 incorporates site-specific and media-specific relative bioavailability (RBA) values into the risk assessment.

HERO Response to Item 3

HERO has no further comments.

4. *Division of Site into Decision Units: HERO recommends presenting the Site divided into decision units or operable units. HERO finds that some locations appear to be prioritized for remedial actions, which could be facilitated via decision units.*

Table 26 lists decision units, background conditions, proposed land uses, and applicable cleanup goals. Sheet 3 depicts the decision units, background conditions, and proposed land use controls. Section 7.3.1 summarizes the decision units and remedial actions.

HERO Response to Item 4

HERO agrees with the proposed updates and will review in the future revised draft RAP.

Regarding the table that was included as the RTC for HERO Comment 4, please clarify Note 2 "Soil to be imported…" and whether the clean fill imported soil will include arsenic soil concentrations below the onsite background threshold value of [20.7] mg/kg. Please include details regarding arsenic concentrations to be used in the clean fill in the RAP.

Note 5 in the table: "…cleaned up to commercial…". HERO is confirming this text is in regard to all other contaminants of concern and excludes arsenic which is based on background.

Note 2 in Table 26 states that arsenic concentrations in imported soil must comply with the non-mineralized arsenic BTV of 20.7 mg/kg. Note 5 in Table 26 states that arsenic is to be cleaned up to background.

5. *Cleanup Goals Section 9.7.4 (pdf page 189): HERO finds the cleanup goal table (pdf page 190) needs clarification. For example, a "not-to-exceed" BTV of 120 mg/kg of arsenic in soil for the mineralized area is higher than the cleanup goal of 60 mg/kg mentioned elsewhere. In addition, the not-to-exceed BTV of 20.7 mg/kg for arsenic in the non-mineralized areas is below the cleanup goal of 60 mg/kg. HERO recommends clearly stating which clean-up goals will be used in each portion of the site.*

Table 26 lists decision units, background conditions, proposed land uses, and cleanup goals. We modified Section 9.7.4 to reference Section 6.4, which presents cleanup goals for arsenic, lead, and mercury for decision units proposed for unrestricted land and also for decision units proposed for future restriction of residential land use.

HERO Response to Item 5

HERO finds the RTCs for Comment 5 do not address the clarification for the derivation of the 60 mg/kg value. The RTCs (for Comment 1) state that the remedial goal of 60 mg/kg was calculated in Appendix H table 7b; however, HERO finds that the 60 mg/kg value is an input in table 7b, not an output. HERO finds that all parameters in table 7b will be affected by the updates requested from Comment 1 to the risk assessment. Inputs into Table 7b will need to be updated. In addition, HERO also finds that based on Table 7b, the 60 mg/kg value for arsenic is not based on a 1x10-6 risk. Please provide the source of the 60 mg/kg cleanup goal.

The revised exposure parameters for recreational use (see Item 1 above) result in arsenic cleanup goals for recreational use that are less than the background values. Therefore, the remedial action is to be based on background arsenic values unless an alternative benchmark value is approved by the DTSC for recreational trail use.

6. *XRF Adjustment for Arsenic: HERO finds that the use of XRF for arsenic in situ often needs a correction factor applied to the XRF data, based on the laboratory data. HERO recommends including text to describe this process in the RAP.*

   HERO recommends also including a description regarding decision criteria, for example, if lab data shows confirmation sampling still contains arsenic above the cleanup level.

We modified Section 9.7.2 to describe procedures for development of a calibration curve for XRF data. Section 9.7.4 sets forth decision criteria.

HERO Response to Item 6

HERO agrees with the proposed language to be added to the revised draft RAP.

7. *Top Soil on Cap: Please describe the cap in more detail. In Section 9 (pdf page 178) cap details (clay soil and imported granular soil) are described, and in Section 9.5.5 (pdf page 185) a geotextile fabric is described to be used as a separator fabric as a visible barrier. HERO defers to the Geological Services Branch to evaluate if the entire cap is only composed of clay material, or if other material (such as a hardscape) will be part of the cap. HERO would also like more information on placement of the geotextile fabric, the text currently describes this being used only at the public recreation facilities and also does not describe if any clean fill (including depth of clean fill) or geotextile fabric will be placed to prevent exposure to contamination left in place.*

The closure cap for the Tailings Pile includes a geotextile separator fabric as a visible barrier overlain by a minimum of one foot of compacted, low-permeability soil cap and a minimum of one foot of clean, compacted soil. Subsequent overlying improvements, such as hardscape or turf fields, are not considered part of the remedy. Details pertaining to the closure cap are to be provided in the RDIP.

HERO Response to Item 7

HERO agrees with the proposed text.

8. *Updates to Conceptual Site Model (CSM): HERO requests including trespassers as a current site receptor in Section [4.2.4] and in the CSM Figure.*

We updated Section 4.2.4 and Figure 5 to include trespassers.

HERO Response to Item 8

HERO agrees with the proposed text.

9. *Fencing Around Lakebed Area: HERO recommends the entire Lakebed Area is fenced to prevent exposure and potential risk to human health. However, HERO also notes that fencing may not be an effective long-term solution.*

The Draft RAP specifies that the entire Lakebed Area is to be fenced except for the southern end, which is contained by the concrete arch dam. Access to the dam is prevented by a fence. We are open to a discussion of effective implementation methods.

HERO Response to Item 9

While HERO notes that long-term fencing may not the most effective solution, HERO defers to the Project Manager upon selection upon physical and/or administrative control methods that keep receptors (recreational, children, trespassers, etc.) out of the lakebed area.

Comment acknowledged.

10. *Figure Request: HERO requests that a figure is provided that shows exceedances for all soil analytes (excluding arsenic) overlaid on the proposed remedial plan. HERO would like to confirm that all other exceedances will be addressed via the proposed plan. This includes "hot spots" that were mentioned in the RAP. For example, while mercury is listed as a contaminant of concern (COC), the cleanup of the site is not based on mercury. HERO would like to confirm that any mercury above the clean up goal of 4.4 mg/kg (found in Section 9.7.4) is addressed (i.e., mercury "hotspots" coincide with consolidation and capping).*

Our *Response To Comments on Draft Remedial Action Plan* (November 10, 2023) indicated that we would prepare a figure depicting exceedances for all soil analytes excluding arsenic, along with the decision units, the background conditions, and the proposed land use controls.

HERO Response to Item 10

HERO notes that this figure will be provided in the revised draft RAP.

Because cleanup goals are required for multiple contaminants (arsenic, lead, and mercury), multiple background conditions (non-mineralized and mineralized), and multiple proposed land uses (with or without restrictions), the creation of a figure or figures depicting the exceedances proved to be complicated. In lieu of figures, we sorted all site data by decision unit as presented in Table 2a, and we listed all cleanup goal exceedances for arsenic, lead, and mercury on Table 26. Table 26 does not list naturally occurring arsenic concentrations in the mineralized portion of the site that exceed the mineralized BTV for arsenic, but the data are plotted on Sheet 3. The analysis is summarized in Section 7.3.1, *Summary of Decision Units and Remedial Actions*.

11. *Mercury Clean Up Value: HERO requests more details on the 4.4 mg/kg clean up goal and whether this is a "not to exceed" value or if this clean up goal is based on a 95% Upper Confidence Limit (UCL). No details were provided for what scenarios mercury will be addressed at the Site.*

Section 9.7.4 describes the BTV cleanup goals as not-to-exceed values and the RBCLs as UCL goals, including the RBCL for mercury in commercial soil (4.4 mg/kg). The UCL goals apply to exposures for any portion of the cleanup area that represents a typical exposure area, such as a lot size. Section 9.74 specifies that the decision unit size and the statistical methodology related to the UCL goals must be established as part of a VSAP to be reviewed by the DTSC as part of the RDIP.

HERO Response to Item 11

HERO finds that the 4.4 mg/kg mercury in soil value was selected as the clean up goal based on the DTSC Commercial/ Industrial soil screening level found in HHRA Note 3. The 4.4 mg/kg value is not a 95% UCL or BTV. HERO therefore finds the response to Comment 11 unclear. However, HERO finds that the tables included in the RTCs for responses to HERO comments 4 and 5, indicate that clean up goals for mercury are either 1 mg/kg (unrestricted) or 4.4 mg/kg (commercial) in soil, and areas for specific clean up goals have been presented in Comment 4.

Comment acknowledged. In portions of the site where future residential development is to be restricted (i.e., naturally mineralized areas), the referenced benchmark values for lead and mercury are equal to their commercial/industrial screening levels. As described in Sections 5.7.1.5, 5.7.1.6, and 5.1.8, these benchmark values are acceptable under the recreational land use scenarios considered herein.

12. *Figure 8: It appears that for Figure 8, two figures have been overlaid on top of one another. This may be an error with downloading the file; however, HERO recommends confirming that these two figures are shown separately.*

In its original state, Figure 8 is an Ecological Conceptual Model Diagram without overlay. We can provide additional copies if needed for review.

HERO Response to Item 12

HERO has no further comments on Figure 8.

13. *Groundwater Exceedances: In Section 4.3.12.1 (pdf page 95), groundwater monitoring at the Site identified arsenic, iron, and manganese exceeding their DTSC Screening Levels for tap water (maximum contaminant levels, or MCLs). The Section also describes groundwater in the area having a beneficial use as drinking water (Basin Plan 2019). Currently, the RAP does not address remediation of groundwater at the Site. HERO requests including groundwater in the risk assessment to evaluate domestic use. The result of this risk assessment will inform whether a land use covenant preventing groundwater use at the Site for drinking water purposes is needed.*

Section 5.1.9 characterizes risk for water pathways. Human health risk and hazard for water pathways are evaluated under the standard unrestricted land use (residential) exposure scenario in Appendix H, Tables 10a through 10c. COCs (arsenic, lead, iron, manganese, and cyanide) for groundwater, groundwater seeps, and surface water are identified Appendix H, Table 1e. The maximum detected concentrations of arsenic, iron, manganese, and cyanide in groundwater, groundwater seeps, and surface water downgradient of the Tailings Pile present risk and hazard that are not acceptable for unrestricted (residential) use. Additionally, the maximum detected concentration of arsenic in seasonal surface water in the Lakebed Area is not acceptable for unrestricted use.

HERO Response to Item 13

HERO requests further information regarding future restrictions to groundwater, such as whether a land use covenant will be used.

The land use covenants proposed for the Lakebed Area, Cyanide Process Area, Tailings Pile, Western Area, and Southern Area will address restrictions on groundwater use. The installation of off-site groundwater monitoring wells downgradient of the existing groundwater monitoring wells MW-01 and MW-02 has been proposed to help to delineate the extent of arsenic and cyanide concentrations detected above maximum contaminant levels in groundwater, as discussed in response to GSB Comment 2. Design details for proposed downgradient wells are to be presented in the RDIP, as noted in Sections 9.1 and 9.11.3.

1.5.2.3 ESPO Comments

The following comments were presented in an ESPO memorandum dated September 29, 2023, and an email confirmation dated November 30, 2023.

1. *Format: Please ensure that all acronyms used in the RAP are listed in the Acronyms List (e.g., acronyms on page 170 like "SMP" and "MRP", while obvious, are not in the list). Cross-section (Figure 4) locations on the Site need to be displayed on a plan view map.*

We added missing acronyms, including SMP and MRP, to the list. We revised Figure 4 to state that the alignments of the cross-sections on Figure 4 are depicted in plan view on Sheet 2.

2. *Response to Engineering Services Unit (ESU) Comments (Section 1.5.6): ESPO comments on the prior document (Draft Removal Action Plan [RAW]) have been addressed.*

Comment acknowledged.

3. *Quantity Estimates (Section 6.3): Final estimates of contaminated soil volume need to be supported by calculations and any assumptions for each area. Additionally, the breakdown for Isolated Tailings Areas shown on page 137 does not sum (18,800 cubic yards) to the same value as that listed in the first table (19,900 cubic yards). Please check and correct the discrepancy.*

Quantity estimates are presented on Table 27 and Section 6.3. As stated in Section 6.3, the surface area and depth estimates listed in Table 27 are based on existing laboratory data and are to be refined by pre-excavation sampling and analysis. Results of the pre-excavation sampling and analysis and revised quantity estimates are to be presented in the RDIP. The quantity estimates for the Lakebed Area and Tailings Pile provided by Dames & Moore (1995) are to be updated based on the results of topographic survey performed as part of the RDIP.

4. *Evaluation of Remedial Action Alternatives (Section 7.0 and Executive Summary): For a RAP, a comparison of alternatives follows the USEPA CERCLA 9-point criteria, and not the 3-point criteria (effectiveness, implementability, and cost) required by a RAW. Please redo the comparative analysis based on the 9-point criteria and report the evaluation as a summary table in the Executive Summary.*

The tables in the Executive Summary and Section 7.2 were updated to include all of the nine criteria described in Section 7.1.

5. *Health and Safety Planning (Section 8.0): In the second paragraph on page 149, please language to state that contractors and subcontractors health and safety plans (HASP) must comply with the overall Site HASP.*

We revised Section 8.0 to state that contractors and subcontractors must prepare health and safety plans that comply with the overall site health and safety plan.

6. *Dust Monitoring (Section 8.3): Please specify how the wind direction will be determined (e.g., anemometer) to establish the background location.*

We revised Section 8.3 to describe the use of a weather monitoring station.

7. *Construction Quality Assurance (CQA, Section 9.2): ESPO recommends the use of an independent 3rd party contractor for CQA of the remediation/redevelopment work.*

Comment acknowledged. We would be happy to discuss the potential benefits and drawbacks.

8. *Field XRF Analysis (Section 9.7.2): Before its use, please ensure that the detection levels of the field XRF are below the cleanup goals presented in Section 6.4.*

We revised Section 9.7.2 to specify that XRF quantification limits must be lower than the corresponding cleanup goals.

9. *Operation and Maintenance Plan (O&MP, Section 9.11.4): The O&MP should incorporate the Soil Management Plan (SMP) and the groundwater Monitoring and Reporting Plan (MRP), and should list the frequency of all inspection and monitoring events.*

We revised Section 9.11.4 to specify that the Operation and Maintenance Plan must incorporate the SMP and MRP and must list the required frequency of all inspection and monitoring.

1.5.2.4 ERAS Comments

The following comments were presented in an ERAS memorandum dated September 21, 2023, and an email confirmation dated November 28, 2023.

<u>General Comments</u>

1. *In general, the ERA in the RAP satisfactorily presents an ecological scoping assessment and an ecological predictive assessment, in accordance with DTSC's ERA guidance documents. The scoping assessment concluded that constituents of potential ecological concern (COPECs) are present in soils of the Lakebed Area and Cyanide Process Area, warranting progression to the predictive assessment; the Tailings Pile is to be capped with clean soil, severing exposure pathways, and was not evaluated in the predictive assessment. Lead and mercury were identified in the predictive assessment as potentially posing a hazard to invertivorous birds (represented by the American robin), but representative exposure concentrations of lead were within the concentration range of naturally mineralized soils in the area (i.e., "background"). For mercury, toxicity was evaluated based on the more-toxic organic form, methylmercury; predicted hazards from organic mercury were relatively low, and while uncertain, predicted hazards from inorganic mercury are likely to be insignificant.*

Comment acknowledged.

2. *As an informative note to Geocon, ERAS no longer favors using U.S. Environmental Protection Agency (USEPA) Region IX Biological Technical Advisory Group (BTAG) High Toxicity Reference Values (TRV-High) for wildlife receptors. The BTAG TRV-Highs are mid-range effects levels that conceivably leave half of*

exposed receptors vulnerable to adverse effects. ERAS instead recommends selection of TRV-Highs based on true thresholds for the onset of potential adverse effects and should be established at an appropriate lowest-observed-adverse-effect level (LOAEL). However, based on ERAS's institutional knowledge, use of true LOAEL-based TRVs instead of BTAG-High TRVs would not significantly change the conclusions of the ERA, nor affect the proposed remedial actions.

Comment acknowledged.

3. *Arsenic, iron, and manganese concentrations in seasonal surface water at the Lakebed Area and in shallow groundwater in contact with the Lakebed Area tailings exceed water quality objectives, but exceedances were not detected in downgradient surface water. The RAP reasonably concludes that active remedial efforts are not necessary to protect downgradient water quality. However, the Tailings Pile releases metals to groundwater and downgradient surface water in exceedance of water quality objectives. Capping, land-use controls, and re-routing of surface-water drainage routes are proposed to reduce impacts from the Tailings Pile to groundwater and surface water.*

Comment acknowledged.

Minor Comment

1. *In Figure 5, the Conceptual [Exposure] Model Diagram, the exposure of ecological receptors to surface water via ingestion and dermal contact, and the exposure of ecological receptors to contamination in plants and animals via food ingestion, should be displayed as potentially complete exposure pathways (currently they are displayed as incomplete).*

We updated Figure 5 to depict food ingestion and surface water ingestion and dermal contact as potentially complete exposure pathways for ecological receptors.

1.6 Limitations and Exceptions

The information provided in this plan is not meant to be comprehensive, to identify all potential concerns, or to eliminate the risk associated with environmental conditions. Geocon used professional judgment and experience to arrive at the conclusions presented herein. Therefore, the conclusions are not to be considered scientific certainties. The recommendations provided herein are contingent upon Geocon's review of future sampling results and any other pertinent information that becomes available.

No environmental assessment can eliminate all uncertainty. Geocon does not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan. Furthermore, the concentrations detected in the samples collected during the site investigation may not be representative of conditions between the locations sampled. Other forms of contamination may be present within the site that the investigation did not detect. Professional judgment and interpretation are inherent in the process, and uncertainty is inevitable. Therefore, the recommendations presented in this plan may need to be revised based on site conditions encountered during the proposed remedial action.

Geocon prepared and issued this plan for the exclusive use of our client and lead regulatory agency. Any reliance on this plan by a third party is at the party's sole risk. Geocon is not responsible for any other party's interpretations of the reported information.

Geocon performed this work in accordance with present, regional, generally accepted standards of care. This report does not represent a legal opinion. No warranty is expressed or implied, and no warranty of merchantability or fitness for the purpose is made or intended in connection with the work.

The findings of this report are valid as of the present date. However, changes in the conditions of the site can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. Changes in regulations, interpretations, and/or enforcement policies may occur at any time. Such changes may affect the extent of mitigation required.

Specific site development plans were not available at the time this plan was prepared. Therefore, the plan must be reviewed, and must be revised, if necessary, to accommodate specific improvements and land uses other than those outlined in this plan. Geocon, or another qualified environmental professional that reviews and accepts the findings and conclusions presented in the plan, should be retained to review all project changes and prepare written responses with regard to their impacts on the conclusions and recommendations presented herein.

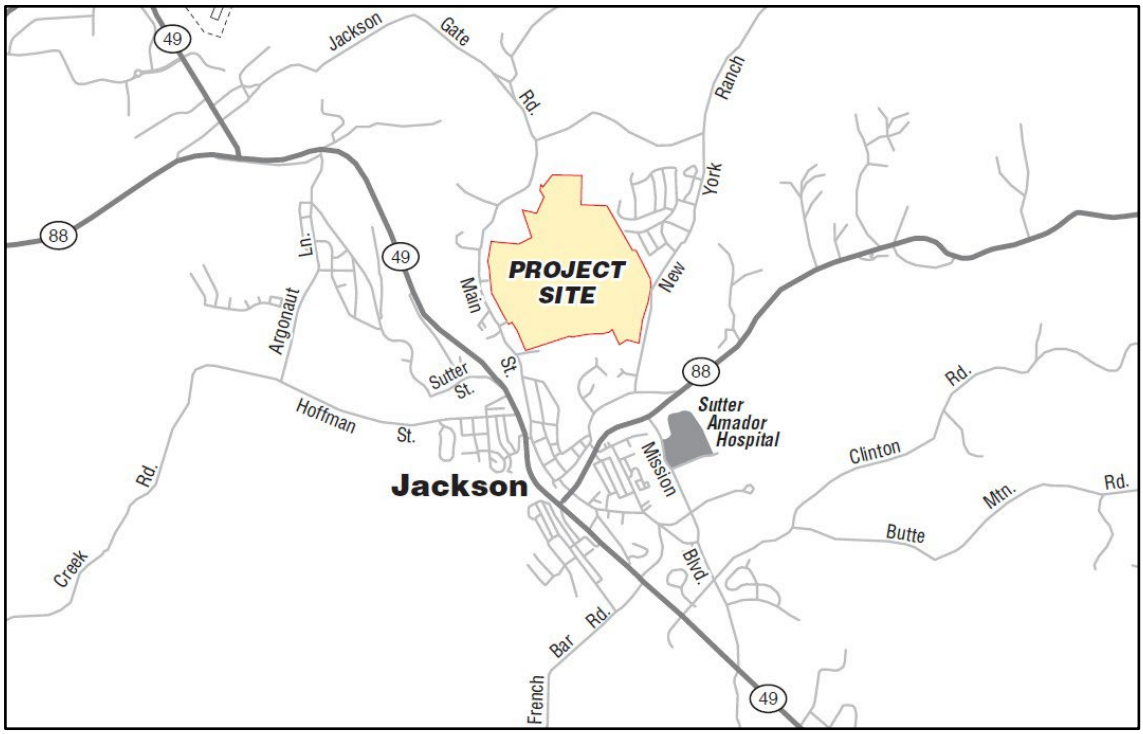
Geocon is not responsible for the health and safety of non-Geocon personnel, on or off the project site. The remediation contractor is responsible for worksite conditions.

2.0 BACKGROUND

This section describes the site and physical setting, operational history, nature and extent of contamination, and previous investigations. Some of the information presented in this section is adapted from Dames & Moore's (D&M) 1995 Environmental Assessment (EA), which was prepared in a Preliminary Endangerment Assessment (PEA) equivalent format and was previously reviewed by the DTSC. The findings of our SSI are presented in this section and following sections to describe the current site conditions and to augment the previous investigation findings.

2.1 Site Description

The site is located within the city limits of Jackson, California, approximately 48 miles southeast of Sacramento, near the junction of State Routes 49 and 88. The site comprises approximately 160 acres east of North Main Street and west of New York Ranch Road, immediately north of downtown Jackson (Figure 1). Residential neighborhoods are adjacent to the south, east, and west (Sheet 1). An excerpt of Figure 1 is presented below.



Excerpt of Figure 1, Site Location Map.

Site identification information and contact information are summarized in the following table.

Site	Oro de Amador
Address/Location	No street address. Site is situated between North Main St and New York Ranch Rd, Jackson, California 95642
Size	159.3 acres
Other Site Names	Kennedy Mine Tailings Site
USEPA Identification Number	CAD982403479
CalSites Identification Number	None
DTSC Site Code	102258
Associated DTSC Site Codes	100489, 101960, 102434
Envirostor ID	03100004
Assessor's Parcel Numbers	020-020-040, 020-070-037, 020-070-038, 020-070-040, and 020-070-031
Section, Township and Range	Section 21, Township 6 North, Range 11 East, Mount Diablo geodetic datum
USGS Quadrangle	Jackson, CA
Latitude	38.359 (N)
Longitude	-120.772 (W)
Land Use	Non-irrigated pasture for cattle
Zoning	The site is to be zoned recreational/open space according to the City of Jackson
Proponent	**City of Jackson**
Point of Contact	Susan M. Peters, ACIP
Mailing Address	33 Broadway Jackson, CA 95642-2301
Phone Number	209.223.1646
Email	smpaicp@gmail.com
Consultant	**Geocon Consultants, Inc.**
Point of Contact	Jason Muir, PE, GE
Mailing Address	3160 Gold Valley Drive, Suite 800 Rancho Cordova, CA 95742
Phone Number	916.852.9118
Email	muir@geoconinc.com

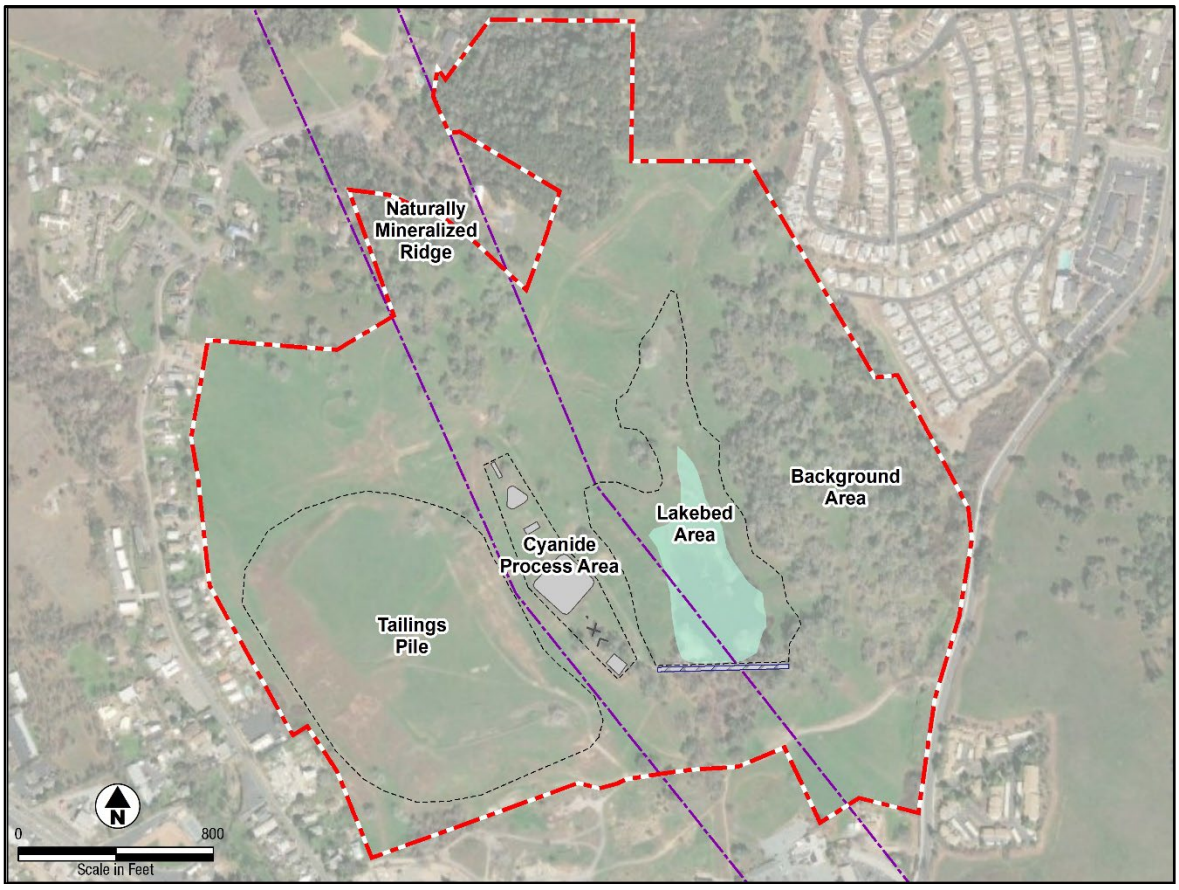
The following table lists the five site parcels by their Amador County assessor's parcel number (APN) and provides a description of each parcel and its acreage.

APN	Description	Acres
020-020-040-501	Northern uplands	8.26
020-070-037-501	Central, Lakebed Area (tailings impoundment)	9.80
020-070-038-501	South-central, downstream of tailings impoundment dam	4.32
020-070-040-501	Southeastern, south of access road	4.83
020-070-031-501	Remainder of site: uplands, Cyanide Process Area and Tailings Pile	132.09
Total		159.3

The EA (D&M, 1995) delineated five assessment areas (study areas) within the site. These areas are depicted on Sheet 1 and are described in the following table.

Assessment Area	Description
Background Area	Upland eastern portion of the site, undisturbed oak woodland.
Lakebed Area	Central southern portion of the site, former tailings impoundment comprising approximately 16 acres at the historical high-water line and containing a marshy wetland that is seasonally inundated. Historically stored more than 1 million tons of mine tailings (sand and silt) resulting from gold ore extraction (stamp milling and mercury amalgamation) performed off-site at the historical Kennedy Mine north of the site.
Cyanide Process Area	Located on the north-south ridge through the central portion of the site, west of the Lakebed Area and east of the Tailings Pile. Approximately one million cubic yards of tailings from the Lakebed Area were processed in this area to extract additional gold from the tailings.
Tailings Pile	Southwestern portion of the site, approximately 29 acres. Land disposal area for the approximately one million cubic yards of tailings processed in the cyanide plant.
Bellwether Mine	A small lode gold mining claim in the upland northwestern portion of the site. The short-lived mining operation resulted in several mining excavations (now collapsed) and small piles of angular, cobble-sized mine waste rock. No evidence of ore processing or processed tailings were identified at the former Bellwether Mine.

The locations of the assessment areas are depicted on the excerpt of Sheet 1 below.



Excerpt from Sheet 1, Site Plan.

The Background Area contains metals in soil at typical background concentrations and is not impacted by historical mining/processing activity.



Background Area, view to east, October 2022.

Conversely, the Lakebed Area and Tailings Pile are clearly impacted by mine tailings and contain metals at elevated concentrations. As depicted on Sheet 1, we identified several isolated areas of tailings outside of the Lakebed Area and Tailings Pile.

At locations where mine waste is not visually identified, soil metals concentrations may be influenced by:

- anthropogenic factors such as mining and processing, and transport of contaminated materials from industrial areas by wind, water, or mechanical means, and
- natural factors such as mineralization associated with the geological shear zone that extends through the middle of the site. roughly following the ridgeline, and the mineralized "halo" around the shear zone resulting from natural geologic processes (metamorphism and hydrothermal emplacement).



Lakebed Area, view to east, May 2023, concrete arch dam behind vegetation on right.



Tailings Pile, view to southeast, May 2023.

The former Bellwether Mine and Cyanide Process Area are located on a ridge running north-south through the site that is naturally mineralized due to geological conditions.



Cyanide Process Area, view to southeast, October 2022, leach tank pads in background right.

Small-scale historical mining excavation at the Bellwether Mine transported mineralized rock from the underground mine workings to the ground surface, where it was deposited in small waste rock piles. No chemical or physical processing is known to have been performed at the former Bellwether Mine location.

2.2 Community Profile

This community profile summarizes our understanding of the level of awareness and interest in the project by the community and provides a list of key contacts and recommendations for potential additional public participation efforts. Most of the basic information required in the community profile, including a description of the site, surrounding land uses, and proximity to residential areas, schools, daycare centers, and other sensitive receptors, is provided elsewhere in Section 2.0.

2.2.1 Demographics

The United States Census Bureau (2020 census data) reports that of a total population of 40,474 for Amador County:

- 77% of the county population is Caucasian;
- 15% is Hispanic;

- 3% is African American;
- 2% is American Indian and Alaska Natives;
- 1.4% is Asian;
- 0.2% is native Hawaiian and other Pacific Islander; and
- 10% report two or more races.

Ethnicity data specific to Jackson were not provided but are likely similar to that of the county as a whole. According to the United States Census Bureau (2020 census data):

- 27% of the Amador County population is 65 years old or older;
- 4.4% of the population speaks English "less than very well"; and
- the median annual earnings is $42,426.

2.2.2 Local Awareness and Interest

The site is visible from neighboring residential and commercial properties in all directions, and the site history is common knowledge to many Jackson residents. The Kennedy Tailing Wheels Park is on property that adjoins the site to the northwest and is operated by the City of Jackson to commemorate the area's rich mining history.

To report on the City's ECRG grant progress and to solicit input regarding the proposed site revitalization, we presented to the public during a City Council meeting on January 23, 2023. We facilitated a second, site-specific public meeting and presentation on July 26, 2023, at the Amador County Board of Supervisors chambers. The meeting was well attended by site neighbors, local residents, and representatives of local organizations including the Amador Trail Stewardship and the Mother Lode Land Trust. The attendees provided valuable input regarding community needs for site revitalization. We also performed a site visit to neighboring residences and follow-up email correspondence.

2.2.3 Key Contacts

Key contacts for the site with respect to providing information to the public include:

- Meghan Hearne, DTSC Project Manager – 714.484.5463, meghan.hearne@dtsc.ca.gov;
- Elsa Lopez, DTSC Public Participation Specialist – 818.717.6566, elsa.lopez@dtsc.ca.gov;
- Susan M. Peters, ACIP, City of Jackson – 209.223.1646, smpaicp@gmail.com; and
- Jason Muir, PE, GE, Geocon Consultants, Inc. – 916.852.9118, muir@geoconinc.com.

2.2.4 Key Issues and Concerns

Agency representatives and community members have previously demonstrated interest in site redevelopment planning, the specific types of public use, and the redevelopment schedule. We anticipate that the public's greatest concerns associated with the planned remediation and redevelopment activities will be airborne dust and noise associated with the remedial action; protection of the viewshed; and the types of public facilities planned for the revitalization.

2.2.5 Recommended Public Participation Activities

Section 10.0 of this RAP outlines public participation requirements, which are set forth in Section 25356.1 of the California Health and Safety Code (HSC). Requirements include the preparation of a community profile report to determine public interest in the remedial action; preparation of a public fact sheet; notice of the RAP in a newspaper of general circulation; provision of a minimum 30-day public comment period; and preparation of a responsiveness summary. The RAP will be available for public review at the DTSC office and at a local public repository such as the library or health department. A public meeting may be held if there is significant public interest. Any interested individuals have the opportunity to learn more about the Oro de Amador property or the RAP by submitting comments to Meghan Hearne with the DTSC at 714-484-5463, or via email at Meghan.Hearne@dtsc.ca.gov.

2.3 Physical Setting

The site is in the Mother Lode region of the Sierra Nevada Foothills, which is geologically rich in gold deposits and other hydrothermal mineral deposits. Gold-bearing ore was mined extensively in the region from circa 1850 to 1950 using underground mining methods. The Kennedy Mine (Appendix E, Photo 1) is ½ mile northwest of the site and is the source of mine tailings at the site. Photos 2 through 12 depict some of the infrastructure used to convey tailings from the Kennedy Mine to the Lakebed Area at the site.

The Melones Fault Zone is represented by a narrow band of highly altered rocks that forms a north-northwest-trending ridge through the site. The off-site Kennedy Mine, as well as the on-site Bellwether Mine and the Cyanide Process Area, are within this mineralized zone. The mineralized ore deposits extracted from the Kennedy Mine and Bellwether Mine, as well as the bedrock in the mineralized ridge crossing the site, contain naturally occurring arsenic, chromium, cobalt, copper, and nickel, which can be present at higher concentrations as a result of the hydrothermal emplacement processes. Mercury also occurs naturally in the area at concentrations below one part per million and is present in mine waste at higher concentrations where liquid (elemental) mercury was used in the gold extraction process.

2.3.1 Topography

The topography of the site and surrounding vicinity is characterized by rolling foothill terrain (Sheet 2). The elevation at the site ranges from 1,270 feet to 1,410 feet above mean sea level (AMSL; USGS, 2012) with the highest elevation in the northern portion of the site and the lowest downstream of the tailings dam in the southern portion. The original topography of the site has been modified by filling with mine tailings and grading of access roads.

2.3.2 Geology

The soil and geologic descriptions in this section are based on information provided by the following publications:

- United States Geological Survey (USGS), *Geology of the Sierra Foothills Melange and Adjacent Areas, Amador County, California*; Geological Survey Professional Paper 827; Duffield and Sharp, 1975;
- California Division of Mines and Geology (CDMG), *Mineral Land Classification of the Sutter Creek 15 Minute Quadrangle, Amador and Calaveras Counties, California*; CDMG Open File Report 83-36, 1981;
- CDMG, *Geologic Map of the Sacramento Quadrangle*, 1:250,000, 1981; and
- United States Department of Agriculture (USDA), Soil Conservation Service, *Soil Survey of Amador Area, California*, September 1965.

The site is in the Mother Lode region of the western foothills of the Sierra Nevada Geomorphic Province. The foothills are bounded by the Sierra Nevada to the east and the Central Valley to the west.

The site is in the Melones Fault Zone, an inactive fault system that hosts the "Mother Lode" hydrothermal gold ore deposits. The *Geologic Map of the Sacramento Quadrangle* (CDMG, 1981) indicates that the Calaveras Formation, which underlies the eastern portion of the site, consists of a series of highly foliated metasedimentary and metavolcanic rocks (Photos 13 through 16). The Mariposa Formation underlies the western portion of the site and consists of black slate interbedded with argillaceous (clayey) metasedimentary rocks (Photos 17 through 19).

D&M (1995) documented a thin band (typically 450 to 600 feet wide) of highly altered rocks from the Calaveras and Mariposa Formations that form a ridge trending north-northwest through the center of the site (Sheet 1; Photos 17 through 24). D&M interpreted this mineralized band to represent the Melones Fault Zone, which juxtaposes the Calaveras Formation to the younger Mariposa Formation (Duffield and Sharp, 1975). Hydrothermal alteration associated with Jurassic (201 to 145 million years ago) hydrothermal emplacement processes extends beyond this thin band of highly altered rock and into adjoining bedrock.

Highly altered rock outcrops are visible along the mineralized zone in the Cyanide Process Area and Bellwether Mine location (Photos 17 through 24). D&M described extensive secondary mineralization, including a bluish, ribbon-like mineral (possibly mariposite, which is a chromium form of muscovite) and other mineral accumulations. Quartz, typical in the Mother Lode area, is present in the mineralized zone (Photos 15, 21, 22 and 24).

2.3.3 Soil Conditions

The USDA Web Soil Survey (https://websoilsurvey .sc.egov.usda.gov/App/HomePage.htm) maps soil on the site generally as Auburn very rocky silt loam with smaller areas of Exchequer, Maymen, and Mariposa rocky loams. The soil survey describes the Auburn series as shallow to moderately deep, well-drained silt loam soil formed in weathered amphibolite schist. The soil survey states that rock outcrop typically comprises 15% of the mapped areas. The soil survey describes a typical profile as dark reddish brown to yellowish red silt underlain by variably weathered bedrock at a depth of 12 to 22 inches. The soil is well-drained and moderately permeable. Native soil, mine tailings and mine waste rock are further described below.

2.3.3.1 Native Soil

D&M (1995) described native soil on the site generally as dark brown and yellowish red silt and some clay of low to medium plasticity (Photos 12 and 20). We observed similar conditions during the SSI, as presented in the exploratory logs (Appendix F). D&M reported laboratory permeability values generally near 10^{-5} centimeters per second (cm/s), with 10^{-7} cm/s measured for a sample collected at the base of the Tailings Pile.

D&M reported that native soil is predominantly hard in consistency (greater than 4.5 tons per square foot), has blocky structure, and contains roots up to 2 millimeters (mm) in diameter. The soil has developed on the underlying bedrock or has been locally translocated to the base of swales on the site. Our exploratory logs (Appendix F) confirm this. Mineralogical analysis of native soil samples shows approximately half of the mineral content to be quartz with the bulk of the remaining fraction as layer silicates, goethite, and plagioclase feldspar.

2.3.3.2 Mine Tailings

Mine tailings in the Lakebed Area and Tailings Pile are predominantly gray, silty, fine sand and gray silt (Photos 28, 29, 32 and 56). The size of the tailings is disturbed bimodally as fine sand and silt-sized material (as a result separation during processing and transport). Fine sand grains are typically 0.1 to 0.3 mm in diameter, and silt particles are typically less than 0.075 mm. The sand and silt occur in roughly equal proportion and are often stratified in partings, seams, and layers.



Native soil and weathered Calaveras Formation bedrock, May 2023.



Interbedded silty and sandy mine tailings in the Tailings Pile, May 2023.

The silt is generally low plasticity and tends to retain moisture more readily than the sand. D&M reported laboratory permeability values for the silt is between 10^{-5} cm/s and 10^{-6} cm/s while that of the silty sand was between 10^{-4} cm/s and 10^{-5} cm/s. Slug permeability testing of monitoring well MW-2 yielded a permeability of 10^{-3} cm/s. D&M observed that this higher permeability value most likely reflects the permeability of the sand that occupies most of the screened section of the well tested.

D&M described roots up to 3 mm in diameter in the surface tailings. The silt is generally stiff to hard and has massive to platy structure. The silty sand generally is loose. Mineralogical analysis indicates that half or more of the mineral content of the tailings samples is quartz. Remaining minerals, in descending order of abundance, include sheet silicates, plagioclase feldspar, ferrous dolomite, pyrite, siderite, and others. Five out of seven tailings samples contained pyrite at levels between 1 and 10 %.

Field observations, mineralogic analyses, and chemical analyses all show that the tailings are not prone to generate acid under oxidizing conditions (D&M, 1995). The tailings display a greater potential to neutralize acid than to generate acid.

Selected samples were sieved prior to analysis into fine (< 0. 075 mm) and coarse fractions. The fine fraction contained more quartz and ferrous dolomite and proportionately less sheet silicates than the coarse fraction.

2.3.3.3 Mine Waste Rock

Small piles of mine waste rock are present at the Bellwether Mine location. The waste rock is dark gray, angular, gravel-size to boulder-size slate with some white veins of microcrystalline quartz. We observed no evidence of chemical or physical ore processing or tailings at the Bellwether Mine location.

2.3.4 Surface Water

The nearest surface water bodies are North Fork Jackson Creek (approximately 400 feet west of the site) and New York Ranch Creek along the southeastern edge of the site. Both creeks flow south and empty into Jackson Creek, which flows southwest through downtown Jackson approximately 1/3 mile south of the site. Jackson Creek empties into Dry Creek approximately 14 miles west-southwest of the site, and Dry Creek drains to the Mokelumne River, which flows into the San Joaquin River in the Sacramento-San Joaquin River Delta and eventually to Suisun Bay and San Pablo Bay.

The ephemeral drainage course extending south from the tailings impoundment dam empties into New York Ranch Creek approximately ¼ mile south of the site before the confluence with Jackson Creek. Geocon (2017) and others collected water samples from two seasonal groundwater seeps located near the southwestern site corner. The seeps originate from meteoric water collected in the Tailings Pile. Seep S-2 is located near the southern site boundary and drains south to Jackson Creek via the ephemeral drainage course originating from the tailings impoundment dam. Seep S-3 is located near the western site boundary and drains west and south towards North Fork Jackson Creek, which empties into Jackson Creek.

2.3.5 Hydrogeology

Groundwater in the foothills of the Sierra Nevada typically occurs within fractured bedrock. Perched groundwater may also be present in shallow alluvium and weathered bedrock overlying the less weathered, fractured bedrock. D&M (1995) reported that during their 1993 investigation they encountered groundwater at depths ranging from 30 to 60 feet in five borings advanced for construction of on-site groundwater monitoring wells MW-1 through MW-5; however, they also documented several lenses of perched water in their soil borings. The perched lenses ranged in thickness from 9 to 15 feet and were of an unknown lateral extent (D&M, 1995). Construction details for the groundwater monitoring wells are summarized in the following table.

Well ID	MW-1	MW-2	MW-3	MW-4	MW-5
Latitude[1]	38.35736229	38.3565311	38.3557081	38.3574078	38.3604906
Longitude[1]	-120.7705677	-120.774523	-120.774465	-120.771111	-120.775558
TOC Elevation[2] (ft AMSL)	1278.40	1294.10	1253.96	1285.88	1362.17
Drilling Method	HSA	HSA(46')/AR	AR	AR	AR
Completion Date	10/27/92	10/27/92	11/10/92	11/12/92	11/11/92
Constructed Total Depth (ft BGS)	14.5	53	38	67	62.5
Measured Total Depth (ft BTOC)	17.50	54.75	40.00	69.60	65.60
Borehole Diameter (in)	8	8	9	9	9
Casing Material	PVC	PVC	PVC	PVC	PVC
Casing Diameter (in)	4	4	4	4	4
Screened Interval (ft BGS)	9-14	37.5-52.5	27.5-37.5	57-67	52-62
Slot width (in)	0.010	0.010	0.030	0.030	0.030

1 Latitude and longitude are presented in decimal degrees based on the World Geodetic System (WGS 1984).
2 As reported by D&M (1995), except for MW-1. The top of the well casing for MW-1 was repaired by removing the top 0.833 feet of casing; therefore, the top of casing elevation is 0.833 feet lower than the elevation reported by D&M.
AMSL = above mean sea level, AR = Ingersoll-Rand TH60 air rotary, BGS = below ground surface, BTOC = below top of casing, HSA = Ingersoll-Rand A-200 hollow stem auger, PVC = polyvinyl chloride, TOC = top of casing

During our May 2023 groundwater monitoring event, the ground surface at MW-1 was covered by approximately 1.5 feet of surface water that is seasonally retained in the Lakebed Area. MW-1 is screened at a depth of 9 to 14 feet. Tailings are present from the ground surface to 11.5 feet and are underlain by native soil and weathered bedrock. The groundwater water elevation encountered in MW-1 is similar to the adjacent surface water elevation; therefore, the seasonal surface water in the Lakebed Area appears to be hydraulically connected to the perched groundwater in the tailings. MW-2 is screened in tailings in the Tailings Pile, and water was encountered at a depth of 30 feet. MW-3, MW-4, and MW-5 are screened in bedrock, although the depth to water in MW-3 (7.9 feet) is influenced by the tailings overlying bedrock at the toe of the Tailings Pile. Water was encountered in bedrock in MW-4 and MW-5 at depths of 15.5 and 41.4 feet, respectively.

Figure 2 depicts the monitoring well locations, groundwater elevations, and generalized groundwater gradient. The groundwater depths measured in the monitoring wells constructed in bedrock (MW-3, MW-4, and MW-5) suggest that the generalized groundwater gradient is 0.05 to the south-southeast; however, this generalized gradient is influenced by the tailings overlying bedrock at MW-3, and the local groundwater flow direction varies based on preferential flow pathways in fractured bedrock.

2.3.6 Habitats and Sensitive Ecosystems

Figure 3 is a habitat map based on vegetation unit descriptions from the California Wildlife Habitat Relationships System (CWHR System; available online at https://wildlife.ca.gov/Data/CWHR /Wildlife-Habitats). According to the CDFW BIOS Map Viewer (available online at https://apps .wildlife.ca.gov /bios/?bookmark=940), vegetation communities at the site are mapped as blue oak woodland, blue oak-foothill pine, and annual grassland.

The California Natural Diversity Database indicates that the western pond turtle (Emys marmorata), a California species of concern, may be present in the site vicinity. The federally threatened valley elderberry longhorn beetle (Desmocerus californicus dimorphus) has been identified in the vicinity of the site. One elderberry bush was identified during a site visit in May 2015 west of the Lakebed Area (Figure 3).

The National Wetlands Inventory (NWI) database maintained by the United States Fish and Wildlife Service maps a wetland in the Lakebed Area upstream of the tailings impoundment dam (Photos 30 and 31). The area behind the tailings dam is classified as both a freshwater pond (permanently flooded) and an emergent wetland (only seasonally flooded). The wetland area did not contain standing water at the time of our site reconnaissance in October 2022, but did contain water in winter and spring 2023.

2.3.7 Meteorology

Jackson's climate is categorized as California Energy Commission climate zone 12 and is within the area known as the Mountain Counties Air Basin. Weather conditions in the area generally follow two distinct seasonal patterns: a hot and dry summer season with high temperatures into the low 100s, and a cool and wet winter season with temperatures falling to the low 30s with 25 to 40 inches of rain per year.

According to the Western Regional Climate Center (https://wrcc.dri.edu/Climate/) the average wind speed in the Sacramento area on a year-round basis is 7 to 8 miles per hour with a prevailing wind direction from the south-southwest. Wind data for Stockton, California, the second closest station for which wind data is available, has average velocities similar to those reported at the Sacramento station, but the reported directions tend to be more westerly (from the west) than those at Sacramento. Reported wind directions in the area are apparently influenced by the location of the reporting station relative to the Sacramento-San Joaquin River Delta. Winds at the site are assumed to be generally more westerly than those in Sacramento due to a combination of topographic effects and the location of the site relative to the Sacramento-San Joaquin River Delta.

2.4 Land Use

2.4.1 Current Site Use

The site is currently closed to public access and is used as non-irrigated pasture for a small herd of cattle (Photos 10, 11 and 29). We observed evidence of unauthorized camping below the tailings impoundment dam in October 2022 and May 2023. Access to the top of the tailings impoundment dam is restricted by fencing (Photo 35). The site boundary is fenced (Photo 47), as are three abandoned mine excavations at the Bellwether Mine location (Photos 58 through 60).

2.4.2 Adjacent Property Land Use

Land surrounding the site is used primarily for residential purposes. Commercial, public and open space uses are also adjacent to the site. Adjacent land use is summarized below:

- To the west:
  - Residential properties along North Main Street (adjoining);
  - St. Seva Serbian Orthodox Church (adjoining); and
  - Detert Park (400 feet west, across North Main Street).
- To the south:
  - Jackson Cemetery (adjoining);
  - Jackson Elementary School (1,400 feet south);
  - Amador Residential Care (assisted living facility, 700 feet south);
  - Jackson Gardens (assisted living facility, 400 feet south);
  - Oak Manor Retirement Complex (400 feet south); and
  - Amador Senior Center (adjoining).
- To the east:
  - Rollingwood Estates (residential subdivision, adjoining); and
  - Jackson Hills Apartments (adjoining).
- To the north:
  - Low-density residential development (adjoining);
  - Theresa's Place (restaurant, adjoining); and
  - Kennedy Tailings Wheels Park (adjoining).

2.4.3 Intended Site Use

The City prepared a conceptual development plan in 2011. Recreational use and open space are proposed, including a park with sports fields, walking and biking trails, a paved access road, and a vehicle parking lot.

2.5 Operational History

The City has owned the site since 2006. The following summary of the site's operational history is taken primarily from the EA (D&M, 1995), Logan's *Mother Lode Gold Belt of California* (1934), and Wagner's *Gold Mines of California* (1970). Sheet 1 depicts the assessment areas.

2.5.1 Bellwether Mine

The Bellwether Mine, a small, short-lived underground gold mine, was operated in the upper, northwestern portion of the site between 1895 and 1900 (Logan, 1934). Surface conditions at the Bellwether Mine location currently include small piles of mine waste rock near three fenced, collapsed excavations, and one shallow pit that may have been an exploratory excavation (Photos 58 through 61). We did not observe mine tailings or other evidence of ore processing at the Bellwether Mine location.

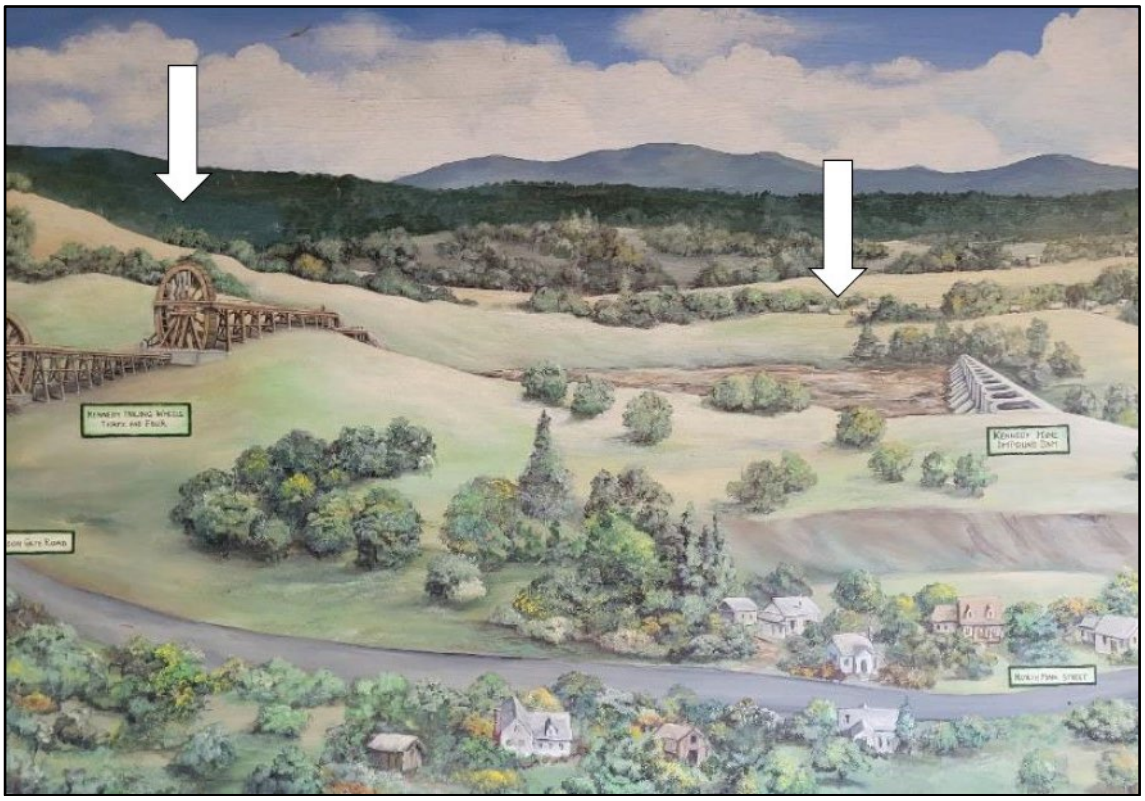


One of three fenced, collapsed excavations at the Bellwether Mine, view to north, October 2022.

According to Logan, the Bellwether claim was located on an agricultural patent 600 feet by 320 feet on the East (or Zelia) vein and was developed by the Bellwether Mining Company between 1895 and 1900. The work included several shallow shafts, the deepest being 180 feet, and an inclined shaft 320 feet deep with crosscuts and drifts to prospect the wide vein (the east branch, or hanging wall branch, of the Motherload). On the 282-foot level, a crosscut was extended 130 feet to the east, and the lode deposit at that location was reportedly 85 feet wide and showed fairly good assays for a width of 40 feet. Nothing more is known of the claim, which later was purchased by the Kennedy Mining and Milling Company (Logan, 1934).

2.5.2 Lakebed Area

In response to California state legislation passed in 1912 to impound tailings or cease operations, the Kennedy Mining and Milling Company acquired approximately 148 acres of the 160-acre site (not including the northernmost, upland parcel) and constructed a system of four 68-foot-diameter wheels (Photos 2 through 5) to transport tailings from the Kennedy Gold Mine (½ mile northwest of the site) to the tailings impoundment (located in the southern central portion of the site) for disposal (D&M, 1995).



Artist's rendition of historical tailings wheels (off-site, left) conveying mine tailings from the Kennedy Mine (off-site) to the Lakebed Area (on-site, right). Exhibit at the City of Jackson Kennedy Tailing Wheels Park.

Prior to transport by tailings wheels to the site, the tailings were processed at the Kennedy Mine by stamp milling and a mercury amalgamation. According to Logan (1934), milling was performed with 100 stamps and later with 60 stamps, followed by 40 Frue vanners (concentrators using a rapidly shaking continuous rubber belt mounted on a slightly inclined frame) for rough concentrate and two Frue vanners for cleaning concentrate, with tailings from the cleaning vats returned to the stamps. Up to about 1915 or later, a canvas plant was used to treat tailings, with Gates concentrators and pumping tables. A chlorination plant was reportedly also in use for many years. The stamps crushed 4½ to 5 tons of ore daily through a 24-mesh screen (Logan, 1934).

In 1914, a multi-arched reinforced concrete dam approximately 60 feet high and 600 feet long was constructed across a valley near the southern site boundary (shown on the right side of the inset photo above) to create an impoundment for the tailings (Photos 25 through 27). During peak operations, the tailings wheels carried up to 854 tons of tailings per day (Garbarini, 1984) to the impoundment. According to D&M (1995), Dorr and others (1950, no citation available) estimated that a total of approximately 1.5 million tons of tailings from the Kennedy Mine were deposited in the Lakebed Area (Photos 6 through 8 and 25 through 35).

The dam structure consists of fourteen connected reinforced concrete arches and abuts the sides of two natural ridges (D&M, 1995). A concrete spillway at the eastern end of the dam is approximately 30 feet above the current tailings surface. The shallow, flat-lying ephemeral drainage course extending south from the dam empties into New York Ranch Creek approximately ¼ mile south of the site. An apparently thin (typically less than one inch thick) layer of tailings is visible on the ground surface down slope of the dam (Photo 36), and native soil is present beneath and adjacent to the tailings layer.

The tailings impoundment occupies a natural drainage between two roughly north-south-trending ridges in the eastern portion of the site. The high-water elevation of the impoundment appears to have been approximately 1,305 feet above mean sea level and included an area of approximately 16 acres at full pool. Only a small amount of water has been seasonally retained behind the dam in recent years. Tailings are present above this elevation on the northern perimeter of the Lakebed Area, possibly as a result of mechanical dispersion (i.e., “track out”) along roads and paths by vehicles or cattle, or as a result of historical tailings retention at a higher elevation by a supplemental earth dam, reportedly constructed in 1933 upstream from the concrete arch dam. Tailings are also present along the conveyance route between the Lakebed Area, Cyanide Process Area, and Tailings Pile (Sheet 1) and at other isolated locations.

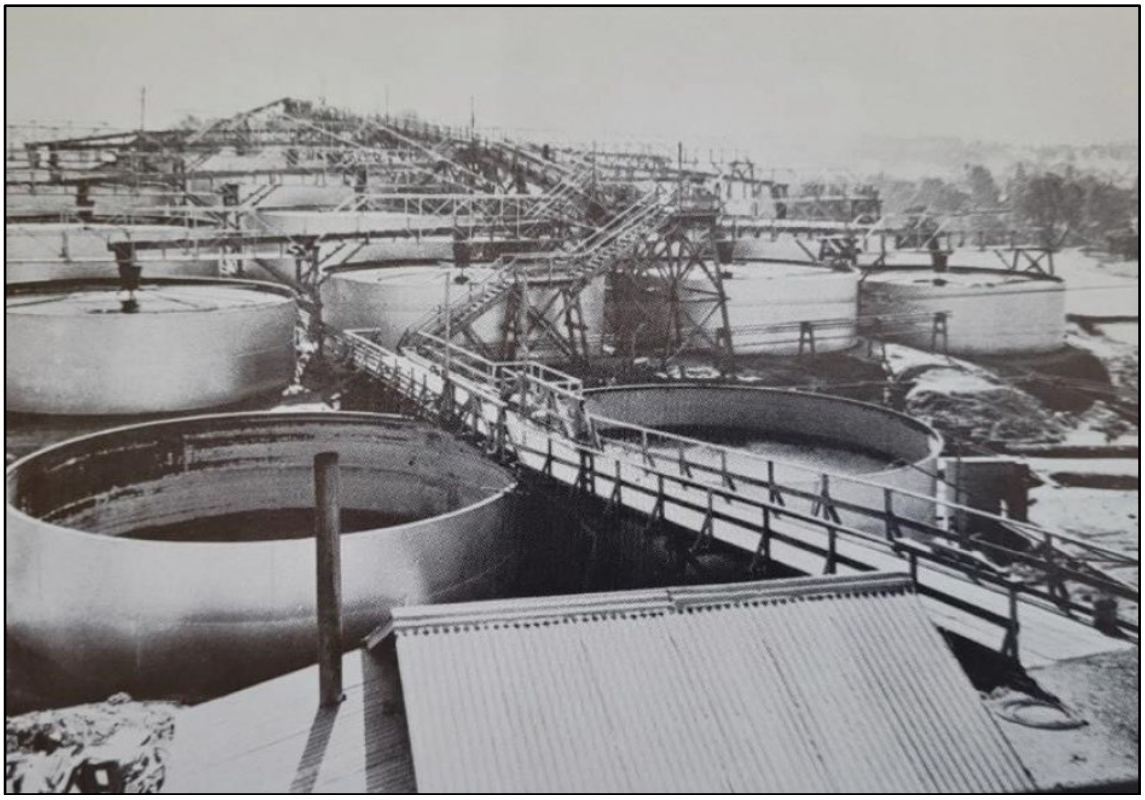
Although most of the reported 1.5 million tons of tailings were removed from the former tailings impoundment (Lakebed Area) for reprocessing in the cyanide plant, D&M reports that roughly 250,000 cubic yards of tailings remain in the Lakebed Area. Remnant tailings are present as stockpiles and as a surface layer of variable thickness. The thickest tailings deposits remaining in the Lakebed Area are generally near the concrete arch dam and extend to a depth of approximately 12 feet (D&M, 1995). The surface elevation of the Lakebed Area is roughly 1,280 feet above mean sea level, and the wetland area immediately upstream of the concrete arch dam is seasonally inundated. The tailings are fine-grained (silt-size to sand-size) quartz-based minerals. The sizes of the tailings are bimodally-disturbed, with one fraction being fine sand size and one fraction being silt size.

2.5.3 Cyanide Process Area

In 1933, the Kennedy Mine began construction of a 1,000-ton cyanide plant on the ridge immediately west of the tailings impoundment. The plant reportedly operated from 1935 to 1939 and was used to extract gold remaining in the tailings from the Kennedy Mine that had previously been placed in the

tailings impoundment. Tailings were removed from the Lakebed Area, processed through the cyanide leaching plant, and deposited at the Tailings Pile in the southwestern portion of the site, west of the Cyanide Process Area.

The Cyanide Process Area (Photos 37 through 45) comprises approximately 4.5 acres of ridgetop area (Sheet 1). The remains of the processing plant include 19 concrete and asphalt pads that supported leaching tanks. The tanks were approximately 40 feet in diameter and 12 feet tall, and the tank capacity was approximately 100,000 gallons. Sixteen of the tanks were grouped on a series of four terraces cut into the ridge. At the center of each pad, an approximately 18-inch-diameter ceramic pipe extends vertically into the ground. Although the pipes appear to have connected the tanks to each other, no outfall has been identified for the piping system. The Cyanide Process Area ridge is bisected by a road cut, and a thin veneer of exposed tailings extends both east (to the Lakebed Area) and west (to the Tailings Pile).



Cyanide plant, view to south-southwest, circa 1948-1950, showing the 19 leaching tanks (Wagner, 1970; from the Garbarini collection).

The sixteen southern cyanide leaching tanks (shown in the background of the inset photo above) had a common subsurface piping system to transport the leaching solution from one processing tank to another. The northern tanks (shown in the foreground of the inset photo above) did not. D&M reported that site-specific treatment process details were not available and described the following general treatment steps that were typical of the period:

- separation of sand from flour (silt) size material (referred to as slime) using mechanical classifiers;
- leaching of the sand using cyanide solution;
- agitation of the thickened slime;
- filtration; and
- precipitation of gold from the cyanide solution on zinc dust.

During the DTSC's review of our draft SSI Workplan, the ESPO identified that the gold cyanidation process likely used at the site was a combination of the MacArthur-Forrest Process for gold solubilization in alkaline cyanide solution in the presence of oxygen, and the Merrill-Crowe process for recovering gold from the cyanide solution using zinc dust, and later sulfuric acid to dissolve the zinc, as described by Azizi and Ghaedrahmati (2015). These processes included the import and release of cyanide, zinc, and sulfur.

According to D&M, the tailings were removed from the Lakebed Area using hydro-seal pumps with rubber linings. In 1933, a new earth fill dam was reportedly constructed in the Lakebed Area, possibly to store new tailings from the mine upstream from the dam during reprocessing of tailings previously stored behind the tailings dam (Logan, 1934). The secondary earth fill dam, if constructed, would likely have been located in a narrow valley approximately 1,700 feet upstream of the concrete arch dam, below the secondary water level control structure (Photos 33 and 34).

Photos 38 through 45 depict concrete foundations in the Cyanide Process Area associated with structures and unit processes. According to D&M (1995), carbonaceous matter associated with the slime (silt-sized fraction of the tailings) could absorb gold from the cyanide solution and result in lower gold recovery levels. The industry commonly used flotation methods to address carbonaceous matter, and less commonly used coal tar products to prevent premature precipitation of gold. Some of the concrete foundations near the cyanide tanks are likely related to flotation processes.

Some of the ground surface around the unit processes at the Cyanide Process Area is covered with an asphaltic surfacing material. Our sampling and analysis of this material (sample TP-65-SURFACE) did not detect elevated metals concentrations.

2.5.4 Tailings Pile

After reprocessing in the cyanide plant, the resulting tailings slurry was deposited in the Tailings Pile west of the plant (Photos 46 through 57). D&M (1995) reports that although site-specific methods are not known, tailings from the cyanide plant would typically have been impounded by building a berm using coarse or compacted tailings. D&M cites historical photographs from the Amador County Archives (undated) indicating that a berm was used at the Tailings Pile to retain tailings deposited as a slurry. D&M reports that liquid from this material was directed to a settling pond located on the southwestern corner of the site (based on D&M's personal communication with Henry Ianni; no reference cited). The reported purpose of this settling pond was to allow sediment from this liquid to settle out prior to discharging the liquid to Jackson Creek.



Southwest-facing slope of Tailings Pile, view to north-northwest, October 2022.

The Tailings Pile is roughly rectangular and occupies approximately 29 acres in the southwestern portion of the site (Sheet 1). The deck (upper surface) of the Tailings Pile typically slopes gently to the southwest at gradients of 1% to 3%. A low, earthen berm bounds much of the deck area, and a berm also bisects the deck from east to west (and is interrupted by a cut near its western end). Figure 4 presents longitudinal and transverse cross sections of the Tailings Pile. Sheet 2 depicts the cross-section alignment. The topography and cross sections are based on publicly available lidar data and should be used for conceptual purposes only. The lidar-derived elevations appear to incorrectly depict the southern slope of the Tailings Pile, depicting a steep slope near the southern site boundary, while the slope is actually set back to the north of the site boundary.

The south-facing and west-facing slopes are up to approximately 50 to 60 feet tall and have gradients commonly ranging from 2:1 to 3.5:1, horizontal to vertical. D&M reported that the north-facing slope exhibits slopes of up to 30%, the west-facing slope gradient varies from approximately 25% to 45%, and the south-facing slope gradient varies from approximately 25% to 65%. D&M identified that the tailings in the Tailings Pile tend to be bimodally-disturbed as silt-size and sand-sized particles, as they are in the Lakebed Area.

Although tailings reprocessing stopped in 1939, tailings from the Kennedy Mine were deposited at the site until 1942 when the mine ceased operation. At the time of the closure of the Kennedy Mine in 1942, over one million cubic yards of tailings had been deposited in the Tailings Pile, and approximately 250,000 cubic yards of tailings remained in the Lakebed Area (D&M, 1995).

The cyanide processing plant and other on-site buildings were dismantled in the 1940s during World War II; and much of the metal was recycled. Small-scale attempts to extract gold from the tailings were reportedly performed between 1948 and 1950. In September 1950, the Kennedy Mining and Milling Company went out of business.

D&M identified that most of the surface area of the pile is covered with a soil layer (Photo 56) reportedly added prior to 1960 to control wind-blown tailings dust. The soil cover thickness typically ranges from approximately 4 to 6 inches, and annual grasses are established in areas where soil cover is present. In some areas, tailings are mixed with the soil cover. This cover layer prevents erosion of the Tailings Pile and acts to minimize potential contact between stormwater runoff and the tailings. There are, however, several areas where tailings are currently exposed (Photo 55, for example). Exposed tailings on the upper surface and steep faces of the piles may have been caused by erosion of cover soil or mechanical excavation, such as the excavation performed by the Flintkote Company at the southern end of the Tailings Pile, as described below.

According to D&M, the Flintkote Company operated a cement pipe manufacturing plant during the 1960s until prior to 1981 and reportedly used 36,000 tons of sand from the tailings in their process. An additional 150,000 tons of sand were reportedly removed from the southern rim of the Tailings Pile in the 1980s and moved off-site by the Wheels Development Corporation. No other industrial operations are known to have been performed at the site since circa 1950.

D&M described a shallow, bermed depression in the hillside located north of the Tailings Pile near monitoring well MW-5 (Sheet 1; Photo 53), referred to herein as the "Pond Area." A thin layer of fine tailings is exposed within the depression. Based on our observation of the area, it is possible that the berm and depression served as a water source for cattle, and the thin layer of tailings in the base of the feature may have been transported by pumping water from the Lakebed Area.

2.5.5 Isolated Tailings Areas

Mine tailings are present at the ground surface at isolated areas, typically less than 2 feet deep, as a result of historical erosion, surface water transport, mechanical transport, and track out. The isolated tailings areas are depicted on Sheet 3 and are listed in the following table. The isolated tailings areas are further characterized in Section 4.6.5.

Isolated Tailings Areas	**Estimated Area** (acres)	**Estimated Volume** (cubic yards)
Pond Area	0.5	1,630
Hot Spot at Sample SOIL16	0.05	148
Hot Spot at Sample SOIL25	0.05	148
Hot Spot at Sample HA-74	0.14	444

Isolated Tailings Areas	**Estimated Area** (acres)	**Estimated Volume** (cubic yards)
Northern Area	0.26	422
Ridge Area[1]	0.6	963
Dam Area	0.5	815
Southeast Area	4.1	6,667
Lakebed Track Out Area	1.7	2,667
Western Area	1.6	5,037
Southern Area	3.7	23,704

1 Area and volume estimates for the Ridge Area do not include portions within the Cyanide Process Area.

2.6 Previous Assessment

We are aware of the following previous assessment documents:

- Preliminary Assessment (PA) Report, Ecology and Environment (E&E), 1989
- EA, D&M, 1995
- Phase I Environmental Site Assessment (Phase I ESA), Carlton Engineering (Carlton), 2006
- Targeted Brownfields Assessment (TBA), START Team 9 (USEPA), 2008
- Targeted Site Investigation (TSI), LFR Inc., an Arcadis company (Arcadis), 2009
- Community Wide Assessment Report, DTSC, 2011
- Groundwater Seep Evaluation, Geocon, 2017

These documents are summarized below. Exploratory locations are depicted on Sheet 2, and coordinates are listed in Table 1. Laboratory data are presented in Tables 2 through 17. The previous investigation reports are appended to the SSI Workplan (Geocon, 2023).

2.6.1 Preliminary Assessment Report

The *Preliminary Assessment Report* (E&E, 1989) performed on behalf of the USEPA was not available for review, but was cited in D&M's EA. According to D&M, E&E concluded that the Kennedy Mine and tailings site were unlikely to be eligible for inclusion on the National Priorities List (NPL) and recommended to the USEPA that no further remedial actions be planned. No information from the PA report was used in this RAP.

2.6.2 Environmental Assessment

The EA (D&M, 1995) provides extensive information pertaining to the site history, physical and geochemical characteristics, and contaminant transport mechanisms, and serves as the primary source for site characterization and environmental factors governing the Conceptual Site Model (CSM). The study encompassed most of the site but did not include the 8.3-acre, upland, oak woodland parcel (APN 020-020-040) on the northern end of the site.

The DTSC reviewed and commented on both the EA and the EA Work Plan (D&M, 1992), and the final report included results of additional sampling and analysis recommended by the DTSC. Although the EA was a self-directed program, D&M states that the EA is similar in content to a PEA and was developed in accordance with guidelines set forth in the following guidance documents:

- Draft PEA Guidance Manual (DTSC, June 16, 1993); and
- Risk Assessment Guidance for Superfund, Volumes I and II (USEPA, 1989).

The EA is cited extensively in this RAP, which updates the risk assessment performed by D&M based on current toxicological criteria.

D&M performed site investigation between August 1990 and June 1993, including:

- drilling of six exploratory borings (SB-1, SB-2, SB-3, and SB-4 by Beylik Drilling, Inc. of Sacramento, California, and borings SB-5 and SB-SA by Hunt Drilling of Jackson, California);
- drilling and installation of five groundwater monitoring wells (MW-1 through MW-5 by Hunt Drilling);
- collection of surface soil samples and excavation and sampling of twelve exploratory trenches (TP-1 through TP-12);
- surface water and groundwater sample collection, and hydrogeologic well testing;
- laboratory analysis by the California-certified D&M Laboratories of Petaluma, California;
- acid-base accounting (ABA) by McClelland Laboratories of Sparks, Nevada; and
- soil physical testing (e.g., particle size analysis and hydraulic conductivity) by D&M of Sacramento, California.

D&M delineated five study areas, which are referred to as assessment areas in the present document. The assessment areas include:

- Background Area (eastern upland oak woodland);
- Lakebed Area (central tailings impoundment);
- Cyanide Process Area (located on the central ridge);
- Tailings Pile (western disposal area for tailings from the cyanide plant); and
- Bellwether Mine (a small lode gold mining claim in the northwestern portion of the site).

The scope of the D&M site investigation, broken out by assessment area, is summarized below:

1. Background Area
    a. collection and chemical analysis of 13 surface soil samples;
    b. collection and chemical analysis of 13 subsurface soil and bedrock samples from six test pits;
    c. physical testing of eight surface and subsurface soil samples;

d. collection and particle size chemical analysis of one surface and subsurface soil sample;

e. mineralogical analysis of one surface sample;

f. collection and chemical analysis of three surface water samples collected from Jackson Creek, New York Ranch Creek, and an upstream point on the creek that feeds the Lakebed Area; and

g. installation, sample collection, and slug permeability testing of an upgradient well screened in fractured bedrock (MW-5).

2. Tailings Pile:

   a. collection and chemical analysis of twelve exposed tailings and soil cover samples;

   b. collection and particle size analysis of two exposed tailings samples and one soil cover sample;

   c. collection and chemical analysis of 28 subsurface tailings and soil samples from 15 test pits and seven soil borings;

   d. collection and analysis of two soil sediment samples;

   e. physical testing of 14 surface and subsurface soil and tailings samples;

   f. mineralogical analysis of three tailings samples;

   g. collection and chemical analysis of surface water and a creek bed sediment sample collected from three locations downgradient of the Tailings Pile; and

   h. installation, sample collection, and slug permeability testing of a groundwater monitoring well screened in tailings (MW-2) and a monitoring well screened in fractured bedrock (MW-3).

3. Lakebed Area:

   a. collection and chemical analysis of six exposed tailings samples;

   b. collection, chemical analysis, and particle size analysis of two exposed tailings samples;

   c. collection and chemical analysis of 16 subsurface tailings, soil, and bedrock samples from nine test pits and two borings;

   d. collection, chemical analysis, and particle size analysis of two subsurface tailings and soil samples;

   e. physical testing of seven surface and subsurface tailings and soil samples;

   f. mineralogical analysis of seven tailings samples;

   g. collection and chemical analysis of two surface water samples collected from water ponded in the Lakebed Area and downgradient of the tailings dam; and

   h. installation, sample collection, and slug permeability testing of a monitoring well screened in tailings (MW-1) and in fractured bedrock (MW-4).

4. Cyanide Process Area:

   a. collection and chemical analysis of five exposed tailings and rock outcrop samples;

   b. collection and chemical analysis of eight subsurface soil, tailings, and bedrock samples from eight test pits;

   c. collection, chemical analysis, and particle size analysis of one subsurface tailings sample;

   d. physical testing of three surface and subsurface tailings and soil samples; and

e. mineralogical analysis of two soil and bedrock samples.

5. Bellwether Mine:
    a. collection and analysis of seven surface and subsurface waste rock, soil, and bedrock samples from three test pits;
    b. collection, chemical analysis, and particle size analysis of one subsurface soil sample;
    c. mineralogical analysis of one bedrock sample; and
    d. physical testing of four surface and subsurface waste rock and soil samples.

The DTSC reviewed the EA and requested the following additional investigation to assess the oxidation state of chromium (hexavalent or trivalent) in site soil; assess tailings acid generation potential (AGP); and confirm that elevated metal concentrations from samples collected from the mineralized zone at the site are naturally occurring. Specifically, they requested:

- collection of two soil or tailings samples each from the Tailings Pile, Cyanide Process Area, and Bellwether Mine and three tailings samples from the Lakebed Area (total of nine samples) for analysis of total chromium and hexavalent chromium;
- collection of two soil samples from the Tailings Pile and three samples from the Lakebed Area (total of five samples) for AGP; and
- collection of two samples from areas off-site where soil overlies mineralized rock.

D&M performed the additional investigation and presented the findings in the Final EA report (D&M, 1995).

2.6.3 Phase I ESA

Carlton conducted a Phase I ESA of the site in 2006 for the City of Jackson as a part of their environmental due diligence in acquiring the property. Carlton concluded that there had not been any changes in the site's physical condition since D&M's EA. The Phase I ESA did not identify any recognized environmental conditions associated with the site other than the waste rock and tailings from mining and mineral processing on the site upstream of the tailings dam and in the tailing pile areas. Carlton found that the prior owner of the site (Oro de Amador, Inc.) complied with requirements of the RWQCB related to storm water monitoring and pollution prevention to protect adjoining and adjacent properties from surface water runoff from the site. The City of Jackson continues to monitor storm water pursuant to a Storm Water Pollution Prevention Plan (SWPPP). Carlton stated that previously obtained laboratory data indicate that metals concentrations were less than California Human Health Screening Levels for commercial land use except arsenic, which was present at concentrations up to 500 milligrams per kilogram (mg/kg). Carlton stated that previous investigation data indicated that arsenic, cyanide, and manganese concentrations may pose a potential threat to surface water and groundwater and concluded that elevated concentrations of metals and processing chemicals could cause the materials to be classified as hazardous waste.

2.6.4 Targeted Brownfields Assessment

The TBA (USEPA, 2008) included a Phase I and Phase II ESA. The Phase II ESA included the collection of 110 soil samples including duplicates. Seventy-eight samples and seven duplicates were collected from 39 locations in the eastern portion of the site from depths of one and 3 feet, primarily from the Background Area and north of the Background Area above the tailings impoundment. Twenty-four samples were collected from eight locations in the southeastern portion of the site, south of the access road, from depths of 1, 3 and 5 feet. The samples were analyzed for 23 metals/metalloids and cyanide. A hand auger was used to obtain the samples. Boring logs were not provided; however, the samples were collected from portions of the site that generally have an undisturbed, native soil profile.

Because the majority of the soil samples collected from the proposed public use area had arsenic concentrations exceeding published background concentrations, the USEPA determined that this area of the site should not be opened to public access until contaminated material was removed or another method of remediation was conducted. Additionally, laboratory analysis results for soil samples collected from the proposed borrow fill area in the southeastern portion of the site indicated that the material present was not appropriate for use as fill material, because arsenic was present in both surface and subsurface soil at elevated concentrations (USEPA, 2008). Naturally occurring background metals concentrations were not evaluated.

2.6.5 Targeted Site Investigation

In 2009 and while under contract with the DTSC, Arcadis collected 121 soils samples from 96 locations (96 surface soil samples, 13 shallow subsurface soil samples and 12 duplicate soil samples) and groundwater samples from the five groundwater monitoring wells. Following are descriptions of where these samples were collected and how they were analyzed.

- Cover soil samples were collected from five locations in the Tailings Pile on the western side of the site and analyzed for total Title 22 metals. Tailings samples were collected at the same five locations, but from beneath the cover soil and were analyzed for total arsenic, manganese, and magnesium, as well as extractable arsenic and manganese by the waste extraction test using deionized water (DI-WET).
- Surface and subsurface soil samples were collected from five locations in the Lakebed Aera and analyzed for total arsenic, manganese, and magnesium. Subsurface sampling was not possible at two of the locations because excavation was limited by bedrock. Some of the samples were also analyzed for DI-WET arsenic and manganese.
- Surface and subsurface soil samples were collected from five locations in the Cyanide Processing Area in the central portion of the site, and analyzed for total arsenic, manganese, and magnesium. Some of the samples were also analyzed for DI-WET arsenic and manganese.
- Seventy-six surface soil samples were collected from infill areas not associated with the tailings impoundment or Tailings Pile and were analyzed for total arsenic.
- Five surface soil samples were collected from the uplands area on the eastern side of the site, which was assumed to be representative of background conditions.

- Twelve duplicate soil samples were collected for quality control purposes.
- Groundwater samples were collected from groundwater monitoring wells MW-1 through MW-5, were filtered by the laboratory prior to analysis, then analyzed for arsenic and manganese and cyanide.

Notable findings of the TSI are summarized below.

- Extractable arsenic was detected by DI-WET in two of the five subsurface soil samples (HA-25 through HA-29) collected from the Tailings Pile at concentrations of 0.0068 and 0.0081 milligrams per liter (mg/l). The primary Maximum Contaminant Level (MCL) for arsenic in drinking water is 0.010 mg/l. Extractable manganese was detected by DI-WET in one of the five subsurface soil samples analyzed at a concentration of 0.340 mg/l. The secondary MCL for manganese in drinking water is 0.050 mg/l.
- Extractable arsenic and manganese were detected in the five subsurface soil samples (HA-58 through HA-62) collected from the Tailings Processing Area at concentrations ranging from 0.0083 to 0.0094 mg/l and 0.039 to 0.130 mg/l, respectively.
- Extractable arsenic and manganese were detected in one of the three subsurface soil samples (HA-85) collected from the Lakebed Area at concentrations of 0.0089 and 0.0068 mg/l, respectively.
- Arsenic was detected in four of the five groundwater samples at concentrations ranging from 0.0012 (MW-4) to 0.061 (MW-2) mg/l.
- Cyanide was detected in only one (MW-2) of the five groundwater samples collected during this monitoring event at a concentration of 0.190 mg/l, which exceeds the MCL of 0.150 mg/l.
- Manganese was detected in all five groundwater samples at concentrations ranging from 0.0077 to 1.700 mg/l, two of which exceed the secondary MCL (0.050 mg/l) for manganese in drinking water.

Arcadis concluded that the proposed use of the site as open space appeared to be suitable, as there was a low risk to future site receptors from metals in site soil. They also assumed that groundwater beneath the site would not be used as a drinking water resource.

2.6.6 Community Wide Assessment

The DTSC's Community Wide Assessment (2011) investigated metals concentrations in soil at approximately 36 locations near Jackson and Sutter Creek. The purpose of the assessment was to facilitate development planning by providing information regarding naturally occurring metals concentrations and potential contamination from historical mining activity.

The assessment included collection of soil at nine locations in the immediate site vicinity (within ¼ mile) as summarized in the following table. Two of the locations are within the site. Soil at one of the privately-owned off-site locations was not sampled due to lack of owner authorization.

No.	Name	Parcel No.	Owner	Comments
12	Cemetery	020-070-020	City of Jackson	100 feet south of site, downslope of Tailings Pile, Mineralized Area, Cyanide Process Area and Tailings Impoundment. Soil piles, imported material and debris present at sampling location. Arsenic concentrations up to 120 mg/kg. Lead and mercury concentrations within their respective background ranges.
14	Detert Park	020-070-002	City of Jackson	600 feet west of southeastern corner of site, across North Main Street and North Fork Jackson Creek. Arsenic concentrations up to 50 mg/kg. Lead and mercury concentrations exceed background but are less than DTSC-SLs.
		020-070-041	Amador County	
15	Evergreen	020-510-006	State of California	Immediately north of site. Drains to tailings impoundment. Mine waste rock present. Arsenic concentrations up to 106 mg/kg, lead up to 1,500 mg/kg, and mercury up to 7.5 mg/kg.
16	Garibaldi Pit	020-070-043	Roman Catholic Bishop of Sacramento	Immediately southeast of site, beyond New York Ranch Road. Sampling not authorized by owner.
21	Oro de Amador North	020-020-040	City of Jackson	Northern upland portion of site. Apparent prospecting excavations. Arsenic concentrations up to 230 mg/kg, lead up to 108 mg/kg (by handheld XRF analyzer in the field), and mercury up to 3.8 mg/kg.
22	Oro de Amador South	020-070-040	City of Jackson	Southeastern portion of site, south of access road. Arsenic concentrations up to 240 mg/kg, lead up to 51 mg/kg (XRF), and mercury up to 5.7 mg/kg (XRF).
25	Ratto Mine South	020-020-016	State of California	400 feet north and upgradient. Arsenic concentrations up to 23 mg/kg, lead and mercury concentrations within background range.
28	Tailing Wheels Park North	020-020-028	City of Jackson	600 feet northwest of the site, beyond North Main Street. Historical tailings conveyance route. Arsenic concentrations up to 2,400 mg/kg, lead up to 230 mg/kg, and mercury up to 4.8 mg/kg.
29	Tailings Wheels Park South	020-020-020, 020-070-018, 020-070-028	City of Jackson	Adjoining the site to the northwest. Historical tailings conveyance route. Arsenic concentrations up to 440 mg/kg, lead up to 170 mg/kg, and mercury up to 6.2 mg/kg.

As = arsenic, Pb = lead, Hg = mercury, XRF = analysis by field x-ray fluorescence
DTSC-SL = California Department of Toxic Substances Control Screening Level for residential soil

The DTSC developed a preliminary, local screening level for arsenic in soil using arsenic concentration data from the assessment, selecting locations that were apparently unimpacted by historical mining activity. The evaluation generally followed the *Arsenic Strategies Guidance* (DTSC, 2009). Although metals concentrations were determined both by field x-ray fluorescence (XRF) and by laboratory analysis (USEPA Method 6010B), the XRF data were not used to support the arsenic screening evaluation due to poor correlation between XRF and laboratory results at low concentrations.

The assessment produced a screening level of 43 mg/kg, which is not considered a definitive background value for the study area. The DTSC found that individual site-specific background evaluations would likely vary from this result. In addition, the DTSC found that the study area includes an intermediate range of arsenic concentrations (43 to 75 mg/kg) between the screening level and what may be considered mining-impacted soil. These concentrations may represent mineralized soil, although no distinct mineralized zones were recognized by the field crews. The DTSC concluded that selected data from the assessment may be useful to supplement site-specific background evaluations if the parameters of both data sets can be shown to be similar. The DTSC laboratory data for the site are evaluated herein.

2.6.7 Groundwater Seep Evaluation

Geocon (2017) evaluated laboratory results for filtered and unfiltered groundwater seep samples collected by Cal State Engineering, Inc. (CSE; May 2017) from locations S-2 and S-3; reviewed previous physical and geochemical data obtained by D&M (1995); and compared the geochemistry of the seep samples to the geochemistry of historical groundwater and stormwater samples. The investigation is summarized in Section 4.3.15.

2.7 Previous Response Actions

Several actions have been performed at the site without regulatory oversight, as summarized below. No other previous response actions are known.

- Prior to 1960, most of the surface area of the Tailings Pile was covered with a soil layer to control wind-blown tailings dust (Appendix E, Photos 55 through 57). The soil cover thickness typically ranges from approximately 4 to 6 inches, and annual grasses are established in areas where soil cover is present.
- Three collapsed mine excavations at the former Bellwether Mine location are fenced and posted (Appendix E, Photos 58 through 60). The 6-foot-tall, chain-link fence is posted with metal signs.
- Access to the concrete arch dam is restricted by a locked steel gate and fence (Appendix E, Photo 35).
- Access to the site is restricted by barbed-wire fencing and locked gates (Appendix E, Photo 47).

3.0 SUPPLEMENTAL SITE INVESTIGATION

This section presents the objectives, rationale, methodology, and results of our SSI performed in May 2023. The SSI data are presented along with the previous assessment data in Tables 1 through 17. Exploratory locations are depicted on Sheet 2. Photos are presented in Appendix E, and field and laboratory reports are presented in Appendix F.

3.1 Purpose and Objectives

The purpose of the SSI was to address data gaps that we identified in the previous assessments and that the DTSC identified during their review of the 2018 RAW. The objectives of the SSI were discussed during a virtual meeting with DTSC representatives on January 18, 2023, and are outlined below.

1. Excavation of 21 exploratory trenches to depths of approximately 5 feet;
    a. lithologic description and photographic documentation of subsurface conditions;
    b. collection of approximately 71 soil samples including seven co-located duplicate samples; and
    c. laboratory analysis of selected soil samples for:
        i. total arsenic, lead and other CAM 17 Metals by USEPA Methods 6010B/7471A,
        ii. total sulfur by USEPA Method 6010B,
        iii. relative bioavailability (RBA) for arsenic in soil by the California Arsenic Bioaccessibility (CAB) method (DTSC Human Health Risk Assessment [HHRA] Note 6, September 2017), and
        iv. extractable metals of concern by the Synthetic Precipitation Leaching Procedure (SPLP; USEPA Method 1312).
2. Monitoring of groundwater using the five existing groundwater wells including;
    a. measurement of depth to groundwater/groundwater elevation;
    b. collection of representative groundwater samples from each well; and
    c. laboratory analysis of the groundwater samples for:
        i. total CAM 17 Metals by USEPA Methods 200.7/200.8, and
        ii. total cyanide by SM4500CN-E.

We performed the SSI in accordance with our *Final Site Characterization Summary and SSI Workplan* (SSI Workplan) dated April 25, 2023. The SSI findings support the arsenic background study and risk assessment presented in Sections 4.0 and 5.0, respectively.

3.2 Rationale

This section presents the rationale for the sample collection and analysis strategy.

3.2.1 Background Study

Arsenic is a COC in tailings and contaminated soil and governs risk-management decisions for site remediation. Because arsenic occurs naturally in soil at background concentrations that may present a health risk, and because the ranges of background concentrations vary between several geological formations at the site, it is important to define the ranges of background concentrations and characterize the associated risks. The lack of defined background arsenic populations for the site's complex geology, and the lack of information regarding the bioavailability of arsenic in soil from different geological origins, were considered data gaps.

The SSI laboratory program evaluated the co-occurrence of constituents that originate from natural and anthropogenic sources, including the following constituents:

- Arsenic, cadmium, lead, mercury, molybdenum, and selenium are identified as COCs by the statistical analysis presented in Section 4.5 because they occur at higher concentrations in tailings than in background soil and rock.
- Chromium, cobalt, copper, and nickel are not considered COCs, but their co-occurrence in mineralized bedrock informs the background study.
- Zinc and sulfur are not considered COCs but may be byproducts of the Merrill-Crowe process for recovering gold from cyanide solution.
- Thallium was included in the laboratory program to further assess the anomalous thallium concentrations detected in soil by D&M (1995).

We used an authoritative sampling approach to target the various geological conditions at the site, as summarized below. Exploratory trench locations are presented on Sheet 2.

- TP-49 through TP-51 are on the mineralized ridge crossing the center of the site from north to south and representing the Melones Fault Zone;
- TP-55 through TP-57 are in undisturbed soil weathered in residuum from the Calaveras Formation on the northern end of the site, which was not previously characterized;
- TP-58 through TP-60 are in undisturbed soil weathered in residuum from the Calaveras Formation within and to the north of the Background Area;
- TP-61 through TP-63 are in undisturbed soil weathered in residuum from the Mariposa Formation north of the Tailings Pile;
- TP-64 through TP-66 are in the Cyanide Process Area; and
- TP-67 through TP-69 are in the Lakebed Area.

3.2.2 Solubility Testing

Additional solubility testing using the SPLP (USEPA Method 1312) was performed to supplement the previous DI-WET extraction and analysis, and to validate the findings of groundwater monitoring and groundwater seep monitoring, which suggest that some metals of concern are soluble at low

concentrations when exposed to meteoric water. We excavated exploratory trenches TP-52 through TP-54 into the Tailings Pile (Sheet 2) and collected shallow subsurface tailings samples for extraction by SPLP and analysis for arsenic, lead, mercury, selenium, and silver by USEPA Method 6020.

3.2.3 Thallium Reanalysis

D&M re-analyzed selected samples for thallium to evaluate anomalously high thallium concentrations. Re-analysis results were generally similar to the original result and are noted by "E" in Table 2. Thallium concentrations detected by D&M are significantly higher than those detected by the USEPA and Arcadis in the same assessment areas and media. Therefore, the D&M thallium data are considered suspect, and additional thallium analysis was performed to determine whether the D&M laboratory results could be reproduced. Selected samples from exploratory trenches TP-49 through TP-69 were analyzed for total thallium by USEPA Method 6010B to verify that thallium concentrations fall within the range defined by the previous USEPA and Arcadis assessments.

3.2.4 Groundwater Monitoring

Groundwater monitoring was performed in 1993 following installation of the five groundwater monitoring wells at the site and again in 2009. Additional groundwater monitoring was performed to document the current groundwater quality and to verify that conditions have not changed significantly since the previous monitoring events.

3.3 Methodology

This section summarizes the SSI procedures. Detailed methodology is presented in the SSI Workplan.

3.3.1 Pre-field Activities

As outlined in the SSI Workplan, we posted work notices, assisted with Tribal notification, notified utility agencies, prepared chain-of-custody documentation, reviewed the Unanticipated Discovery Plan and HSP, and notified the DTSC prior to the field investigation.

3.3.2 Field and Laboratory Activities

3.3.2.1 Soil Sample Collection Procedures

We performed exploratory trenching on May 22 and 23, 2023, using a rubber-tire backhoe. Locations TP-55 through TP-57 (at the northern end of the site) were not accessible to the backhoe; therefore, we advanced TP-55 and TP-56 by hand-auger, and we used hand tools at location TP-57 to excavate into an existing cut slope.

We obtained soil samples using hand tools and new, single-use, individually-wrapped, disposable plastic scoops. Samples were placed in new, heavy-duty, resealable, gallon-size plastic bags, and were kneaded and shaken to homogenize. A portion of the homogenized sample was transferred to a new,

laboratory-supplied, 8-ounce glass jar with a Teflon™-lined lid. We labeled the plastic bag and glass jar with a unique sample ID, date and time of location, and project name and number and placed them on ice in a thermally-insulated container for delivery under chain-of-custody to California Laboratory Services (CLS) of Rancho Cordova, California.

3.3.2.2 Soil Laboratory Analysis

CLS analyzed selected samples of soil, weathered rock, and tailings for:

- total arsenic, lead and other CAM 17 Metals by USEPA Methods 6010B/7471A,
- total sulfur by USEPA Method 6010B,
- CAB by HHRA Note 6, DTSC (September 2017), and
- extractable metals of concern by the SPLP (USEPA Method 1312).

3.3.2.3 Groundwater Sampling Procedures

Groundwater depth measurement, purging, field parameter measurement and sampling was conducted for on-site groundwater monitoring wells MW-1 through MW-5 on May 30, 2023. Field parameters included pH, electrical conductivity (EC), temperature, dissolved oxygen (DO), and oxidation-reduction potential (ORP). During purging, we monitored and recorded stabilization parameters including pH, EC, temperature, and ORP.

We obtained the groundwater samples using a submersible pump and laboratory-supplied containers. We labeled and preserved the samples in accordance with the SSI Workplan and placed them on ice in a thermally-insulated container for delivery by courier under chain-of-custody to McCampbell Analytical, Inc. (MAI) of Pittsburg, California.

3.3.2.4 Groundwater Laboratory Analysis

MAI analyzed the groundwater samples for:

- total CAM 17 Metals by USEPA Methods 200.7/200.8, and
- total cyanide by SM4500CN-E.

3.3.2.5 Decontamination Procedures

We used new nitrile gloves at each sample location and changed gloves whenever they come into contact with a sample or other potential source of contamination. We decontaminated all non-dedicated sampling equipment using the following steps:

- pre-wash rinse of tap water to remove soil particles;
- non-phosphate detergent in tap water wash using a brush;
- tap water rinse;

- initial deionized/distilled water rinse; and
- final deionized/distilled water rinse.

3.3.2.6 Quality Control/Quality Assurance Procedures

The following summarizes our collection of equipment blank and field duplicate samples during the SSI.

- We collected one equipment rinseate blank sample (RB-052323) during soil sampling from the final rinse of decontaminated field equipment. CLS analyzed the sample for CAM 17 Metals. No metals were detected except for silver (0.026 mg/l), which was also flagged for spike recovery outside of the laboratory's acceptance limits.
- We collected co-located field duplicate soil samples at a minimum frequency of one duplicate sample per ten field samples. The duplicate samples were collected at the same location as the field sample using the same methods employed for the field sample. Relative percent difference (RPD) was typically 20% or less, except for sample and replicate pairs with analyte concentrations near the laboratory reporting limit.
- We collected one equipment blank sample during the groundwater monitoring event using clean water provided by MAI. The equipment blank sample was in contact with the pump and the pump's tubing. MAI analyzed the sample for the list of metals specified in the groundwater monitoring program, and no metals were detected.
- We collected one field duplicate groundwater sample (designated as MW-6) after collecting the corresponding field sample (from MW-2) using the same methods employed for the field sample. Variance in the laboratory results was not significant for the replicate sample.

3.4 Data Validation

We performed the following tasks to validate the site investigation data:

- reviewed blank sample laboratory analysis results;
- reviewed the relative percent difference for field duplicate samples;
- verified that sample hold times were not exceeded; and
- reviewed laboratory quality control reports.

Based on the results of the data validation procedures, the SSI data were accepted without qualification.

3.5 Results

SSI laboratory data are presented along with previous investigation data in the following tables:

- Table 1 – assessment locations (latitude, longitude, northing, and easting);
- Tables 2 and 3 – soil total metals, cyanide, sulfur, and other inorganic constituents;
- Table 4 – soil extractable metals concentrations;
- Table 5 – ABA, pH, and sulfur forms;

- Table 6 – mineralogical analysis;
- Table 7 – soil CAB and RBA results;
- Tables 8 through 10 – groundwater total metals, inorganics, and general parameters;
- Tables 11 through 17 – water and sediment data.

SSI results are presented and evaluated in Section 4.0. Sheet 2 depicts the assessment locations. Appendix E contains photos of the SSI, and Appendix F presents the exploratory trench logs; groundwater monitoring well logs, diagrams, and completion reports; groundwater monitoring field forms; and analytical laboratory reports.

4.0 DATA EVALUATION

This section describes the apparent problem, develops a conceptual model, evaluates the site investigation data, provides information regarding background metals concentrations, identifies COCs, and presents the results of bioaccessibility testing for arsenic.

4.1 Apparent Problem

D&M's EA (1995) was conducted in PEA-equivalent format to investigate environmental conditions at the site and to address potential health risks. The EA identified:

- the Lakebed Area where mine tailings from the off-site Kennedy Mine were impounded;
- the Cyanide Process Area where the mine tailings were reprocessed; and
- the Tailings Pile where the reprocessed mine tailings were disposed to land.

The tailings contain heavy metals and cyanide at concentrations that present potential risks to human health and the environment. The EA also identified:

- naturally mineralized geologic conditions that result in elevated ambient concentrations of heavy metals in soil;
- spreading of heavy metal contamination beyond the historical boundaries of the industrial operations by mechanical transport; and
- small-scale historical lode gold mining at the Bellwether Mine in naturally mineralized bedrock, which resulted in collapsed mine excavations and small piles of mineralized bedrock.

The presence of heavy metals in soil at elevated concentrations of result from:

- past industrial operations (i.e., underground mining [mineral extraction] and processing of the mineralized ore materials); and
- weathering of naturally mineralized bedrock near the ground surface.

Naturally-mineralized gold-bearing ore materials, mine waste materials (waste rock), and processed mining waste (tailings) commonly contain heavy metals and metalloids (e.g., arsenic) at elevated concentrations. These naturally mineralized materials can be transported from subsurface mine workings to the ground surface as a result of underground mining operations. The processing of naturally mineralized ore materials for gold extraction (e.g., crushing and chemical treatment) tends to make the heavy metals more available for human exposure. In addition, heavy metals from mining and ore processing can be transported to adjacent locations by wind, surface water, or mechanical means.

The processing of mined ore materials released other chemicals that do not naturally occur at the site at elevated concentrations:

- elemental mercury (quicksilver) was imported for use at the Kennedy Mine (off-site) to recover gold from crushed ore, and processed tailings containing residual mercury were transported to the Lakebed Area at the site; and
- cyanide was imported to the site for use at the Cyanide Process Area to recover additional gold from the previously processed tailings, and the reprocessed tailings containing residual cyanide were disposed of in the Tailings Pile.

Naturally occurring heavy metals and metalloids such as arsenic and lead, as well as imported chemicals such as mercury and cyanide, present water quality concerns. They also pose potential health concerns in the case of routine, long-term exposure to the soil, such as inhalation of soil dust, ingestion, and/or dermal contact with the soil.

4.2 Conceptual Site Model

Figure 5 presents a CSM diagram depicting source media, transport mechanisms, exposure media and potential receptors. The model is described below.

4.2.1 Source Media and Release Mechanisms

Source media include mine waste (tailings and mine waste rock):

1. Naturally mineralized gold-bearing ore materials, waste materials (waste rock), and processed mining waste (tailings) may contain heavy metals and metalloids (e.g., arsenic) at elevated concentrations. These naturally mineralized materials were brought to the surface as a result of underground mining operations at the off-site Kennedy Mine and also occur naturally in soil and rock at the site. Heavy metals and metalloids (e.g., arsenic) were liberated from the ore deposits as a result of crushing and chemical processing at the off-site Kennedy Mine. The Kennedy Mine tailings were transported by mechanical means to the Lakebed Area at the site. Mineralized bedrock at the site was also brought to the ground surface at the Bellwether Mine location.
2. Mercury was imported in elemental form (quicksilver) to the Kennedy Mine ore processing facility (off-site) for use in recovery of gold from crushed ore materials. Residual mercury is present in the processed mine tailings that were transported to the site from the Kennedy Mine.
3. Cyanide was imported to the Cyanide Process Area at the site for additional recovery of gold during the reprocessing of tailings from the Lakebed Area. The reprocessed tailings containing residual cyanide were subsequently disposed of in the Tailings Pile.

Release mechanisms include the liberation of heavy metals and metalloids by crushing and chemical processing, mercury loss to tailings during the amalgamation process (at the off-site Kennedy Mine), and incomplete cyanide recovery/destruction during the cyanide leaching process at the on-site Cyanide Process Area, which resulted in residual cyanide in the reprocessed mine tailings disposed of at the on-site Tailings Pile.

4.2.2 Transport Mechanisms

Transport mechanisms are depicted on Figure 5 and are described below.

4.2.2.1 Surface Water Erosion

Surface water may transport tailings and contaminated soil as suspended sediment. The tailings in the Lakebed Area are hydraulically controlled by a concrete arch dam. The tailings in the Tailings Pile are not hydraulically contained by dams or detention basins, but much of the Tailings Pile surface is covered with imported soil that is densely vegetated with annual grasses, which tends to reduce erosion by surface water and retain eroded sediment.

4.2.2.2 Leaching

Precipitation and percolation may leach (solubilize) contaminants from tailings and contaminated soil and transport them in soluble (dissolved) form. Metals and cyanide have been detected in groundwater beneath the Tailings Pile and in groundwater seeps at the southern and western (downslope) sides of the Tailings Pile. The groundwater gradient is approximately 0.05 to the south-southwest.

4.2.2.3 Wind Erosion

Erosion of tailings and contaminated soil by wind or mechanical disturbance may transport suspended particulates. The prevailing wind direction is expected to be from the southwest and west based on regional meteorological data. There does not appear to be a significant difference between the metals concentrations reported for samples collected on the western and eastern sides of the low ridge in the Background Area, suggesting that the area has not been significantly impacted by wind-blown contaminated materials from the Lakebed Area. In addition, metals concentrations are relatively constant with depth in the Background Area: metals concentrations in the native soil at and near the ground surface are similar to those in the underlying Calaveras Formation bedrock from which the soil was derived. Because metals concentrations in surface samples are not higher than those in subsurface samples, aerial transport of dust with elevated metals concentrations from the contaminated areas to the Background Area is not evident.

4.2.2.4 Mechanical Transport

Mechanical transport of tailings is evident in several areas outside of the Lakebed Area and Tailings Pile. For example:

- The Flintkote Company operated a cement pipe manufacturing plant during the 1960s until sometime prior to 1981 and reportedly used 36,000 tons of sand from the Tailings Pile in their process. Residual tailings sand remains at the concrete foundations associated with this operation immediately south of the Tailings Pile.
- A thin layer of tailings is present in the road cut through the mineralized ridge between the Lakebed Area and Tailings Pile, likely as a result of mechanical transport of the tailings from the Lakebed Area to the Cyanide Process Area, and subsequently to the Tailings Pile.
- A thin layer of fine tailings is present in a shallow, bermed depression in the hillside north of the Tailings Pile near groundwater monitoring well MW-5 (Sheet 1; Photo 53). It is possible that the bermed depression served as a water source for cattle, and the thin layer of tailings in the base of feature may have been transported by pumping of water from the Lakebed Area.

- "Track out" of tailings is evident along the road and trails extending uphill from the Lakebed Area (Sheet 1).

4.2.2.5 Volatilization

Metals and cyanide are not volatile with the exception of mercury, which is volatile in its elemental form. The mercury concentrations detected at the site are relatively low, and residual mercury present in tailings is believed to occur primarily as Hg(II) adsorbed to particle surfaces rather than in elemental form as volatile liquid mercury.

4.2.2.6 Ecological Uptake

Heavy metals and metalloids may be incorporated in plant tissue as a result of biological uptake by plants growing in contaminated soil or mine waste and may be incorporated in animal tissue through the food chain or as a result of direct contact (i.e., ingestion, dermal contact, inhalation of soil dust) with contaminated soil.

4.2.3 Exposure Media and Routes

Exposure media for the site are:

- tailings, contaminated soil, and contaminated sediment with elevated metals concentrations and/or cyanide;
- air that may contain suspended particulates (dust) originating from the tailings or contaminated soil; and
- water, including seasonal surface water in the Lakebed Area, groundwater beneath the site, and groundwater seepage downslope of the Tailings Pile.

Exposure routes are incidental ingestion and dermal contact with tailings and contaminated soil, inhalation of particulates originating from the tailings and soil, and ingestion of and dermal contact with water.

4.2.4 Receptors

The site is undeveloped open space. Public access is currently restricted, and the site is planned for public recreational use. Workers and trespassers may currently be subject to exposure. Future site visitors (e.g., recreators) and workers may be subject to exposure when the site is developed.

4.3 Site Investigation Data

Data from the following sources are evaluated quantitatively in this section:

- EA, D&M, 1995;
- TBA, USEPA, 2008;
- TSI, Arcadis, 2009;
- Community Wide Assessment Report, DTSC, 2011;

- Groundwater Seep Evaluation, Geocon, 2017; and
- Supplemental Site Investigation, Geocon, 2023.

Sheet 2 depicts sample collection locations, and Table 1 lists the latitude and longitude of sample collection locations. Only validated laboratory data are considered in this section; the data summary below does not include metals concentration data obtained in the field by XRF equipment.

4.3.1 Soil, Rock and Tailings – Total Metals, Cyanide, and Sulfur Forms

Table 2 presents laboratory analysis data for metals, cyanide and sulfur forms in soil, weathered rock, and tailings. Table 2 also lists the following descriptive information for each sample:

- the data source (author and date);
- the assessment area: Background Area, Bellwether Mine Area, Lakebed Area, Cyanide Process Area, Tailings Pile, and off-site;
- the sample collection depth (in feet) and the depth interval: surface (upper foot) or subsurface (below one foot);
- the parent geology: Calaveras Formation, Mariposa Formation, Melones Fault Zone/mineralized zone, and tailings imported from the Kennedy Mine; and
- the sampled medium: soil, weathered rock, mineralized soil, mineralized rock, Tailings Pile soil cover, mine tailings, and mine waste rock.

When no assessment area is listed in Table 2, the sample was collected from the site outside of any specific assessment area.

We recorded the medium for all samples, as did D&M. For other data sources, the sampled medium is typically listed as soil as cited in the corresponding reports, unless the sample location and depth corresponds to tailings.

Data populations for specific analytes are described in the following table.

Analyte	Number of Samples Analyzed	Number of Detects	% ND	Min ND	Max ND	Min Detect	Max Detect	Mean Detect	CV
Antimony	222	6	97%	0.5	25	0.99	20	11.7	0.856
Arsenic	437	416	5%	1	2	1.2	1300	79.1	1.624
Barium	222	222	0%	na	na	6.2	768	131	0.584
Beryllium	222	149	33%	0.2	5	0.011	12	0.682	2.424
Cadmium	222	124	44%	0.05	2.6	0.19	6.6	1.23	1.119
Chromium	283	275	3%	0.98	2.5	1.5	1690	58.7	2.46
Cobalt	222	209	6%	0.98	5.1	1	140	16.7	1.152

Analyte	Number of Samples Analyzed	Number of Detects	% ND	Min ND	Max ND	Min Detect	Max Detect	Mean Detect	CV
Copper	222	222	0%	na	na	3.5	178	60.5	0.502
Lead	274	258	6%	2.4	7.5	2.7	400	25.5	1.652
Mercury	274	182	34%	0.01	0.2	0.017	28	1.66	1.965
Molybdenum	112	36	68%	0.25	10	0.27	120	6.08	3.276
Nickel	266	266	0%	na	na	7	1340	68.4	2.449
Selenium	222	123	45%	0.25	4.7	0.3	4.8	1.09	0.539
Silver	222	93	58%	0.25	2.5	0.05	5.6	0.65	0.964
Thallium[1]	138	70	49%	0.08	4	0.26	1.9	1.13	0.35
Vanadium	222	221	0.5%	6	6	1.7	148	33.8	0.831
Zinc	222	222	0%	na	na	14	307	66.8	0.421
Chromium VI	9	0	100%	1	1	na	na	na	na
Cyanide	167	6	96%	0.5	5	0.75	21.9	6.44	1.383
Reactive Cyanide	57	0	100%	5	5	na	na	na	na
Sulfide	7	0	100%	50	50	na	na	na	na
Reactive Sulfide	40	0	100%	25	50	na	na	na	na
Sulfur	22	22	0%	na	na	7.8	4600	473	2.099

1 Thallium data obtained by D&M (1995) were not validated and are excluded. See Section 4.3.1.4.
CV = coefficient of variation, Detect = detection, na = not applicable, ND = non-detection

4.3.1.1 Cyanide and Sulfide

As shown on Table 2, total cyanide was detected at concentrations exceeding the laboratory reporting limit (0.5 to 5.0 mg/kg) in six of 167 samples. Following are the samples, depths of collection, and cyanide concentrations for the six samples that contained cyanide:

- SB-01-41.5, Tailings Pile, 41.5 feet deep – 21.9 mg/kg;
- SB-02-17.0, Tailings Pile, 17.0 feet deep – 12.7 mg/kg;
- SB-03-20.0, Tailings Pile, 10.0 feet deep – 0.75 mg/kg;
- SB-04-36.5, Tailings Pile, 36.5 feet deep – 0.88 mg/kg;
- SB-04-40.0, Tailings Pile, 40.0 feet deep – 1.1 mg/kg; and
- TP-12-4.5, Tailings Pile, 4.5 feet deep – 1.3 mg/kg.

The samples were collected from the 74 exploratory locations depicted on Figure 6. All six samples with cyanide detections were collected from tailings near the base of the Tailings Pile. Cyanide is more likely to persist in deep, saturated locations and more likely to degrade in shallow, oxygen-rich environments. Five of the tailings samples listed above were collected near the tailings/native soil interface from exploratory borings advanced through the Tailings Pile. The sixth tailings sample (TP-12-4.5) was collected from an exploratory trench near the southwestern (downgradient) toe of the Tailings Pile at a depth of 4.5 feet in tailings, at an elevation close to the original (pre-industrial) ground surface.

Total cyanide was also detected in one sediment sample (SED-02; 2.0 mg/kg), which was collected from the SW-02 sample location near the southwestern corner of the Tailings Pile. Cyanide was not detected in any of the 110 samples collected by the USEPA (2008) during their TBA, which were collected within 6 feet of the ground surface.

Cyanide was not detected in the 29 soil and tailings samples collected from the Lakebed Area (Table 2). Tailings in the Lakebed Area were not subject to processing with cyanide, whereas tailings in the Tailings Pile were discharged from the cyanide treatment plant. No cyanide was detected in the 13 soil, tailings, and bedrock samples collected from the Cyanide Process Area, nor in the nine soil, mineralized rock, and waste rock samples collected from the Bellwether Mine.

Reactive cyanide was not detected in any of the 57 samples analyzed for reactive cyanide. D&M provided the following explanation of total and reactive cyanide: "... total cyanide is expressed as a sum of reactive cyanide (which consists of cyanide ion and molecular hydrogen cyanide) and most cyanide bound as metallic complexes and compounds (Smith and Struhsacker, 1988). All cyanide detections were from tailings samples collected in saturated zones or from depths near the tailings-native soil contact. Several cyanide-degrading reactions can occur in an oxidative environment, including oxidation, biodegradation, and hydrolysis. Cyanide-degrading reactions within saturated environments, however, require the presence of sulfides (Smith and Struhsacker, 1988)."

Sulfide was not detected in any of the seven samples analyzed for sulfide, and reactive sulfide was not detected in any of the 40 samples analyzed for reactive sulfide.

4.3.1.2 Sulfur and Zinc

Sulfur and zinc are not considered COCs; however, as identified by ESPO (Section 2.5.3) anomalous concentrations of sulfur or zinc may originate from the Merrill-Crowe process for recovering gold from cyanide solution. Sulfur and zinc concentrations detected in soil during the SSI are summarized in the following table.

Assessment Area	Sulfur Concentrations				Zinc Concentrations			
	Pop	Min	Mean	Max	Pop	Min	Mean	Max
Background Area	6	15	55	130	6	52	71	130
Bellwether Mine	4	7.8	31	50	4	44	54	61
Lakebed Area	4	40	94	180	4	31	54	73
Cyanide Process Area	5	290	626	1,200	5	15	77	120
Tailings Pile	3	890	2,147	4,600	3	46	59	71

Concentrations are reported in mg/kg. Pop = sample population (number of measurements), Min = minimum detected value, Max = maximum detected value

Sulfur concentrations detected at the Background Area, Bellwether Mine, and Lakebed Area are within a typical agronomic range (up to approximately 300 mg/kg). The elevated sulfur concentrations detected at the Cyanide Process Area and Tailings Pile are indicative of byproducts of the Merrill-Crowe process. Zinc concentrations detected at the Cyanide Process Area and the Tailings Pile are not elevated in comparison with the Background Area.

4.3.1.3 Chromium Speciation

Pursuant to DTSC comments on the draft EA, D&M performed supplemental investigation to assess the oxidation state of chromium (hexavalent or trivalent) within soil and tailings at the site. Two soil or tailings samples each were collected from the Tailings Pile, Cyanide Process Area, and Bellwether Mine Area, and three tailings samples were collected from the Lakebed Area, for a total of nine samples. Hexavalent chromium was not detected in any of the samples at concentrations exceeding the detection limit of 1.0 mg/kg.

4.3.1.4 Thallium Reanalysis

Thallium concentrations reported by D&M were significantly higher for all assessment areas than those reported by the USEPA and Arcadis. Additional thallium analysis performed as part of the SSI validated the USEPA and Arcadis results and confirmed that the D&M results were not reproducible. The D&M thallium data are therefore excluded from the risk assessment.

Figure 7 depicts all exploratory locations where one or more samples were obtained for thallium analysis. The USEPA and Arcadis obtained 116 samples for thallium analysis as summarized below.

- The USEPA obtained 110 samples, including:
  - 32 tailings and soil samples from the Lakebed Area with thallium concentrations ranging from 0.8 to 1.6 mg/kg;
  - 16 soil samples from other portions of the site with thallium concentrations ranging from 0.5 to 1.2 mg/kg; and
  - 62 soil samples from the Background Area with thallium concentrations ranging from 0.26 to 1.9 mg/kg.
- Arcadis obtained six tailings samples from the Tailings Pile, and thallium was not detected at or greater than the reporting limit of 0.5 mg/kg.

On Figure 7, the D&M exploratory locations are highlighted because all of the detected thallium concentrations are significantly greater than those detected by the USEPA and Arcadis. D&M obtained 84 samples for thallium analysis as summarized below:

- 15 tailings, soil, and rock samples from the Lakebed Area with thallium concentrations ranging from 5.0 to 15 mg/kg;
- nine waste rock, soil, and mineralized bedrock samples from the Bellwether Mine Area with thallium concentrations ranging from 6.0 to 36 mg/kg;

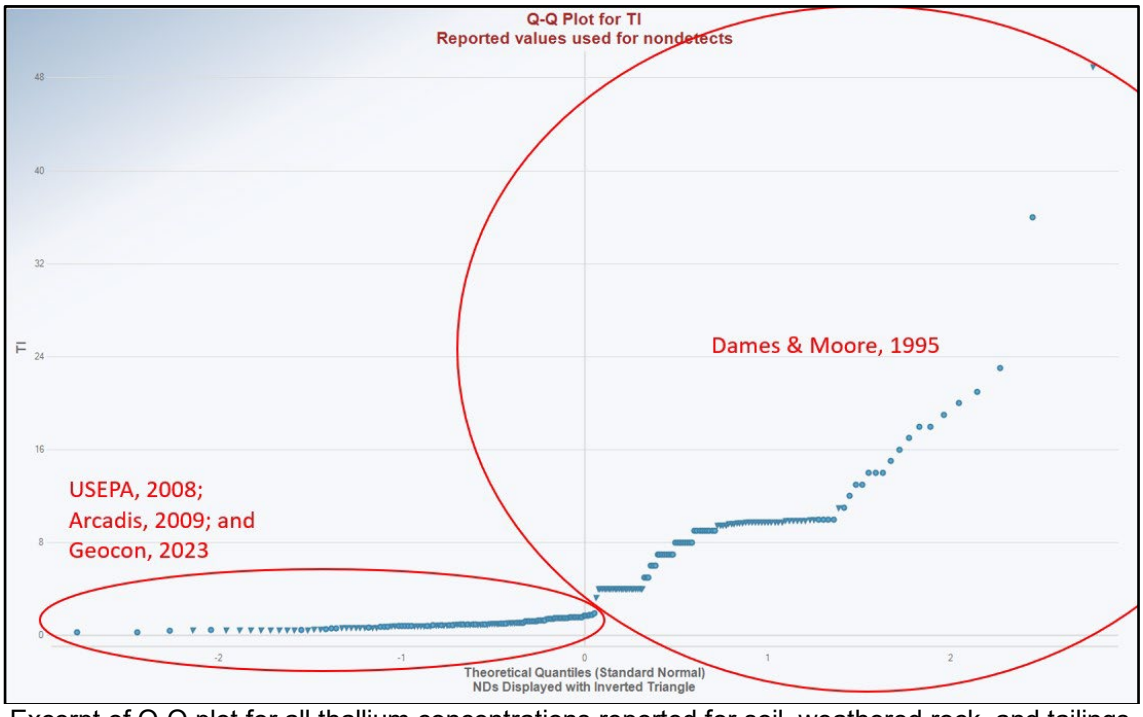
- four soil and mineralized rock samples from the Cyanide Process Area (less than 9.6 to 11 mg/kg);
- 28 tailings, cover soil, soil, and waste rock samples from the Tailings Pile (9.0 to 20 mg/kg); and
- 28 soil and rock samples from the Background Area (5.0 to 13 mg/kg).

We obtained 22 samples for thallium analysis during the SSI, including:

- four tailings and soil samples from the Lakebed Area;
- three tailings samples from the Tailings Pile;
- five soil/rock samples from the Process Area;
- four soil/bedrock samples from the mineralized shear zone in the vicinity of the Bellwether Mine;
- three native soil/rock samples from areas underlain by the Mariposa Formation; and
- three native soil/rock samples from areas underlain by the Calaveras Formation.

Site-wide, thallium was detected in 121 of 224 samples of soil, weathered rock, and tailings at concentrations ranging from 0.26 to 36 mg/kg. A Q-Q plot for the site-wide, pooled thallium concentration data (presented below) displays two distinct populations:

1. Thallium was detected in 70 of the 138 samples collected by the USEPA (2008), Arcadis (2009), and Geocon (2023) at concentrations ranging from 0.26 to 1.9 mg/kg; and
2. Thallium was detected in 14 of 84 samples collected by D&M (1995) at concentrations ranging from 5.0 to 36 mg/kg.



Excerpt of Q-Q plot for all thallium concentrations reported for soil, weathered rock, and tailings.

ProUCL finds the pooled concentration data obtained by USEPA (2008), Arcadis (2009), and Geocon (2023) to be normally distributed and suggests the use of a 95% Kaplan-Meier (KM) hypothesis test statistic (t) UCL (0.94 mg/kg) as a conservative central tendency estimate. The Q-Q plot is linear, and Rosner's Outlier Test does not identify potential outliers at 5% or 1% significance level. The RSL for thallium in commercial soil is 12 mg/kg.

4.3.2 Distribution of Metals With Depth

The variation of metals concentrations with depth is discussed below.

4.3.2.1 Background Area

Metals concentrations are relatively constant with depth in the Background Area. Metals concentrations in the native soil are similar to metals concentrations in the underlying Calaveras Formation bedrock from which it was derived. Because metals concentrations in surface samples are not higher than those in subsurface samples, aerial transport of dust with elevated metals concentrations from the contaminated areas to the Background Area is not evident.

4.3.2.2 Tailings Pile

Metals concentrations reported for samples collected from the Tailings Pile were relatively consistent with depth. Mean arsenic, mercury, and lead concentrations in the tailings exceed those of soil in the Background Area. The mean nickel concentration reported for the tailings samples does not appear to differ significantly from that of the Background Area, while the mean chromium concentration for the tailings samples appears to be lower than that of the Background Area samples.

4.3.2.3 Native Soil Beneath the Tailings Pile

Exploratory borings advanced through the Tailings Pile by D&M generally encountered less than 1.5 feet of native soil between the Tailings Pile and the underlying weathered bedrock. Sample collection within the underlying bedrock was not possible with the drilling equipment that D&M used. Native soil samples collected within one foot below the tailings-native soil contact appear to have arsenic and mercury concentrations that are slightly greater than those detected in samples collected from the Background Area. Mean chromium, nickel, and lead concentrations reported for native soil samples collected beneath the Tailings Pile are comparable to mean background concentrations.

4.3.2.4 Soil Cover on the Tailings Pile

Mean arsenic and mercury concentrations in soil cover samples appear slightly greater than mean background concentrations, which may be due to physical mixing of the soil cover and the underlying tailings. The cover soil appears to be locally-borrowed native soil and weathered bedrock.

4.3.2.5 Lakebed Area

Metals concentrations were relatively consistent with depth within the tailings in the Lakebed Area. Mean arsenic, mercury, and lead concentrations in the tailings samples collected from the Lakebed Area are greater than those of the Background Area. The mean reported nickel concentration in the tailings samples does not appear to differ significantly from background, while the mean reported chromium concentration in the tailings samples appears to be less than that of the Background Area.

4.3.2.6 Native Soil Beneath Lakebed Area Tailings

D&M reported that the native soil beneath the Lakebed Area tailings was generally less than 1.5 feet thick, as also reported for the Tailings Pile, and sample collection within the underlying bedrock was generally not feasible using D&M's drilling equipment. Eight native soil and weathered bedrock samples were collected at the tailings/native soil contact to assess whether leaching of metals from the tailings had occurred. The mean arsenic and mercury concentrations reported for these samples are skewed by two samples (TP-11-12.0 and TP-16-3.5), which had arsenic concentrations of 195 and 81.2 mg/kg and mercury concentrations of 4.0 and 3.8 mg/kg, respectively. D&M reported that these native soil samples may have been mixed with tailings. Regardless of these anomalous results, arsenic and mercury concentrations in native soil immediately underlying the Lakebed Area tailings appear to be slightly greater than those of the Background Area. Mean chromium, nickel, and lead concentrations reported for native soil samples collected beneath the tailings are comparable to those of the Background Area.

4.3.3 Relative Abundance of Metals in Coarse and Fine Fractions

We encountered higher metals concentrations in finer soil types and finer fractions during the SSI. For example, mercury was detected at a concentration of 6.6 mg/kg in silt (ML) obtained from the Tailings Pile, and at lower concentrations (2.1 and 3.3 mg/kg) in samples classified as fine sand (SM). Sulfur was detected at a concentration of 4,600 mg/kg in the tailings sample classified as silt, and at lower concentrations (890 and 950 mg/kg) in the fine sand. The difference is likely attributable to the larger surface area available for adhesion in the finer particle sizes.

Prima (Table 7) performed total arsenic analysis on both the whole samples and also the finer fraction (<250 μm, or <60 mesh) of the CAB analysis samples obtained from:

- non-mineralized soil and weathered rock in the Background Area;
- mineralized soil and weathered rock in the Bellwether Mine and Cyanide Process Area; and
- tailings samples obtained from the Tailings Pile.

Arsenic concentrations in the finer fraction were roughly double the arsenic concentrations reported for the corresponding whole samples.

D&M partitioned selected soil and tailings samples into coarse and fine fractions prior to laboratory analysis. Coarse fraction samples (fine sand; retained on the #200 sieve; >0.075 mm) are designated with a "C" in the sample name on Table 2, and fine fraction samples (silt; passing the #200 sieve; <0.075 mm) are designated by an "F" in the sample name. These samples were submitted for analysis to assess potential differences in concentration in each size fraction. Results are summarized below by assessment area.

4.3.3.1 Background Area

D&M reported that there does not appear to be a significant difference between the metal concentrations detected in the fine (<0.075mm) and coarse (> 0.075mm) fraction of the one surface soil sample (BKRD-6-0.0) that was submitted for particle size chemical analysis. This result suggests an equal distribution of metals between the two size fractions.

4.3.3.2 Tailings Pile

D&M reported results of particle size chemical analysis for two surface tailings samples (SURF-07-0.0 and SURF-09-0.0) showing that reported metal concentrations were higher in the fine fraction (< 0.075 mm) in each case, while there appeared to be no significant difference in metal concentrations reported for the fine and coarse fractions of the one soil cover sample (TP-28-0.5). Results are summarized in the following table.

Sample ID	Arsenic	Chromium	Lead	Mercury	Nickel
	mg/kg				
SURF-07-0.0 (tailings, surface)	F: 262 C: 102	F: 7.0 C: 3.5	F: 57 C: 26	F: 2.30 C: 2.10	F: 27 C: 12
SURF-09-0.0 (tailings, surface)	F: 110 C: 66	F: 4.5 C: 3.1	F: 28 C: 10	F: 1.4 C: 0.6	F: 16 C: 8.5
TP-28-0.5 (soil cover on Tailings Pile)	F: 6.0 C: 16	F: 30.8 C: 27.0	F: 10 C: 12	F: <0.20 C: 0.30	F: 27 C: 25

F = fine (<0.075 mm), C = coarse (>0.075 mm)

4.3.3.3 Lakebed Area

D&M reported results of particle size chemical analysis for four tailings samples (SURF-06-0.0, SURF-15-0.0, TP-14-3.0, and TP-17-0.5) showing that arsenic concentrations were higher in the fine fraction (<0.075 mm) of the three surface samples, but not for the subsurface sample, as summarized in the following table.

Sample ID	Arsenic	Chromium	Lead	Mercury	Nickel
	mg/kg				
SURF-06-0.0 (tailings, surface)	F: 151 C: 81	F: 5.5 C: <2.4	F: 24 C: 14	F: 1.2 C: 0.88	F: 17 C: 9.4
SURF-15-0.0 (tailings, surface)	F: 333 C: 161	F: 8.7 C: 8.3	F: 33 C: 33	F: 3.3 C: 3.3	F: 27 C: 21
TP-14-3.0 (tailings, subsurface)	F:2.5 C: 27	F: 5.2 C: <2.5	F: 13 C: 11	F: 0.7 C: 0.5	F: 15 C: 9.3
TP-17-0.5 (tailings, surface)	F: 189 C: 110	F: 34.4 C: 24.9	F: 32 C: 11	F: 2.0 C: 0.7	F: 28 C: 17

F = fine (<0.075 mm), C = coarse (>0.075 mm)

4.3.3.4 Cyanide Process Area

D&M reported results of particle size chemical analysis for one tailings sample (TP-13-0.10) suggesting that selected metal concentrations were higher in the fine fraction (<0.075 mm) than the coarse fraction. The reported arsenic, chromium, lead, mercury, and nickel concentrations for the fine fraction were 98.0, 5.4, 61, 2.0, and 10 mg/kg, respectively, while the reported values for the coarse fraction were 44.0, 3.1, 31, 0.9, and 11.0 mg/kg, respectively.

4.3.3.5 Bellwether Mine Area

D&M reported results of the particle size chemical analysis for one waste rock sample (TP- 24-1.5) that do not appear to show a significant difference in levels of selected metals between the fine (<0.075 mm) and coarse fractions.

4.3.4 Soil and Tailings – Other Inorganic Constituents

Table 3 presents the results of laboratory analysis of 142 soil and tailings samples for aluminum, calcium, iron, magnesium, manganese, potassium, and sodium. D&M observed accumulations of salt at the surface of some areas of exposed tailings at the Tailings Pile. They collected samples of these salt accumulations (SURF-7 and SURF-8) to evaluate their chemical character. Magnesium, calcium, and sulfate concentrations were greater in these samples in comparison to the concentrations in the below-surface tailings samples. The high concentrations of calcium and sulfate suggest that the salt is precipitated gypsum.

4.3.5 Soil and Tailings – pH and Electrical Conductivity

D&M reported the following regarding pH and EC in soil and tailings samples.

4.3.5.1 Background Area

Measured pH in soil samples collected from the Background Area was lower than that of soil samples from the other assessment areas. The mean pH for soil samples from the Background Area was 5.8, with a range of 4.7 to 7.8. The acidic soil conditions of the Background Area may at least in part be a result of decomposition of fallen oak leaves and other accumulated vegetative debris, which were visible on the ground surface in this area more prevalently than in other site areas. The mean measured soil EC was 213 micromhos per centimeter (µmhos/cm) with a range of 20 to 1,900 µmhos/cm.

4.3.5.2 Tailings Pile

The pH of tailings and native soil samples was measured as neutral to slightly basic (7.35 to 8.30), while that of the soil cover samples was slightly acidic (5.40 to 6.80). The slightly acidic pH and the physical characteristics of the soil cover samples suggests that this soil was imported locally from an area similar to the Background Area where slightly acidic soil pH was also measured. Compared to Background Area soil, the EC appeared to be elevated in tailings samples, slightly elevated in native soil samples, and normal in the soil cover samples.

4.3.5.3 Lakebed Area

The pH of Lakebed Area tailings and native soil samples were similar to those described above for the Tailings Pile.

4.3.5.4 Cyanide Process Area

The pH of soil samples from the Cyanide Process Area were reported as slightly acidic to neutral (5.50 to 7.35), consistent with conditions found in the Background Area. The pH of mineralized rock samples were reported as neutral to slightly basic (7.05 to 7.35), while reported tailings sample pH values ranged from near-neutral to slightly basic (7.2 to 8.1).

4.3.5.5 Bellwether Mine Area

The pH of soil and waste rock samples were reported as slightly acidic to neutral (4.6 to 7.2), consistent with conditions found in the Background Area, where the acidity was presumably derived from the decay of organic matter. Past industrial operations at the Bellwether Mine appears to be limited to the excavation of mineralized rock from the subsurface and is not expected to have significantly affected soil pH values.

4.3.6 Soil, Rock and Tailings – Extractable Metals

The results of extraction testing are presented in Table 4. We performed extraction testing by SPLP, Arcadis used DI-WET, and D&M used both the standard citrate buffer extractant solution (standard WET) as well as DI-WET for a few selected sample-analyte pairs. Results are summarized below.

We obtained three samplings of tailings from the Tailings Pile for SPLP extraction and analysis by USEPA Method 6020 of the metals of concern (arsenic, lead, mercury, selenium, and silver).

- SPLP arsenic in tailings samples ranged from 0.0019 to 0.0049 mg/l, and the mean SPLP arsenic concentration was 0.0031 mg/l. The detected values are less than the Primary MCL for arsenic in drinking water (0.010 mg/l).
- SPLP selenium in tailings samples ranged from 0.0014 to 0.0024 mg/l, and the mean SPLP selenium concentration was 0.0018 mg/l. The detected values are less than the Primary MCL for selenium in drinking water (0.050 mg/l), the agricultural water quality goal for selenium (0.020 mg/l), and the California Toxics Rule (CTR) Criterial Continuous Concentration (CCC) for freshwater aquatic life protection (0.005 mg/l).
- SPLP lead, mercury, and sliver were not detected above reporting limits of 0.0003, 0.0001, and 0.00024 mg/l, respectively.

Arcadis performed DI-WET extraction of 15 soil and tailings samples (including two co-located duplicate samples) with analysis of the extractant solution for arsenic and manganese by USEPA Method 6010B.

- DI-WET arsenic was detected in ten of the 15 soil samples at concentrations exceeding the reporting limit of 0.005 mg/l. The mean and maximum detected concentrations were 0.024 and 0.094 mg/l, respectively. DI-WET arsenic concentrations were highest in naturally mineralized soil samples collected from and near the Cyanide Process Area, as summarized below:
    - DI-WET arsenic concentrations in tailings samples from the Tailings Pile ranged from less than 0.005 to 0.0081 mg/l;
    - DI-WET arsenic concentrations in tailings and soil samples from the Lakebed Area ranged from less than 0.005 to 0.0089 mg/l; and
    - DI-WET arsenic concentrations in mineralized soil samples collected from the Cyanide Process Area ranged from 0.0076 to 0.094 mg/l.
- DI-WET manganese was detected in eight of the 15 soil samples at concentrations exceeding the reporting limit of 0.005 mg/l. The mean and maximum detected concentrations were 0.096 and 0.340 mg/l, respectively. Except for one anomalous result for the Tailings Pile, DI-WET manganese concentrations were highest in naturally mineralized soil samples collected at and near the Cyanide Process Area, as summarized below:
    - DI-WET manganese was not detected in tailings samples from the Tailings Pile at concentrations exceeding the reporting limit of 0.005 mg/l in four of the five samples, and was detected at a concentration of 0.340 mg/l in the fifth sample;
    - DI-WET manganese concentrations in tailings and soil samples from the Lakebed Area ranged from less than 0.005 to 0.0068 mg/l; and
    - DI-WET manganese concentrations in mineralized soil samples from the Cyanide Process Area ranged from 0.0039 to 0.130 mg/l.

DI-WET arsenic concentrations in three samples from the Lakebed Area ranged from 0.0055 to 0.013 mg/l, which are similar to those from Arcadis presented above. D&M analyzed one sample from the Background Area for DI-WET lead, which was not detected at a concentration exceeding the reporting limit of 0.150 mg/l.

D&M performed WET extraction using the standard buffered citric acid extractant of eleven samples of background soil, tailings, mineralized rock and waste rock, with analysis of the extractant solution for arsenic, chromium, lead, mercury and nickel by USEPA Methods 6010B/7471A. Results are summarized below.

- WET arsenic was detected at concentrations up to 0.064 mg/l in background soil samples, up to 27 mg/l in tailings samples, up to 0.54 mg/l in mineralized rock samples, and up to 0.23 mg/l in waste rock samples at the Bellwether Mine location. The waste rock is mineralized bedrock that was transported to the ground surface by mining excavation.
- WET chromium was not detected at concentrations exceeding the reporting limit of 0.05 mg/l in background soil samples. WET chromium was detected at concentrations up to 0.11 mg/l in tailings samples, up to 0.26 mg/l in mineralized rock samples, and 0.10 mg/l in waste rock samples.
- WET lead was detected in background soil samples at concentrations up to 0.26 mg/l and in tailings samples up to 2.49 mg/l. WET lead was not detected in mineralized rock or waste rock samples at concentrations exceeding the reporting limit of 0.015 mg/l.

- WET mercury was detected in background soil samples at concentrations up to 0.0076 mg/l and was not detected in mineralized rock or waste rock samples at concentrations exceeding the reporting limit of 0.003 mg/l. Tailings samples were not analyzed for WET-extractable mercury.
- WET nickel was detected in background soil samples at concentrations up to 0.25 mg/l, in mineralized rock samples at concentrations up to 5.86 mg/l, and in waste rock samples at 0.52 mg/l. Tailings samples were not analyzed for WET-extractable nickel.

The results of ABA, as described below, indicate that the tailings are net neutralizing. The low sulfide concentrations detected in the tailings, as discussed below, indicate that the tailings do not have a significant long-term acid-generating potential. In addition, pH measurements for soil, tailings, and water samples are neutral. Therefore, acidic conditions are not likely to be present, and are not likely to be generated in the long term. Thus, the WET results reported above (using an acidic, buffered extractant solution) are not considered representative of field conditions and are not deemed useful for the evaluation of the potential risk to water quality from tailings at the site, but are useful in the case of off-site disposal at a licensed solid waste facility.

4.3.7 Tailings – ABA

D&M collected two tailings samples from the Tailings Pile and three samples from the Lakebed Area. The samples were submitted to McClelland Laboratories, Inc. (McClelland) for ABA, and to Rocky Mountain Geochemical Corporation for sulfur speciation. Results are presented in Table 5. McClelland used a modified ABA procedure in which the AGP is calculated using the sulfide sulfur content rather than the total sulfur content. The calculation methods for acid-neutralizing potential (ANP) and paste pH were not modified. Results are summarized in the following table.

Sample ID	Assessment Area	Paste pH	Sulfur Forms (%)			AGP	ANP	NNP	NP:AGP
			Total Sulfur	Sulfide	Sulfate				
TP-40	Lakebed	8.24	0.020	<0.001	0.020	<0.03	45.7	+45.7	>1500
TP-41	Lakebed	8.12	0.088	<0.001	0.088	<0.03	40.0	+40.0	>1300
TP-45	Lakebed	8.64	0.064	<0.001	0.064	<0.03	47.6	+47.6	>1500
TP-47	Tailings Pile	7.83	0.820	0.120	0.700	3.8	41.8	+38.0	11.0
TP-48	Tailings Pile	8.09	0.960	0.040	0.920	1.2	46.6	+45.4	38.8

AGP = acid-generating potential, ANP = acid-neutralizing potential, NNP = net neutralizing potential

None of the tailings samples from the Tailings Pile or Lakebed Area displayed a potential to produce acid. Sulfide concentrations were low, indicating no significant potential to generate acidic conditions in the long term.

4.3.8 Arsenic Speciation and Dissolution Kinetics

D&M contracted with Walsh & Associates, Inc. (Walsh) to evaluate arsenic speciation and dissolution kinetics in seven soil and tailings samples, and to prepare the report (Walsh, 1993) presented as Appendix B of the EA (D&M, 1995). Samples are listed in the following table. These samples were also subjected to mineralogical analysis as summarized in Table 6.

Sample ID	Sample Date	Data Source	Area	Geology	Medium	Sample Depth (feet)
BKRD-10-0.0	10/28/92	D&M 1995	BKG	CAL	S	0.0
MW-01-11.5	10/27/92	D&M 1995	LKBD	CAL*	S	11.5
SB-05A-23.0	11/02/92	D&M 1995	TAIL	KEN	T	23.0
SURF-08-0.0	10/27/92	D&M 1995	TAIL	KEN	T	0.0
SURF-16-0.0	01/11/93	D&M 1995	PROC	MEL	MR	0.0
TP-15-3.0	10/21/92	D&M 1995	LKBD	KEN	T	3.0
TP-23-2.0	10/26/92	D&M 1995	BELL	MEL	MR	2.0

BKG = Background Area, BELL = Bellwether Mine, LKBD = Lakebed Area, PROC = Cyanide Process Area, TAIL = Tailings Pile, CAL = Calaveras Formation, MAR = Mariposa Formation, MEL = Melones Fault Zone/ mineralized zone, KEN = Kennedy Mine tailings, S = soil, T = tailings, MR = mineralized rock
D&M 1995 = Final Environmental Assessment, Dames & Moore, 1995
* = may be influenced by overlying or adjacent waste

The scope of study included:

- evaluation of the major solid phases of arsenic by extraction with sequentially more aggressive extraction solutions (magnesium chloride solution, phosphate solution, and nitric acid solution); and
- evaluation of the rate of dissolution in extraction solutions of several pH values (1.0, 2.0, 5.4, and 8.0) by testing the extractant solutions for arsenic at 1, 8, 24, 48 and 72 hours.

Walsh (1993) concluded:

- the sequential extraction results and water solubility studies demonstrate that the aqueous phase solubility of arsenic in the samples is relatively low;
- the low arsenic solubility appears to be related to a high attenuation capacity in the adsorbed phase;
- most of the arsenic occurs in the mineral "refractory" phase; and
- dissolution equilibrium appeared to be approached within 48 to 72 hours for all pH values except for the most aggressive pH 1.0 extractant solution.

According to Walsh, if a metal is associated with primary minerals, then the solubility may be much lower than if it is associated with loosely bound species such as those held to mineral surface solely by electrostatic interactions. The extractant solutions and findings are summarized below, in order of less aggressive to more aggressive. In general, arsenic released later in the sequential extraction process is considered less accessible or less soluble with regard to natural weathering processes.

4.3.8.1 Magnesium Chloride Buffer Solution

The magnesium chloride buffer solution (1.0 molar [M] $MgCl_2$ adjusted to pH 7 with NaOH; gently shaken for 2 hours) is intended to approximate water solubility, although the higher ionic strength of the solution will likely enhance solubility. The solution is intended to extract "exchangeable" arsenic held by electrostatic attraction and readily soluble arsenic species. Arsenic solubility in the magnesium

chloride solution was typically less than 1% of the total arsenic concentration, suggesting that little arsenic is available in an easily leached form. This first extraction step resulted in higher arsenic extraction (apparently less than 2% of the total arsenic based on the graphical results) in samples SURF-08-0.0 and MW-01-11.5.

4.3.8.2 Phosphate Buffer Solution

The phosphate buffer solution (0.5 M KH_2PO_4 + 0.5 M K_2HPO_4; adjusted to pH 7; gently shaken for 2 hours) is intended to extract arsenic that is adsorbed on iron oxide and manganese oxide surfaces, which are bound strongly to mineral surfaces with some degree of covalent bonding. According to Walsh, bonding of arsenic in the "adsorbed phase" usually involves replacement of a surface hydroxyl group (such as those in iron oxides and manganese oxides) with the arsenate (As V) or arsenite (As III) oxyanion. During this extraction, the bound arsenate or arsenite is intended to be exchanged with phosphate. This extraction removed 15% to 50% of the total arsenic. Walsh concluded that the relatively large percentage of adsorbed arsenic usually means that mineral surfaces in the sample are effectively sequestering arsenic from solution and this attenuating its loss through leaching.

4.3.8.3 Nitric Acid Solution

The nitric acid solution (HNO_3; 4.0 M; heated to 80ºC) is intended to extract arsenic in the refractory mineral phase of the samples, which may be present as arsenopyrite minerals that may be occluded within other pyritic minerals. The majority of the arsenic in the samples was extracted as part of this final, most aggressive step. Therefore, most of the arsenic in the samples is believed to be associated with refractory mineral phases that are not accessible to less aggressive extractant solutions.

4.3.9 Arsenic Bioavailability Study

We submitted soil samples to Prima Environmental, Inc. (Prima) for arsenic bioavailability study using the CAB procedure pursuant to HHRA Note 6 (DTSC, 2017).

4.3.9.1 Procedures

Prima air-dried and then sieved each soil sample to obtain the less than 250 µm size fraction, which is approximately equal to the passing 60-mesh sieve size fraction. Prima performed gastric-phase bioaccessibility tests using the CAB method. Simulated gastric solution was prepared by dissolving reagents (NaCl, ascorbic acid, and pepsin) in deionized water, then adjusting the pH to 1.5 ± 0.1. Each soil sample was extracted by adding 150 ± 1 mL of gastric solution to 1.00 ± 0.05 grams (g) soil (<250 µm fraction), then mixing end-over-end in a 37°C water bath for 120 minutes. After 120 minutes, the gastric solution was filtered through a 0.45-µm filter, and the final pH of each sample was measured. The target final pH of each sample was within 0.1 pH units of the initial pH, as required by the method. Filtered gastric solution was submitted to a certified analytical laboratory for analysis of arsenic.

Prima reported the concentration of arsenic in simulated gastric solution and in the unextracted <250 µm fraction soil and calculated bioaccessibility and relative bioavailability (RBA) values as summarized below. The bioaccessibility value was presented both as a percentage (Equation 1 below) and as the mass of soluble metal per mass of soil (Equation 2 below). RBA was calculated from the CAB bioaccessibility value (expressed as a percent) according to Equation 3 below pursuant to the DTSC's HHRA Note 6.

$$\text{CAB (\%)} = 100 \times \frac{\text{(concentration in extract, mg/L) * (volume extract, L)}}{\text{(concentration in soil, mg/kg) * (mass of soil, kg)}} \quad \text{Eqn. 1}$$

$$\text{CAB (mg As/kg soil)} = \frac{\text{(concentration in extract, mg/L) * (volume extract, L)}}{\text{(mass of soil, kg)}} \quad \text{Eqn. 2}$$

$$\text{RBA (\%)} = 0.81 * \text{CAB (\%)} + 3.2 \quad \text{Eqn. 3}$$

Prima determined that QC parameters were within acceptance limits pursuant to Prima's internal QC procedures.

4.3.9.2 Results

Results of the arsenic bioavailability study are presented in Table 7. RBA ranged from 6.5% to 43%, and the mean RBA was 18.3%. The lowest RBA values (6.5% and 7.2 %) are associated with mineralized bedrock (samples TP-49-1.5 and TP-49-4.5). The highest RBA (43%) is associated with fill soil in the Cyanide Process Area (sample TP-66-0.0), and the next highest RBA values (25% and 23%) are associated with sandy tailings (samples TP-53-3.0 and TP-54-3.0) in the Tailings Pile. Tailings classified as silt (sample TP-53-3.0) had a lower RBA (16%). The RBA of background soil ranged from 9.4% to 19%. Average RBA values for the tested media are presented in the following table.

Medium	Sample ID	RBA	Average RBA (%)
Background soil, non-mineralized	TP-56-1.5	<12[a]	15.5
	TP-61-1.5	19 J	
Background soil, mineralized	TP-51-0.0	18	18
Naturally mineralized bedrock	TP-49-1.5	6.5	7.7
	TP-49-4.5	7.2	
	TP-58-3.0	9.4 J	
Tailings	TP-52-3.0	23	21.3
	TP-53-3.0	16	
	TP-54-3.0	25	
Cyanide Process Area Soil and Rock	TP-64-3.0	13	23
	TP-65-3.0	13	
	TP-66-0.0	43[b]	

a = The reporting limit was used to represent the non-detected result.
b = The anomalously high RBA value was associated with a shallow surface fill.
J = The reported RBA value is based on trace analytical concentrations and is therefore an estimate.

4.3.10 Microscopy and Microprobe Analysis

D&M contracted with Robert S. Borch, Ph.D., of Davis, California, to perform scanning electron microscopy (SEM) and to evaluate arsenic-bearing and chromium-bearing mineral phases by electron microprobe analysis of seven soil and tailings samples. Borch used a Hitachi S-450 scanning electron microscope and a Cameca SX-50 electron microprobe at the Geology Department of the University of California, Davis. Results are presented in Appendix B of the EA (D&M, 1995). Samples are listed in the following table.

Sample ID	Sample Date	Data Source	Area	Geology	Medium	Sample Depth (feet)
BKRD-10-0.0	10/28/92	D&M 1995	BKG	CAL	S	0.0
MW-01-11.5	10/27/92	D&M 1995	LKBD	CAL*	S	11.5
SB-05A-23.0	11/02/92	D&M 1995	TAIL	KEN	T	23.0
SURF-08-0.0	10/27/92	D&M 1995	TAIL	KEN	T	0.0
SURF-16-0.0	01/11/93	D&M 1995	PROC	MEL	MR	0.0
TP-15-3.0	10/21/92	D&M 1995	LKBD	KEN	T	3.0
TP-23-2.0	10/26/92	D&M 1995	BELL	MEL	MR	2.0

BKG = Background Area, BELL = Bellwether Mine, LKBD = Lakebed Area, PROC = Cyanide Process Area, TAIL = Tailings Pile, CAL = Calaveras Formation, MAR = Mariposa Formation, MEL = Melones Fault Zone/ mineralized zone; KEN = Kennedy Mine tailings, S = soil, T = tailings, MR = mineralized rock
D&M 1995 = Final Environmental Assessment, Dames & Moore, 1995
* = may be influenced by overlying or adjacent waste

Pyrite was the primary arsenic-bearing mineral phase in the Tailings Pile and Lakebed Area samples. Minor arsenopyrite (iron-arsenic sulfide) was also observed. The pyrite grains were described as small (generally less than 10 microns [µm]), and many are present in fragments of slate. The sulfides from the Tailings Pile and Lakebed Area samples appeared to be unaltered, whereas the non-tailings samples are partially oxidized and contain iron oxyhydroxides.

Sample SURF-16-0.0, collected from the mineralized zone at the Cyanide Process Area, appears to consist of hydrothermally altered slates, and may thus represent the naturally occurring pre-industrial conditions in the mineralized portions of the site in terms of arsenic and chromium abundance and speciation. The arsenic and chromium in this mineralized sample occur primarily in mineral form, as described below, and not as a result of contamination by tailings or processing operations.

According to Boyle and Jonnason (1975), arsenic is known to form relatively large dispersion “halos” in rock and soil around zones that are mineralized (geochemically altered by hydrothermal emplacement processes). Sample SURF-16-0.0 contains abundant goethite (an iron oxyhydroxide [FeO(OH)] containing ferric iron), which contains arsenic at concentrations up to approximately 1.5% by weight. The goethite was likely formed by supergene oxidation within or near the mineralized zone, which occurred extensively in portions of the ore bodies in the Mother Lode above groundwater. Chlorites (mica-like silicate minerals) present in sample SURF-16-0.0 are rich in chromium and nickel, and account for the higher concentrations of these metals in the mineralized sample.

4.3.11 Mineralized Soil and Rock Conditions

Table 6 presents the results of mineralogical analysis. Findings from D&M include:

- Mineralogical analysis of native soil samples shows approximately half of the mineral content to be quartz with the bulk of the remaining fraction as layer silicates, goethite, and plagioclase feldspar.
- Half or more of the mineral content of the tailings samples are quartz. Remaining minerals, in descending order of abundance, include layer silicates, plagioclase feldspar, ferrous dolomite, pyrite, siderite, and others.
- Five out of seven tailings samples contained pyrite at levels between 1% and 10%. One tailings sample was sieved prior to analysis into fine (<0. 075 mm) and coarse fractions. The fine fraction contained more quartz and ferrous dolomite and proportionately less layer silicates than the coarse fraction.

D&M reported that mineralized rock and soil samples collected from the mineralized ridge extending north-south through the site generally contained substantially higher arsenic, chromium, and nickel concentrations than soil and rock samples from the Background Area. D&M found that arsenic, chromium, and nickel concentrations in mineralized rock and soil tend to be higher than the corresponding concentrations in tailings and are a consequence of the mineralized nature of these materials rather than from the tailings or cyanide treatment process.

4.3.11.1 Off-site Mineralized Samples

D&M collected soil samples MR-01 and MR-02 from off-site mineralized areas located within 1,000 feet north-northwest of the site along the Melones Fault Zone. The mineralized soil samples contained higher arsenic and nickel concentrations and similar chromium and lead concentrations in comparison to mineralized materials samples collected from the site. Mercury concentrations were higher in MR-01 and similar in the other sample to those reported for the on-site mineralized area samples. Metals concentrations detected in the off-site mineralized samples, and the range of reported concentrations of these metals from the on-site mineralized areas, are summarized in the following table.

Analyte	Off-site		On-site	
	MR-01	MR-02	Process Area	Bellwether Mine
	mg/kg			
Arsenic	490	530	12 – 257	31
Total Chromium	360	750	88.3 – 1,690	943
Lead	38	14	<7.3 – 71.4	<7.5
Mercury	2.1	0.073	<0.10 – 0.30	<0.2
Nickel	1,500	1,400	89.2 – 1,340	473

mg/kg = milligrams per kilogram

4.3.12 Groundwater

D&M installed groundwater monitoring wells MW-1 through MW-5 at the site (Sheet 2).

- MW-1 and MW-4 were installed in the Lakebed Area north of the tailings dam. MW-1 is screened in shallow tailings that are hydraulically connected to seasonal surface water in the Lakebed Area. MW-4 is screened in bedrock that does not appear to be hydraulically connected to the seasonal surface water or perched groundwater in the shallow tailings.
- MW-2 and MW-3 were installed in the southern portion of the Tailing Pile area.
- MW-5 was installed upgradient of the Tailing Pile and is considered representative of background groundwater conditions.

Construction details for these monitoring wells are in Appendix F. Groundwater was monitored using these wells in 1993, 2009, and 2023. Results are presented in Tables 8 through 10. Table 10 presents groundwater well information.

Groundwater monitoring was performed in February and June 1993, February 2009, and May 2023. A groundwater sample was not collected from MW-1 in February 1993 because it was in standing water. During the February 1993 monitoring event, groundwater samples were collected and analyzed for total metals (excluding antimony) and selected inorganics (calcium, iron, magnesium, manganese, potassium, sodium, and cyanide). Samples were collected again in June 1993 with unfiltered samples analyzed for antimony only. Filtered groundwater samples were collected from all wells in February 2009 and analyzed for dissolved arsenic and manganese and total cyanide. Unfiltered groundwater samples were collected from all wells in May 2023 and analyzed for metals; total and amenable (or weak acid dissociable, WAD) cyanide; major ions; and general water quality parameters.

4.3.12.1 Metals in Groundwater

As shown on Table 8, groundwater monitoring identified the following MCL exceedances:

- Arsenic concentrations in groundwater samples ranged from <0.001 to 0.061 mg/l. The arsenic concentrations in groundwater samples collected from wells MW-1 and MW-2 exceeded the Primary MCL for arsenic in drinking water (0.01 mg/l).
- Iron concentrations ranged from <0.25 to 160 mg/l. The iron concentrations in MW-1, MW-2, MW-3 and MW-5 (the background well, 0.93 mg/l) exceed the Secondary MCL for iron in drinking water (0.3 mg/l).
- Manganese concentrations ranged from <0.25 to 1.7 mg/l. The manganese concentrations in MW-1, MW-2 and MW-3 exceeded the Secondary MCL for manganese in drinking water (0.05 mg/l).

MCLs are primarily used to regulate the quality of drinking water generated by a public water system. Although drinking water is considered to be a beneficial use of groundwater pursuant to the Basin Plan (RWQCB, 2019), groundwater resources will likely not be developed as a future potable water source for the site. Drinking water at the site is anticipated to be supplied by the City of Jackson through the Amador Water Agency. A distribution pipeline crosses east to west and north to south through the site.

4.3.12.2 Cyanide in Groundwater

As summarized in Table 9, MAI analyzed groundwater samples wells MW-1 through MW-5 for total and amenable (free) cyanide. The initial testing for amenable cyanide provided an invalid result for four of the samples due to interference during the chlorination step. Pursuant to Method 4500-CN-G, WAD cyanide was analyzed by SM4500-CN-I for these samples as an alternative to determining free cyanide.

During the May 2023 monitoring event, total cyanide was detected in wells MW-1, MW-2 and MW-4 at concentrations ranging from 0.0012 to 0.0017 mg/l. Free (WAD) cyanide was detected in well MW-2 at 0.0016 mg/l. The detected concentrations are less than the Primary MCL for cyanide in drinking water (0.15 mg/l).

Past investigations included the analysis of nine groundwater samples from wells MW-1 through MW-5 for total cyanide. As shown on Table 9, reported cyanide concentrations in the groundwater samples ranged from <0.01 to 0.19 mg/l. Cyanide was detected only in the groundwater samples collected from MW-2, and the highest reported total cyanide concentration (0.19 mg/l, February 2009) exceeded the Primary MCL (0.15 mg/l).

4.3.12.3 Background

Arsenic was detected in the groundwater sample collected from background well MW-5 at 0.0023 mg/l in 2009, iron was detected in MW-5 in 2023 at 0.93 mg/l, and manganese was detected in the original MW-5 sample and the replicate sample MW-5d at 0.400 and 0.370 mg/l, respectively.

Cyanide was not detected in the groundwater samples collected from MW-5 in 1993, 2009, or 2023 at concentrations exceeding reporting limits of 0.02, 0.01, and 0.001 mg/l, respectively.

Sulfide was detected at 2.0 mg/l in the original MW-5 sample but was less than the detection limit of 1.0 mg/l in the replicate sample, MW-5d. There was a noticeable odor of sulfur from the water purged from this well.

4.3.13 Surface Water

D&M collected surface water samples from eight locations, primarily to evaluate the potential for metals and cyanide to be mobilized in stormwater runoff. Their surface water sample locations are described in the following table.

Location	Description
SW-1	Downgradient of Lakebed Area and tailings dam, stormwater runoff
SW-2	Downgradient of Tailings Pile, stormwater runoff
SW-3	Lakebed Area, western portion
SW-4	Upgradient off-site drainage course, draining to Lakebed Area

Location	Description
SW-5	Upgradient New York Ranch Creek, east of the site
SW-6	Upgradient North Fork Jackson Creek, west of the site
SW-7	Downgradient stormwater runoff, downgradient of Tailings Pile and SW-2
SW-8	Downgradient stormwater runoff, downgradient of Tailings Pile and SW-2

Samples SW-1 through SW-6 were analyzed for Title 22 metals and other inorganics including calcium, iron, magnesium, manganese, potassium, sodium, and cyanide (Tables 11 and 12). Samples SW-7 and SW-8 were analyzed for total cyanide. All surface water samples were unfiltered. A duplicate surface water sample (SW-1) was filtered prior to arsenic analysis.

4.3.13.1 Metals in Surface Water

As shown on Table 11, barium and lead were detected in surface water samples (a primary and a duplicate) collected from SW-5 upgradient of the site. Barium was detected at a concentration of 0.053 mg/l in both the primary and duplicate samples. Lead was detected in the SW-5 duplicate sample at a concentration of 0.023 mg/l but was not detected in the primary sample.

Arsenic was detected in surface water sample SW-2 (downgradient of the Tailings Pile) at a concentration of 0.0077 mg/l. Arsenic was detected in surface water samples SW-1 and SW-3 (downgradient and at the Lakebed Area, respectively) at concentrations of 0.0088 and 0.010 mg/l, respectively. A duplicate sample from SW-1 was filtered, and dissolved arsenic was detected in the filtered sample at a concentration of 0.0071 mg/l. Barium was detected in sample SW-2 at a concentration of 0.053 mg/l.

4.3.13.2 Cyanide in Surface Water

Eight surface water samples were analyzed for total cyanide. As shown on Table 12, total cyanide was detected in both unfiltered (0.26 mg/l) and filtered (0.36 mg/l) surface water samples collected at location SW-2. Cyanide was not detected in the surface water samples SW-7 and SW-8 collected downgradient of SW-2. Cyanide was also not detected in any of the other surface samples collected at concentrations that exceeded the laboratory reporting limit.

4.3.13.3 Background

Barium and lead were detected in surface water samples SW-5 and the replicate SW-5d. Lead was detected in SW-5d at 0.0230 mg/l, but at a concentration less than the detection limit of 0.15 mg/l in SW-5. Barium was detected at 0.053 mg/l in both SW-5 and SW-5d. Neither total cyanide nor sulfide was detected in background surface water samples. The pH was near-neutral (between 6.4 and 7.5) and the mean EC was 186 µmhos/cm with a range of 54 to 270 µmhos/cm.

4.3.14 Sediment

D&M (1995) collected six surface sediment samples at the following locations.

Location	Description
SS-1	Downgradient of Lakebed Area and tailings dam
SED-01	Downgradient of Lakebed Area and tailings dam
SED-02	Downgradient of Tailings Pile
SED-03	Downgradient of Cyanide Process Area
SED-04	Downgradient of Lakebed Area and tailings dam
SED-06	Downgradient of site in New York Ranch Creek

The samples were generally analyzed for total Title 22 metals and total cyanide, except that on-site sample SS-1 was analyzed only for metals and off-site sample SED-06 was analyzed only for cyanide.

4.3.14.1 Metals

As shown on Table 13, arsenic, barium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc were detected at concentrations exceeding their respective reporting limits in all sediment samples analyzed. Arsenic concentrations in sediment samples ranged from 39 to 110 mg/kg. Mercury concentrations in sediment samples ranged from 0.2 to 2.0 mg/kg.

4.3.14.2 Cyanide

Five sediment samples were analyzed for total cyanide. Cyanide was detected in only one sample (SED-02) and at a concentration equal to the reporting limit of 2.0 mg/kg. SED-02 was collected at surface water sample location SW-02; therefore, the sediment sample was saturated.

4.3.15 Groundwater Seeps

Geocon evaluated laboratory results for filtered and unfiltered groundwater seep samples collected by Cal State Engineering, Inc. (CSE; May 2017) from locations S-2 and S-3; reviewed previous physical and geochemical data obtained by D&M (1995); and compared the geochemistry of the seep samples to the geochemistry of historical groundwater and stormwater samples. Results are summarized in Tables 14 through 17 and Charts 1 through 3. The investigation is summarized below.

CSE collected two sets of groundwater seep samples in May 2017 from seep locations S-2 and S-3, which correspond to surface water sample locations SW-02 and SW-03 (Sheet 2). The sample locations are described below.

- Sample S-2 was collected from water flowing (at approximately 4.8 gallons per minute [gpm]) into a storm drain culvert near the southern site boundary, downstream of a seep or spring near the southwestern site corner.
- Sample S-3 was collected from water flowing (at approximately 2.5 gpm) from a 6-inch diameter steel culvert at the western site boundary on the western (downgradient) edge of a small seep or spring west of the Tailings Pile.

No rainfall occurred for at least 2 weeks prior to the sampling events. Samples collected on May 16, 2017, were not filtered prior to analysis, and samples collected on May 31, 2017, were filtered at the laboratory prior to analysis. Geocon collected additional unfiltered groundwater seep samples from the same locations in November 2017, after the Geocon report was issued. The additional November 2017 results are presented and evaluated herein. Results are summarized below:

- Total dissolved solids (TDS; 1,000 to 2,300 mg/l), EC; 1,800 to 2,200 µmhos/cm) and sulfate (520 to 1,800 mg/l) concentrations exceeded the secondary MCLs for those parameters of 500 mg/l, 900 µmhos/com and 250 mg/l, respectively.
- Total cyanide in most samples (0.018 to 0.350 mg/l) exceeded the California Primary MCL of 0.150 mg/l and CTR CCC of 0.0052 mg/l. Geocon found that the total and amenable cyanide concentrations were similar and pH was relatively neutral, suggesting that cyanide occurs in the water samples as free cyanide or cyanide salts rather than strong metal-cyanide complexes.
- Arsenic was detected in unfiltered samples collected at location S-2 at concentrations of 0.0077 to 0.820 mg/l, which generally exceeded the Primary MCL for arsenic of 0.010 mg/l, but arsenic was not detected in the filtered sample collected at location S-2 at a concentration exceeding the reporting limit. Arsenic was detected in one unfiltered sample collected at location S-3 at a concentration of 0.0086 mg/l. The arsenic detections at S-2 and S-3 appear to be related to suspended sediment rather than dissolved arsenic.
- Similarly, aluminum and iron concentrations were higher in unfiltered samples:
    - Aluminum was detected in unfiltered samples at concentrations of 0.140 and 0.110 mg/l, which exceeded those in the filtered samples of 0.056 and 0.057 mg/l. The secondary MCL for aluminum in drinking water is 0.200 mg/l, and the Primary MCL is 1.000 mg/l.
    - Iron was detected in unfiltered samples at concentrations of 12 and 0.860 mg/l, which exceeded those in the filtered samples of 0.360 and 0.140 mg/l. The secondary MCL for iron in drinking water is 0.300 mg/l.
- Manganese was detected in unfiltered samples at concentrations of 0.380 and 0.130 mg/l, which were similar to concentrations of 0.440 and 0.100 mg/l in the filtered samples. The secondary MCL for manganese in drinking water is 0.050 mg/l.

As summarized in Table 17 and Charts 1 through 3, comparison of seep water quality data to groundwater and surface water quality data indicates that the Tailings Pile appears to be the source of the elevated TDS, cyanide, iron, manganese and other constituents in seep samples S-2 and S-3. The pH of the seep samples, as well as the historical (D&M, 1995) perched groundwater sample from MW-2 and surface water sample SW-02, are neutral to very slightly alkaline. Graphical water quality analysis (Charts 1 through 3) suggests that seep water originates from perched groundwater in the Tailings Pile.

COCs in the seep water (and tailings groundwater) include TDS, amenable cyanide, iron, and manganese, which are mobilized from the tailings under reducing conditions. Potential remedial actions to decrease the mobilization of these constituents include source control (i.e., regrading of the Tailings Pile surface to promote runoff and to reduce ponding and infiltration of meteoric water), covering of the Tailings Pile with less permeable materials, and removal of dense and decaying vegetation from the seep areas to promote more oxidizing conditions.

4.4 Contaminants of Concern

We performed statistical analysis of pooled site-wide soil and weathered rock data to identify COCs. Findings of the analysis are summarized below.

- Arsenic, cadmium, lead, mercury, molybdenum, selenium, and silver occur in tailings at concentrations greater than those reported for background soil and mineralized background soil/rock and are therefore COCs.
- Cyanide is present in saturated tailings near the base of the Tailings Pile, and has also been detected in groundwater, groundwater seepage, and sediment. Cyanide is a COC.
- Antimony, chromium, cobalt, copper, and nickel are not considered COCs, but their relative abundance in mineralized soil and bedrock informs the background study.

We used ProUCL Version 5.2 (USEPA, 2022) to prepare box plots and normality plots and to perform outlier tests and summary statistics for the pooled site data (Appendix G). Multiple data populations are present for many of the CAM 17 metals. The multiple data populations are believed to correspond to the multiple geological origins of the soil, which include:

1. background conditions associated with the Calaveras and Mariposa Formations;
2. mineralized background conditions associated with geochemical alteration of the Calaveras and Mariposa Formation bedrock as a result of shearing and hydrothermal emplacement processes along the fault zone between the Calaveras and Mariposa Formations; and
3. contaminated tailings that were imported to the Lakebed Area from the off-site Kennedy Mine, subsequently reprocessed at the Cyanide Process Area, and then disposed of in the Tailings Pile.

Statistical evaluation of the pooled site soil metals data is summarized in Table 18 and is described below. General statistics for non-mineralized background, mineralized background, and assessment areas are presented in Tables 19 through 24. Metals concentrations in the Lakebed Area and Tailings Pile are compared to non-mineralized background. Metals concentrations in the Cyanide Process Area and Bellwether Mine are compared to naturally mineralized background because these assessment areas are located on the mineralized ridge.

4.4.1 Antimony

Site-wide, antimony was detected in 6 of 222 solid samples. The three highest antimony concentrations (12, 17, and 20 mg/kg) were detected in samples of naturally mineralized soil and rock and are similar to the antimony concentrations (17 and 20 mg/kg) detected in mineralized rock samples obtained by D&M from an off-site segment of the same mineralized shear zone. Other detected concentrations include 5.8 mg/kg (TP-66-0.0, soil in Cyanide Process Area), 1.1 mg/kg (SOIL43-1, soil in the southeastern corner of the site), and 0.99 mg/kg (HA-25-0.5, soil on the Tailings Pile). The detected concentrations are less than the USEPA RSL for antimony in commercial soil of 470 mg/kg. Antimony is not a COC but is evaluated as part of the background study because it is present in naturally mineralized soil and rock.

4.4.2 Arsenic

Site-wide, arsenic was detected in 416 of 437 solid samples at concentrations ranging from 1.2 to 1,300 mg/kg. Maximum arsenic concentrations detected at each assessment location in tailings, soil or weathered rock are depicted on Sheet 3. The maximum arsenic concentration detected site-wide (1,300 mg/kg; sample TP-65-3.0) was detected in mineralized soil at a depth of 3.0 to 3.5 feet, and was co-located with elevated concentrations of antimony, chromium, cobalt, copper, and nickel. The maximum arsenic concentration detected in tailings was 305 mg/kg (sample TP-10-4.0) obtained from a depth of 4.0 feet in the Lakebed Area. An anomalously high arsenic concentration was detected in sample SOIL16-01 (502 mg/kg), located up slope and to the east of the Lakebed Area; this hot spot is assumed to be an area of isolated tailings impact. The pooled site-wide arsenic data do not follow a discernable distribution. The box plot and Rosner's Outlier Test (Appendix G) identify multiple potential outliers, and the Q-Q plot suggests multiple populations. Arsenic concentrations, including background concentrations, exceed the DTSC-SL for arsenic in commercial soil of 0.36 mg/kg. Arsenic is a COC because it occurs in tailings at concentrations higher than non-mineralized background.

4.4.3 Barium

Site-wide, barium was detected in 222 of 222 solid samples at concentrations ranging from 6.2 to 768 mg/kg. The highest reported barium concentration of 768 mg/kg was reported by the USEPA (2008) in their sample SOIL44-5, which was collected from a depth interval of 4.5 to 6.0 feet in soil/weathered bedrock of the Calaveras Formation near the southeastern corner of the site. This sample was collected from depth at a location that is cross-gradient to, and farther than 600 feet from, the Lakebed Area. The anomalous concentration was culled from the data set, although it is not expected to be anthropogenic.

After removal of the highest reported barium concentration, the remaining detected concentrations range from 6.2 to 307 mg/kg, and the mean concentration is 129 mg/kg. The data follow an approximate normal distribution, and the 95% Student's-t upper confidence limit (UCL) is 136 mg/kg. The linear Q-Q plot suggests a single population of data, and Rosner's Outlier Test detected no outliers at the 5% or 1% significance levels. Barium concentrations detected in site soil are less than the RSL for barium in commercial soil of 220,000 mg/kg. Barium is not a COC.

4.4.4 Beryllium

Site-wide, beryllium was detected in 149 of 222 solid samples at concentrations ranging from 0.011 to 12 mg/kg. The mean detected concentration is 0.68 mg/kg. The Q-Q plot suggests two populations of data, with an inflection point near 0.5 mg/kg. Of the 24 detected concentrations exceeding 0.5 mg/kg, only one concentration of 0.53 mg/kg is associated with tailings, and the highest beryllium concentrations were detected in background soil. The detected beryllium concentrations are less than the DTSC-SL for beryllium in commercial soil of 230 mg/kg. Beryllium is not a COC.

4.4.5 Cadmium

Site-wide, cadmium was detected in 124 of 222 solid samples at concentrations ranging from 0.19 to 6.6 mg/kg. The mean detected concentration is 1.2 mg/kg. The Q-Q plot suggests multiple populations of data, and an inflection point occurs near 0.6 mg/kg. Of the 17 highest cadmium concentrations, 16 correspond to naturally mineralized soil and rock samples in which anomalous beryllium concentrations were also observed, as described above. Only five of the 60 cadmium concentrations exceeding 1 mg/kg are from tailings samples.

Cadmium was detected in non-mineralized background soil at concentrations up to 2.9 mg/kg, in Lakebed Area samples at concentrations up to 2.6 mg/kg, and in Tailings Pile samples at concentrations up to 4.4 mg/kg. Cadmium was detected in mineralized background soil and rock at concentrations up to 6.6 mg/kg, in Bellwether Mine waste rock at concentrations up to 5.0 mg/kg, and in Cyanide Process Area samples at concentrations up to 2.7 mg/kg. The detected cadmium concentrations are less than the DTSC-SL for cadmium in commercial soil of 79 mg/kg. Because cadmium was detected in samples from the Tailings Pile above the range of non-mineralized background, cadmium is a COC for the Tailings Pile. Cadmium is not a COC for other assessment areas.

4.4.6 Chromium

Site-wide, chromium was detected in 275 of 283 solid samples at concentrations ranging from 1.5 to 1,690 mg/kg. The mean detected concentration is 55.1 mg/kg. The Q-Q plot suggests multiple populations of data, and the data are non-parametric. Twenty-one of the samples have chromium concentrations exceeding 100 mg/kg. Of these samples, 19 are mineralized soil and rock samples collected from 15 exploratory locations on the mineralized ridge, and one is a subsurface soil/weathered rock sample collected from the Background Area. A single outlying value (1,690 mg/kg, sample SURF-16-.0.0) is co-located with an anomalously high nickel concentration (1,340 mg/kg) and was culled from the Cyanide Process Area dataset. The detected chromium concentrations are less than the RSL for chromium in commercial soil of 1,800,000 mg/kg. Chromium is not a COC but is evaluated as part of the background study because it is present in non-mineralized soil and rock.

4.4.7 Cobalt

Site-wide, cobalt was detected in 209 of 222 solid samples at concentrations ranging from 1.0 to 140 mg/kg. The mean detected concentration is 16.1 mg/kg. The Q-Q plot depicts eight potentially outlying values exceeding 40 mg/kg, and the eight corresponding samples were collected from five locations on the mineralized ridge and one location in the Background Area. The detected cobalt concentrations are less than the RSL for cobalt in commercial soil of 350 mg/kg. Cobalt is not a COC but is evaluated as part of the background study.

4.4.8 Copper

Site-wide, copper was detected in 222 of 222 solid samples at concentrations ranging from 3.5 to 178 mg/kg. The mean detected concentration is 60.5 mg/kg. The Q-Q plot identifies an inflection point at 100 mg/kg, and the 15 concentrations exceeding 100 mg/kg associated with five exploratory locations in the Background Area and three exploratory locations on the mineralized ridge. The detected copper concentrations are less than the RSL for copper in commercial soil of 47,000 mg/kg. Copper is not a COC but is evaluated as part of the background study.

4.4.9 Lead

Site-wide, lead was detected in 258 of 274 solid samples at concentrations ranging from 2.7 to 400 mg/kg. The mean detected concentration is 25.5 mg/kg. Rosner's Outlier Text and the box plot identify potential outliers, and the Q-Q plot suggests multiple populations of data, with a possible inflection point near 30 mg/kg and eight outlying concentrations exceeding 70 mg/kg. The outliers are predominantly associated with samples of tailings, and also with surface soil samples collected from the Lakebed Area. The detected lead concentrations are less than the DTSC-SL for lead in commercial soil of 500 mg/kg. Lead is a COC because it occurs in tailings at concentrations higher than non-mineralized background.

4.4.10 Mercury

Site-wide, mercury was detected in 182 of 274 solid samples at concentrations ranging from 0.02 to 28 mg/kg. The mean detected concentration is 1.7 mg/kg. The Q-Q plot suggests an inflection point less than 1 mg/kg and five outlying concentrations exceeding 8 mg/kg. The five outliers, and most concentrations exceeding 3 mg/kg, are associated with tailings samples. The DTSC-SL for mercury in commercial soil is 4.4 mg/kg. Mercury is a COC because it occurs in tailings at concentrations higher than non-mineralized background.

4.4.11 Molybdenum

Site-wide, molybdenum was detected in 36 of 112 solid samples at concentrations ranging from 0.27 to 120 mg/kg. The maximum molybdenum concentration detected site-wide (120 mg/kg; sample TP-65-3.0) is an outlier detected in naturally mineralized soil at a depth of 3.0 to 3.5 feet. The second and third highest molybdenum concentrations (13.1 and 5.5 mg/kg) also appear to be outliers and are associated with mineralized rock samples collected from the mineralized ridge at the Cyanide Process Area. Molybdenum concentrations detected in tailings samples range up to 5.5 mg/kg. Molybdenum concentrations detected at the site are less than the RSL for molybdenum in commercial soil of 5,800 mg/kg. Molybdenum is a COC because it occurs in tailings at concentrations higher than non-mineralized background.

4.4.12 Nickel

Site-wide, nickel was detected in 266 of 266 solid samples at concentrations ranging from 7 to 1,340 mg/kg. The mean detected concentration is 58 mg/kg. The 13 highest nickel concentrations (ranging from 149 to 1,340 mg/kg) are associated with samples of mineralized soil and rock collected from 10 locations on the mineralized ridge. A single outlying nickel concentration (126 mg/kg, sample TP-12-4.5) was culled from the Tailings Pile dataset. Nickel concentrations of 1,400 and 1,500 mg/kg were detected in off-site mineralized rock samples collected by D&M. The detected nickel concentrations are less than the DTSC-SL for nickel in commercial soil of 11,000 mg/kg. Nickel is not a COC but is evaluated as part of the background study.

4.4.13 Selenium

Site-wide, selenium was detected in 123 of 222 solid samples at concentrations ranging from 0.3 to 4.8 mg/kg. The mean detected concentration is 1.1 mg/kg. The Q-Q plot identifies potentially outlying values of 4.8 and 4.0 mg/kg associated with tailings and surface soil samples collected from the Lakebed Area. Of the remaining 59 concentrations exceeding 1.0 mg/kg, most are associated with background soil samples. The selenium concentrations detected at the site are less than the RSL for selenium in commercial soil of 5,800 mg/kg. Selenium is a COC because it occurs in tailings at concentrations higher than non-mineralized background.

4.4.14 Silver

Site-wide, silver was detected in 93 of 222 solid samples at concentrations ranging from 0.05 to 5.6 mg/kg. The mean detected concentration is 0.65 mg/kg. The Q-Q plot identifies seven potentially outlying concentrations exceeding 1.0 mg/kg. The highest detection (5.6 mg/kg; sample SOIL16-1) is an anomalous detection near the eastern edge of the Background Area and is co-located with anomalous detections of arsenic, lead, and mercury. The second and third highest detections (2.1 and 1.2 mg/kg) are associated with tailings or potentially impacted soil samples; one detection (1.7 mg/kg) is associated with a sample of mineralized rock, and four (1.3, 1.1, 1.1 and 1.1 mg/kg) are associated with samples collected from the Background Area. The silver concentrations are less than the RSL for silver in commercial soil of 5,800 mg/kg. Silver is evaluated as COC but is typically not identified as a COC based on the background evaluation presented in Section 4.5.

4.4.15 Thallium

Site-wide, thallium was detected in 70 of 138 solid samples at concentrations ranging from 0.26 to 1.9 mg/kg. As discussed in Section 4.3.1, the anomalous soil thallium date obtained by D&M (1995) were not reproducible and therefore were excluded from the assessment. ProUCL finds the validated thallium concentration data obtained by USEPA (2008), Arcadis (2009), and Geocon (2023) to be normally distributed and suggests the use of a 95% KM (t) UCL (0.94 mg/kg) as a conservative central tendency estimate. The Q-Q plot is linear, and Rosner's Outlier Test does not identify potential outliers at 5% or 1% significance level. The RSL for thallium in commercial soil is 12 mg/kg. Thallium is not a COC.

4.4.16 Vanadium

Site-wide, vanadium was detected in 221 of 222 solid samples at concentrations ranging from 1.7 to 148 mg/kg. The mean detected concentration is 33.8 mg/kg. The Q-Q plot has an inflection point near 40 mg/kg. The eleven vanadium concentrations exceeding 100 mg/kg are associated with mineralized soil and rock, cover soil on the Tailings Pile, and subsurface background soil outside of the assessment areas. Two anomalous vanadium concentrations (148 mg/kg and 133 mg/kg) were culled from the Tailings Pile dataset because they are associated with soil and rock rather than tailings. The detected vanadium concentrations are less than the DTSC-SL for vanadium in commercial soil of 5,800 mg/kg. Vanadium is not a COC.

4.4.17 Zinc

Zinc was detected in 222 of 222 solid samples at concentrations ranging from 14 to 307 mg/kg. The mean detected concentration is 67 mg/kg. The anomalous, maximum concentration of 307 mg/kg is associated with a soil sample collected from the Lakebed Area. The Q-Q plot is linear for concentrations less than approximately 100 mg/kg, and the eleven concentrations exceeding the linear segment from 105 to 175 mg/kg are representative of tailings, background soil and mineralized soil/rock. Six of these samples are associated with subsurface and surface background soil, three are associated with tailings and cover soil, and two are associated with the mineralized zone. The detected concentrations are less than the RSL for zinc in commercial soil of 350,000 mg/kg. Zinc is not a COC.

4.5 Background Metals Evaluation

This section describes background metals concentrations in site soil and rock, including:

- soil and weathered bedrock derived from the non-mineralized Calaveras and Mariposa Formations, and
- soil and weathered bedrock derived from the mineralized shear zone that extends north-south through the middle of the site.

Soil in the Background Area contains metals at typical background concentrations and clearly has not been impacted by historical mining/processing activity based on the laboratory analytical data presented in Table 2 and the physical and geochemical data reviewed in Section 3. Conversely, the Lakebed Area and Tailings Pile are clearly impacted by metals associated with mine tailings, including arsenic, lead, and mercury. The Tailings Pile is additionally impacted by cyanide.

The remainder of the site is mapped as blue oak woodland, blue oak-foothill pine, and annual grassland. Metals concentrations in soil in the remainder of the site may be influenced by both anthropogenic factors (i.e., mining/processing and contaminant transport by wind and water) and natural mineralization (the geologic shear zone that extends north-south through the middle of the site). This evaluation is intended to determine background concentrations of the COCs in both the non-mineralized and mineralized portions of the site to help determine the extent of mine-related contamination.

4.5.1 Regulatory Guidance for Background Evaluation

The Interstate Technology and Regulatory Council's *Soil Background and Risk Assessment* (ITRC, 2022) provides guidance regarding the establishment and use of soil background values in risk assessment. It focuses on the process of establishing defensible background concentrations of naturally occurring substances such as metals.

The ITRC identifies background concentrations of metals as a factor that should be considered in the risk assessment process, particularly when concentrations at a cleanup site may originate from releases attributable to a site as well as other sources, including natural sources and anthropogenic ambient sources not attributable to the specific site under investigation. According to the ITRC, this is especially important when chemical concentrations exceed risk-based values (which are typically numerical chemical concentrations that are protective for specified levels of health risk).

Background concentrations that present a potential health risk can be evaluated and presented in the risk assessment process so that the public can be informed (USEPA, 2002). The comparison of site and background concentrations informs risk management decisions and aids in understanding the magnitude and spatial patterns of chemicals of potential concern in site media.

The ITRC defines soil as "fragmented particulate material consisting of discrete rock and mineral particles less than 2.0 millimeters in size and varying amounts of organic matter (humus)." Much of the soil at the site was formed in place as a result of physical and chemical weathering of bedrock, while other soil-size materials (i.e., mine tailings) were transported to the site and are considered to be an anthropogenic source of contamination.

The ITRC considers soil background as both naturally-occurring and anthropogenic ambient concentrations. Multiple lines of evidence can be considered when determining whether a constituent concentration in soil is the result of a contaminant release, is naturally-occurring background, or is anthropogenic ambient soil background. The following definitions are adopted from the ITRC guidance document and tailored to the site conditions:

- Natural Soil Background: The concentration of a substance present in soil due to geological characteristics, natural processes, or releases from nonanthropogenic sources (for example, wildfires, volcanic activity). For this site, natural soil background conditions are evaluated for both non-mineralized and naturally-mineralized portions of the site. Natural soil background does not include releases from local anthropogenic sources, releases from distant anthropogenic sources of persistent chemicals, or other anthropogenic sources of ubiquitous or widespread contamination.
- Anthropogenic Ambient Soil Background: The concentration of a substance present in soil due to anthropogenic nonpoint sources, especially when chemicals have the ability to be transported long distances. "Anthropogenic" describes the activity that caused the release while "ambient" describes the widespread distribution of the chemical. This is potentially relevant to metals with a widespread urban source, such as the long-distance transport of mercury. Local direct or

indirect release sources, such as those from a specific facility (e.g., the off-site Kennedy Mine or on-site Cyanide Processing Area) are excluded. For this site, natural soil background conditions are more important than anthropogenic ambient soil background conditions.

For metals such as antimony, arsenic, chromium, cobalt, copper, and nickel, the site has more than one site-specific soil background based on the underlying geology and natural mineralization related to geological and geochemical emplacement processes.

Once a background data set of a sufficient population is established, the distribution is determined using goodness-of-fit tests, and a background threshold value (BTV) is estimated. A BTV represents a parameter in the upper tail of the background population distribution and can be estimated as an upper prediction limit (UPL), upper tolerance limit (UTL), or upper simultaneous limit (USL). A concentration less than the BTV estimate is commonly interpreted as representative of an unimpacted background location, and an on-site concentration exceeding a BTV estimate is commonly viewed as potentially contaminated.

Geochemical evaluation as described in Section 4.3 can be used to provide an additional line of evidence to support whether or not soil metals concentrations represent background for the purposes of human health and ecological risk assessment. Geochemical evaluations are based in part on selected elemental ratios, and they are used to identify the processes controlling element concentrations in soil and to confirm or rule out the presence of contamination in individual samples. Accordingly, geochemical evaluations may be used during background studies to verify whether statistical outliers should be retained in a candidate background dataset, for instance, and can be used during comparisons of site versus background datasets.

4.5.2 Procedures for Background Evaluation

The following lines of evidence were evaluated to distinguish between anthropogenic influence and natural mineralization:

- statistical comparison of soil metals data populations pursuant to DTSC (1997, 2009) and ITRC (2022) guidelines;
- mapping of mineralized bedrock conditions;
- evaluation of soil profiles to identify potential sources of contamination and to distinguish disturbed conditions from native soil weathered in residuum from bedrock;
- evaluation of metals distribution with soil depth to evaluate potential near-surface anthropogenic influences (e.g., aerial, alluvial and mechanical transport of contaminated materials);
- evaluation of metals of potential concern co-occurrence at elevated concentrations and correlation to the mineralogy of mineralized and non-mineralized bedrock; and
- review of local metals data for mineralized soil and rock from previous assessments including the EA (D&M, 1995) and the DTSC's Community Wide Assessment (2011).

The identification of anthropogenic and naturally-occurring metals concentrations in soil is fundamental to the site's conceptual model and is particularly important for arsenic because risk-based screening levels for arsenic in soil are lower than the naturally-occurring soil arsenic concentrations. The DTSC's HERO "strongly recommends consideration of site-specific background concentrations of inorganic constituents" (DTSC, 2022 May).

The DTSC provides a framework in which risk assessors may identify background metals concentrations. Pursuant to the DTSC's October 2019 guidance, "risk assessments should eliminate from consideration those whose range of concentrations falls within the range of local ambient conditions." To do this, the local ambient data set may be defined by pooling all site data and determining ambient conditions in the presence of possible contamination. The DTSC describes two methods of comparison:

- comparison of all detected site concentrations for a given metal to a single concentration representative of the upper range of local ambient conditions; and
- comparison of mean site concentrations for a given metal to mean ambient concentrations using the Wilcoxon Rank Sum test, a simple non-parametric statistical technique.

The two methods may be used to compare both high-end concentrations and mean concentrations to determine whether impacts exist.

We analyzed general statistics, outlier values, data distributions, and UCL statistics for metals detected in the following datasets:

- non-mineralized background areas, including the Background Area and other portions of the site that are not impacted by mining or processing;
- the naturally mineralized shear zone crossing through the site from north to south;
- the Lakebed Area, which contains tailings processed by mercury amalgamation and is located in a non-mineralized portion of the site;
- the Tailings Pile, which contains tailings from the Lakebed Area that were additionally processed by cyanide leaching and is located in a non-mineralized portion of the site; and
- the Cyanide Process Area and Bellwether Mine waste rock piles, both of which are located on the naturally mineralized ridge.

Prior to statistical analysis of the geological origin data sets, we reviewed the location, depth and matrix (sampled medium) associated with each sample (Table 2) and culled data associated with samples that may be influenced by overlying or adjacent waste or contaminated materials. For example, the background datasets generally did not include samples of native soil beneath or adjacent to waste areas, or surface samples whose metals concentrations indicated potential impact from contaminant transport. The culled samples are denoted by an asterisk (*) in the "geology" column of Table 2.

Because the analysis is intended to evaluate whole samples, we culled data associated with samples that had been partitioned into coarse and fine fractions. These data were evaluated only in the site-wide pooled data set described above in Section 4.4 and presented in Appendix G.

We used ProUCL to perform outlier tests on the metals data and to prepare box plots and normality plots. Based on the outlier test results and visual interpretation of the plots, we culled the datasets so that only a single population nearest the graphical (X,Y) origin is used to represent background conditions. For constituents with site concentrations exceeding the site background range, we used ProUCL to perform BTV statistics on the culled datasets. Procedures are set forth by the DTSC and are summarized below:

1. Upper-bound Outlier Determination:
    a. Calculate and report descriptive statistics including quartiles.
    b. Identify outliers using the fourth spread (Fs) analysis: outliers are defined as all data points greater than the third quartile (Q3) + [1.5 x Fs], where Fs = Q3 minus the first quartile (Q1).
    c. Remove identified outliers and repeat the fourth spread method iteratively until no further outliers are identified.
2. BTV Determination:
    a. Determine the upper threshold limit of the dataset following outlier removal, which can be considered as representative of the site-specific BTV or upper-bound ambient value.
    b. Identify site values exceeding the BTV.
3. Central Tendency Comparison:
    a. Calculate and compare the 95% UCL of the mean for the dataset with and without the concentrations exceeding the BTV to determine whether the site values exceeding the BTV have a significant influence on the central tendency estimation and the exposure point concentration to be used in the risk assessment.
    b. Compare data sets, if necessary, using a non-parametric statistical technique such as the Wilcoxon Rank Sum test.

4.5.3 Results of Background Evaluation

Datasets are presented in Appendix G for non-mineralized background and mineralized background.

4.5.3.1 Non-Mineralized Background

We used ProUCL to analyze descriptive statics for the COCs in non-mineralized background soil as summarized in the following table.

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Population	163	95	95	95	95
Detections	144	92	45	75	49
% Non-detect	12	3	53	21	48
Minimum (mg/kg)	<1	<7.5	<0.01	<0.3	<1
Maximum (mg/kg)	46.9	38	0.34	2.0	1.3

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Mean Detect	10.6	14.6	0.081	1.05	0.64
First Quartile (Q1)	2.0	7.9	0.027	0.30	0.41
Median	8.2	14.3	0.070	1.0	1.0
Third Quartile (Q3)	12.0	17.2	0.135	1.35	2.5
95th Percentile	24.3	24.0	0.20	2.5	2.5
Standard Deviation	7.59	5.92	0.0577	0.437	0.256
Coefficient of Variation	0.797	0.414	1.022	0.455	0.410
Fs = Q3 – Q1	8.0	9.3	0.108	1.05	2.09
Q3 + 1.5Fs	24.0	31.2	0.30	2.93	5.64
Outlying Values > (Q3 + 1.5Fs)	Nine	One	One	One	None

Fs = fourth spread, Q1 = first quartile, Q3 = third quartile

The fourth spread method identified nine outliers for arsenic and one outlier each for lead, mercury, and selenium:

- Arsenic outlying values: 46.9 mg/kg, sample SOIL33-3; 35 mg/kg, sample HA-66-0.5; 34 mg/kg, sample HA-53-05; 32.1 mg/kg, sample SOIL 32-1; 29.6 mg/kg, sample SOIL33-1; 27 mg/kg, sample HA-48-0.5; 26 mg/kg, sample HA-52-0.5; and 24.4 mg/kg, sample SOIL26-3.
- Lead outlying value: 38 mg/kg, sample SOIL06-3.
- Mercury outlying value: 0.34 mg/kg, sample SOIL21-1.
- Selenium outlying value: 3.7 mg/kg, sample SOIL31-3.

All data (including concentration data for all COCs) associated with the samples represented by the outlying data points were culled from the non-mineralized background data set. We used ProUCL to analyze descriptive statics for the COCs in an intermediate non-mineralized dataset as summarized in the following table.

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Population	151	88	88	88	88
Detections	132	85	43	69	43
% Non-detect	13	3	51	22	51
Minimum (mg/kg)	<1	<7.5	<0.01	<0.3	<1
Maximum (mg/kg)	23	30.2	0.23	2.0	1.3
Mean Detect	9.22	14.57	0.0706	1.06	0.673
First Quartile (Q1)	4.25	10.73	0.0388	0.755	0.698
Median	7.7	14.35	0.069	1.05	1.0
Third Quartile (Q3)	11.1	17.4	0.128	1.325	2.5
95th Percentile	18.35	23.63	0.20	2.325	2.5
Standard Deviation	5.241	5.513	0.0463	0.445	0.242
Coefficient of Variation	0.64	0.388	0.879	0.463	0.369
Fs = Q3 – Q1	6.85	6.67	0.089	0.57	1.80
Q3 + 1.5Fs	21.4	27.4	0.262	2.18	5.20
Outlying Values > (Q3 + 1.5Fs)	Three	One	None	None	None

Fs = fourth spread, Q1 = first quartile, Q3 = third quartile

The fourth spread method identified three outliers for arsenic and one outlier for lead in the intermediate background data set:

- Arsenic outlying values: 23 mg/kg, sample HA-93-0.5; 23 mg/kg, sample HA-64-0.5; and 23 mg/kg, sample HA-69-0.5 (dup).
- Lead outlying value: 30.2 mg/kg, sample SOIL31-1.

All data (including concentration data for all COCs) associated with the samples represented by the outlying data points were culled from the non-mineralized background data set. We used ProUCL to analyze descriptive statics for the COCs in a final, culled, non-mineralized background dataset as summarized in the following table.

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Population	147	87	87	87	87
Detections	128	84	42	68	42
% Non-detect	13	3	52	22	52
Minimum (mg/kg)	<1	<7.5	<0.01	<0.3	<1
Maximum (mg/kg)	20.7	26.3	0.23	2.0	1.3
Mean Detect	8.91	14.4	0.070	1.07	0.683
First Quartile (Q1)	4.1	10.65	0.0385	0.775	0.7
Median	7.5	14.3	0.068	1.1	1.0
Third Quartile (Q3)	11.0	17.15	0.135	1.35	2.5
95th Percentile	17.28	23.35	0.2	2.35	2.5
Standard Deviation	4.387	5.048	0.0562	0.41	0.252
Coefficient of Variation	0.493	0.351	0.807	0.384	0.369
Fs = Q3 – Q1	6.9	6.5	0.0965	0.575	1.8
Q3 + 1.5Fs	21.4	26.9	0.280	2.21	5.2
Outlying Values > (Q3 + 1.5Fs)	None	None	None	None	None
Distribution	Approximate Normal	Normal	Non-parametric	Approximate Normal	Normal
95% UCL	8.55	15.0	0.061	1.05	0.726
UCL Method	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)
BTV Estimate	20.7	26.3	0.23	2.5	2.5
BTV Method	95% USL	95% USL	95% USL	95% USL	95% USL

Fs = fourth spread, Q1 = first quartile, Q3 = third quartile

We used a USL as a conservative estimate of the BTVs for the culled, non-mineralized background data set. According to the ProUCL documentation, a USL tends to provide a balance between false positives and false negatives when many on-site observations need to be compared to background data set free of outliers and representing clean, unimpacted locations.

4.5.3.2 Mineralized Background

We used ProUCL to analyze descriptive statics for the COCs in mineralized background soil as summarized in the following table.

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Population	65	17	17	16	16
Detections	63	14	6	9	8
% Non-detect	3	18	65	44	50
Minimum (mg/kg)	<2	<2.5	<0.04	<0.3	<1
Maximum (mg/kg)	1,300	360	0.30	1.2	0.71
Mean Detect	156	37.8	0.21	0.76	0.42
First Quartile (Q1)	32	7.5	0.09	0.648	0.47
Median	59	12.7	0.13	0.805	0.855
Third Quartile (Q3)	140	16.8	0.2	2.5	1
95th Percentile	606	88	0.24	2.5	2.5
Standard Deviation	240.7	92.86	0.0628	0.189	0.237
Coefficient of Variation	1.544	2.457	0.307	0.247	0.562
Fs = Q3 – Q1	108	9.3	0.11	1.852	0.53
Q3 + 1.5Fs	302	30.8	0.37	5.28	1.80
Outlying Values > (Q3 + 1.5Fs)	Ten	One	None	None	None

Fs = fourth spread, Q1 = first quartile, Q3 = third quartile

The fourth spread method identified ten outliers for arsenic and one outlier for mercury:

- Arsenic outlying values: 1,300 mg/kg, sample TP-65-3.0; 950 mg/kg, sample TP-49-0.0; 760 and 760 mg/kg, sample TP-49-1.5 and replicate; 550 mg/kg, sample HA-41-0.5; 510 mg/kg, sample HA-41-0.5; 510 mg/kg, sample TP-49-4.5; 480 mg/kg, sample TP-49-3.0; 360 mg/kg, sample HA-39-0.5; and 350 and 330 mg/kg, sample HA-42-0.5 and replicate.
- Lead outlying value: 360 mg/kg, sample TP-65-3.0.

All data (including concentration data for all COCs) associated with the samples represented by the outlying data points were culled from the mineralized background data set. We used ProUCL to analyze descriptive statics for the COCs in an intermediate mineralized background dataset as summarized in the following table.

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Population	55	14	14	13	13
Detections	53	11	4	9	8
% Non-detect	4	21	71	31	38
Minimum (mg/kg)	<2	<2.5	<0.04	<0.3	<1
Maximum (mg/kg)	280	18.4	0.30	1.2	0.71
Mean Detect	68.1	11.9	0.24	0.76	0.42
First Quartile (Q1)	28	7.425	0.06	0.61	0.23
Median	49	10.1	0.15	0.73	0.68
Third Quartile (Q3)	78	14.28	0.208	0.82	1.0
95th Percentile	175	17.36	0.255	2.5	2.5
Standard Deviation	56.71	5.221	0.0923	0.241	0.221
Coefficient of Variation	0.863	0.514	0.950	0.354	0.526
Fs = Q3 – Q1	50	6.86	0.148	0.21	0.77
Q3 + 1.5Fs	153	24.6	0.43	1.14	2.16
Outlying Values > (Q3 + 1.5Fs)	Four	None	None	One	None

Fs = fourth spread, Q1 = first quartile, Q3 = third quartile

The fourth spread method identified four outliers for arsenic and one outlier for selenium in the intermediate data set:

- Arsenic outlying values: 280 mg/kg, sample TP-51-0.0; 220 mg/kg, sample HA-45-0.5; 210 mg/kg, sample HA-34-0.5, and 160 mg/kg, sample HA-31-0.5.
- Selenium outlying value: 1.2 mg/kg, sample SOIL39-1 (dup).

Additional iteration of the fourth spread method identified four additional outlying arsenic values: 153 mg/kg, sample TP-20-1.5; 150 mg/kg, sample HA-52-0.5; 140 mg/kg, sample HA-32-0.5; and 130 mg/kg, sample HA-44-0.5.

All data (including concentration data for all COCs) associated with the samples represented by the outlying data points were culled from the non-mineralized background data set. We used ProUCL to analyze descriptive statics for the COCs in a final, culled, mineralized background dataset as summarized in the following table.

Parameter	Arsenic	Lead	Mercury	Selenium	Silver
Population	47	13	13	13	13
Detections	45	10	4	9	8
% Non-detect	4	23	69	31	38
Minimum (mg/kg)	<2	<2.5	<0.04	<0.3	<1
Maximum (mg/kg)	120	18.4	0.3	1.2	0.71
Mean Detect	48.18	12.18	0.24	0.764	0.421
First Quartile (Q1)	26.5	7.4	0.05	0.61	0.23
Median	42	10.9	0.1	0.73	0.68
Third Quartile (Q3)	67	14.7	0.21	0.82	1
95th Percentile	96.1	17.44	0.258	2.5	2.5
Standard Deviation	27.37	5.413	0.0944	0.241	0.221
Coefficient of Variation	0.592	0.529	0.929	0.354	0.526
Fs = Q3 – Q1	40.5	7.3	0.16	0.21	0.77
Q3 + 1.5Fs	127.8	25.7	0.45	1.14	2.16
Outlying Values > (Q3 + 1.5Fs)	None	None	None	None	None
Distribution	Normal	Normal	Normal	Normal	Normal
95% UCL	52.3	13.1	0.16	0.82	0.57
UCL Method	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)
BTV Estimate	120	18.4	0.30	2.5	2.5
BTV Method	95% USL	95% USL	95% USL	95% USL	95% USL

Fs = fourth spread, Q1 = first quartile, Q3 = third quartile

We used a USL as a conservative estimate of the BTVs for the culled, mineralized background data set. According to the ProUCL documentation, a USL tends to provide a balance between false positives and false negatives when many on-site observations need to be compared to background data set free of outliers and representing clean, unimpacted locations.

The fourth spread method culled 19 outlying arsenic values ranging from 1,300 to 130 mg/kg. Although these outlying arsenic values are not used to estimate a BTV, they are representative of the range of naturally occurring arsenic concentrations in native soil and weathered bedrock associated with the mineralized shear zone.

4.6 Metals in Tailings and Waste Rock

We used ProUCL to evaluate COC concentrations for the Lakebed Area, the Cyanide Process Area, the Tailings Pile, and waste rock at the Bellwether Mine location.

4.6.1 Lakebed Area

Identification of COCs for the Lakebed Area is presented in Table 1a of Appendix H and is summarized below. Arsenic, lead, mercury, molybdenum, and selenium are COCs for the Lakebed Area because they exceed the corresponding BTVs for non-mineralized soil and bedrock.

Parameter	Arsenic	Cadmium	Lead	Mercury	Molybdenum	Selenium	Silver
Population	65	35	46	46	17	35	35
Detections	65	16	44	37	6	20	17
% Non-detect	0	54	4	20	65	43	52
Minimum (mg/kg)	4	<0.13	<7.4	<0.07	<0.98	<0.3	<0.5
Maximum (mg/kg)	320	2.5	102	9.7	3.9	4.0	1.0
Mean Detect	108	1.05	26.9	2.22	2.6	1.25	0.393
95th Percentile	278	2.5	62.8	6.28	9.92	3.0	2.5
SD	83.0	0.625	22.4	2.30	0.97	0.73	0.32
CV	0.772	0.977	0.863	1.28	0.497	0.587	0.813
Distribution	Approx. Normal	Approx. Normal	Log-normal	Approx. Normal	Normal	Non-Parametric	Non-Parametric
95% UCL	125	0.84	33.4	2.38	2.54	1.26	0.464
UCL Method	95% Student's-t	95% KM (t)	KM H	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)
BTV, Non-Mineralized	20.7	2.9	26.3	0.23	3.7	2.5	2.5
BTV Method	95% USL	95% USL	95% USL	95% USL	Upper Range Background	95% USL	95% USL
COC?	**Yes**	No	**Yes**	**Yes**	**Yes**	**Yes**	No

BTV = background threshold value; CV = coefficient of variation; mg/kg = milligram per kilogram, SD = standard deviation, UCL = upper confidence limit

Rosner's Outlier Test identified the highest detected values of arsenic (502 mg/kg), lead (386 mg/kg), and mercury (28 mg/kg) for the entire site as outliers associated with sample SOIL16-1, which was located above the eastern shoreline of the Lakebed Area in blue oak woodland on the western edge of the Background Area. The laboratory data for sample SOIL16-1 were not included in the Lakebed Area dataset because the sample was obtained east and upslope of the Lakebed Area and was not associated with tailings. The location of sample SOIL16-1 is considered a hot spot that requires remedial action. Cyanide was not detected in the Lakebed Area.

4.6.2 Tailings Pile

Identification of COCs for the Tailings Pile is presented in Table 1b of Appendix H and is summarized below. Arsenic, cadmium, lead, mercury, molybdenum, and cyanide are COCs for the Tailings Pile because they exceed the corresponding BTVs for non-mineralized soil and bedrock.

Parameter	Arsenic	Cadmium	Lead	Mercury	Molybdenum	Cyanide
Population	67	37	55	55	37	22
Detections	67	25	51	45	24	6
% Non-detect	0	32	7	18	35	73
Minimum (mg/kg)	3	0.34	<7.4	<0.1	0.27	0.75
Maximum (mg/kg)	263	4.4	400	15	5.5	21.9
Mean Detect	101.1	1.41	36.29	2.839	2.23	6.44
95th Percentile	230	3.74	65.8	7.65	10.0	12.3
SD	80.74	1.22	53.42	2.961	1.39	5.0
CV	0.799	1.18	1.563	1.264	0.752	2.35
Distribution	Approx. Gamma	Non-Parametric	Approx. Gamma	Gamma	Normal	Approx. Normal
95% UCL	125	1.39	50.5	3.20	2.28	4.14
UCL Method	95% Approx. Gamma	95% KM (t)	95% KM Approx. Gamma	95% KM Approx. Gamma	95% KM (t)	95% KM (t)
BTV, Non-Mineralized	20.7	2.9	26.3	0.23	3.7	ND
BTV Method	95% USL	95% USL	95% USL	95% USL	Upper Range Background	na
COC?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

BTV = background threshold value; CV = coefficient of variation; mg/kg = milligram per kilogram, SD = standard deviation
UCL = upper confidence limit

Rosner's Outlier Test identified the highest detected values of lead (400 mg/kg) and mercury (15 mg/kg) as outliers. These outlying values were included in the UCL calculations for the Tailings Pile.

4.6.3 Cyanide Process Area

Identification of COCs for the Cyanide Process Area is presented in Table 1c of Appendix H and is summarized below. Arsenic, lead, mercury, and molybdenum are COCs for the Cyanide Process Area because they exceed the corresponding BTVs for mineralized soil and bedrock.

Parameter	Arsenic	Cadmium	Lead	Mercury	Molybdenum	Selenium	Silver
Population	28	8	16	15	8	8	8
Detections	28	7	12	10	3	0	5
% Non-detect	0	13	25	33	63	100	38
Minimum (mg/kg)	4	1.1	<2.4	<0.1	2.3	<2.5	<0.5
Maximum (mg/kg)	450	2.7	72	1.0	13.1	ND	2.1
Mean Detect	125.2	1.89	29.12	0.411	7.1	na	1.358
95th Percentile	368	2.56	71.55	0.239	10.6	3	1.96
SD	124.7	0.545	22.09	0.582	4.05	na	0.521
CV	0.996	0.307	0.965	3.103	1.241	na	0.477
Distribution	Gamma	Normal	Normal	Normal	Normal	na	Normal
95% UCL	185	2.17	33.0	0.421	6.58	na	1.51

Parameter	Arsenic	Cadmium	Lead	Mercury	Molybdenum	Selenium	Silver
UCL Method	95% Adjusted Gamma	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	na	95% KM (t)
BTV, Mineralized	120	5.4	18.4	0.30	ND	2.5	2.5
BTV Method	95% USL	95% USL	95% USL	95% USL	na	95% USL	95% USL
COC?	**Yes**	No	**Yes**	**Yes**	**Yes**	No	No

BTV = background threshold value; CV = coefficient of variation; mg/kg = milligram per kilogram, SD = standard deviation
UCL = upper confidence limit; na = not applicable

Rosner's Outlier Test identified the highest detected mercury concentration (20 mg/kg, sample TP-13-2.5) as an outlier. This outlying value was not included in the UCL calculations for the Cyanide Process Area. The remaining mercury concentrations detected in the Cyanide Process Area range up to 1.0 mg/kg.

Arsenic concentrations detected in the Cyanide Process Area exceed the corresponding BTV for arsenic in naturally mineralized soil and bedrock; however, the arsenic concentrations detected in the Cyanide Process Area are within the range of arsenic concentrations (up to 1,300 mg/kg) detected in naturally mineralized soil and bedrock elsewhere on the mineralized ridge. Cyanide was not detected in the Cyanide Process Area.

4.6.4 Bellwether Mine Waste Rock

No COCs are identified for the Bellwether Mine waste rock as described in Table 1d of Appendix H and as summarized below. Arsenic, cadmium, lead, and mercury are not COCs because they occur in the Bellwether Mine waste rock at concentrations similar to those detected in naturally mineralized soil and bedrock on the mineralized ridge, where the waste rock piles are located and from which they were excavated. Molybdenum, selenium, silver, and cyanide were not detected in Bellwether Mine waste rock.

Parameter	Arsenic	Cadmium	Lead	Mercury	Molybdenum	Selenium	Silver
Population	7	7	7	7	7	7	7
Detections	7	3	7	5	0	0	0
% Non-detect	0	57	0	29	100	100	100
Minimum (mg/kg)	5	2.7	9.1	<0.2	<0.2	<0.3	<0.25
Maximum (mg/kg)	139	5.0	21	0.32	na	na	na
Mean Detect	48.3	3.9	13.4	0.17	na	na	na
95th Percentile	131.8	4.73	19.8	0.305	na	na	na
SD	56.46	0.98	4.14	0.129	na	na	na
CV	1.169	0.320	0.308	0.999	na	na	na
Distribution	Normal	na	Normal	Normal	na	na	na
95% UCL	89.8	na	16.5	0.236	na	na	na
UCL Method	Student's-t	na	Student 's-t	95% KM (t)	na	na	na
BTV, Mineralized	120	5.4	18.4	0.30	ND	2.5	2.5
BTV Method	95% USL	95% USL	95% USL	95% USL	na	95% USL	95% USL
COC?	No	No	No	No	No	No	No

BTV = background threshold value; CV = coefficient of variation; mg/kg = milligram per kilogram, SD = standard deviation
UCL = upper confidence limit ; na = not applicable

The maximum arsenic concentration detected in the Bellwether Mine waste rock (139 mg/kg) exceeds the corresponding BTV (120 mg/kg) for arsenic in naturally mineralized soil and bedrock; however, the arsenic concentrations detected in the Bellwether Mine waste rock are within the range of arsenic concentrations detected in subsurface samples of naturally mineralized, weathered bedrock (up to 1,300 mg/kg).

For the purposes of comparison, we calculated UCLs for arsenic, lead, and mercury in Bellwether Mine waste rock despite the small number of samples. We also used the Wilcoxon-Mann-Whitney (WMW) two-sample hypothesis test to compare central-tendency values in Bellwether Mine waste rock to central-tendency values in the culled, mineralized, background data set. For arsenic, mercury, and lead concentrations, the central tendency of the Bellwether Mine data population is less than or equal to the central tendency of the culled, mineralized background population, indicating that arsenic, lead, and mercury are not COCs for the Bellwether Mine waste rock. Results are presented in Appendix G.

4.6.5 Isolated Tailings Areas

Mine tailings are present at the ground surface at isolated areas, typically less than 2 feet deep, as a result of historical erosion, surface water transport, mechanical transport, and track out. The isolated tailings areas are listed in the following table and are depicted on Sheet 3 with the exploratory locations, which are color-coded based on the maximum detected (surface and subsurface) arsenic concentration at each location. Each decision unit is described below.

Isolated Tailings Areas	**Estimated Area** (acres)	**Estimated Volume** (cubic yards)
Pond Area	0.5	1,630
Hot Spot at Sample SOIL16	0.05	148
Hot Spot at Sample SOIL25	0.05	148
Hot Spot at Sample HA-74	0.14	444
Northern Area	0.26	422
Ridge Area[1]	0.6	963
Dam Area	0.5	815
Southeast Area	4.1	6,667
Lakebed Track Out Area	1.7	2,667
Western Area	1.6	5,037
Southern Area	3.7	23,704

1 Area and volume estimates for the Ridge Area do not include portions within the Cyanide Process Area.

4.6.5.1 Pond Area

The Pond Area decision unit contains a thin layer of fine tailings in a shallow, bermed depression in the non-mineralized hillside north of the Tailings Pile near groundwater monitoring well MW-5 (Sheet 3; Photo 53). It is possible that the bermed depression served as a water source for cattle, and the thin layer of tailings in the base of feature may have been transported by pumping of water from the Lakebed Area. Arsenic, lead, and mercury concentrations are summarized in the following table. Tailings and impacted soil are to be removed from the Pond Area and placed as engineered fill in the Tailings Pile.

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
HA-25-0.5	02/09/09	Arcadis 2009	0.5	98	40	7.5
HA-25-2.0	02/09/09	Arcadis 2009	2.0	3.6	na	na
TP-25-0.2	10/23/92	D&M 1995	0.2	28	70	15
TP-25-1.0	10/23/92	D&M 1995	1.0	30.	<7.5	<0.2
TP-26-2.0	10/23/92	D&M 1995	2.0	9.0	10	0.9

mg/kg = milligram per kilogram, na = not analyzed

Tailings and impacted soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for non-mineralized background locations are to be excavated from the hot spot location and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

4.6.5.2 Hot Spot at Sample SOIL16

Elevated arsenic, lead, and mercury concentrations were detected near the ground surface at exploratory location SOIL16 within the Background Area. COCs were detected in the non-mineralized background range at adjacent exploratory locations.

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SOIL16-1	05/13/08	USEPA 2008	1.0	502	386	28
SOIL 16-3	05/13/08	USEPA 2008	3.0	19.2	13.5	0.45

mg/kg = milligram per kilogram, na = not analyzed

Tailings and impacted soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for non-mineralized background locations are to be excavated from the hot spot location and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

4.6.5.3 Hot Spot at Sample SOIL25

Elevated arsenic, lead, and mercury concentrations were detected near the ground surface at exploratory location SOIL25 within the Background Area. COCs were detected in the non-mineralized background range at adjacent exploratory locations.

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
SOIL25-1	05/14/08	USEPA 2008	1.0	160	102	5.9
SOIL 25-3	05/14/08	USEPA 2008	3.0	48.5	33	1.6

mg/kg = milligram per kilogram, na = not analyzed

Tailings and impacted soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for non-mineralized background locations are to be excavated from the hot spot location and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

4.6.5.4 Hot Spot at Samples HA-74 and SOIL30

Elevated arsenic, lead, and mercury concentrations were detected near the ground surface at exploratory locations HA-74 and SOIL30 within the Background Area.

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
HA-74	01/12/09	Arcadis 2009	0.5	230	na	na
SOIL30-1	05/14/08	USEPA 2008	0.0-0.5	43.6	31.4	1.9
SOIL30-3	05/14/08	USEPA 2008	2.5-3.0	8.7	90	0.023

mg/kg = milligram per kilogram, na = not analyzed

The surface arsenic concentration (43.6 mg/kg) at location SOIL30 is significantly greater than the subsurface arsenic concentration (8.7 mg/kg) detected in underlying weathered rock, and an elevated mercury concentration (1.9 mg/kg) was detected at the ground surface.

Tailings and impacted soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for non-mineralized background locations are to be excavated from the hot spot location and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

Arsenic and/or mercury were detected at concentrations above their non-mineralized BTVs at three other locations in the Background Area (HA-93, SOIL20, and SOIL26) as summarized in the table below. Four of the detected arsenic concentrations exceed the non-mineralized arsenic BTV (20.7), and one of the detected mercury concentrations exceeds the non-mineralized mercury BTV (0.23 mg/kg). Statistical analysis, as described below, indicates that arsenic and mercury concentrations at these locations are not significantly different than background, and no action is proposed at these locations.

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
HA-93-0.5	02/12/09	Arcadis 2009	0.5	23	na	na
SOIL20-1	05/14/08	USEPA 2008	0.0-0.5	37.6	17.8	0.26
SOIL20-3	05/14/08	USEPA 2008	2.5-3.0	23.9	12.6	<0.076
SOIL26-1	05/14/08	USEPA 2008	0.0-0.5	16.3	14.8	0.068
SOIL26-3	05/14/08	USEPA 2008	2.5-3.0	24.4	11.6	<0.10

mg/kg = milligram per kilogram, na = not analyzed

Arsenic concentrations in the samples obtained from a depth of 3.0 feet in native soil at locations SOIL20 (23.9 mg/kg) and SOIL26 (24.4 mg/kg) are slightly higher than the non-mineralized arsenic BTV (20.7 mg/kg). The arsenic concentration detected at a depth of 3.0 feet in native soil at location SOIL26 is higher than the corresponding surface arsenic concentration. These values are considered representative of background conditions.

We used ProUCL Version 5.2 (USEPA, 2022) to evaluate central-tendency arsenic and mercury concentrations in the northern portion of the Background Area with and without the values detected at locations HA-93, SOIL20, and SOIL26. Results are summarized below.

Parameter	Arsenic		Mercury	
	All Data, Northern Portion of Background Area	Excluding HA-93, SOIL20, and SOIL26	All Data, Northern Portion of Background Area	Excluding HA-93, SOIL20, and SOIL26
Population	50	45	41	37
Detections	45	40	22	20
% Non-detect	10	11	46	46
Minimum Detect (mg/kg)	2.0	2.0	0.017	0.017
Maximum Detect (mg/kg)	37.6	17.7	0.34	0.34
Mean Detect (mg/kg)	9.6	7.6	0.070	0.060
SD Detects	7.1	4.0	0.080	0.072
CV Detects	0.743	0.527	1.151	1.187
Distribution	Gamma	Normal	Approximate Lognormal	Approximate Lognormal
95% UCL	10.7	8.0	0.065	0.059
UCL Method	95% KM Approx. Gamma	95% KM (t)	KM H-UCL	KM H-UCL

CV = coefficient of variation, mg/kg = milligram per kilogram, SD = standard deviation, UCL = upper confidence limit, KM = Kaplan-Meier

We performed Wilcoxon-Mann-Whitney (WMW) and Gehan tests to compare the central tendency of the unculled data set to the culled data set for the northern Background Area. The tests concluded that the central tendency of the unculled data set was not significantly higher than the central tendency of the culled data set. Results are presented in Appendix G.

4.6.5.5 Northern Area

The Northern Area decision unit is a thin layer of tailings on the ground surface on the mineralized ridge south of the adjoining Tailing Wheels Park. Tailings and impacted soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for mineralized background locations are to be excavated from the Northern Area and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

4.6.5.6 Ridge Area

The Ridge Area decision unit is a thin layer of tailings in the road cut through the mineralized ridge between the Lakebed Area and Tailings Pile. The thin layer of tailings is likely the result of mechanical transport of the tailings from the Lakebed Area to the Cyanide Process Area and subsequently to the Tailings Pile. Tailings and impacted soil not contained within the Cyanide Process Area and with arsenic, lead, or mercury concentrations exceeding the cleanup goals for mineralized background locations are to be excavated from the Ridge Area and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

4.6.5.7 Dam Area

The Dam Area decision unit is thin layer of mine tailings (or possibly mineralized, weathered bedrock) south of the Lakebed Area dam. The photographs below depict the surface layer and underlying soil.

The surface layer shown in the photographs is underlain by red-brown native soil at a depth of 1 to 2 inches. The arsenic concentrations detected in this thin surface layer were within the range of mineralized background arsenic concentrations. The material is similar in appearance to nearby weathered bedrock (depicted in the photograph below). The removal of the thin layer of tailings and/or completely weathered, mineralized bedrock is considered appropriate so that it is not transported off-site by stormwater runoff.

Tailings / mineralized surface soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for mineralized background locations are to be excavated from the Dam Area and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.



View to north of the thin layer of tailings or completely weathered rock at the ground surface south of the dam.



Red-brown native soil (right) underlies the possible tailings layer (left) at a depth of one to two inches.



Nearby weathered bedrock south of the dam in the mineralized zone is similar in appearance and arsenic content to the thin layer of tailings (or completely weathered, mineralized bedrock) in the Dam Area decision unit.

4.6.5.8 Southeast Area

The Southeast Area decision unit, containing exploratory locations SOIL40, SOIL41, and SOIL42, is near the southeastern corner of the site, southeast of the Lakebed Area in the mineralized area. A total of 37 surface and subsurface soil samples were previously obtained from this area by others.

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Mercury (mg/kg)
HA-90-0.5	02/13/09	Arcadis 2009	0.5	68	na
22S002	Nov-09	DTSC 2011	Surface	51	1.4
22S004	Nov-09	DTSC 2011	Surface	140	3.3
22S006	Nov-09	DTSC 2011	Surface	240	4.4
SOIL40-1	05/15/08	USEPA 2008	0.0-0.5	81.2	2.8
SOIL41-1	05/15/08	USEPA 2008	0.0-0.5	76.1	1.8
SOIL42-1	05/15/08	USEPA 2008	0.0-0.5	80.4	1.10
SOIL43-1	05/15/08	USEPA 2008	0.0-0.5	55.4	0.74
SOIL45-1	05/15/08	USEPA 2008	0.0-0.5	57.3	0.49

mg/kg = milligram per kilogram, na = not analyzed

The arsenic concentrations in surface soil in the Southeast Area, and the co-located mercury concentrations presented in the table above, suggest anthropogenic surface impact. Impacted near-surface soil that is not representative of mineralized background is to be excavated from the Northeast Area and placed as engineered fill in the Tailings Pile.

Arsenic concentrations detected in surface soil in this area range up to 240 mg/kg and therefore may be influenced by past industrial site use (i.e., heavy meals associated with mining waste). The transport mechanism is not known. The Southeast Area is a relatively undisturbed south-facing slope that is cross-gradient to (not downslope from) the Lakebed Area, and therefore historical alluvial transport of tailings from the Lakebed Area to the Southeast Area is not expected. Although little if any aerial dispersion of mine tailings from the Lakebed Aera to the adjoining Background Area is evident, the possibility of historical aerial dispersion from the Lakebed Area to the Southeast Area cannot be ruled out.

Subsurface conditions in the Southeast Area are typified by relatively undisturbed native soil underlain at shallow depth by weathered metasedimentary bedrock, as depicted in the photographs below. Arsenic concentrations detected in subsurface soil and weathered rock range up to 59 mg/kg and appear to originate from natural mineralization. Based on the relatively shallow native soil profile underlain by weathered bedrock, we anticipate that the depth of excavation will typically be less than one foot. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of the additional investigation, and the refined excavation limits, are to be presented in the RDIP.



View to the northeast of a road cut through the Southeast Area.



View to the north of weathered bedrock exposed in the road cut.



View to the north of weathered bedrock exposed in the road cut.



Weathered bedrock at the ground surface in the Southeast Area.

4.6.5.9 Lakebed Track Out Area

"Track out" of tailings is evident along the road and trails extending uphill from the Lakebed Area (Sheet 3). Tailings and impacted soil with arsenic, lead, or mercury concentrations exceeding the cleanup goals for mineralized background locations are to be excavated from the hot spot Lakebed Track Out Area and placed as engineered fill in the Tailings Pile. Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

4.6.5.10 Western Area and Southern Area

The Western Area and Southern Area decision units are between the toe of the Tailings Pile and the site boundary in non-mineralized areas. Both decision units are downslope of the Tailings Pile and contain tailings. Arsenic and mercury concentrations are summarized in the following table.

Sample ID	**Sample Date**	**Data Source**	**Sample Depth** (feet)	**Arsenic** (mg/kg)	**Mercury** (mg/kg)
TP-02-0.5	08/23/90	D&M 1995	0.5	35	1.2
TP-03-4.0	08/23/90	D&M 1995	4.0	38	<0.1
HA-1-0.5	02/09/09	Arcadis 2009	0.5	8.2	na
HA-2-0.5	02/09/09	Arcadis 2009	0.5	59	na
HA-3-0.5	02/09/09	Arcadis 2009	0.5	19	na
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	0.5	19	na

Sample ID	Sample Date	Data Source	Sample Depth (feet)	Arsenic (mg/kg)	Mercury (mg/kg)
HA-4-0.5	02/09/09	Arcadis 2009	0.5	11	na
HA-5-0.5	02/09/09	Arcadis 2009	0.5	13	na
HA-6-0.5	02/09/09	Arcadis 2009	0.5	11	na
HA-7-0.5	02/09/09	Arcadis 2009	0.5	46	na
HA-8-0.5	02/09/09	Arcadis 2009	0.5	28	na

mg/kg = milligram per kilogram, na = not analyzed

The Western Area and Southern Area are to be included in the Tailings Pile Land Use Covenant (LUC) and will be subject to an Operation and Maintenance (O&M) Agreement and Soil Management Plan (SMP) to restrict unauthorized disturbance.

5.0 RISK ASSESSMENT

This section presents an updated human and ecological risk assessment and water quality evaluation. Data tables and calculations are in Appendix H.

5.1 Human Health Risk Assessment

The HHRA performed by D&M (1995) is updated herein based on current toxicological criteria and using validated site characterization data from the following sources:

- EA, D&M, 1995;
- TBA, USEPA, 2008;
- TSI, Arcadis, 2009;
- Community Wide Assessment Report, DTSC, 2011;
- Groundwater Seep Evaluation, Geocon, 2017; and
- Supplemental Site Investigation, Geocon, 2023.

We performed the risk assessment in general accordance with the guidance documents available at HERO's HHRA website (https://dtsc.ca.gov/human-health-risk-hero/).

5.1.1 Exposure Pathways and Media of Concern

The CSM is described in Section 4, and a CSM diagram is presented as Figure 5. Exposure media for the site are soil, air, and water. Exposure pathways are incidental ingestion and dermal contact with the affected soil, inhalation of airborne particulates and volatile mercury originating from impacted soil, ingestion of water, and dermal contact with water. Water quality is further evaluated in Section 5.3.

5.1.2 Exposure Concentrations and Chemical Groups

The site is impacted by inorganics (metals, metalloids, cyanide) associated with mining waste. Exposure point concentrations (EPC) are generally represented by a reasonable maximum exposure (RME) concentration using the 95% UCL of the arithmetic mean COC concentration. When UCL calculations are not possible based on a limited number of detections, the maximum detected concentration is used as the EPC.

An authoritative rather than random soil sampling approach was employed for the remedial site investigation in order to address data gaps identified in the previous site investigation results. Investigative locations are presented on Sheet 2.

5.1.3 Contaminants of Concern

COCs in tailings and impacted soil include arsenic, cadmium, lead, mercury, molybdenum, selenium, and cyanide. No other COCs have been identified. COCs and EPCs are identified for each assessment area in Appendix H, Tables 1a through 1d. Details are presented in Sections 4.5 and 4.6. COCs are listed below by assessment area.

- Lakebed Area: arsenic, lead, mercury, molybdenum, and selenium
- Tailings Pile: arsenic, cadmium, lead, mercury, molybdenum, and cyanide
- Cyanide Process Area: arsenic, lead, mercury, and molybdenum

No COCs are identified for the Bellwether Mine waste rock. Arsenic, cadmium, lead, and mercury are not COCs because they occur in the Bellwether Mine waste rock at concentrations similar to those detected in the naturally mineralized soil and bedrock on the mineralized ridge, where the waste rock piles are located and from which they were excavated. Molybdenum, selenium, and cyanide were not detected in Bellwether Mine waste rock.

Water at the site includes groundwater, groundwater seepage from the toe of the Tailings Pile, and seasonal surface water in the Lakebed Area. COCs and EPCs for water are identified in Appendix H, Table 1e. Arsenic, lead, and cyanide were identified as COCs for water by comparison of site water concentrations to background water concentrations for COCs identified in site soil. Iron and manganese are also considered COCs for water although they are not soil COCs. The EPCs for water are maximum detected concentrations.

At seep locations S-2 and S-3, downgradient of the Tailings Pile, maximum detected concentrations were commonly detected in unfiltered samples, suggesting that the maximum detections include suspended sediment. Total and filtered groundwater seep data are described below for selected constituents.

- Arsenic was detected in unfiltered groundwater seep samples collected at location S-2 at concentrations of 0.0077 to 0.820 mg/l, but arsenic was not detected in a filtered sample collected at location S-2. Arsenic was detected in one unfiltered sample collected at location S-3 at a concentration of 0.0086 mg/l. The arsenic detections at S-2 and S-3 appear to be related to suspended sediment rather than dissolved arsenic.
- Mercury was detected in one unfiltered groundwater seep sample from S-2 at 0.00039 mg/l but was not detected in the duplicate sample nor in filtered water samples. The anomalous detection of mercury in the unfiltered sample is believed to be associated with suspended sediment in the groundwater seep sample. Mercury was not detected in groundwater or surface water and is not considered a COC for water.
- Iron was detected in unfiltered groundwater seep samples at concentrations of 12 and 0.860 mg/l, which exceeded those in the filtered samples of 0.360 and 0.140 mg/l.

5.1.4 Assessment Areas

This risk assessment addresses the following areas, which are described in Section 2.0.

Assessment Area	Description
Lakebed Area	Central southern portion of the site, former tailings impoundment comprising approximately 16 acres at the historical high-water line and containing seasonal surface water and a marshy wetland. Historically stored over 1 million tons of mine tailings (sand and silt) resulting from gold ore extraction (stamp milling and mercury amalgamation) performed off-site at the historical Kennedy Mine north of the site. Currently contains approximately 250,000 cubic yards of tailings.
Cyanide Process Area	Located on the north-south ridge through the central portion of the site, west of the Lakebed Area and east of the Tailings Pile. Approximately one million cubic yards of tailings from the Lakebed Area were processed in this area to extract additional gold from the tailings.
Tailings Pile	Southwestern portion of the site, approximately 29 acres. Land disposal area for the approximately one million cubic yards of tailings processed in the cyanide plant.

The Lakebed Area and the Tailings Pile are located in areas of non-mineralized background, while the Cyanide Process Area is located on a ridge characterized by naturally mineralized soil and bedrock.

5.1.5 Exposure Parameters

Unrestricted (residential) land use is evaluated, although residential land use is not proposed. Recreational, industrial, commercial indoor, and construction worker exposure are also evaluated.

5.1.5.1 Residential Land Use

Exposure to Soil and Soil Dust

Exposure parameters for residential land use are adopted from the *PEA Guidance Manual* (DTSC, 2015) as updated by *HERO HHRA Note No. 1* (DTSC, 2019) and *Note No. 10* (DTSC, 2019), pursuant to guidance presented in *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual* (RAGS Part E, Supplemental Guidance for Dermal Risk Assessment; USEPA, OSWER 9285.7-02EP; 2004) and *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA, OSWER 9355.4-24; 2002). Exposure parameters are summarized below:

- Exposure frequency is 350 days per year.
- Body weight is 15 kilograms (kg) for child and 80 kg for adult.
- The incidental soil ingestion rate is 200 milligrams per day (mg/day) for child and 100 mg/day for adult. Pica is not considered.
- The inhalation rate is 10 cubic meters per day (m^3/day) for child and 20 m^3/day for adult.
- Averaging time is 70 years for carcinogenic effects.

- Exposure duration for children is 6 years. Exposure duration for adults is 20 years. Averaging time for non-carcinogenic effects is equal to the exposure duration.
- Exposed skin surface area is 2,373 square centimeters (cm^2) for children and 6,032 cm^2 for adults.
- The dermal adherence factor is 0.2 milligrams per square centimeter (mg/cm^2) for children and 0.07 mg/cm^2 for adults.
- The particulate emission factor (PEF) is 1.36 x 10^9 cubic meters per kilogram (m^3/kg).

Exposure to Water

The assessment evaluates baseline conditions for water pathways related to groundwater, groundwater seepage, and surface water. Additional exposure parameters for unrestricted land use related to water pathways include:

- Exposure time during bathing is 0.54 hr/day for children and 0.71 hr/day for adults.
- The water ingestion rate is 0.78 liters per day (l/day) for children and 2.5 l/day for adults.
- Skin surface area available for water contact is 6,365 cm^2 for children and 19,652 cm^2 for adults.

5.1.5.2 Industrial Land Use

Exposure parameters for industrial land use are adopted from HERO HHRA Note No. 1 (DTSC, 2019):

- Adult exposure is considered.
- Exposure frequency is 250 days per year.
- Body weight is 80 kg.
- The incidental soil ingestion rate is 100 mg/day.
- The inhalation rate is 14 m^3/day.
- Averaging time is 70 years for carcinogenic effects.
- Exposure duration is 25 years.
- Averaging time for non-carcinogenic effects is equal to the exposure duration.
- Exposed skin surface area is 6,032 cm^2.
- Dermal adherence factor is 0.2 mg/cm^2.
- PEF is 1.36 x 109 m^3/kg.

5.1.5.3 Commercial Indoor Worker

Exposure parameters for the commercial indoor worker are adopted from *Risk Assessment Guidance for Superfund* (RAGS; USEPA, 2004) and *Supplemental Guidance* (USEPA, 2002), and are identical to the parameters set forth above for industrial land use, with the following exceptions:

- Incidental soil ingestion rate is 50 mg/day instead of 100 mg/day.
- Exposed skin surface area is 3,300 cm^2 instead of 6,032 cm^2.

5.1.5.4 Adult Recreational Trail Runner

Exposure parameters for a "recreational runner" scenario were set forth by the DTSC's HERO (formerly known as the Human and Ecological Risk Division) in the memorandum *Remediation Goals for the Recreational Runner on Trails, Empire Mine State Historical Park (EMSHP), Grass Valley* (September 29, 2006). The memorandum, presented in Appendix H, describes the exposure parameters.

In 2006, the DTSC observed recreational use patterns on trails within the EMSHP and determined that the runner who routinely uses the trails would likely have the highest chronic exposure to contaminants in the soil based on the extent of heavy physical activity involved in running compared to the other observed uses of the trails. Because the subject site is smaller than the EMSHP and potential future trail segments through the site would typically be shorter than those at the EMSHP, this appears to be a conservative exposure scenario with respect to adult recreational trail use of the site.

The DTSC (2006) calculated a remedial goal for arsenic in soil on trails at the EMSHP of 270 mg/kg, determining that the consideration of arsenic as a threshold toxicant, rather than as a carcinogen, is appropriate and health protective of the recreational runner due to the short time duration of trail use. The remedial goal corresponded to a hazard quotient of one and a risk within the range of one-per million and one-per-ten-thousand, considering that complete exposure pathways exist for inhalation, ingestion and dermal contact. The exposure scenario is evaluated herein based on current toxicological values (Appendix H, Tables 7a through 7d). Exposure parameters are summarized below:

- Adult exposure is considered.
- Exposure frequency is 200 days per year.
- Exposure time is 1 hour per day.
- Exposure duration is 30 years.
- Body weight is 70 kg.
- The incidental soil ingestion rate is 3 mg/hr x 1 hr/day = 3 mg/day.
- The inhalation rate is 3.9 m^3/hr x 1 hr/day = 3.9 m^3/day.
- Averaging time is 70 years for carcinogenic effects.
- Averaging time for non-carcinogenic effects is equal to the exposure duration.
- Exposed skin surface area is 5,700 cm^2.
- Dermal adherence factor is 0.2 mg/cm^2.
- PEF is 1.0 x 10^6 m^3/kg.

5.1.5.5 Child and Adult Recreational Use

Exposure parameters for child and adult recreational use are based on our correspondence with HERO during the DTSC's review of the Draft RAP.

- Child and adult exposure are considered.
- Exposure frequency is 12 days per year.
- Exposure duration is 6 years for child and 24 years for adult.
- Body weight is 15 kg for child and 80 kg for adult.
- Incidental soil ingestion rate is 200 mg/day for child and 100 mg/day for adult.
- Inhalation rate is 10 m^3/day for child and 20 m^3/day for adult.
- Averaging time is 70 years (25,550 days) for carcinogenic effects.
- Averaging time for non-carcinogenic effects is equal to the exposure duration.
- Exposed skin surface area is 2,373 cm^2 for child and 6,032 cm^2 for adult.
- Dermal adherence factor is 0.2 mg/cm^2.
- PEF is 1.36 x 10^9 m^3/kg.

5.1.5.6 Recreational Wading

Exposure parameters for recreational wading are based on our correspondence with HERO during the DTSC's review of the Draft RAP.

- Adolescent exposure is considered.
- Exposure frequency is 26 days per year (half of the typical 52 days per year because the Lakebed Area retains water only during the winter).
- Exposure duration is 12 years (4,380 days).
- Exposure time is 2 hours per day.
- Incidental water ingestion rate is 0.137 liters per event.
- Body weight is 44.3 kg.
- Body surface area exposed to wading in surface water is 9,800 cm^2.
- Averaging time is 70 years (25,550 days) for carcinogenic effects.
- Averaging time for non-carcinogenic effects is equal to the exposure duration.

5.1.5.7 Construction Worker

Exposure parameters for the construction worker are adopted from HERO HHRA Note No. 1 (DTSC, 2019). Considering the expected duration of the cleanup (approximately six months), the default exposure duration (one year) used in this scenario is conservative.

- Adult exposure is considered.
- Exposure duration is one year.
- Exposure frequency is 250 days per year.
- Body weight is 80 kg.

- Incidental soil ingestion rate is 330 mg/day.
- Inhalation rate is 20 m^3/day for an eight-hour workday.
- Averaging time is 70 years for carcinogenic effects.
- Averaging time for non-carcinogenic effects is equal to the exposure duration.
- Exposed skin surface area is 6,032 cm^2.
- Dermal adherence factor is 0.08 mg/cm^2.
- PEF is 1.0 x 106 m^3/kg.

5.1.6 Toxicity Values

Toxicity values and references are listed in Appendix H, Table 2. The assessment uses the specific toxicity criteria listed in Appendix I of the TCR, pursuant to the *Hazardous Substances Account Act* (California HSC §25300 et seq., Chapter 6.8 and CCR §69021).

5.1.7 Risk Characterization for Soil Pathways

Exposure to Soil and Soil Dust

Risk and hazard calculations for soil and soil dust are performed using the following equations for non-volatile constituents. Calculations are summarized in Appendix H.

$$Risk_{soil} = SF_o \times C_s \times [((IR_{s,child} \times EF \times ED_{child} \times 10^{-6} \text{ kg/mg}) / (BW_{child} \times AT \times 365 \text{ days/yr})) + ((SA_{child} \times AF \times ABS \times EF_{child} \times ED_{child} \times 10^{-6} \text{ kg/mg}) / (BW_{child} \times AT \times 365 \text{ days/yr})) + ((IR_{s,adult} \times EF \times ED_{adult} \times 10^{-6} \text{ kg/mg}) / (BW_{adult} \times AT \times 365 \text{ days/yr})) + ((SA_{adult} \times AF \times ABS \times EF_{adult} \times ED_{adult} \times 10^{-6} \text{ kg/mg}) / (BW_{adult} \times AT \times 365 \text{ days/yr}))]$$

$$Hazard_{soil} = (C_s / RfD_o) \times [((IR_s \times EF \times ED \times 10^{-6} \text{ kg/mg}) / (BW \times AT \times 356 \text{ days/yr})) + ((SA \times AF \times ABS \times EF \times ED \times 10^{-6} \text{ kg/mg}) / (BW \times AT \times 365 \text{ days/yr}))]$$

$$Risk_{air} = SF_i \times C_a \times [((IR_{child} \times EF \times ED_{child}) / (BW_{child} \times AT \times 365 \text{ days/yr})) + ((IR_{adult} \times EF \times ED_{adult}) / (BW_{adult} \times AT \times 365 \text{ days/yr}))]$$

$$Hazard_{air} = (C_a / RfD_i) \times (IR \times EF \times ED) / (BW \times AT \times 365 \text{ days/yr})$$

Where:

ABS = absorption fraction of chemical from soil

AT = averaging time, years

AF = soil to skin adherence factor, mg/cm^2

BW = body weight, kg

C_a = concentration in air, mg/m^3 ($C_a = C_s / PEF$)

C_s = concentration in soil, mg/kg

ED = exposure duration, years

EF = exposure frequency

PEF = particulate emission factor, m^3/kg

$Hazard_{air}$ = non-cancer chronic health hazard for air pathways

$Hazard_{soil}$ = non-cancer chronic health hazard for soil pathways

IR_a = inhalation rate, m^3/day

IR_s = incidental soil ingestion rate, mg/day

SA = exposed skin surface area, cm^2

SF_i = inhalation cancer slope factor, $(mg/kg\text{-}day)^{-1}$

SF_o = oral cancer slope factor, $(mg/kg\text{-}day)^{-1}$

RfD_i = inhalation reference dose, mg/kg-day

RfD_o = oral reference dose, mg/kg-day

$Risk_{air}$ = lifetime excess cancer risk for air pathways

$Risk_{soil}$ = lifetime excess cancer risk for soil pathways

Pursuant to *HHRA Note No. 3* and *HHRA Note No. 6*, an RBA factor (0.6) is used for ingestion of soil-borne arsenic unless specific RBA data are available. This assessment employs the following average RBA values as determined in Section 4.3.9.

Medium	**Average RBA** (%)
Background soil, non-mineralized	15.5
Background soil, naturally mineralized	18
Naturally mineralized bedrock	7.7
Tailings	21.3
Cyanide Process Area Soil and Rock	23

Exposure to Volatile Constituents in Soil

For volatile constituents (i.e., mercury) in soil, the following methodology is used to assess chronic health hazard related to air pathways as previously described in HERO *HHRA Note No. 3*.

$$Hazard_{air} = (C_a / RfC_i) \times (EF_i \times ED \times ET) / (AT_{nc} \times 24\ hr/day \times 365\ day/yr)$$

Where:

RfC_i = reference concentration for inhalation exposure, mg/m^3 (mercury RfCi = 3.0E-05 mg/m^3 as established by the California Office of Environmental Health Hazard Assessment [OEHHA])

AT_{nc} = averaging time for non-carcinogenic effects, years

C_a = concentration in air, mg/m^3 ($C_a = C_s / VF$)

VF = volatilization factor for soil, m^3/kg, as established by DTSC (2016) Table A-5 ($VF_{resident}$ = 3.52E+04 m^3/kg; VF_{worker} = 3.52E+04 m^3/kg)

C_s = concentration in soil, mg/kg

EF_i = exposure frequency for inhalation pathway, days/yr

ED = exposure duration, years

ET = exposure time, hr/day (24 hr/day for resident and 8 hr/day for worker)

5.1.7.1 Background Soil Arsenic Concentrations

For the purposes of risk communication, this assessment estimates the risk (and hazard) associated with site-specific background soil arsenic concentrations, which are evaluated in Section 4.5 and are summarized below.

Medium	95% UCL[1] (mg/kg)	BTV[1] (mg/kg)	Maximum Detected Concentration[2] (mg/kg)
Background soil and weathered bedrock, non-mineralized	8.55	20.7	46.9
Background soil and weathered bedrock, naturally mineralized	52.3	120	1,300

1 For culled background datasets without outliers; 2 Including outlying values; BTV = background threshold value; mg/kg = milligram per kilogram; UCL = upper confidence limit on the mean

Hazard and risk associated with the UCL and BTV for mineralized and non-mineralized background arsenic concentrations under the unrestricted land use scenario are summarized in the following table.

Exposure Point Concentration	Non-Mineralized Background UCL	Non-Mineralized Background BTV	Mineralized Background UCL	Mineralized Background BTV
Soil arsenic concentration (mg/kg)	8.55	20.7	52.3	120
RBA (%)	15.5	15.5	18	18
Excess lifetime cancer risk	3.8E-05	9.2E-05	2.5E-04	5.6E-04
Non-cancer hazard index	7.1	17	48	110

BTV = background threshold value; mg/kg = milligram per kilogram; UCL = upper confidence limit on the mean. UCL and BTV are based on culled background datasets without outliers.

In the tables below, background risk and hazard are compared to the risk and hazard due to contamination at the site under the unrestricted land use scenario. The "excess risk" values listed in the table below are equal to the site risk minus the background risk (central tendency values).

Lakebed Area	All COCs	Non-Mineralized Background Arsenic, UCL	Excess Risk/ Hazard
Excess lifetime cancer risk	6.3E-04	3.8E-05	5.9E-04
Non-cancer hazard index	132	7.1	125

Tailings Pile	All COCs	Non-Mineralized Background Arsenic, UCL	Excess Risk/ Hazard
Excess lifetime cancer risk	6.3E-04	3.8E-05	5.9E-04
Non-cancer hazard index	133	7.1	126

Cyanide Process Area	All COCs	Mineralized Background Arsenic, UCL	Excess Risk/ Hazard
Excess lifetime cancer risk	9.6E-04	2.5E-04	7.1E-04
Non-cancer hazard index	204	48	156

All COCs = Risk and hazard resulting from all COCs for the assessment area based on 95% UCL values
Background = Risk and hazard resulting from 95% UCL for background soil arsenic
Excess Risk/Hazard = Site Risk/Hazard – Background Risk/Hazard

5.1.7.2 Residential Land Use

Constituents of Concern, Unrestricted Land Use

Human health risk and hazard under the standard unrestricted land use (residential) exposure scenario are characterized for COCs in Appendix H, Tables 3a through 3c. The chronic health hazard index (hazard, or HI) exceeds unity, and the lifetime excess cancer risk (risk) exceeds one-per-million for the Lakebed Area, Tailings Pile, and Cyanide Process Area. Arsenic is the primary contributor to hazard and risk. Mercury also presents hazard quotients greater than 1.0 for the Lakebed Area and Tailings Pile. Lead is evaluated separately (Section 5.1.8).

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	6.3E-04	0	6.3E-04
Non-cancer hazard index	132	2.4	130

Tailings Pile	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	6.3E-04	2.1E-09	6.3E-04
Non-cancer hazard index	133	3.4	130

Cyanide Process Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	9.6E-04	0	9.6E-04
Non-cancer hazard index	204	0.43	203

All Detected Chemicals, Including Ambient Range

Appendix H, Tables 4a through 4c, summarize hazard and risk for all detected chemicals, including ambient metals concentrations. Pursuant to guidelines set forth in *HHRA Note No. 4* (DTSC, 2019), hazard and risk are calculated considering exposure to all detected chemicals, including those that are determined to be consistent with site-specific background or ambient concentrations. This information is intended to be useful for risk management decisions and to foster public transparency.

Lakebed Area	All Detected Chemicals	All Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	6.3E-04	4.5E-08	6.3E-04
Non-cancer hazard index	133	3.9	129

Tailings Pile	All Detected Chemicals	All Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	6.3E-04	4.5E-08	6.3E-04
Non-cancer hazard index	134	4.2	130

Cyanide Process Area	All Detected Chemicals	All Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	9.6E-04	1.9E-07	9.6E-04
Non-cancer hazard index	207	3.7	203

The hazard index and cumulative risk are not significantly changed by inclusion of all detected chemicals. Arsenic remains the primary contributor to hazard and risk, and the COC mercury also contributes to hazard in the Lakebed Area and Tailings Pile. Ambient concentrations of cadmium, cobalt, thallium, and vanadium present hazard quotients between 0.1 and 1.0. Ambient concentrations of cobalt in naturally mineralized background present a hazard quotient between 1.0 and 2.0.

5.1.7.3 Industrial Land Use

Human health hazard and risk are characterized under an industrial land use scenario in Appendix H, Tables 5a through 5c. Results are summarized below.

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	2.1E-04	0	2.1E-04
Non-cancer hazard index	18	0.5	18

Tailings Pile	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	2.1E-04	7.3E-10	2.1E-04
Non-cancer hazard index	18	0.7	18

Cyanide Process Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	3.2E-04	0	3.2E-04
Non-cancer hazard index	27	0.1	27

Arsenic remains the primary contributor to hazard and risk. Other COCs do not contribute significantly to risk or hazard under the industrial land use scenario.

5.1.7.4 Commercial Indoor Worker

Human health hazard and risk are characterized under a commercial indoor worker scenario in Appendix H, Tables 6a through 6c. Results are summarized below.

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	1.1E-04	0	1.1E-04
Non-cancer hazard index	9.8	0.5	9.3

Tailings Pile	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	1.1E-04	7.3E-10	1.1E-04
Non-cancer hazard index	10	0.7	9

Cyanide Process Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	1.7E-04	0	1.7E-04
Non-cancer hazard index	14	0.1	14

Arsenic remains the primary contributor to hazard and risk. Other COCs do not contribute significantly to risk or hazard under the indoor commercial scenario.

5.1.7.5 Adult Recreational Trail Runner

Human health hazard and risk are characterized under an adult recreational trail runner scenario in Appendix H, Tables 7a through 7d. Results are summarized below.

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	4.4E-05	0	4.4E-05
Non-cancer hazard index	2.2	0.1	2.2

Tailings Pile	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	4.5E-05	3.0E-07	4.4E-05
Non-cancer hazard index	2.2	0.1	2.2

Cyanide Process Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	6.6E-05	0	6.6E-05
Non-cancer hazard index	3.2	0.01	3.2

Arsenic remains the primary contributor to hazard and risk. Other COCs do not contribute significantly to risk or hazard under the adult recreational trail runner scenario.

The adult recreational trail runner scenario is potentially applicable to proposed trails in the Western Area and Southern Area adjacent to the toe of the Tailings Pile. Table 2a lists soil metals data for the Western Area and Southern Area. Table 7d presents risk and hazard for the Western Area and Southern Area under the adult recreational runner scenario. The EPCs include a UCL for arsenic (39.8 mg/kg) and maximum detected concentrations for other COCs. Exposure parameters and the site-specific RBA for ingestion of soil-borne arsenic (21.3%) are listed in Table 7d of Appendix H.

Western Area and Southern Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	1.4E-05	2.1E-07	1.4E-05
Non-cancer hazard index	0.7	0.04	0.7

The adult recreational trail runner scenario results in a hazard index less than one and a risk of 1.4E-05, which is within the risk management zone (1E-06 to 1E-04). Arsenic drives hazard and risk, and other COCs, including mercury, do not contribute significantly. A mercury input value equal to the screening level for commercial/industrial land use (4.4 mg/kg) yields a hazard quotient of 0.1.

5.1.7.6 Child and Adult Recreational Use

Human health hazard and risk are characterized for child and adult recreational use in Appendix H, Tables 7e through 7h. Results are summarized below.

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	2.5E-05	0	2.5E-05
Non-cancer hazard index	4.5	0.01	4.5

Tailings Pile	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	2.5E-05	8.1E-11	2.5E-05
Non-cancer hazard index	4.6	0.1	4.4

Cyanide Process Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	3.8E-05	0	3.8E-05
Non-cancer hazard index	7.0	0.02	7.0

Arsenic remains the primary contributor to hazard and risk. Other COCs do not contribute significantly to risk or hazard under the child and adult recreational use scenario. Under this scenario, an arsenic concentration of 5.1 mg/kg yields a risk of one-per-million. The non-mineralized BTV for arsenic is 20.7 mg/kg.

The child and adult recreational scenario is potentially applicable to the Western Area and Southern Area adjacent to the toe of the Tailings Pile. Table 2a lists soil metals data for the Western Area and Southern Area. Table 7h presents risk and hazard for the Western Area and Southern Area under the child and adult recreational scenario. The EPCs include a UCL for arsenic (39.8 mg/kg) and maximum detected concentrations for other COCs. Exposure parameters and the site-specific RBA for ingestion of soil-borne arsenic (21.3%) are listed in Table 7h of Appendix H.

Western Area and Southern Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	7.9E-06	5.5E-07	7.9E-06
Non-cancer hazard index	1.1	0.04	1.0

Therefore, risk exceeds one-per-million and hazard exceeds unity under this recreational use scenario for Western Area and Southern Area based on the arsenic UCL of 39.8 mg/kg. The child and adult recreational use scenario results in a hazard index of 1.1 a risk of 7.9E-06, which is within the risk management zone (1E-06 to 1E-04). Arsenic drives hazard and risk, and other COCs, including mercury, do not contribute significantly. A mercury input value equal to the screening level for commercial/ industrial land use (4.4 mg/kg) yields a hazard quotient of 0.15.

5.1.7.7 Construction Worker

Human health hazard and risk are characterized under a construction worker scenario in Appendix H, Tables 8a through 8c. Results are summarized below.

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	3.6E-05	0	3.6E-05
Non-cancer hazard index	72	0.6	71
Tailings Pile	**All COCs**	**COCs Excluding Arsenic**	**Arsenic Only**
Excess lifetime cancer risk	3.7E-05	5.7E-08	3.7E-05
Non-cancer hazard index	72	0.91	72

Cyanide Process Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	5.5E-05	0	5.5E-05
Non-cancer hazard index	108	0.1	108

Arsenic remains the primary contributor to hazard and risk. Other COCs do not contribute significantly to risk or hazard under the construction worker scenario.

5.1.8 Lead Hazard Assessment

Lead hazards were assessed using the *Lead Risk Assessment Spreadsheet Version 9* (LeadSpread 9; DTSC, 2022) for child and adult exposure. Calculations were performed using standard exposure parameters and both the EPC concentrations (95% UCL concentrations) and the maximum detected concentrations listed in Appendix H, Tables 1a through 1c. Results are presented in Appendix H, Tables 9a through 9f, and are summarized below.

Assessment Area	95% UCL Lead Concentration			Maximum Detected Lead Concentration		
	EPC (mg/kg)	Child[1]	Adult[2]	EPC (mg/kg)	Child[1]	Adult[2]
Lakebed Area	33.4	0.5	0.1	102	1.5	0.3
Tailings Pile	50.5	0.7	0.2	400	5.7	1.2
Cyanide Process Area	33.0	0.5	0.1	72	1.0	0.2

1 90th percentile estimate of blood lead (ug/dl) for non-pica child based on 95% UCL
2 90th percentile estimate of blood lead (ug/dl) for adult worker based on 95% UCL
3 90th percentile estimate of blood lead (ug/dl) for non-pica child based on maximum detection
4 90th percentile estimate of blood lead (ug/dl) for adult worker based on maximum detection
EPC = exposure point concentration; UCL = upper confidence limit on the arithmetic mean soil lead detection (mg/kg); mg/kg = milligram per kilogram; ug/dl = microgram per deciliter

As summarized in the table above, the maximum detected lead concentrations for the Lakebed Area and Tailings Pile are not suitable for unrestricted land use. The baseline central-tendency lead concentrations for all assessment areas, and the maximum detected lead concentration for the Cyanide Process Area, are below 80 mg/kg.

5.1.9 Risk Characterization for Water Pathways

Exposure to Non-Volatile Constituents in Water

Risk and hazard calculations for water are performed using the following equations for non-volatile constituents. Calculations are summarized in Appendix H.

$Risk_{water} = SF_o \times C_w \times [((IR_{w,child} \times EF \times ED_{child}) / (BW_{child} \times AT \times 365 \text{ days/yr})) + ((SA_{child} \times K_p \times ET \times EF_{child} \times ED_{child} \times 10^{-3} \text{ liters/cm}^3) / (BW_{child} \times AT \times 365 \text{ days/yr})) + ((IR_{w,adult} \times EF \times ED_{adult}) / (BW_{adult} \times AT \times 365 \text{ days/yr})) + ((SA_{adult} \times K_p \times ET \times EF_{adult} \times ED_{adult} \times 10^{-3} \text{ liters/cm}^3) / (BW_{adult} \times AT \times 365 \text{ days/yr}))]$

$Hazard_{water} = (C_w / RfD_o) \times [(IR_w \times EF \times ED_{child}) / (BW_{child} \times AT \times 365 \text{ days/yr}) + (SA \times K_p \times ET \times EF \times ED_{child} \times 10^{-3} \text{ liters/cm}^3) / (BW_{child} \times AT \times 365 \text{ days/yr})$

Where:

AT = averaging time, years

BW = body weight, kg

C_w = concentration in water, mg/l

ED = exposure duration, years

EF = exposure frequency, days/year

ET = exposure time during bathing, hr/day

K_p = chemical-specific dermal permeability coefficient from water, cm/hr

$Hazard_{water}$ = non-cancer chronic health hazard for water pathways

IR_w = water ingestion rate, liters/day

SA = skin surface area available for contact, cm^2

SF_o = oral cancer slope factor, $(mg/kg\text{-}day)^{-1}$

RfD_o = oral reference dose, mg/kg-day

$Risk_{water}$ = lifetime excess cancer risk for water pathways

Exposure to Volatile Constituents in Water

For volatile constituents (i.e., mercury) in water, chronic health hazard related to air pathways typically must be assessed. No volatile COCs were identified in water at the site; therefore, air pathways related to water are not quantified.

5.1.9.1 Unrestricted Water Use

Human health risk and hazard for water pathways are evaluated under the standard unrestricted land use (residential) exposure scenario in Appendix H, Tables 10a through 10c. COCs (arsenic, lead, iron, manganese, and cyanide) for groundwater, groundwater seeps, and surface water are identified Appendix H, Table 1e. The maximum detected concentrations of arsenic, iron, manganese, and cyanide in groundwater, groundwater seeps, and surface water downgradient of the Tailings Pile present a risk

and hazard that are not acceptable for unrestricted (residential) use. Additionally, the maximum detected concentration of arsenic in seasonal surface water in the Lakebed Area is not acceptable for unrestricted use. Further assessment of water quality is presented in Section 5.3.

5.1.9.2 Recreational Surface Water Wading

Human health hazard and risk are characterized for recreational surface water wading in Appendix H, Table 10d. Exposure parameters were provided by HERO (see Section 1.5.2.2). The exposure frequency (26 days per year) is equal to half of the typical value recommended by HERO because the Lakebed Area retains water only seasonally. Results are summarized below.

Lakebed Area	All COCs	COCs Excluding Arsenic	Arsenic Only
Excess lifetime cancer risk	4.1E-06	0	4.1E-06
Non-cancer hazard index	0.9	0.2	0.7

Arsenic remains the primary contributor to hazard and risk. Other COCs do not contribute significantly to risk or hazard under the recreational wading scenario. The risk under this wading scenario exceeds one-per-million based on the arsenic EPC of 10 µg/l (which is equal to the MCL for arsenic in drinking water). As presented in Section 5.1.7.6 above, the Lakebed Area is also not suitable for use under the child and adult recreational scenario when dry.

5.1.10 Uncertainty Analysis

The OEHHA (2004) finds that "systematic, logical and informed approaches to decision making about carcinogens in the environment call for quantitative assessments, because the absence of clearly definable thresholds does not permit identification of 'safe' levels of exposure. Unfortunately, due to the frequent lack of sufficient data, assumptions have to be made in order to complete quantitative assessments of cancer risk."

Uncertainties include contaminant concentrations in site media, the amount of exposure to site media, the biological uptake of contaminants from site media, and the toxicological effects of biologically available contaminants. The uncertainties must be discussed so that the assessment does not result in a "higher degree of implied certainty in the overall assessment than is warranted" (OEHHA, 2004).

As a result of the uncertainties described below, confidence in the exposure assessment is considered low to moderate. Confidence in toxicity values range from low to high based on the data available for specific metals. The assessment uses site-specific bioavailability for soil arsenic via ingestion, which is generally lower than the 60% default value.

5.1.10.1 Sampling Uncertainty

Uncertainty related to contaminant concentrations in soil and water, as well as uncertainty related to the literature-derived exposure and toxicity parameters, contribute to the overall uncertainty of the risk assessment. Statistical analysis is performed as part of the risk assessment to develop a reasonable EPC for each COC. Confidence in a population mean and variance increases as the number of samples collected and analyzed increases. Based on the moderate number of samples and the authoritative sampling approach, confidence in the assessment is considered moderate.

5.1.10.2 Model Uncertainty

The literature-derived exposure factors and toxicity factors used in the assessment were obtained with the goal of reducing uncertainty; however, limitations of existing data pertaining to activity patterns for future site occupants, as well as health effects from metals exposure, result in model uncertainty.

5.1.10.3 Laboratory Methods and Detection Limits

The COC concentrations generally exceed the corresponding laboratory detection limits. Therefore, detection limits are not expected to be a significant source of uncertainty.

5.1.10.4 Toxicity Values

Toxicity values are listed in Appendix H, Table 2. When available, California-specific toxicity values are used to quantify risk and hazard. The California toxicity values are generally developed by OEHHA and are supported by HERO. When California toxicity values are not available, the risk assessment employs commonly-accepted federal toxicity criteria. The toxicity values are generally considered to be conservative with respect to estimation of risk and hazard.

5.1.11 Conclusions Regarding the Human Health Risk Assessment

Risk assessment findings for baseline conditions identified at each of the assessment areas are summarized in the following table.

Exposure Scenario	Unrestricted		Industrial		Commercial Indoor		Recreational Use		Construction Worker	
Assessment Area	HI>1	Risk $>10^{-6}$	HI>1	Risk $>10^{-6}$	HI>1	Risk $>10^{-6}$	HI>1	Risk $>10^{-6}$	HI>1	Risk $>10^{-6}$
Lakebed Area	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Tailings Pile	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cyanide Process Area	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bellwether Mine[1]	--	--	--	--	--	--	--	--	--	--
Groundwater	yes	yes	--	--	--	--	--	--	--	--
Groundwater Seeps	yes	yes	--	--	--	--	--	--	--	--
Surface Water	yes	yes	--	--	--	--	yes	no	--	--

1 = Risk and hazard associated with waste rock at the Bellwether Mine was not quantified because the metals concentrations detected in the waste rock were similar to those detected in the surrounding naturally mineralized soil and bedrock.
HI = Chronic health hazard index
Risk = Excess lifetime cancer risk for routine, long-term exposure
-- = Risk and hazard not quantified

The baseline central tendency COC concentrations for the Lakebed Area, Tailings Pile, and Cyanide Process Area are not suitable for unrestricted land use. In addition, engineering controls are required for worker protection if soil-disturbing activity is to take place in these areas.

Arsenic is the primary contributor to hazard and risk for all exposure scenarios. Mercury contributes significantly to hazard under the unrestricted (residential) land use scenario. For other exposure scenarios (industrial, commercial, recreational trail use, and construction worker), arsenic is the only significant contributor to hazard and risk, and other COCs do not contribute significantly. Therefore, the following background concentrations for arsenic in soil are important to the remedial design.

Benchmark Concentration for Arsenic in Soil	Value
BTV, Non-Mineralized Background	20.7 mg/kg
BTV, Mineralized Background	120 mg/kg

BTV = background threshold value; mg/kg = milligram per kilogram

The Cyanide Process Area is located on a naturally mineralized ridge that crosses the site from north to south. The maximum detected arsenic concentration in naturally mineralized soil and bedrock (1,300 mg/kg) and the BTV for arsenic in naturally mineralized soil and bedrock (120 mg/kg) are higher than the BTV for arsenic elsewhere on the site (20.7 mg/kg). Background arsenic concentrations are evaluated in Section 4.5, and risk and hazard associated with the naturally occurring background soil arsenic concentrations are described in Section 5.1.7.1.

Although the natural background concentrations of arsenic in soil and bedrock present a cancer risk and chronic health hazard, mitigation of background conditions is not required under the regulations pertaining to this assessment. In general, residential development is not recommended in areas of highly mineralized background materials, and avoidance is recommended to reduce the potential for routine, long-term exposure to the naturally mineralized materials.

The baseline central-tendency soil lead concentrations for all assessment areas are suitable for unrestricted land use, although the maximum detected soil lead concentrations in the Lakebed Area and Tailings Pile exceed 80 mg/kg. Lead also occurs at concentrations above 80 mg/kg in the isolated tailings areas that are to be excavated, transported to the Tailings Pile, and placed as engineered fill.

The maximum detected concentrations of arsenic, iron, manganese, and cyanide in groundwater, groundwater seeps, and surface water downgradient of the Tailings Pile present a risk and hazard that are not acceptable for unrestricted (residential) use. No uses of groundwater, groundwater seeps, or surface water immediately downgradient of the Tailings Pile are known. Groundwater resources will not likely be developed as a future potable water source because drinking water is supplied by the City of Jackson through the Amador Water Agency. A water distribution pipeline crosses east to west and north to south through the site.

The maximum detected concentration of arsenic in seasonal surface water in the Lakebed Area is not acceptable for residential use or routine recreational use. Access to the site is restricted by the City of Jackson, and no human uses of the seasonal surface water are known. Further assessment of water quality is presented in Section 5.3.

5.2 Ecological Risk Assessment

We performed an ecological risk assessment in general accordance with the guidance documents available at HERO's Ecological Risk Assessment website (https://dtsc.ca.gov/ecological-risk-assessment-hero/).

An Ecological Scoping Assessment is the first phase of assessment, and is intended to develop a CSM, identify contaminants and receptors of concern, and identify potential exposure pathways. Scoping-level assessment is described in *Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Part A: Overview* (DTSC, 1996). We used the results of the following scoping assessment as a basis for the predictive assessment presented in Section 5.2.7.

The predictive assessment identified potential ecological hazard related to avian insectivore (e.g., American robin) exposure to lead and mercury at the Lakebed Area, which is to remain in place under land use restrictions. The lead concentrations in tailings and soil at the Lakebed Area are similar to the naturally mineralized background lead concentrations at the site, and the baseline ecological risk assessment tends to overestimate the mercury hazard to avian insectivores as discussed in Section 5.2.8. Therefore, no remedial action is proposed to address the ecological effects of lead and mercury for mine waste remaining in place at the Lakebed Area.

5.2.1 Site Characterization

The physical setting is described in Section 2.0, the site characterization findings are presented in Section 4.0, and Section 4.2 develops the CSM. Figure 5 is a conceptual diagram depicting source media, release mechanisms, and transport mechanisms. Figure 8 is a generalized conceptual diagram for ecological receptors.

This assessment addresses the following assessment areas, which are characterized in Section 2.0.

Assessment Area	Description
Lakebed Area	Central southern portion of the site, former tailings impoundment comprising approximately 16 acres at the historical high-water line and containing seasonal surface water and a marshy wetland. Historically stored more than 1 million tons of mine tailings (sand and silt) resulting from gold ore extraction (stamp milling and mercury amalgamation) performed off-site at the historical Kennedy Mine north of the site. Currently contains approximately 250,000 cubic yards of tailings.
Cyanide Process Area	Located on the north-south ridge through the central portion of the site, west of the Lakebed Area and east of the Tailings Pile. Approximately one million cubic yards of tailings from the Lakebed Area were processed in this area to extract additional gold from the tailings.
Tailings Pile	Southwestern portion of the site, approximately 29 acres. Land disposal area for the approximately one million cubic yards of tailings processed in the cyanide plant.

The Lakebed Area and the Tailings Pile are located in areas of non-mineralized background, while the Cyanide Process Area is located on a ridge characterized by naturally mineralized soil and bedrock. Several waste rock piles located on the upper, northern portion of the mineralized ridge are associated with the historical Bellwether Mine. These waste rock piles contain metals concentrations that are similar to those detected elsewhere on the naturally mineralized ridge and therefore are not included in this scoping-level assessment.

The following table lists the size, estimated waste quantity, constituents exceeding background concentrations, and potential remedial actions for each assessment area. Soil metals data for the Lakebed Area and Tailings Pile were compared to non-mineralized background, and soil metals data for the Cyanide Process Area were compared to mineralized background because the Cyanide Process Area is located in a naturally mineralized area. The background metals evaluation is presented in Section 4.5.

Assessment Area	Size (acres)	Estimated Waste Quantity	Constituents Exceeding Background	95% UCL (mg/kg)	Max Detect (mg/kg)	Proposed Remedial Action
Lakebed Area	15.5	250,000 cy tailings	Arsenic	125	320	Restrict human visitation by posting and fencing under a LUC.
			Lead	33.4	102	
			Mercury	2.38	9.7	
			Molybdenum	2.54	3.9	
			Selenium	1.26	4.0	
Tailings Pile	29	1,000,000 cy tailings	Arsenic	125	263	Cap and cover under a LUC.
			Cadmium	1.39	4.4	
			Lead	50.5	400	
			Mercury	3.20	15	
			Molybdenum	2.28	5.5	
			Cyanide	4.14	21.9	

Assessment Area	Size (acres)	Estimated Waste Quantity	Constituents Exceeding Background	95% UCL (mg/kg)	Max Detect (mg/kg)	Proposed Remedial Action
Cyanide Process Area	4.2	Surface soil impact	Arsenic	185	450	Restrict human visitation by posting and fencing under a LUC.
			Lead	33.0	72	
			Mercury	0.42	1.0	
			Molybdenum	6.58	13.1	

cy = cubic yard; LUC = land use covenant; mg/kg = milligram per kilogram;
UCL = upper confidence limit on mean

5.2.2 Proposed Site Development

Future remedial action and site development may include:

1. Lakebed Area:
   a. fencing and posting of the perimeter to restrict public access; and
   b. recording a LUC to restrict disturbance of the waste and to preclude future residential development.
2. Cyanide Process Area:
   c. fencing and posting of the perimeter to restrict public access; and
   d. recording a LUC to restrict disturbance of the waste and to preclude future residential development.
3. Tailings Pile:
   e. capping with clean soil;
   f. routing of surface water runoff to reduce infiltration;
   g. construction of public recreational facilities on the clean soil cap; and
   h. recordation of a LUC to restrict disturbance of the capped waste and to preclude future residential development.

5.2.3 Chemicals of Potential Ecological Concern

Chemicals of Potential Ecological Concern (COPEC) are identified based on comparison to ecological screening levels and background concentrations. Background statistics are summarized in Sections 4.5 and are compared to site concentrations in Section 4.6. EPCs (typically 95% UCL concentrations) are listed in Appendix H, Tables 11a through 11c. The EPCs are compared to background statistics and ecological screening levels in Appendix H, Tables 12a through 12c. The comparison addresses the following questions:

- Does the EPC exceed ecological soil screening levels (Eco-SSLs)?
- Does the EPC exceed the upper-end background concentration?

Constituents that meet both of these criteria are considered COPECs and are summarized below. Constituents that exceed background, and for which Eco-SSLs are not listed, are also considered COPECs. For EPCs represented by a central-tendency value (UCL), maximum detected site concentrations were also compared to upper-end background concentrations.

Assessment Area	**COPEC**	**95% UCL** (mg/kg)	**Maximum Detection** (mg/kg)
Lakebed Area	Arsenic	125	320
	Lead	33.4	102
	Mercury	2.38	9.7
	Molybdenum	2.54	3.9
	Selenium	1.26	4.0
Tailings Pile	Arsenic	125	263
	Cadmium	1.39	4.4
	Lead	50.5	400
	Mercury	3.20	15
	Molybdenum	2.28	5.5
	Cyanide	4.14	21.9
Cyanide Process Area	Arsenic	185	450
	Lead	33.0	72
	Mercury	0.42	1.0
	Molybdenum	6.58	13.1

COPEC = chemical of potential ecological concern; mg/kg = milligram per kilogram; UCL = upper confidence limit

5.2.4 Biological Characterization

Figure 3 is a habitat map based on vegetation unit descriptions from the CWHR System; available online at https://wildlife.ca.gov/Data/CWHR/Wildlife -Habitats. According to the CDFW BIOS Map Viewer (available online at https://apps.wildlife.ca.gov /bios/?bookmark=940), vegetation communities at the site are mapped as blue oak woodland, blue oak-foothill pine, and annual grassland.

5.2.4.1 Habitats

The CHWR provides general descriptions for the vegetation community types mapped at the site:

Annual Grassland

Annual grassland habitats are open grasslands composed primarily of annual plant species. Fall rains cause germination of annual plant seeds. Plants grow slowly during the cool winter months, remaining low in stature until spring, when temperatures increase and stimulate more rapid growth. Large amounts of standing dead plant material can be found during summer in years of abundant rainfall and light to moderate grazing pressure. Heavy spring grazing favors the growth of summer-annual forbs, such as tarweed and turkey mullein, and reduces the amount of standing dead material.

Introduced annual grasses are the dominant plant species in this habitat. These include wild oats, soft chess, ripgut brome, red brome, wild barley, and foxtail fescue. Common forbs include broadleaf filaree, redstem filaree, turkey mullein, true clovers, bur clover, popcorn flower, and many others. California poppy, the State flower, is found in this habitat. Perennial grasses, found in moist, lightly grazed, or relic prairie areas, include purple needlegrass and Idaho fescue.

Blue Oak Woodland

Generally, these woodlands have an overstory of scattered trees, although the canopy can be nearly closed at better quality locations. The canopy is dominated by broad-leaved trees 16 to 50 feet tall, commonly forming open savanna-like stands on dry ridges and gentle slopes. Blue oaks may reach over 80 feet in height. Shrubs are often present but rarely extensive, often occurring on rock outcrops. Typical understory is composed of an extension of annual grassland vegetation.

Blue oak is the dominant species, comprising 85 to 100 percent of the trees present. Common associates in the canopy are interior live oak in the Sierra Nevada and valley oak where deep soil has formed. Associated shrub species include poison-oak, California coffeeberry, buckbrush, redberry, California buckeye, and manzanita. The ground cover is comprised mainly of annuals, such as brome grass, wild oats, foxtail, needlegrass, filaree, fiddeneck, and others.

Blue Oak-Foothill Pine

This habitat is typically diverse in structure both vertically and horizontally, with a mix of hardwoods, conifers, and shrubs. The shrub component is typically composed of several species that tend to be clumped, with interspersed patches of annual grassland. Woodlands of this type generally have small accumulations of dead and downed woody material and relatively few snags compared with other tree habitats in California. Most existing stands of this type are in mature stages, with canopy cover ranging from 10 to 59 percent, and tree diameter at breast height ranging from 1 to 12 inches.

Blue oak and foothill pine typically comprise the overstory of this habitat, with blue oak usually most abundant. In the foothills of the Sierra Nevada, tree species typically associated with this habitat are interior live oak and California buckeye. At lower elevations, where blue oaks make up most of the canopy, the understory tends to be primarily annual grasses and forbs. Shrub species include manzanita, redberry, California coffeeberry, poison-oak, silver lupine, blue elder, California yerbasanta, rock gooseberry, and California redbud.

Wetland

According to the NWI database maintained by the United States Fish and Wildlife Service, a wetland is present at the site upstream of the tailings impoundment dam (Photos 30 and 31). The area behind the tailings dam is classified as both a freshwater pond (permanently flooded) and an emergent wetland (only seasonally flooded). The wetland appears to flood only seasonally and did not contain standing water at the time of our site reconnaissance in October 2022, but did contain water in winter and spring 2023.

5.2.4.2 Special-Status Species

The California Natural Diversity Database indicates that the western pond turtle (Emys marmorata), a California Species of Special Concern, may be present in the site vicinity. The federally threatened valley elderberry longhorn beetle (Desmocerus californicus dimorphus) has been identified in the vicinity of the site. One elderberry bush was identified at the site in May 2015, west of the Lakebed Area (Figure 3).

Geocon (2018) queried the CDFW California Natural Diversity Database (CNDDB) for a 10-mile radius around the site to determine the potential occurrence of special-status species. The following special-status plant species, which are predominantly endemic to soils derived from serpentinite and gabbro (not present at the site), were identified within a 10-mile radius of the site:

- Bisbee Peak rush-rose (Helianthemum suffrutescens);
- Ione manzanita (Arctostaphylos myrtifolia);
- Ione buckwheat (Eriogonum apricum var. apricum);
- Parry's horkelia (Horkelia parryi); and
- Red Hills soaproot (Chlorogalum grandiflorum).

The following animal species of special concern were identified with a 10-mile radius of the site:

- Alameda whipsnake (Masticophis lateralis euryxanthus);
- Giant garter snake (Thamnophis gigas);
- Rudolph's cave harvestman (Banksula rudolphi);
- Northwestern pond turtle (Clemmys marmorata); and
- Valley elderberry longhorn beetle (Desmocerus californicus dimorphus).

The blue oak woodland provides suitable nesting habitat for raptors such as the Swainson's hawk (Buteo swainsoni), bald eagle (Haliaeetus leucocephalus), white-tailed kite (Elanus leucurus), and other species. The CNDDB did not record documented nests for either Swainson's hawk or bald eagle in the site vicinity, and there were no incidental sightings of active raptor nests at the site.

The *State Oak Woodlands Protection Act* (Senate Bill 1334, Section 21083.4) provides some level of protection for oak woodlands throughout the state. The valley oak woodland is considered by the CDFW to be a habitat of special concern, and therefore potential impacts to such habitat must be considered under CEQA. The site does support valley oaks.

As indicated above, one elderberry shrub (Sambucus spp.) exists on the western edge of the emergent wetland habitat (Lakebed Area). This species is the sole host plant of the Federally-listed, threatened valley elderberry longhorn beetle (Desmocerus californicus dimorphus). While no valley elderberry longhorn beetles have been documented in the area of the site, this elderberry shrub is within riparian

habitat and may provide potential habitat for this protected species. Elderberry shrubs are considered potential valley elderberry longhorn beetle habitat up to 3,000 feet elevation in the Sierra foothills; site elevation ranges from 1,270 feet to 1,410 feet above mean sea level (MSL). The individual shrub was mapped and is shown on Figure 3. The shrubs were surveyed for exit holes and other signs of the beetles, but no evidence of beetle habitation was observed.

5.2.5 Pathway Assessment

Terrestrial receptors are potentially exposed to elevated metals concentrations in mine tailings and contaminated soil. Figures 5 and 8 are conceptual model diagrams. The conceptual model is described in Section 4.2.

The contaminated media are soil, sediment, and water. Potentially complete exposure pathways include:

- Direct exposure to contaminated soil, sediment, and water for producers and invertebrates;
- Indirect exposure for consumers via food-web transfer (ingestion of affected biota); and
- Secondary direct exposure for consumers (incidental soil ingestion, inhalation of airborne soil particulates, dermal contact with soil, water ingestion, and dermal contact with water).

Terrestrial plants may be exposed via root contact, and herbivorous consumers may consume the contaminants with the affected plants. Terrestrial invertebrates may incorporate contaminants by contact with contaminated soil and water. Wildlife exposure may occur via food-web transfer or directly via inhalation of airborne particulates or incidental ingestion during activities such as foraging, grooming or burrowing, or by ingestion or contact with water.

Mercury is the only potentially volatile constituent. Wildlife exposures to chemicals in soil via inhalation of volatile constituents or dust and dermal contact are not evaluated quantitatively in this assessment pursuant to the Eco-SSL guidance (USEPA, 2005).

5.2.6 Findings of the Ecological Scoping Assessment

The scoping assessment identified COPECs (arsenic, cadmium, lead, mercury, molybdenum, selenium, and cyanide) in mine tailings and impacted soil. Constituents are selected as COPECs when their concentrations exceed site background concentrations and one or more Eco-SSLs, if Eco-SSLs are available. When an Eco-SSL is not available, COPEC selection is based on comparison to background. Arsenic was detected in seasonal surface water in the Lakebed Area at 0.010 mg/l, which exceeds upgradient background (not detected at or above a reporting limit of 0.005 mg/l). Lead, mercury, and cyanide were not detected in Lakebed Area surface water.

Potentially complete exposure pathways exist for terrestrial receptors for mine tailings and contaminated soil if they remain at the site in an undeveloped condition. Therefore, a predictive ecological assessment is appropriate to address potential exposure pathways for the Lakebed Area and Cyanide Process Area

where contaminated material may remain in place. The Tailings Pile is to be covered with clean soil, and predictive ecological assessment is not performed for the Tailings Pile. Assessment areas, COPECs, and proposed remedial actions are summarized in the following table.

Assessment Area	Size (acres)	Estimated Waste Quantity	Constituents Exceeding Background	95% UCL (mg/kg)	Max Detect (mg/kg)	Proposed Remedial Action
Lakebed Area	15.5	250,000 cy tailings	Arsenic	125	320	Restrict human visitation by posting and fencing under a LUC.
			Lead	33.4	102	
			Mercury	2.38	9.7	
			Molybdenum	2.54	3.9	
			Selenium	1.26	4.0	
Tailings Pile	29	1,000,000 cy tailings	Arsenic	125	263	Cap and cover under a LUC.
			Cadmium	1.39	4.4	
			Lead	50.5	400	
			Mercury	3.20	15	
			Molybdenum	2.28	5.5	
			Cyanide	4.14	21.9	
Cyanide Process Area	4.2	Surface soil impact	Arsenic	185	450	Restrict human visitation by posting and fencing under a LUC.
			Lead	33.0	72	
			Mercury	0.42	1.0	
			Molybdenum	6.58	13.1	

cy = cubic yard; LUC = land use covenant; mg/kg = milligram per kilogram; UCL = upper confidence limit on mean

5.2.7 Ecological Predictive Assessment

An ecological Phase I predictive assessment was performed to assess exposure and toxicity for representative terrestrial receptors with respect to metals that occur in mine tailings and contaminated soil that may remain at the site at (undeveloped) locations where ecological exposure is anticipated. This predictive assessment evaluates baseline (current) conditions for tailings and contaminated soil associated with the Lakebed Area and Cyanide Process Area. Cyanide was not detected at either of these assessment areas.

The findings of this predictive assessment are to be used to develop remedial alternatives for the non-time-critical remedial action. The goal of the predictive assessment is to predict potential adverse effects of chemical contaminants on the biota at or near the site. This predictive assessment is organized as follows:

- *Problem Formulation* – identifies physical site characteristics, chemical waste characteristics, and ecological factors that may result in exposure of ecological receptors to constituents of potential concern.
- *Exposure Assessment* – quantifies the exposure of representative ecological receptors to the identified constituents of potential ecological concern by predicting intake rates associated with direct and indirect exposure routes.

- *Toxicity Assessment* – quantifies the potential for adverse ecological effects by comparison of the calculated exposure levels to toxicity data available in the literature.
- *Risk Characterization* – summarizes the results of analysis, discusses sources of uncertainty associated with the assessment, and provides information relevant to risk management decision-making.

5.2.7.1 Problem Formulation

The scope of the predictive assessment is developed by identifying:

- areas of concern (AOC);
- habitat types;
- representative ecological receptors;
- ambient metals concentrations;
- constituents of potential ecological concern;
- potentially complete exposure pathways; and
- assessment and measurement endpoints.

These factors are described below.

Areas of Concern

AOCs for this predictive assessment are identified based on the following criteria:

- the area is to be left in place or consolidated at the site without burial; and
- the area contains anthropogenic contaminants or metals concentrations exceeding site background levels.

The Lakebed Area and Cyanide Process Area may remain in place without burial or capping.

Habitat Description

Habitat types are described in Section 5.2.4.

Representative Ecological Receptors

The following representative ecological receptors are considered:

- primary producers (plants),
- terrestrial invertebrates,
- insectivorous mammals (ornate shrew),
- omnivorous mammals (California ground squirrel),
- insectivorous birds (American robin),
- granivorous birds (California quail),

- carnivorous birds (red-tailed hawk), and
- carnivorous mammals (long-tailed weasel).

A representative species is chosen primarily because of its function in the ecosystem, and secondarily because of taxonomic relatedness and known or presumed similarities in physiology and life history with respect to the functional group of organisms which the species represents (DTSC, 1996). Per DTSC (1996) the following selection criteria are to be considered:

- sensitivity of the representative species;
- availability of data for the representative species;
- relationship of the representative species to the assessment endpoint(s);
- consistency of exposure scenarios with the species or functional group being evaluated;
- availability of toxicity data and suitable test protocols; and
- societal values such as economic importance or high recreational value.

Appendix H, Table 13, presents representative species from each trophic level or feeding guild. This assessment assumes that protection of the selected species is protective of other common or expected species for which there is typically little toxicity information. It is not within the scope of this assessment to assess all species that have been identified or are expected to occupy the site.

Ambient Metals Concentrations

Ambient metals concentrations in site soil are established in Section 4.5. Metals concentrations in site soil and weathered bedrock are influenced by natural mineralization associated with the shear zone that extends north-south through the middle of the site and the mineralized "halo" around the shear zone resulting from natural geologic processes, including metamorphism and hydrothermal emplacement.

Constituents of Potential Ecological Concern

COPECs are established by comparison to ambient concentrations and comparison to Eco-SSLs as performed in Section 5.2.3.

Potentially Complete Exposure Pathways

Potentially complete exposure pathways are identified based on USEPA (1998) guidance, which defines a potentially complete exposure pathway as having:

- a source and mechanism of constituent release (e.g., historical off-site gold mining and on-site reprocessing of the mine tailings);
- a transport medium (e.g., soil, water, and tissue);
- a point or area where receptors of concern may contact COPECs; and

- an exposure route through which constituent uptake occurs (e.g., ingestion).

Soil Exposure Pathways

The following soil exposure pathways are potentially complete:

- bioconcentration of constituents in soil by plants;
- bioaccumulation of constituents in soil-by-soil invertebrates;
- incidental ingestion of constituents in soil by wildlife;
- ingestion of constituents in plant or animal tissue by wildlife; and
- dermal absorption and inhalation of constituents in soil by wildlife.

Dermal absorption of metals and metalloids (such as lead and arsenic) from soil would not likely contribute significantly to the total hazard posed by soil metals to ecological receptors. Most forms of metals are poorly absorbed by the skin. Studies indicate that exposures due to dermal absorption are insignificant compared to ingestion for terrestrial receptors (Peterle, 1991).

The COPECs are not volatile compounds except for mercury. Mercury is expected to occur in soil primary as mercury II bound to soil particles rather than as elemental mercury and is present in soil at concentrations that would generally not be expected to result in significant mercury volatilization.

Burrowing mammals such as the ground squirrel are likely to inhale dust containing metals. However, as stated by DTSC (2007), most of the contaminated dusts are eventually swallowed. This route of exposure creates additional uncertainty in calculation of the total ingested dose, and the incidental soil ingestion rate is intended to include this route of exposure.

Surface Water Exposure Pathways

Surface water exposure pathways include ingestion and dermal contact.

Groundwater Exposure Pathways

Exposure pathways associated with groundwater are not considered to be potentially complete. Water quality evaluation is presented in Section 5.3.

Assessment and Measurement Endpoints

Appendix H, Table 14, presents assessment and measurement endpoints. The predictive assessment focuses on assessment endpoints (attributes) which are considered to be critical to the function of the biological community or population (DTSC, 1996). Measurement endpoints, such as toxicity values or reference doses, are selected to represent a benchmark value indicative of measurable effects from the chemicals of concern on selected assessment endpoints. Toxicological data were not available for molybdenum, and therefore molybdenum toxicity was not quantified in this assessment.

The goal of ecological risk assessment is to assess the magnitude and extent of threats to the structure and function of plant and animal communities and ecosystems (the assessment endpoint). However, the measurement endpoints addressed in a typical Phase I predictive assessment are at lower levels of organization, such as the population, the individual, an organ system, or a biochemical response (DTSC, 1996).

5.2.7.2 Exposure Assessment

The exposure assessment quantifies the exposure of representative ecological receptors to the identified COPECs by predicting intake rates associated with potentially complete exposure routes.

Exposure Model

The predictive assessment considers the direct and indirect exposure routes set forth in the CSM diagram (Figure 8). The total dose for the subject terrestrial receptors includes incidental soil ingestion and ingestion of plant, invertebrate and mammal tissues as food:

$$Dose_{TOTAL} = Dose_{SOIL} + Dose_{PLANT} + Dose_{INVERT} + Dose_{MAMMAL}$$

where:

$$Dose_{SOIL} = IR \times \%Diet_{SOIL} \times C_{SOIL} \times SPI \times BW^{-1}$$

$$Dose_{PLANT} = IR \times \%Diet_{PLANT} \times C_{PLANT} \times SPI \times BW^{-1}$$

$$Dose_{INVERT} = IR \times \%Diet_{INVERT} \times C_{INVERT} \times SPI \times BW^{-1}$$

$$Dose_{MAMMAL} = IR \times \%Diet_{MAMMAL} \times C_{MAMMAL} \times SPI \times BW^{-1}$$

and:

BW = body weight (g)

C_{SOIL} = concentration of COPEC in soil (mg/kg)

C_{PLANT} = concentration of COPEC in plant tissue (mg/kg)

C_{INVERT} = concentration of COPEC in invertebrate tissue (mg/kg)

C_{MAMMAL} = concentration of COPEC in mammal tissue (mg/kg)

IR = aggregate food ingestion rate (g/day)

SPI = site presence index, ratio of exposure area to foraging area

$\%Diet_{SOIL}$ = percentage of diet comprising soil

$\%Diet_{PLANT}$ = percentage of diet comprising plant tissue

$\%Diet_{INVERT}$ = percentage of diet comprising invertebrate tissue

$\%Diet_{MAMMAL}$ = percentage of diet comprising small mammal tissue

Reduction of the dose equations expressed above results in the following simplified equations for terrestrial wildlife:

$$Total\ Dose = IR \times SPI \times BW^{-1} \times [(\%Diet_{SOIL} \times C_{SOIL}) + (\%Diet_{PLANT} \times C_{PLANT}) + (\%Diet_{INVERT} \times C_{INVERT}) + (\%Diet_{MAMMAL} \times C_{MAMMAL})]$$

For terrestrial wildlife, dose is expressed as milligrams (mg) of COPEC per kilogram (kg) of body weight per day according to the equations presented above. For plants and invertebrates, dose is expressed as mg of COPEC per kg of soil and, therefore, the exposure equations are not applicable, and the hazard quotient is simply a ratio of the contaminant concentration in soil to the toxicity reference value.

Per DTSC (2007), the SPI is assumed to be 1.0 for calculation of hazard quotients based on the no observed adverse effect level (NOAEL) toxicity reference value (TRV-low), and maximum detected metals concentrations are used to calculate the TRV-low. The SPI is calculated as the ratio of AOC area to foraging area for calculation of hazard quotients based on TRV-high, and 95% UCL values are used for metals concentrations.

Exposure Factors

Appendix H, Table 15, presents literature-based uptake equations used to estimate prey tissue concentrations. Appendix H, Table 16, presents EPCs derived using the uptake equations. Exposure factors are listed in Appendix H, Table 17, and sources are summarized below.

- Body weights are obtained from Eco-SSL Attachment 4-1 (USEPA, 2005). The data were originally presented in the *Wildlife Exposure Factors Handbook* (USEPA, 1993) and other sources, as cited by the USEPA (2005).
- Soil ingestion rates (90th percentile) are estimated as a percentage of the dietary food ingestion rate per USEPA (2005).
- Dry-weight food ingestion rates and diet proportions are obtained from USEPA (2005).
- SPIs are calculated as the ratio of AOC area (exposure area) to foraging area. Foraging areas are obtained from USEPA (2005).
- The predictive assessment assumes that COPECs in the ingested soil and tissue are completely available for uptake, i.e., the adsorption factor or assimilation factor is 100%.

Toxicity reference values are listed in Appendix H, Table 18a. Toxicological data were not available for molybdenum, and therefore molybdenum toxicity was not quantified in this assessment.

Summary of Exposure Assessment

Appendix H, Tables 19a through 19h, summarize the exposure assessment. The tables present EPCs, SPIs for wildlife, and total dose. Species-specific parameters for wildlife are footnoted in the tables.

5.2.7.3 Toxicity Assessment

The TRV-low values are based on chronic NOAELs, which are concentrations or doses not expected to result in adverse ecological effects. The Biological Technical Assistance Group (BTAG) TRV-high values are generally based on a level which lies approximately in the middle of the range of possible adverse effects, while the non-BTAG TRV-highs are generally based on chronic lowest observed adverse effects levels (LOAELs). TRVs are listed in Appendix H, Table 18a. Consideration of alternate TRVs may be useful in the context of risk management decision-making. An alternate TRVs for lead and mercury are described below and are listed in Appendix H, Table 18b and 18c.

Alternate TRV for Lead

The USEPA (2005) performed literature search, data quality evaluation and data extraction resulting in lead toxicity data for avian species from 54 published studies. USEPA (2005; Table 5.1 and Figure 5.1) summarizes the lead toxicity data and derives a TRV based on an evaluation of NOAEL data for the growth and reproduction effect groups. The USEPA (2005) calculated a geometric mean (i.e., the nth root of the product of n numbers) NOAEL value (10.9 mg/kg-day) and selected a lower TRV (1.63 mg/kg-day) based on a single NOAEL value for reproduction.

An alternate lead TRV (TRV-alt,lead) for avian species is calculated based on the geometric mean of the LOAEL values presented by USEPA (2005). These data are presented in Appendix H, Table 18b. Pursuant to methodology set forth by USEPA (2003) for LOAEL values, the alternate TRV is equal to the geometric mean (44.6 mg/kg-day) of LOAEL values for growth and reproductive effects. Evaluation of bounded values (bounded refers to a LOAEL/NOAEL pair resulting from the same study) pursuant to the methodology set forth by USEPA (2003) does not apply because LOAEL rather than NOAEL values are being evaluated.

Alternate TRV for Mercury

The USEPA (1995) Great Lakes Initiative presents mercury toxicity data for avian species from |11 published studies. These data are presented in Appendix H, Table 18c. An alternate MeHg TRV (TRV-alt,MeHg) for avian species is calculated based on the geometric mean of the LOAEL values presented by USEPA (1995). The alternate TRV is equal to the geometric mean (0.23 mg/kg-day) of LOAEL values for growth and reproductive effects presented in Appendix H, Table 18c.

Interspecific Scaling

Per DTSC (2007), TRVs should be adjusted allometrically for body weight only when the difference in body weight between the test species and the species being assessed is two orders of magnitude or greater. When the difference in body weight is two orders of magnitude or greater, TRVs may be allometrically scaled using a procedure and scale factors presented by Sample and Arenal (1999), per the following equation:

$$TRV_{receptor} = TRV_{test\ species} \times (BW_{test\ species} / BW_{receptor})^{b}$$

where:

$TRV_{receptor}$ = toxicity reference value for representative receptor species (mg/kg-day)

$TRV_{test\ species}$ = toxicity reference value for test species (mg/kg-day)

$BW_{test\ species}$ = body weight of test species (g)

$BW_{receptor}$ = body weight of representative receptor species

b = species-specific or default allometric scaling factor provided by Sample and Arenal (1999)

5.2.7.4 Risk Characterization

Appendix H, Tables 19a through 19h, present the risk characterization. Hazard quotients (HQs) for wildlife are presented for TRV-low values (HQ1) and TRV-high values (HQ2).

ERAS (formerly HERD, 2007) considers lead and mercury toxicity to be potentially additive because of their known interference with calcium mediated intracellular signaling pathways and nephrotoxic effects; therefore, a hazard index (HI) was calculated for lead and mercury when these metals were evaluated for a particular AOC.

Per DTSC (2007), the SPI is assumed to be 1.0 for calculation of HQs based on a NOAEL TRV (TRV-low), and maximum detected metals concentrations are used to calculate the TRV-low. The SPI is calculated as the ratio of AOC area to foraging area for calculation of HQs based on a TRV-high, and 95% UCL values for metals concentrations are used when available for calculation of the TRV-high. Results are discussed below.

- Plant HQs for arsenic, mercury and selenium exceed 1.0. Invertebrate HQs for arsenic and mercury also exceed 1.0. The predictive assessment identifies potential hazard to lower trophic level receptors (plants and invertebrates) resulting from arsenic, mercury and selenium in soil. DTSC (2007) suggests that plants and invertebrates living in mineralized zones may adapt to the geochemistry of the mineralized soil. Results are tabulated in Appendix H, Tables 19a and 19b.
- Wildlife HQs (Appendix H, Tables 19c through 19h) based on TRV-low values commonly exceed 1.0. Specifically, HQs are above 1.0 for California ground squirrel (As, Se), California quail (Pb, Hg), ornate shrew (As, Pb, Se), American robin (As, Pb, Hg, Se), long-tailed weasel (As, Se), and red-tailed hawk (Pb). HQs based on TRV-low values conservatively assume that the receptors are exposed to the maximum detected contaminant concentrations and conservatively use a SPI of 1.0, neglecting the size of the AOCs in comparison to foraging area size.
- Wildlife HQs based on TRV-high values are less than 1.0 except for the secondary consumer species American robin. Lead and mercury TRV-high HQs exceed 1.0. EPCs for lead and mercury are 95% UCL values. For the Lakebed Area, EPCs for lead and mercury are 33.4 mg/kg and 2.38 mg/kg, respectively. For the Cyanide Process Area, EPCs for lead and mercury are 33.0 mg/kg and 0.42 mg/kg, respectively.

5.2.7.5 Uncertainty Analysis

Ecological assessment should consider, among other factors, the natural variability in the population in question, sampling uncertainty, and model uncertainty (USEPA, 2003). As a result of the uncertainties described below, confidence in the exposure assessment is low. Confidence in toxicity values ranges from low to high based on the data available for specific contaminants and receptor species. The predictive assessment assumes a protective "worst case" exposure scenario by considering reasonable maximum exposure to contaminants, using NOAEL values to evaluate potential adverse wildlife effects.

Natural Variation

There is natural variation in the values exhibited by populations for all exposure factors (USEPA, 2003). Population values for some parameters (e.g., body weight) can assume a normal distribution that can be characterized by a mean and variance. Other parameters are not normally distributed. This predictive assessment generally considers mean values which are intended to be characteristic of the population and are not necessarily characteristic of individual receptors. Mean population values may vary with geographic location, season, and other factors such as habitat quality.

Sampling Uncertainty

Sampling uncertainty related to contaminant concentration in soil, as well as sampling uncertainty related to the literature-derived exposure and toxicity parameters, contribute to the overall uncertainty of the assessment. Confidence in a population mean and variance increases as the number of samples taken from the population increases (USEPA, 2003).

Model Uncertainty

USEPA (2003) identifies uncertainty regarding allometric models used to predict exposure parameters. Uncertainty associated with allometric models can be reduced by the use of a model derived from the smallest and most similar taxonomic/dietary group. Although the literature-derived exposure factors and toxicity factors were obtained with the goal of reducing uncertainty, the limitation of existing data results in model uncertainty.

Detection Limits

The concentrations of metals of concern in soil generally exceed the corresponding laboratory detection limits. Therefore, detection limits are not expected to be a significant source of uncertainty.

Toxicity Values

There is uncertainty associated with the derivation of toxicity values obtained from the literature, as well as the allometric scaling of toxicity values. The modeling of dose-response relationships for test species, as well as the use of literature-derived dose-response relationships for representative site species, is a source of significant uncertainty as a result of the limited availability of data.

5.2.8 Conclusions Regarding the Ecological Predictive Assessment

Wildlife HQs based on TRV-high values exceed 1.0 for the American robin in the case of central-tendency concentrations for lead and mercury in soil. The central-tendency lead concentrations detected in the Lakebed Area (33.4 mg/kg) and Cyanide Process Area (33.0 mg/kg) are similar to lead concentrations detected in naturally mineralized soil at the site, as summarized in the table below.

Parameter	Arsenic	Lead	Mercury	Selenium
Lakebed Area Soil EPCs				
95% UCL	125	33.4	2.38	1.26
Maximum	320	102	9.7	4.0
Cyanide Process Area Soil EPCs				
95% UCL	185	33.0	0.42	not detected
Maximum	450	72	1.0	not detected
Site Soil, Mineralized Background				
Population	65	17	17	16
Detections	63	14	6	9
% Non-detect	3	18	65	44
Minimum (mg/kg)	<2	<2.5	<0.04	<0.3
Maximum (mg/kg)	**1,300**	**360**	**0.30**	**1.2**
Mean Detect	156	37.8	0.21	0.76
95th Percentile	606	88	0.24	2.5
Number of Outlying Values Removed Prior to BTV Calculation	Nineteen	One	None	One

Materials in the Lakebed Area and Cyanide Process Area are to remain in place in open space, and lead concentrations detected in these areas are within the range of naturally mineralized site soil background. Therefore, remedial action does not appear to be required to address the ecological effects of lead.

The mercury EPCs in the Lakebed Area (2.38 mg/kg) and Cyanide Process Area (0.42 mg/kg) result in HQs of 6.0 and 4.1, respectively, for the American robin based on TRV-high values. The assessment tends to overestimate the ecological hazard for the following reasons:

- The tailings in the Lakebed Area are densely vegetated, and no mercury was detected in seasonal surface water in the Lakebed Area.
- The mercury TRV is based on exposure to methylmercury rather than to total mercury. The model estimates that most of the mercury exposure results from incidental soil ingestion rather than invertebrate diet. Methylmercury comprises only a fraction of the total mercury concentration in soil, and the EPCs based on total mercury concentrations overestimate the hazard.
- An alternate methylmercury TRV for avian species can be calculated based on the geometric mean of the LOAEL values presented by USEPA (1995). The alternate TRV (0.23 mg/kg-day) is equal to the geometric mean of LOAEL values for growth and reproductive effects. Use of the alternate TRV would reduce the calculated hazard by approximately 20 percent.
- The model assumes that the American robin diet is 100% invertebrate. Wheelwright (1986) presents graphical data pertaining to the proportion of fruit (by volume, vs. animal prey) for 436 robin individuals in the western United States, and the average proportion of fruit in the American robin diet (by volume, vs. animal prey) for the entire year is 59%. Consideration of the opportunistic feeding habits and varied diet of the American robin would tend to reduce the HQ.
- The assessment did not include allometric scaling of the TRV, which would tend to reduce the HQ by approximately one order of magnitude.

Based on the conservative nature of the assessment, the calculated hazard to avian insectivores is not expected to require further action with respect to ecological effects of mercury.

The only constituent detected in the seasonal surface water in the Lakebed Area is arsenic (0.010 mg/l), and no lead, mercury, or cyanide was detected in Lakebed Area surface water. Additionally, no cyanide was detected in mine tailings or soil at the Lakebed Area or Cyanide Process Area. Section 5.3 presents additional water quality evaluation.

5.3 Water Quality Evaluation

We evaluated the risk to water quality based on the results of the SSI, the results of previous site investigation, and the guidelines set forth in the following documents:

- *The Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin River Basins* (RWQCB, 2019),
- The *Designated Level Methodology (DLM) for Waste Classification and Cleanup Level Determination* (RWQCB, June 1989),
- *A Compilation of Water Quality Goals* (RWQCB, 2023, https://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/), and
- Resolution No. 68-16 (Antidegradation Policy; State Water Resources Control Board [SWRCB], 1968).

Procedures set forth in the Basin Plan, Antidegradation Policy, and DLM were used to evaluate the potential impact to surface water and groundwater from metals concentrations above background concentrations and to determine the appropriate water quality goals for the most restrictive beneficial use.

5.3.1 Regulatory Framework

The regulatory framework governing the protection of water quality is described in the *Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, also known as the State Implementation Policy (SWRCB, 2005). Pursuant to state and federal regulation, the following water quality objectives and criteria are potentially applicable:

1. Federal water quality criteria set forth in the *National Toxics Rule* (NTR; USEPA, 1995) and in the CTR (USEPA, 2000), which is promulgated by the USEPA in 40 CFR 131.38.
2. Water quality objectives from the Basin Plan, including MCLs promulgated in CCR Title 22 and incorporated by reference in the Basin Plan.
3. USEPA ambient water quality recommended criteria and other criteria commonly used by the RWQCB to interpret narrative objectives in the Basin Plan, such as OEHHA fish consumption benchmarks, federal and state antidegradation requirements, and waterway-specific benchmarks.

When federal standards appear to be over-protective or under-protective of the designated uses for a specific water body, the RWQCB may develop site-specific water quality criteria. The Clean Water Act (CWA) 303(d) list of impaired water bodies contains such site-specific water quality criteria.

As described in Section 2.4.4, the nearest surface water bodies are North Fork Jackson Creek (approximately 400 feet west of the site) and New York Ranch Creek (along the southeastern edge of the site). Both creeks flow south and empty into Jackson Creek, which flows southwest through downtown Jackson approximately 1/3 mile south of the site. Jackson Creek flows through Lake Amador and empties into Dry Creek approximately 14 miles west-southwest of the site, and Dry Creek drains to the Mokelumne River five miles west of Galt, which flows into the San Joaquin River in the Sacramento-San Joaquin River Delta and eventually to Suisun Bay and San Pablo Bay.

Lake Amador has been placed on the CWA Section 303(d) list by the SWRCB as impaired for mercury and pH (high). Delta waterways are listed for mercury and pesticides. Pursuant to the 303(d) listings, waterway-specific Total Maximum Daily Load (TMDL) limitations are under development.

5.3.2 Receptors

5.3.2.1 Surface Water Receptors

Pursuant to the Basin Plan, California water bodies must be protected against water quality degradation for the most restrictive beneficial use. The Basin Plan does not specifically identify beneficial uses and water quality objectives for Jackson Creek, New York Ranch Creek, Dry Creek, or Amador Lake. However, the beneficial uses of any water body that is specifically identified in the Basin Plan generally apply to its tributary streams. The Basin Plan identifies the following existing and potential beneficial uses for the Mokelumne River:

- Municipal and domestic supply;
- Agricultural water supply;
- Water contact and non-contact recreation;
- Warm and cold freshwater habitat;
- Spawning, reproduction and/or early development of fish; and
- Wildlife habitat.

Although these beneficial uses do not necessarily apply to the Jackson Creek or New York Creek drainages, the corresponding water quality objectives may be used as a basis for a conservative comparison:

- MCLs for drinking water;
- CTR values for protection of human health and aquatic life; and
- Agricultural (Ag) water quality objectives set forth in the Basin Plan.

The Basin Plan defines water quality objectives for metals as dissolved concentrations except for selenium, molybdenum, and boron, which are defined as total concentrations. Laboratory test methods and detection limits are set forth in the RWQCB's *Tech Note, Mining Waste Characterization* (2008), and are based on the practical quantitation limits (PQL) pursuant to the State Implementation Policy.

5.3.2.2 Groundwater Receptors

As presented in Section 2.4.5, depth to water in wells MW-2 through MW-5 ranged from 7.9 to 41.4 feet, and the gradient was 0.05 to the south-southwest as depicted on Figure 2. The site is located within the City of Jackson, and drinking water in the city limits is supplied by the City of Jackson through the Amador Water Agency. The Basin Plan states that unless otherwise designated by the RWQCB, all groundwater in the region is considered suitable or potentially suitable, at a minimum, for municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.

5.3.3 Soluble Constituents

Section 4.3.6 presents the results of extraction testing for metals of concern. SPLP extraction from tailings samples and analysis of the extractant by USEPA Method 6020 did not detect soluble metals at concentrations exceeding the water quality objectives, as summarized below.

- SPLP arsenic in tailings samples ranged from 1.9 to 4.9 micrograms per liter (µg/l), and the mean SPLP arsenic concentration was 3.1 µg/l. The detected values are less than the Primary MCL for arsenic in drinking water (10 µg/l).
- SPLP selenium in tailings samples ranged from 1.4 to 2.4 µg/l, and the mean SPLP selenium concentration was 1.8 µg/l. The detected values are less than the Primary MCL for selenium in drinking water (50 µg/l), the agricultural water quality goal for selenium (20 µg/l), and the CTR CCC for freshwater aquatic life protection (5 µg/l).
- SPLP lead, mercury, and sliver were not detected above reporting limits of 0.3, 0.1, and 0.24 µg/l, respectively.

As described in Section 4.3.7, ABA results for tailings samples did not indicate a potential to produce acid, and sulfide concentrations were low, indicating no significant potential to generate acidic conditions in the long term.

5.3.4 COC Concentrations in Water

Table 25 summarizes the maximum and mean COC concentrations detected in groundwater, groundwater seepage, and surface water. The data are further described in Sections 4.3.12, 4.3.15, and 4.3.13, respectively. The groundwater and surface water data are compared to the water quality objectives listed in Table 25 and described above in Section 5.3.2. 1. Water quality objectives were exceeded for arsenic, iron, manganese, and cyanide at the site, as summarized below.

1. Arsenic:
    a. Arsenic was detected at concentrations exceeding the Primary MCL (10 µg/l) in groundwater recently in contact with tailings, including shallow groundwater in tailings at the Lakebed Area (well MW-1, mean 40 µg/l), perched groundwater in tailings at the Tailings Pile (well MW-2, mean 50 µg/l), and groundwater seepage at the toe of the Tailings Pile (location S-2, mean 150 µg/l).
    b. Arsenic was detected at concentrations less than the Primary MCL at downgradient locations, including groundwater in fractured rock beneath the Lakebed Area (well MW-4, mean 1.2 µg/l) and shallow groundwater immediately downgradient of the Tailings Pile (well MW-3, mean 3.0 µg/l).
    c. Arsenic was detected in upgradient background groundwater (well MW-5, mean 2.0 µg/l).
    d. Arsenic was not detected in surface water at concentrations exceeding the Primary MCL.
2. Iron:
    a. Iron was detected at concentrations exceeding the Secondary MCL (0.3 mg/l) in shallow groundwater in tailings at the Lakebed Area (well MW-1, 4.8 mg/l), perched groundwater in tailings at the Tailings Pile (well MW-2, mean 1.1 mg/l), groundwater seepage at the toe of the Tailings Pile (locations S-2 and S-3, mean 6.5 mg/l), and shallow groundwater at the toe of the Tailings Pile (well MW-3, mean 80 mg/l).
    b. Iron was not detected in groundwater in fractured rock beneath the Lakebed Area (well MW-4).
    c. Iron was detected in upgradient groundwater (MW-5, mean 0.7 mg/l).
    d. Iron was detected in seasonal surface water at the Lakebed Area (location SW-3, 22 mg/l) but not in surface water downgradient of the Lakebed Area (location SW-1).
    e. Iron was detected in surface water downgradient of the Tailings Pile (location SW-2, 1.1 mg/l).
    f. Iron was detected in upgradient background surface water (locations SW-4, SW-5, and SW-6) at a mean concentration of 0.25 mg/l.
3. Manganese:
    a. Manganese was detected at concentrations exceeding the Secondary MCL (0.05 mg/l) in shallow groundwater in tailings at the Lakebed Area (well MW-1, 0.47 mg/l), perched groundwater in tailings at the Tailings Pile (well MW-2, mean 0.44 mg/l), groundwater seepage at the toe of the Tailings Pile (locations S-2 and S-3, mean 2.0 mg/l), and shallow groundwater at the toe of the Tailings Pile (well MW-3, mean 2.0 mg/l).
    b. Manganese was detected in groundwater in fractured rock beneath the Lakebed Area (well MW-4, 0.008 mg/l) and in upgradient groundwater (MW-5, mean 2.0 mg/l).
    c. Manganese was detected in seasonal surface water at the Lakebed Area (location SW-3, 0.07 mg/l) and in surface water downgradient of the Lakebed Area (location SW-1, 0.05 mg/l). Iron was detected in surface water downgradient of the Tailings Pile (location SW-2, 0.11 mg/l).
    d. Iron was detected in upgradient background surface water (locations SW-4, SW-5, and SW-6) at a mean concentration of 0.031 mg/l.

4. Cyanide:
    a. Cyanide was detected at concentrations exceeding the Primary MCL (150 µg/l) in perched groundwater in tailings at the Tailings Pile (MW-2, mean 83 µg/l) and groundwater seeps at the toe of the Tailings Pile (locations S-2 and S-3, mean 197 ug/l), and in surface water downgradient of the Tailings Pile (location SW-2, mean 310 µg/l).
    b. Cyanide was detected at concentrations less than 2 µg/l in shallow groundwater in tailings in the Lakebed Area (well MW-1, 1.2 µg/l) and in groundwater in fractured rock beneath the Lakebed Area (well MW-4, 1.5 µg/l).

Lead was detected in shallow groundwater in the Lakebed Area (well MW-1) and in a groundwater seep at the toe of the Tailings Pile (location S-2) at concentrations below the Primary MCL. Lead was detected in upgradient background surface water at concentrations exceeding the Primary MCL. Cadmium, mercury, selenium, and silver were not detected in groundwater or surface water.

5.3.5 Potential for Future Tailings Transport

The Lakebed Area is generally vegetated and is hydraulically controlled by a concrete arch dam. Therefore, the potential for transport of tailings from the Lakebed Area is low.

Most of the surface area of the Tailings Pile is covered with a thin layer of locally-borrowed soil (Photo 56) reportedly added prior to 1960 to control wind-blown tailings dust. The soil cover thickness typically ranges from approximately 4 to 6 inches, and annual grasses are established in areas where soil cover is present. In some areas, tailings are mixed with the soil cover. The soil cover layer reduces erosion of the Tailings Pile and contact between stormwater runoff and tailings and increases sediment retention. There are, however, several areas where tailings are exposed (Photo 55, for example). The tailings lack nutrients and therefore support little vegetation. Exposed tailings on the upper surface and steep faces of the piles may have been caused by erosion of cover soil or mechanical excavation as discussed in Section 2.6.4. Uncovered tailings have the potential to be transported by wind or stormwater runoff, although the transported particles would likely be retained on the densely vegetated surfaces around the Tailings Pile.

A site neighbor described slope instability on the western slope of the Tailings Pile that occurred in the 1950s and transported tailings off-site to the west across Main Street. Although additional slope failure is not anticipated, a slope stability analysis is required as part of the remedial design. The slope stability analysis should be based on the results of subsurface investigation and laboratory strength testing and should evaluate factors of safety under static loading (considering the final grades with additional soil cover) and dynamic (seismic) loading.

5.3.6 Summary of the Evaluation

Arsenic, iron, and manganese concentrations in seasonal surface water at the Lakebed Area and in shallow groundwater in contact with the Lakebed Area tailings exceed water quality objectives. Concentrations of these constituents detected in deeper groundwater beneath the Lakebed Area and in surface water downgradient of the Lakebed Area do not exceed water quality objectives, suggesting that the contaminant concentrations are attenuated during downgradient transport. Therefore, remedial action does not appear to be required to protect water quality downgradient of the Lakebed Area.

Arsenic, iron, manganese, and cyanide concentrations (Table 25 and Section 5.3.4) in groundwater in the Tailings Pile, groundwater seepage at the toe of the Tailings Pile, and surface water downgradient of the Tailings Pile exceed water quality objectives. Downgradient surface water is impacted by seepage that originates from meteoric water collected in the Tailings Pile:

- Seep S-2 is located near the southern site boundary and drains south to Jackson Creek via the ephemeral drainage course originating from the tailings impoundment dam.
- Seep S-3 is located near the western site boundary and drains overland to a storm drain beneath North Main Street, and then west and south to North Fork Jackson Creek, which empties into Jackson Creek.

Therefore, remedial action is appropriate to reduce the meteoric water infiltration into the Tailings Pile. Covering of the Tailings Pile and routing of surface water drainage around the Tailings Pile would reduce surface water infiltration and leaching of contaminants from the Tailings Pile. Stability of the Tailings Pile under static and dynamic (seismic) loading should be evaluated as part of the remedial design.

6.0 REMEDIAL ACTION OBJECTIVES

This section establishes remedial action objectives (RAOs) pursuant to 40 CFR 300.430. The RAOs are intended to specify contaminants and media of concern, potential exposure pathways, and remediation goals. The remediation goals are acceptable exposure levels that are protective of human health and the environment and do not conflict with applicable, relevant and appropriate requirements (ARARs) under federal and state environmental law.

For known or suspected carcinogens, acceptable exposure levels are generally represented by contaminant concentrations that present an excess upper bound lifetime cancer risk to an individual of between one in ten thousand and one in one million, using information on the relationship between dose and response. For systemic toxicants, remediation goals generally represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety.

Remediation goals must also consider factors related to technical limitations such as metals concentrations in ambient soil, detection/quantification limits for contaminants, factors related to uncertainty, and other pertinent information.

6.1 ARARs

The *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP) requires compliance with ARARs during remedial actions to the extent practicable. ARARs include federal, state, and local environmental laws, regulations, and standards that can be chemical-specific, location-specific, or action-specific. Chemical-specific ARARs are health-based or environmentally-based numerical limits pertaining to the amount of a contaminant released to the environment or allowed to remain in the environment as a result of the proposed remedial activity. Location-specific ARARs may restrict remedial action if the proposed action is located in an environmentally sensitive or historically significant area. Action-specific ARARs may restrict remedial action based on the specific remedial action and/or byproducts of the remedial action. ARARs are described below.

6.1.1 Chemical-Specific ARARs

6.1.1.1 Resource Conservation and Recovery Act

Resource Conservation and Recovery Act (RCRA) Subtitle C, contained in 40 CFR, pertains to the characterization of hazardous waste. The site investigation findings indicate that some of the materials at the site could be classified as hazardous waste under federal guidelines with respect to the constituents analyzed, based on the results of laboratory analysis for total and extractable metals and in the event that the material was planned to be removed from the site for off-site disposal. Therefore, RCRA Subtitle C is applicable.

Site investigation findings indicate that the potential for acid generation is low and the potential for discharge or leaching of heavy metals at concentrations that would significantly impact surface water or groundwater quality is low, indicating that the mine waste, when considered as a whole, is suitable for management as Group C mine waste as defined in California Code of Regulations (CCR) Title 27 Section 2248(b).

6.1.1.2 California Code of Regulations Title 22

CCR Title 22 Division 4.5 sets forth standards for management of hazardous waste. Section 66261 of CCR Title 22 pertains to the characterization of hazardous waste. The site investigation findings indicate that some of the mine waste could be classified as hazardous waste with respect to the constituents analyzed, based on the results of laboratory analysis for extractable arsenic concentrations and in the event that the material was planned to be removed from the site for off-site disposal. CCR Title 22 is applicable.

CCR Title 22 Section 66261.4(b)(5)(B) provides an exclusion from the requirements of CCR Title 22 Division 4.5 and Chapter 6.5 of the HSC for waste from the extraction, beneficiation, and processing of ores and minerals, as those terms are defined in HSC Section 25143.1, which would otherwise be classified as a non-RCRA hazardous waste pursuant to CCR Title 22 Section 66261.101. These wastes remain subject to HSC Chapter 6.5, Article 9.5 if the wastes would otherwise be classified as hazardous wastes pursuant to HSC Section 25117 or CCR Title 22 Division 4.5.

6.1.1.3 California Code of Regulations Title 27

CCR Title 27 Section 22480 sets forth groups of mining waste. Group B mining wastes are defined as:

- Mining wastes that consist of or contain hazardous wastes that qualify for a variance under CCR Title 22 Division 4.5, Chapter 11 provided that such mining wastes pose a low risk to water quality; or
- Mining wastes that consist of or contain non-hazardous soluble pollutants at concentrations which exceed water quality objectives for, or could cause, degradation of waters of the state.

Title 27 Section 22480(d) requires that mining waste be treated or neutralized whenever feasible to minimize the threat to water quality and minimize the need to install waste containment structures. In reaching decisions regarding classification of a mining waste as a Group B or Group C waste, the following factors can be considered:

- Whether the waste contains hazardous constituents only at low concentrations;
- Whether the waste has no or low acid-generating potential; and
- Whether, because of its intrinsic properties, the waste is readily containable by less stringent measures.

Site investigation findings indicate that the overall potential for acid generation is low and the potential for discharge or leaching of heavy metals at concentrations that would significantly impact surface water or groundwater quality is low, indicating that the mine waste, when considered as a whole, may be suitable for management as Group C mine waste as defined in CCR Title 27 Section 22480(b). Group C mining wastes are defined as wastes from which any discharge would comply with the applicable water quality control plan (Basin Plan), including water quality objectives other than turbidity. Reduction of meteoric water infiltration into the Tailings Pile by capping and surface water routing is appropriate to reduce the discharge of seepage with concentrations of arsenic, iron, and manganese exceeding water quality goals.

6.1.1.4 California Toxicity Criteria Rule

The California Toxicity Criteria Rule (TCR) requires that HHRAs, risk-based screening levels and remediation goals use the specific toxicity criteria as listed in Appendix I of the TCR, pursuant to the Hazardous Substances Account Act (HSC §25300 et seq., Chapter 6.8 and CCR §69021). The TCR is applicable, as it applies to all sites undergoing cleanup under the following laws:

- the Hazardous Waste Control Act (HSC section 25100 et seq., also known as "Chapter 6.5");
- the Hazardous Substances Account Act (HSC section 25300 et seq. also known as "Chapter 6.8"); and
- the California Land Reuse and Revitalization Act (HSC section 25395.60, et seq.).

6.1.1.5 Regional Screening Levels

The United States Environmental Protection Agency (USEPA) Region 9 Regional Screening Levels (RSL) are applicable as a screening tool. RSLs are modified by Cal/EPA when California-specific toxicity criteria are available and are promulgated as DTSC HHRA Note 3 Screening Levels (DTSC-SL). Metals concentrations in some portions of the site exceed their corresponding screening levels in residential and commercial soil. For arsenic, however, its management in soil is typically based on background concentrations because background arsenic concentrations in soil commonly exceed the DTSC-SLs for arsenic in residential and commercial soil.

6.1.1.6 California Water Code

Division 7 of the CWC establishes priorities for the RWQCB, and guidance and numerical limits are presented in various documents. The Basin Plan (RWQCB, 2019), DLM (RWQCB, 1989), Antidegradation Policy (SWRCB, 1968), and *A Compilation of Water Quality Goals* (RWQCB, 2023) establish policies, procedures, and numerical limits for protection of surface water and groundwater quality. Site investigation findings indicate that remedial action is appropriate for the Tailings Pile with respect to water quality, and the CWC is applicable.

6.1.2 Location-Specific ARARs

6.1.2.1 National Historic Preservation Act

The National Historic Preservation Act, as set forth in Sections 65 and 800 of CFR Title 36, pertains to cultural resources and historic sites. The proposed remedial action is subject to CEQA review and is not expected to result in the disturbance of significant cultural resources or historic sites. The proposed remedial action will comply with the National Historic Preservation Act and will be performed in a manner that will not disturb significant cultural resources or historic sites.

6.1.2.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act, as set forth in Section 6.302 of CFR Title 40, pertains in part to wetlands protection and flood management. Wetlands and flood-prone areas have been delineated at the site, and this regulation is applicable. Mitigation of disturbances to wetland and flood-prone areas would be required if the areas are affected by the proposed remedial action. If disturbance is proposed, then a Streambed Alteration Agreement (Section 1600, et seq.) must be obtained from the California Department of Fish and Wildlife (CDFW) prior to implementation of a remedial action.

6.1.2.3 Clean Water Act

The CWA, as set forth in Section 230 of CFR Title 40, pertains to flood-prone areas and wetlands. Wetlands and flood-prone areas have been delineated at the site, and this regulation is applicable. Mitigation of disturbances to wetland and flood-prone areas would be required if these areas are affected by the proposed remedial action. In that case, a CWA Section 404 Individual Permit from the United States Army Corps of Engineers (USACE) would be required prior to implementation of the remedial action.

6.1.3 Action-Specific ARARs

6.1.3.1 Air Resources Board Regulation 93105

Under California law, disturbance of soil and rock that contains ultramafic rock, serpentinite or naturally occurring asbestos (NOA) minerals must be handled as described in Cal/EPA Air Resources Board Regulation 93105, Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. Based on the geology underlying the site and vicinity, NOA is not expected to be present at the site, but may be present in the vicinity, and this regulation is considered to be applicable. Preparation and implementation of a Dust Mitigation Plan and CAMP is typically required as part of remedial action that involves the disturbance of soil containing contaminants.

6.1.3.2 California Water Code

The CWC governs the characterization of waste for disposal to land. Waste disposal to land that is performed as part of the proposed remedial action must comply with the provisions of the CWC.

6.1.3.3 Amador County Code

The remedial action is subject to the requirements of the Amador County Code, including Title 15, Buildings and Construction. A grading permit is required for earthwork and is to be obtained from the County of Amador prior to implementation of remedial action.

6.1.3.4 Amador Air District Rule 218

Rules and regulations promulgated by the Amador Air District are available online at https://www .amadorgov.org/home/showpublisheddocument/41448/637782875137670000. Rule 218 pertains to fugitive dust emissions and generation of visible dust and is applicable to the proposed remedial action.

6.1.3.5 Public Resources Code 4581 and 4621

A Timber Harvesting Plan (Public Resources Code 4581) and a Timberland Conversion Permit (Public Resources Code 4621) are required for a significant timber operation. The proposed remedial action is not expected to include timber operations that involve the removal of conifers. A "significant" timber operation is generally considered to involve the disturbance of more than 2.99 acres of timberland. The referenced codes are not applicable to the proposed remedial action unless involves a significant timber operation.

6.1.3.6 National Pollutant Discharge Elimination System

Pursuant to the National Pollutant Discharge Elimination System (NPDES), coverage under the Construction General Permit (Order No. 2009-0009-DWQ) issued by the SWRCB must be obtained to address discharges of stormwater runoff form construction projects that encompass one acre or more in total acreage of soil disturbance. Because the proposed remedial action will disturb more than one acre of land, a Notice of Intent (NOI) must be submitted and a permit fee must be paid, and a SWPPP must be prepared to address stormwater BMPs for erosion control, sediment retention and waste management.

6.1.4 CEQA

The CEQA is a statute that requires State and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. In response to the passage of the National Environmental Policy Act (NEPA) in 1969, the California Legislature passed CEQA in 1970 as a system of checks and balances for land use development and management decisions in California. CEQA was subsequently codified into the Public Resources Code (Division 13, Section 21000 et seq.). The Resources Agency adopts and certifies certain regulations (known as CEQA Guidelines) to explain and interpret CEQA law. These regulations were codified into the CCR, Title 14, Chapter 3, Section 15000 et seq.

CEQA is a self-executing statute with administrative procedures to ensure comprehensive environmental impact review prior to project approval. The Resources Agency does not enforce CEQA, nor does it review governmental actions for CEQA compliance. If necessary, the public may challenge a CEQA project decision in court. Where a State agency is the lead agency or a responsible/trustee agency, or where the project has statewide, regional, or area-wide significance, such CEQA documents shall be submitted to the State Clearinghouse within the Governor's Office of Planning and Research for processing State agency review.

A CEQA project is a California project that has a potential for resulting in a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment. CEQA applies to discretionary CEQA projects proposed to be carried out or approved by California public agencies, unless an exemption applies.

As required by California law, the DTSC reviewed this RAP in accordance with CEQA. Based on the DTSC's review, and contingent upon the results of the public comment period, the DTSC anticipates that a CEQA MND will be appropriate for the proposed remedial action.

6.2 Media and Contaminants of Concern

The media of concern at the site are soil and water, and the COCs are metals, metalloids and cyanide. Potential exposure pathways include dermal absorption through direct contact with soil or water, ingestion of soil or water, and inhalation of soil dust.

6.3 Quantity Estimates

Decision units are listed in Table 26 and are depicted on Sheet 4, which presents an overview of the proposed remedial action. Quantity estimates are presented in Table 27. The proposed remedial actions and quantity estimates are summarized below.

Area	**Description**	**Materials**	**Proposed Remedial Action**	**Size of Area** (acres)	**Volume of Impacted Material** (cubic yards)
Lakebed Area	Central southern portion of the site, former tailings impoundment comprising approximately 16 acres at the historical high-water line and containing a seasonally inundated, marshy wetland. Historically stored more than 1 million tons of mine tailings (sand and silt) resulting from gold ore extraction (stamp milling and mercury amalgamation) performed off-site at the historical Kennedy Mine north of the site. Currently contains approximately 250,000 cubic yards of tailings.	Mine tailings	Fencing, posting, and land use controls.	15.5	250,000

Area	Description	Materials	Proposed Remedial Action	Size of Area (acres)	Volume of Impacted Material (cubic yards)
Cyanide Process Area	Located on the north-south ridge through the central portion of the site, west of the Lakebed Area and east of the Tailings Pile. Tailings from the Lakebed Area were processed in this area to extract additional gold.	Contaminated surface soil	Fencing, posting, and land use controls.	4.2	6.700
Tailings Pile	Land disposal area in the southwestern portion of the site for approximately one million cubic yards of tailings processed in the cyanide plant. The deck (upper surface) of the Tailings Pile typically slopes gently to the southwest at gradients of 1 to 3 %. The south-facing and west-facing slopes are up to approximately 50 to 60 feet tall.	Mine tailings	Capping with clean soil and land use controls.	29.0	1,000,000
Western Area and Southern Area	The Western Area and Southern Area are between the toe of the Tailings Pile and the site boundary, are to be included in the Tailings Pile LUC, and will be subject to an O&M Agreement and SMP to restrict unauthorized disturbance. No cap is proposed. Recreational trails must be constructed in soil representative of non-mineralized background arsenic conditions unless an alternative benchmark value is approved by the DTSC.	Mine tailings and contaminated soil	Land use controls	5.3	28,741
Isolated Tailings Areas to be Excavated	Tailings are present at the ground surface at isolated areas, typically less than 2 feet deep, as a result of historical erosion, surface water transport, mechanical transport, and track out. Tailings that do not meet the remedial action goals are to be excavated, transported within the site, and consolidated at the Tailings Pile.	Mine tailings	Excavation, verification sampling and analysis, and consolidation at the Tailings Pile.	7.9	13,904
Naturally Mineralized Shear Zone	A band of highly altered bedrock, typically 450 to 600 feet wide, forms a ridge trending north-northwest through the center of the site (Sheet 1; Photos 17 through 24) and represents the Melones Fault Zone, which juxtaposes the Calaveras Formation (to the east) to the younger Mariposa Formation (to the west). Jurassic (201 to 145 mya) hydrothermal emplacement processes altered this band of bedrock and the adjoining bedrock.	Naturally mineralized soil and bedrock	None. Avoidance of highly mineralized soil is recommended.	54	not applicable
Remainder of Site	Annual grassland and blue oak woodland.	None	None.	62	not applicable

The isolated tailings areas (Sheet 4) are listed below. Details are presented in Table 27.

Isolated Tailings Areas	**Estimated Area** (acres)	**Estimated Volume** (cubic yards)
Tailings to be Excavated and Placed in the Tailings Pile		
Pond Area	0.5	1,630
Hot Spot at Sample SOIL16	0.05	148
Hot Spot at Sample SOIL25	0.05	148
Hot Spot at Sample HA-74	0.14	444
Northern Area	0.26	422
Ridge Area[1]	0.6	963
Dam Area	0.5	815
Southeast Area	4.1	6,667
Lakebed Track Out Area	1.7	2,667
Total Estimated Quantity of Tailings to be Excavated		**13,904**
Tailings to Remain in Place Adjacent to the Tailings Pile under the Tailings Pile LUC		
Western Area	1.6	5,037
Southern Area	3.7	23,704
Total Estimated Quantity of Tailings to Remain Under LUC		**28,741**

1 Area and volume estimates for the Ridge Area do not include portions within the Cyanide Process Area.

The surface area and depth estimates listed in Table 27 are based on existing laboratory data and are to be refined by pre-excavation sampling and analysis. Results of the pre-excavation sampling and analysis and revised quantity estimates are to be presented in the RDIP.

6.4 Remedial Action Goals

The goal of the remedial action is to reduce to acceptable levels the potential human health risk and water quality impact associated with the environmental conditions identified at the site.

The remedial action is intended to reduce the potential for routine contact with waste having elevated metals concentrations, and to reduce the potential for leaching and erosion, by excavation, consolidation on-site at a designated location, capping with clean engineered fill, and establishment of land use controls. At locations of remedial excavation, post-excavation sampling and analysis are required to verify that the underlying materials are acceptable for the intended land use (recreational trail use).

Land use controls are required where waste remains in place (the Lakebed Area, Cyanide Process Area, and Tailings Pile) to limit contact with contaminated soil that is to remain on-site, and to restrict future residential use of portions of the site that are remediated to non-residential standards:

1. A LUC is required to memorialize the land use controls.
2. An O&M Agreement is required to set forth procedures for routine visual monitoring and reporting.
3. Where recreational use is proposed (the Tailings Pile) the waste must be covered with clean engineered fill and protected from erosion using storm water best management practices.

4. Where public access is to be restricted and the potential for contaminant transport is low (the Lakebed Area and Cyanide Process Area), fencing and posting are required.
5. Routine monitoring is to be performed to verify the protectiveness of the remedial action.

Table 26 presents numerical cleanup goals for each decision unit based on the background condition (mineralized or non-mineralized) and the proposed land use. Table 2a lists all soil metals data by decision unit. Arsenic is the primary contributor to hazard and risk for all exposure scenarios, and mercury contributes significantly to hazard under the unrestricted (residential) land use scenario. For other exposure scenarios (industrial, commercial, recreational trail use, and construction worker), arsenic is the only significant contributor to hazard and risk, and other COCs do not contribute significantly. Therefore, the following benchmark concentrations for arsenic in soil inform the remedial design.

Benchmark Concentration for Arsenic in Soil	Value
BTV, Non-Mineralized Background	20.7 mg/kg
BTV, Mineralized Background	120 mg/kg

BTV = background threshold value, mg/kg = milligram per kilogram

Maximum arsenic concentrations detected at each assessment location from all sampled depths in tailings, soil or weathered rock are depicted on Sheet 3. The assessment locations are color-coded by comparison to the cleanup goal and BTVs listed above. The Cyanide Process Area is located on the naturally mineralized ridge that crosses the site from north to south. The maximum arsenic concentration detected in naturally mineralized soil and weathered bedrock (1,300 mg/kg) and the BTV for arsenic in naturally mineralized soil and weathered bedrock (120 mg/kg) are higher than the BTV for arsenic elsewhere on the site (20.7 mg/kg). Background arsenic concentrations are evaluated in Section 4.5, and risk and hazard associated with the naturally occurring background soil arsenic concentrations are described in Section 5.1.7.1.

6.4.1 Cleanup Goals for Unrestricted Land Use

Isolated tailings are to be removed from non-mineralized background locations, and no land use controls are proposed for these areas. The cleanup goals for unrestricted land use are listed in the table below for isolated tailings at the Pond Area, and hot spots at sample locations SOIL16, SOIL25, and HA-74 (including SOIL30).

Decision Unit	Background Condition	Arsenic (mg/kg)		Lead (mg/kg)		Mercury (mg/kg)	
		BTV	Max	RBCL	Max	RBCL	Max
Isolated Tailings Areas to be Excavated from Non-Mineralized Background Locations							
Pond Area	Non-mineralized	20.7	**98**	80	70	1.0	**15**
Hot Spot SOIL16	Non-mineralized	20.7	**502**	80	**386**	1.0	**28**
Hot Spot SOIL25	Non-mineralized	20.7	**160**	80	**102**	1.0	**5.9**
Hot Spot HA-74	Non-mineralized	20.7	**230**	80	31.4	1.0	**1.9**

BTV = background threshold value, RBCL = risk-based cleanup level, UCL = upper confidence limit
Values in bold font exceed the cleanup goal.

The BTV cleanup goal for arsenic is a not-to-exceed value. The risk-based cleanup levels (RBCL) for lead and mercury are UCL goals that apply to exposures for any portion of the cleanup area that represents a typical exposure area, such as a typical rural residential lot size (i.e., 10,000 square feet). The decision unit size and the statistical methodology related to the UCL goal must be established as part of a verification sampling and analysis plan (VSAP) for DTSC review.

For other COCs listed in the table below, the maximum detected site concentration is lower than the screening level for the COC in residential soil. Cyanide was detected only in saturated materials near the base of the Tailings Pile and was not detected in shallow tailings. Therefore, no verification sampling and analysis is proposed and no cleanup goal is established for these COCs.

COCs Less than Screening Levels	Maximum Detected Site Concentration (mg/kg)	Screening Level for Residential Soil (mg/kg)	Basis for Screening Level
Cadmium	6.6	7.1	DTSC-SL
Molybdenum	120	390	RSL
Selenium	4.8	390	RSL
Cyanide	21.9	23	RSL

DTSC-SL = DTSC Screening Level; RSL = USEPA Regional Screening Level; mg/kg = milligram per kilogram

6.4.2 Cleanup Goals for Mineralized Background Locations

Isolated tailings are to be removed from mineralized background locations, and the mineralized background locations are to be restricted from future residential development. The cleanup goals for the mineralized background locations are based on the mineralized arsenic BTV and the commercial/ industrial cleanup goals for lead and mercury listed in the table below for isolated tailings at the Northern Area, Ridge Area, Dam Area, Southeast Area, and Lakebed Track Out Area. As discussed in Sections 5.1.7.5, 5.1.7.6, and 5.1.8, the commercial/industrial RBCLs listed below for lead and mercury are acceptable under the recreational use scenarios evaluated in the risk assessment.

Decision Unit	Background Condition	Arsenic (mg/kg)		Lead (mg/kg)		Mercury (mg/kg)	
		BTV	Max	RBCL	Max	RBCL	Max
Isolated Tailings Areas to be Excavated from Mineralized Background Locations							
Northern Area	Mineralized	120	**150**	500	na	4.4	na
Ridge Area	Mineralized	120	98	500	72	4.4	**20**
Dam Area	Mineralized	120	120	500	na	4.4	na
Southeast Area	Mineralized	120	**240**	500	68	4.4	4.4
Lakebed Track Out Area	Mineralized	120	**130**	500	51.4	4.4	4.1

BTV = background threshold value, na = not analyzed, RBCL = risk-based cleanup level, UCL = upper confidence limit
Values in **bold** font exceed the cleanup goal.

The BTV cleanup goal for arsenic is a not-to-exceed value. The RBCLs for lead and mercury are UCL goals that apply to exposures for any portion of the cleanup area that represents a typical exposure area, such as a typical commercial lot size (i.e., 10,000 square feet). The decision unit size and the statistical methodology related to the UCL goal must be established as part of a verification sampling and analysis plan (VSAP) for DTSC review.

For other COCs listed in the table below, the maximum detected site concentration is lower than the screening level for the COC in commercial/industrial soil. Cyanide was detected only in saturated materials near the base of the Tailings Pile and was not detected in shallow tailings. Therefore, no verification sampling and analysis is proposed, and no cleanup goal is established for these COCs.

COCs Less than Screening Levels	Maximum Detected Site Concentration (mg/kg)	Screening Level for Commercial Soil (mg/kg)	Basis for Screening Level
Cadmium	6.6	79	DTSC-SL
Lead	400	500	DTSC-SL
Molybdenum	120	5,800	RSL
Selenium	4.8	5,800	RSL
Cyanide	21.9	150	RSL

DTSC-SL = DTSC Screening Level; RSL = USEPA Regional Screening Level; mg/kg = milligram per kilogram

6.4.3 Other Decision Units

No soil removal is proposed for the Lakebed Area, the Cyanide Process Area, the Tailings Pile, and the Southern Area and Western Area adjoining the Tailings Pile. These decision units are subject to land use controls.

As summarized in the table below, arsenic and mercury concentrations in the Lakebed Area, Cyanide Process Area, and Tailings Pile are not suitable for commercial/industrial use. The Tailings Pile is to be capped with clean imported soil to facilitate recreational use.

No cap is proposed for the Western Area or Southern Area; however, recreational trails proposed for the Western Area and Southern Area adjoining the toe of the Tailings Pile must be constructed in soil representative of non-mineralized background arsenic conditions unless an alternative benchmark value is approved by the DTSC. As discussed in Sections 5.1.7.5, 5.1.7.6, and 5.1.8, the commercial/industrial RBCLs listed below for the Western Area and Southern Area are acceptable under the recreational use scenarios evaluated in the risk assessment.

Decision Unit	**Background Condition**	**Arsenic** (mg/kg)			**Lead** (mg/kg)		**Mercury** (mg/kg)	
		BTV	**Max**	**95% UCL**	**RBCL**	**Max**	**RBCL**	**Max**
Decision Units to be Closed in Place with Land Use Controls								
Lakebed Area	Non-mineralized	20.7	**333**	**125**	500	63	4.4	**9.7**
Cyanide Process Area	Mineralized	120	**450**	**185**	500	71	4.4	0.5
Tailings Pile	Non-mineralized	20.7	**263**	**125**	500	400	4.4	**10**
Isolated Tailings Areas to be Restricted with the Tailings Pile								
Western Area and Southern Area	Non-mineralized	20.7	**59**	--	500	23	4.4	1.2

BTV = background threshold value, RBCL = risk-based cleanup level, UCL = upper confidence limit,
-- = no central-tendency value was determined for sample populations less than eight

7.0 EVALUATION OF REMEDIAL ACTION ALTERNATIVES

This RAP is intended to serve as the equivalent of an Engineering Evaluation/Cost Analysis (EE/CA) pursuant to requirements set forth in the NCP. Remedial alternatives are evaluated based on effectiveness, implementability, and cost. Remedial alternatives evaluated in this section include:

1. No Action,
2. On-Site Consolidation Under Land Use Controls, and
3. Off-Site Disposal.

7.1 Overview

Pursuant to 40 CFR Part 300.430, as determined appropriate and to the extent sufficient information is available the short-term and long-term aspects of the following three criteria are to be used to guide the development and screening of remedial alternatives:

- *Effectiveness* – This criterion focuses on the degree to which an alternative reduces toxicity, mobility, or volume through treatment, minimizes residual risks and affords long-term protection, complies with ARARs, minimizes short-term impacts, and how quickly it achieves protection. Alternatives providing significantly less effectiveness than other more promising alternatives are eliminated. Alternatives that do not provide adequate protection of human health and the environment are also eliminated from further consideration.
- *Implementability* – This criterion focuses on the technical feasibility and availability of the technologies each alternative would employ and the administrative feasibility of implementing the alternative. Alternatives that are technically or administratively infeasible or that would require equipment, specialists, or facilities that are not available within a reasonable period of time are eliminated from further consideration.
- *Cost* – The costs of construction and any long-term costs to operate and maintain the alternatives are to be considered. Costs that are grossly excessive compared to the overall effectiveness of alternatives are considered as one of several factors used to eliminate alternatives. Alternatives providing effectiveness and implementability similar to that of another alternative by employing a similar method of treatment or engineering control, but at greater cost, may be eliminated.

The scope of the analysis is intended to reflect complexity of the recognized environmental conditions and the complexity of the proposed remedial alternatives. The analysis considers the relative significance of the following criteria:

- *Overall protection of human health and the environment* – Alternatives are assessed to determine whether they can adequately protect human health and the environment, in both the short term and long term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site. Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

- *Compliance with ARARs* – The alternatives are assessed to determine whether they attain applicable or relevant and appropriate requirements under federal environmental laws and state environmental or facility citing laws or provide grounds for invoking waivers from such laws.
- *Long-term effectiveness and permanence* – Alternatives are assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful.
- *Reduction of toxicity, mobility, or volume through treatment* – The degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume.
- *Short-term effectiveness* – Potential short-term impacts are associated with: (1) short-term risks that might be posed to the community during implementation of an alternative; (2) potential impacts on workers during remedial action, and the effectiveness and reliability of protective measures; (3) potential short-term environmental impacts of the remedial action, and the effectiveness and reliability of mitigation measures to be employed during implementation; and (4) the time frame required for the remedial action to be completed.
- *Implementability* – Implementability is associated with the ease or difficulty of implementing the alternatives, considering technical feasibility, administrative feasibility, and availability of services and materials.
- *Cost* – Costs include capital costs (direct and indirect) and O&M costs.
- *State acceptance* – State concerns include the state's position related to the preferred alternative and other alternatives, and state comments on ARARs or the proposed use of waivers.
- *Community acceptance* – Public review is to be performed to assess community support, reservations and/or opposition to components of the proposed remedial action.

The nine criteria listed above are categorized into three groups:

- *Threshold criteria* – Threshold criteria include overall protection of human health and the environment and compliance with ARARs (unless a specific ARAR is waived). Each alternative must meet the threshold criteria to be eligible for selection.
- *Primary balancing criteria* – The five primary balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.
- *Modifying criteria* – State and community acceptance are modifying criteria that are considered in remedy selection.

The remedial alternative that best meets the requirements above is identified and presented to the public in this RAP, which:

1. Provides a summary description of the remedial alternatives;
2. Provides a discussion of the rationale that supports the preferred alternative;
3. Provides a summary of any formal comments received from the support agency; and
4. Provides a summary explanation of any proposed waiver from an ARAR.

7.2 Remedial Action Alternatives

The evaluation of remedial action alternatives is summarized below. Details are provided in the following sections.

Remedial Alternatives and Evaluation Criteria		
No Action	**On-Site Consolidation Under Land Use Controls**	**Off-Site Disposal**
Threshold Criteria		
(1) Overall Protection of Human Health and the Environment		
The No Action alternative does not provide adequate protection of human health or water quality.	Consolidation and deed restriction effectively reduces potential direct exposure pathways. Risk to water quality is reduced by capping and drainage routing to reduce surface water infiltration into the Tailings Pile. Long-term maintenance, monitoring and reporting are required.	Landfill disposal effectively reduces the chance of future contact and protects water quality. Excavation of tailings from the Lakebed Area would impact the wetland habitat.
(2) Compliance with ARARs		
The No Action alternative does not comply with the ARARs.	On-Site Consolidation Under Land Use Controls complies with the ARARs.	Off-Site Disposal complies with the ARARs. Mitigation would be required for removal of mine tailings from wetlands and other sensitive areas.
Primary Balancing Criteria		
(3) Long-term Effectiveness and Performance		
Does not control contaminated materials and does not provide long-term effectiveness.	Effective in the long term by consolidation of contaminated materials under institutional controls with long-term monitoring and reporting. Long-term performance relies upon compliance with institutional controls.	Effective in the long term by removal of contaminated materials from the site.
(4) Reduction of Toxicity, Mobility, or Volume through Treatment		
None.	None.	None.
(5) Short-term Effectiveness		
The No Action alternative does not affect baseline conditions in the short term.	Short-term impacts to human health are mitigated by provisions set forth in a HSP, DMP and CAMP.	Short-term impacts to human health are mitigated by provisions set forth in a HSP, DMP and CAMP.
(6) Implementability		
No implementation required.	Readily implemented. Labor, material, and equipment readily available. Requires land use controls to reduce the chance of future contact. Off-site disposal will be required for excavated materials that exceed hazardous waste criteria.	Readily implemented. Labor, material, and equipment readily available. Requires significant truck traffic through city streets and generates greenhouse gasses.
(7) Cost		
No direct costs, unknown future costs.	Moderate direct costs associated with excavation, dust control, on-site transport, placement, and compaction. Monitoring, reporting and regulatory oversight costs are required in the future.	Very high direct costs associated with off-site transport and landfill disposal. No ongoing costs anticipated.

Remedial Alternatives and Evaluation Criteria		
No Action	**On-Site Consolidation Under Land Use Controls**	**Off-Site Disposal**
Modifying Criteria		
(8) State Acceptance		
To be determined.	To be determined.	To be determined.
(9) Community Acceptance		
To be determined.	To be determined.	To be determined.

ARAR = applicable or relevant and appropriate requirement, CAMP = Community Air Monitoring Plan, HSP = Health and Safety Plan, DMP = Dust Mitigation Plan

7.2.1 No Action

The No Action alternative includes leaving contaminated soil and mine waste in its existing condition without engineering or institutional controls. The evaluation of this alternative is summarized below.

Effectiveness

- Does not provide adequate protection of human health and the environment
- Does not effectively reduce risks
- Does not afford short-term or long-term protection
- Does not comply with ARARs

Implementability

- Immediately implementable
- Labor, material, and equipment not needed
- Administratively infeasible based on ARARs

Cost

- No direct costs
- Unknown future costs

The No Action alternative does not provide adequate protection of human health and water quality and does not comply with ARARs. Therefore, the No Action alternative was eliminated from further consideration.

7.2.2 On-Site Consolidation

The On-Site Consolidation alternative includes the excavation of contaminated soil and mine waste from isolated tailings areas; verification soil sampling and analysis to confirm that the remedial goals have been achieved; and consolidation of the waste and affected soil on-site at the Tailings Pile. Off-site disposal will be required for excavated materials that exceed hazardous waste criteria. Provided that soil verification sampling and analysis results meet the remedial goals, the excavation areas would be suitable for recreational, commercial, or industrial land use. Future residential use would be restricted.

After consolidation, the Tailings Pile and surrounding area will be graded to direct surface water runoff away from the Tailings Pile; drainage infrastructure (berms, ditches, overside drains, and detention ponds) will be constructed; and the Tailings Pile will be covered with a clean soil cap to facilitate future recreational use.

The Lakebed Area and Cyanide Process Area are to be fenced and posted to restrict public access. A LUC and O&M Agreement are required for the Lakebed Area, Cyanide Process Area, and Tailings Pile. Worker health and safety will be addressed by implementing engineering controls, including those outlined in a Dust Mitigation Plan (DMP) and Community Air Monitoring Plan (CAMP) to be prepared as part of a future RDIP, and site-specific Health and Safety Plans (HSP) prepared by the parties involved.

Effectiveness

- Consolidation of the mine waste and contaminated soil, and restriction of access to its location, effectively reduces human health risk by eliminating potential exposure pathways (incidental ingestion, inhalation of airborne particulates, and dermal contact with the impacted soil).
- Covering the Tailings Pile with clean engineered fill, routing of surface runoff around the Tailings Pile, and implementation of Best Management Practices (BMPs) for erosion and sediment control will reduce surface water infiltration, leaching of the tailings, and potential impacts to water quality.
- The remedial alternative includes significant truck traffic for import of clean cover soil to cap the Tailings Pile. Trucks would access the site via State Route (SR) 49, turning northeast on SR 88, and after ½ mile, left on Court Street and then right on New York Ranch Road. The trucks would travel ½ mile north on New York Ranch Road before turning left into the site. Empty trucks would follow the reverse route. An estimated 82,850 cubic yards of clean cover soil would be imported to the site or borrowed from the site. If all of the soil is imported, and each truck transports 18 cubic yards of soil, an estimated 4,600 truck trips would be required.
- No off-site transport is proposed as part of the remedial action unless the excavated waste materials are classified as hazardous waste. If hazardous waste is identified, it will be transported from the site to a licensed solid waste disposal facility using the local route described above. Trucks would exit the site at its eastern boundary, turning right (south) on New York Ranch Road, left (east) onto Court Street, and then right (southwest) onto SR 88, continuing ½ mile to the junction of SR 88 and SR 49.
- Short-term health impacts associated with remediation would be addressed by provisions set forth in a DMP, a CAMP, and HSPs prepared by the parties involved.
- Requires an LUC and O&M Agreement for the Lakebed Area, Cyanide Process Area, and Tailings Pile, where contaminated mine waste and soil are to remain at the site. The LUC and O&M Agreement are intended to facilitate long-term protection of human health by restricting future disturbance.
- Requires environmental monitoring to confirm that the remedial action is protective of human health and the environment.

Implementability

- Readily implemented
- Labor, material and equipment readily available

Cost

An RA cost estimate is presented in Appendix J and is summarized below.

- Capital costs are estimated to be $7,300,976 for excavation, on-site consolidation and capping, surface and subsurface drainage improvements, site restoration and quality assurance. A cost estimate is presented in Table J1 of Appendix J.
- The capital costs include direct costs (estimated $5,675,813), 20% contingency, and indirect costs (estimated $490,000) associated with engineering design, site control, monitoring, quality assurance, DTSC oversight, and development of a LUC and O&M Agreement.
- The estimated net present value of the 30-year O&M cost associated with the LUC is $372,851. The O&M cost estimate is presented in Appendix J, Tables J3 through J9.

7.2.3 Off-Site Disposal

The Off-Site Disposal alternative includes excavation of contaminated mine waste and soil; verification soil sampling and analysis to confirm that the remedial goals are achieved; characterization of the excavated soil for disposal in accordance with landfill acceptance criteria; transport of the contaminated mine waste and soil for disposal at licensed facilities in accordance with applicable regulations; and site restoration. Procedures required for dust control and erosion control would be addressed in a DMP and CAMP. Worker health and safety would be addressed in site-specific HSPs prepared by the parties involved. The evaluation of this alternative is summarized below.

Effectiveness

- Effectively protects human health by eliminating the potential exposure pathways.
- Short-term impacts associated with remediation would be reduced by provisions set forth in a DMP, a CAMP, and HSPs prepared by the parties involved.
- Affords long-term protection of human health and the environment.
- Requires a LUC to restrict future residential use of portions of the site that are remediated to commercial/industrial standards.
- Complies with ARARs related to protection of human health and the environment.

Implementability

- Readily implemented.
- Technically feasible.
- Offhaul of an estimated 1,263,900 cubic yards of contaminated mine waste and soil requires 70,200 truck trips if each truck transports 18 cubic yards of soil. Off-site transport results in significant road use and greenhouse gas emissions. Trucks would exit the site at its eastern boundary, turning right (south) on New York Ranch Road, left (east) onto Court Street, and then right (southwest) onto SR 88, continuing ½ mile to the junction of SR 88 and SR 49. Trucks hauling Class II non-hazardous waste would proceed to a local non-hazardous waste landfill. Trucks hauling Class I hazardous waste would proceed to a Class I solid waste facility such as the US Ecology Beatty disposal facility in Beatty, Nevada; the Waste Management facility in Kettleman Hills, California; or Clean Harbors Buttonwillow disposal facility in Buttonwillow, California.

- Depending upon the number of trucks hauling, the remedial action may require more than one grading season.

Cost

An RA cost estimate is presented in Appendix J and is summarized below.

- Capital costs for Off-Site Disposal are very high (estimated $141 million) for excavation, transportation, disposal, on-site borrow, placement, erosion control and quality assurance. A cost estimate is presented in Table J2 of Appendix J.
- The capital costs include direct costs (estimated $128 million), 10% contingency, and indirect costs (estimated $305,000) associated with environmental monitoring, quality assurance and DTSC oversight.
- If the site is cleaned up to commercial/industrial standards, a LUC would be required to restrict future residential use.

The Off-Site Disposal alternative is not likely feasible based on cost and presents potential concerns related to truck traffic and greenhouse gas emissions.

7.3 Selected Remedial Action

On-Site Consolidation is the preferred remedial alternative because this option is protective of human health and the environment while mitigating the cost, traffic impacts and greenhouse gas impacts associated with off-site disposal.

7.3.1 Summary of Decision Units and Remedial Actions

Decision units are depicted on Sheets 1 through 4. Table 26 lists the decision units, background conditions, proposed land use, and applicable cleanup goals. Soil metals and cyanide data are sorted by decision unit in Table 2a and are compared to cleanup goals and benchmark values. Cleanup goals have been established for arsenic, lead, and mercury, as discussed in Section 6.4. Remedial actions are summarized below.

7.3.1.1 Lakebed Area

Access to the Lakebed Area is to be restricted by fencing and posting, and use is to be prohibited under a LUC.

7.3.1.2 Cyanide Process Area

Access to the Cyanide Process Area is to be restricted by fencing and posting, and use is to be prohibited under a LUC.

7.3.1.3 Tailings Pile

The Tailings Pile is to be re-graded and capped to restrict access to tailings and impacted soil and to facilitate future public recreational use. Soil to be imported to the site for use as the Tailings Pile closure cap must meet criteria for unrestricted land use pursuant to the DTSC *Information Advisory – Clean*

Imported Fill Material (2001). Arsenic concentrations in imported soil must comply with the non-mineralized arsenic BTV of 20.7 mg/kg. The closure cap is intended to provide a physical barrier above the tailings that is suitable for park use, including but not limited to sports fields and trails. Unauthorized disturbance of the closure cap and underlying tailings is to be prohibited under a LUC.

7.3.1.4 Isolated Tailings Areas

Isolated Tailings in Non-Mineralized Locations

Tailings and impacted soil (including the exceedances listed in Table 26) are to be excavated from the Pond Area and hot spot locations SOIL16, SOIL25, and HA-74 (including SOIL30) and placed as engineered fill in the Tailings Pile. Metals concentrations detected in soil at the hot spot locations are listed in Table 2a.

Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

Post-excavation verification soil sampling and analysis are required for arsenic, lead, and mercury. The Pond Area and other hot spots in non-mineralized background locations are to be cleaned up to unrestricted land use criteria, including the non-mineralized arsenic BTV, as no land use controls are proposed. Cleanup goals for unrestricted land use are summarized below.

COC	Cleanup Goal for Unrestricted Land Use	Background Condition	Basis for Cleanup Goal	Type of Cleanup Goal
Arsenic	20.7 mg/kg	Non-mineralized	BTV	Not-to-exceed
Lead	80 mg/kg		RBCL	UCL
Mercury	1.0 mg/kg		RBCL	UCL

BTV = background threshold value, RBCL = risk-based cleanup level, UCL = upper confidence limit

Isolated Tailings in Mineralized Locations

Tailings and impacted soil (including the exceedances listed in Table 26) are to be excavated from the Northern Area, Ridge Area, Dam Area, Southeast Area, and Lakebed Track Out Area and placed as engineered fill in the Tailings Pile. After the proposed soil excavation and removal, these areas are to be restricted from residential use along with the remainder of the mineralized background area. Metals concentrations detected in soil at the hot spot locations are listed in Table 2a.

Pre-excavation soil sampling and laboratory analysis are to be performed to delineate the lateral and vertical extent of the impacted soil. The results of pre-excavation sampling and analysis, and the refined excavation limits, are to be presented in the RDIP.

Post-excavation verification soil sampling and analysis are required for arsenic, lead, and mercury. Cleanup goals are summarized below.

COC	Cleanup Goal for Commercial Land Use	Background Condition	Basis for Cleanup Goal	Type of Cleanup Goal
Arsenic	120 mg/kg	Mineralized	BTV	Not-to-exceed
Lead	500 mg/kg		RBCL	UCL
Mercury	4.4 mg/kg		RBCL	UCL

BTV = background threshold value, RBCL = risk-based cleanup level, UCL = upper confidence limit

Western Area and Southern Area

The Western Area and Southern Area (Sheet 3) are relatively flat-lying areas between the toe of Tailings Pile and the site boundaries. Metals concentrations detected in soil at the Western Area and Southern Area are listed in Table 2a. Soil excavation and residential use are to be restricted under the Tailings Pile LUC. No cap is proposed for the Western Area or Southern Area; however, recreational trails proposed for the Western Area and Southern Area adjoining the toe of the Tailings Pile must be constructed in soil representative of non-mineralized background arsenic conditions unless an alternative benchmark value is approved by the DTSC. As discussed in Sections 5.1.7.5, 5.1.7.6, and 5.1.8, the commercial/industrial RBCLs listed below for the Western Area and Southern Area are acceptable under the recreational use scenarios evaluated in the risk assessment. Sampling and analysis are required for proposed trail alignments in the Western Area and Southern Area. Trails must be routed where arsenic concentrations are below the arsenic RBCL for trail use.

COC	Cleanup Goal for Public Trailed Use	Background Condition	Basis for Cleanup Goal	Type of Cleanup Goal
Arsenic	60 mg/kg	Non-mineralized	RBCL	Not-to-exceed

RBCL = risk-based cleanup level

7.3.1.5 Mineralized Background

Arsenic concentrations detected in naturally mineralized soil and bedrock (Sheet 3) range up to 1,300 mg/kg. Metals concentrations detected in soil in mineralized background locations are listed in Table 2a. Residential use is to be restricted, and no public trails are to be constructed in soil with arsenic concentrations exceeding the BTV for arsenic in mineralized soil. Sampling and analysis are required for proposed trail alignments in the northern end of the mineralized area, north of the Cyanide Process Area. Trails must be routed where arsenic concentrations are below the mineralized arsenic BTV.

COC	Cleanup Goal for Public Trailed Use	Background Condition	Basis for Cleanup Goal	Type of Cleanup Goal
Arsenic	120 mg/kg	Mineralized	BTV	Not-to-exceed

BTV = background threshold value

7.3.1.6 Non-Mineralized Background

No action is proposed for the Background Area and other non-mineralized background locations. Metals concentrations detected in soil at non-mineralized background locations are listed in Table 2a.

As discussed in Section 4.6.5.4, no action is proposed at three locations (HA-93, SOIL20 and SOIL26) where arsenic was detected at concentrations above the BTV because the detections appear to be representative of background conditions and do not significantly affect the central-tendency arsenic value in the northern portion of the Background Area.

As discussed in Section 4.4.7, cobalt was detected at three background locations (BKRD-13, SOIL18, and TP-56) at concentrations exceeding the RSL for cobalt in residential soil. Cobalt is not a contaminant of concern, and the detected concentrations appear to be representative of natural background variation.

As discussed in Section 4.4.15, thallium concentrations exceeding the RSL for thallium in residential soil are considered representative of background, and thallium is not a COC.

7.3.2 Remedial Action Cost Estimate

A cost estimate for the proposed remedial action is presented in Appendix J, Table J1. The total estimated cost ($7,300,976) includes direct costs (estimated $5,675,813), a 20% contingency ($1,135,163) on the direct costs, and indirect costs (estimated $490,000) associated with engineering design, site control, monitoring, quality assurance, DTSC oversight, and development of a LUC and O&M Agreement. The estimate is based on unit costs from local materials suppliers and unit rates obtained from earthwork contractors for similar tasks. Actual costs may vary significantly based on the actual rates, material costs and quantities, and site conditions at the time the work is performed. Bids must be obtained to verify current rates, and remedial design must be performed to verify quantities. The remedial action cost estimate is based on the assumption that 85% of the waste estimated from the isolated tailings areas will be classified as non-hazardous and will be placed in the Tailings Pile as engineered fill, and 15% will be classified as hazardous waste and will be removed from the site. A 20% contingency is added as a percentage of direct costs to address uncertainties related to final grading and drainage design, which will be developed as part of the RDIP. Design of the closure cap using geotextiles may result in significant cost savings and reduction in truck traffic.

7.3.3 O&M Cost Estimate

Post-remediation O&M costs are estimated in Appendix J, Tables J3 through J9. The remedial action is described in Section 9.0 and Sheet 3. The remedial action includes the following elements:

1. Re-grading of the Tailings Pile and capping of the Tailings Pile with clean fill;
2. Routing of surface water drainage away from the Tailings Pile to reduce meteoric water infiltration; and
3. Fencing and posting of the Lakebed Area and Cyanide Process Area to restrict public use.

O&M will be required to address cap and fence maintenance and may be required to address specific causal events such as an earthquake, flood, fire, heavy precipitation, or general degradation of the cap, fences, or monitoring systems. Extreme precipitation is considered a reasonably foreseeable causal event. A low-recurrence storm exceeding the site's design storm event may result in erosion of portions of the soil cover or damage to the storm water conveyance system. Potential mitigation associated with storm damage may include repair of localized erosion of the soil cover and drainage features including berms, culverts, ditches, and overside drains. Sediment may need to be removed from downstream drainage channels.

The 30-year O&M cost estimate is based on:

- Repair of the cap and drainage systems every ten years due to a heavy storm and/or natural degradation (Table J3);
- Repair of fence or sign damage every five years due to treefall or vandalism (Table J4);
- Environmental monitoring (groundwater and surface water) every five years (Table J5);
- Annual inspection, five-year review, and associated DTSC fees.

The O&M cost estimate does not include costs for O&M related to post-cleanup site improvements. The cost estimate should be updated based on the remedial design presented in a forthcoming RDIP, and also upon completion of the remedial action based on the as-built drawings.

Table J6 presents hourly labor and equipment rates pursuant to Caltrans 2023 equipment and labor surcharge rates and prevailing wage determination from the Department of Industrial Relations. Tables J7 and J8 summarize the cost estimate by task and by year, respectively. Table J9 calculates the net present value using a 30-year Real Interest Rate of 2.0% pursuant to the Office of Management and Budget Circular No. A-94, Appendix C (last updated February 2023). The total estimated net present value of the 30-year O&M cost estimate is $372,851.

8.0 HEALTH AND SAFETY PLANNING

We have prepared a HSP (Appendix I) for Geocon employees that provides information regarding potential chemical and physical hazards that may exist at the site and describes safety measures to be followed by field personnel during remedial activities. The HSP conforms to requirements of Hazardous Waste Operations and Emergency Response, Title 8 CCR, Section 5192 and Title 8 CCR, Section 5155.

Remediation contractors and subcontractors selected to perform work associated with the remedial action are responsible for their own health and safety and will be responsible for preparing a HSP for their activities. Health and safety plans prepared by contractors and subcontractors must comply, at a minimum, with the overall site health and safety plan. Geocon will not be responsible for the safety of contractors and site visitors.

All personnel working on the cleanup shall have completed 40 hours of comprehensive health and safety training that meets the requirements of 29 CFR 1910.120. The remediation contractor and subcontractors will be responsible for consulting with a Certified Industrial Hygienist (CIH) to determine the appropriate levels of protection and monitoring for the remediation workers.

8.1 Dust Mitigation

During the remedial activities, soil moisture content is to be maintained to reduce the potential for dust generation and the need for respiratory protection, and dust monitoring is to be performed pursuant to a DMP prepared as part of a future RDIP. Real-time dust monitoring is to be performed to verify that the engineering controls are effective in controlling dust emissions. Airborne dust levels are to be monitored using active, real-time, data-logging aerosol monitors (e.g., a MIE pDR1200 with PM-10 inlet attached to a sampling pump).

Dust monitoring will be performed at a minimum during the first week of soil-disturbing activities and whenever a significant change in operations takes place that may result in additional dust generation. Real-time dust monitoring will only be discontinued after consultation with and approval by the DTSC.

8.2 Community Air Monitoring Plan

A CAMP must be prepared as part of the RDIP in accordance with the *Community Air Monitoring Plan Guidance* (CAMP Guidance; DTSC, 2020). As set forth in the CAMP Guidance, the CAMP must describe specifics of the proposed remedial action including but not limited to:

- physical and chemical characteristics of specific work areas;
- work tasks, objectives, and personnel;
- start date, duration, work hours, and associated air monitoring periods; and
- distance between air monitoring equipment and nearby potential obstructions to air flow (buildings, trees, topography) and the height of nearby obstructions.

Because a detailed redevelopment plan is not yet available for the site, the CAMP must be provided to the DTSC for review as part of the RDIP.

A CAMP is required at response sites under DTSC's oversight whenever remediation or removal activities may release contaminants into the air. The CAMP is intended to describe air monitoring protocols and BMPs to mitigate fugitive emissions (i.e., dust and/or vapor) containing contaminated material during authorized work.

A CAMP focuses on air monitoring at the perimeter of a site to verify the protection of the surrounding community and does not pertain to worker protection within the site, which is to be addressed by the site-specific HSPs prepared by each contractor at the site to protect their employees.

8.2.1.1 Fugitive Dust Action Levels

As set forth in CCR Title 17 Section 70200, the action level for fence-line suspended particulate matter (airborne dust) is 50 micrograms per cubic meter ($\mu g/m^3$), which is equal to 0.05 milligrams per cubic meter (mg/m^3).

This value is based on a 24-hour sample obtained using a PM10 sampler, determined by real-time air monitoring as the difference between upwind and downwind measurements. PM10 is defined generally by the CAMP Guidance as particulate matter with a diameter of 10 microns (µm, or micrometers) or less. CCR Title 17 Section 70200 states that the PM10 sampler is intended to collect a range of particulates reflecting the characteristics of lung deposition, collecting approximately 50% of all particles of 10 µm aerodynamic diameter and collecting a declining fraction of particles as their diameter increases and an increasing fraction of particles as their diameter decreases.

8.2.1.2 Particulate Matter-Based Site-Specific Action Limits for COCs

Procedures for development of Site-Specific Action Limits (SSAL) are presented in Appendix E of the CAMP Guidance, which outlines procedures for derivation of a health-based dust concentration limit (DCL) based on the assumption that contaminant concentrations in dust are proportional to contaminant concentrations detected in soil per the following equation.

$$DCL = \frac{SSAL_{COC}}{(C_{COC} \times CF)}$$

where:

CF = unit conversion factor [1E-06 kg soil/mg soil]
COC = contaminant of concern
C_{COC} = concentration of COC in soil [mg/kg]
DCL = dust concentration limit (not-to-exceed value) [ug/m^3]
$SSAL_{COC}$ = site-specific action limit for a specific COC [ug/m^3]

HERO (2022) recommends that site perimeter (fence-line) DCLs be calculated using:

- arsenic and mercury SSALs based on 8-hour Reference Exposure Levels (REL) developed by the OEHHA Air Toxics Hot Spots Program;
- a lead SSAL based on the National Ambient Air Quality Standard three-month average; and
- both maximum and central-tendency (95% UCL) contaminant concentrations in soil.

These parameters and the calculated fence-line DCLs are listed in the following table. Contaminant concentrations listed in the table below are based on all validated data for the entire Tailings Pile assessment area (Table 23).

Parameter	Unit	Value					
		Arsenic		Lead		Mercury	
Site-Specific Action Limit ($SSAL_{COC}$)	$\mu g/m^3$	0.015		0.15		0.06	
Contaminant Concentration in Soil (C_{COC})	mg/kg	95% UCL	Max Detect	95% UCL	Max Detect	95% UCL	Max Detect
		125	263	50.5	400	3.2	15
Dust Concentration Limit (DCL)	$\mu g/m^3$	120	57	2,970	375	18,750	4,000

The CCR Title 17 Section 70200 action level for fence-line suspended particulate matter is 50 µg/m3. This value is lower than all DCLs listed in the table above. Use of this lower DCL (50 µg/m3) is appropriate for fence-line monitoring.

The CAMP Guidance states that if site-specific particulate or aerosol action levels are required, then additional integrated sampling and chemical analysis of the dust may also be required to verify the accuracy of the initial SSAL model.

8.2.1.3 Visual Assessment

At no time shall the remedial contractor allow visible dust to leave the site perimeter. If visible dust is observed leaving the work site, then work must cease immediately, the source of the visible dust must be controlled, and site activities must be re-evaluated. Additionally, pursuant to Chapter 7 of the CAMP Guidance, the observation of visible dust emissions exiting the site must be recorded and reported to the DTSC.

8.3 Dust Monitoring

At a minimum, dust monitoring units will be placed at the following locations:

1. upwind of the work area to monitor background airborne dust conditions;
2. on the equipment operator where worst-case dust concentrations are anticipated; and
3. on the downwind property line.

Upwind and downwind monitoring locations will be determined during the work at the site using a portable weather station and will be adjusted as the prevailing wind direction changes.

Contractors performing the remedial action are required to prepare their own HSPs for the protection of their employees. We recommend that all remedial action contractors and subcontractors consult with a CIH to determine what dust action levels, engineering controls and personal protective equipment are required to protect their workers for each remedial task. Benchmarks include but are not limited to those described below.

- The Cal-OSHA Permissible Exposure Limit (PEL; 10 mg/m^3) for airborne dust.
- An action level based on the OEHHA 1-hour acute REL for arsenic (0.2 $\mu g/m^3$). The 1-hour acute REL is considered as a not-to-exceed value and may be appropriate for use as a level of concern (LOC) in the Marlowe Equation [AL ($\mu g/m^3$) = LOC ($\mu g/m^3$) x 1,000,000 /Concentration in soil (mg/kg)] to calculate a dust action level (AL). Arsenic values detected in the Tailings Pile range up to 320 mg/kg, and an outlying value (502 mg/kg) was detected at a hot spot in the Background Area at sample location SOIL16 (Sheet 2). The mean detected value for the Tailings Pile is 101 mg/kg, and the 95% UCL on the mean concentration is 125 mg/kg. Using the central-tendency EPC for arsenic in soil/dust (125 mg/kg), an AL of 1,600 $\mu g/m^3$ (1.6 mg/m^3) can be calculated. The maximum soil arsenic detection (502 mg/kg) yields in an AL equal to 396 $\mu g/m^3$ (0.40 mg/m^3).
- An AL based on the Cal-OSHA AL for arsenic in air (5 $\mu g/m^3$): Dividing the Cal-OSHA AL for arsenic in air (5 µg arsenic / m^3 dust) by the central-tendency value for arsenic in soil and dust (125 mg arsenic / kg soil and dust) yields a suspended particulate AL of 40 mg/m^3. Using the maximum detected soil arsenic concentration (502 mg/kg) yields an AL equal to 10 mg/m^3.

Dust monitoring instruments must be calibrated daily pursuant to the manufacturer's recommendations, must be set to log dust levels over 5-minute periods, and must be visually read every 15 minutes.

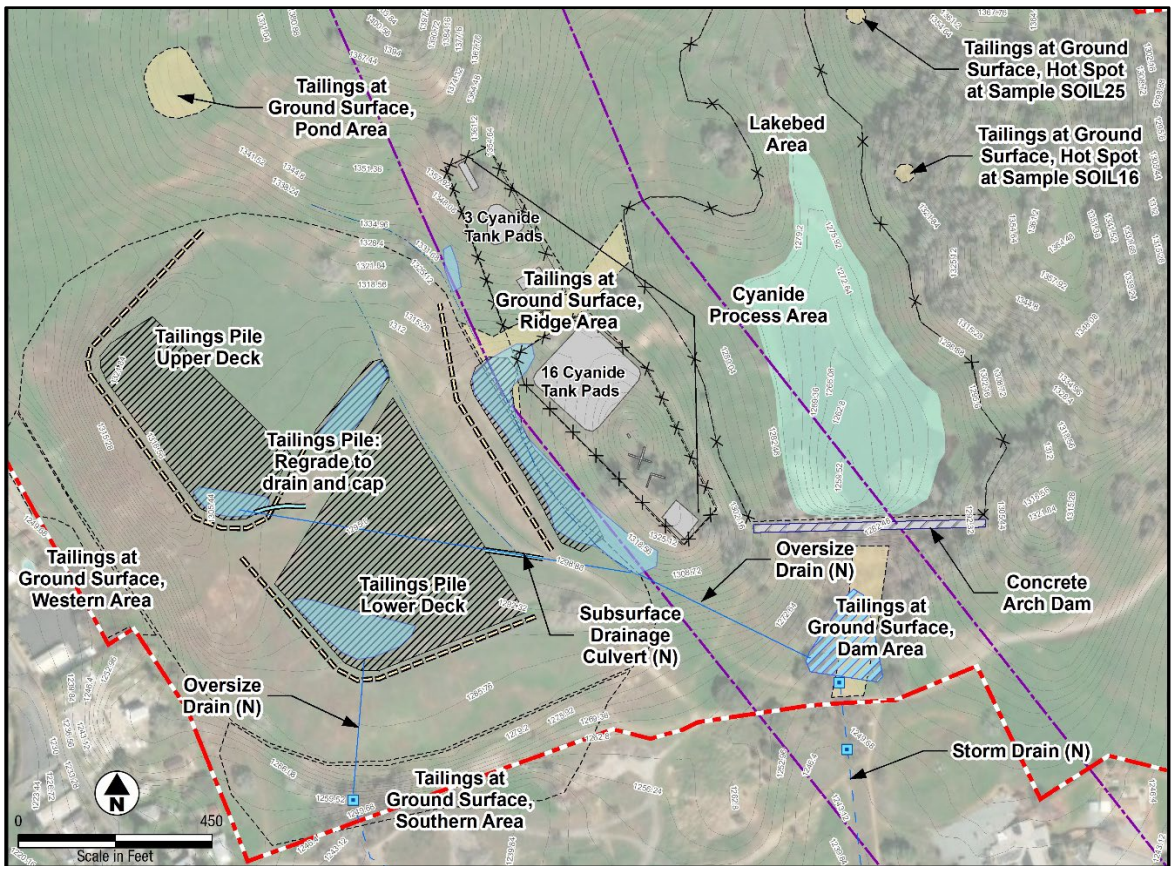
If airborne dust monitoring results exceed the CCR Title 17 Section 70200 fence-line AL for dust in air (0.05 mg/m^3), additional water is to be applied to the soil, and additional engineering controls for dust suppression are to be performed as required to maintain dust concentrations below the AL. In addition to the monitoring requirements described above, the Amador Air District Rule 218 requires dust suppression using water or other means, reasonable vehicle speeds, and good housekeeping.

The lead agency or local enforcement agency may require additional dust monitoring and may also require air sampling and analysis at any time during the remedial action. If conditions arise such that additional monitoring is required, the monitoring shall be conducted in accordance with these guidelines unless modified by the agencies. Air sampling and analysis, if required, is to be performed in accordance with NIOSH Method 7082, with analysis by flame atomic absorption spectroscopy (FAAS). All results of air monitoring shall be reported to the DTSC within 48 hours.

9.0 REMEDIAL PROCEDURES AND IMPLEMENTATION

This section describes remedial action procedures and implementation methods. Sheet 4 is an overview of the proposed remedial action. Key components of the remedial action are summarized below.

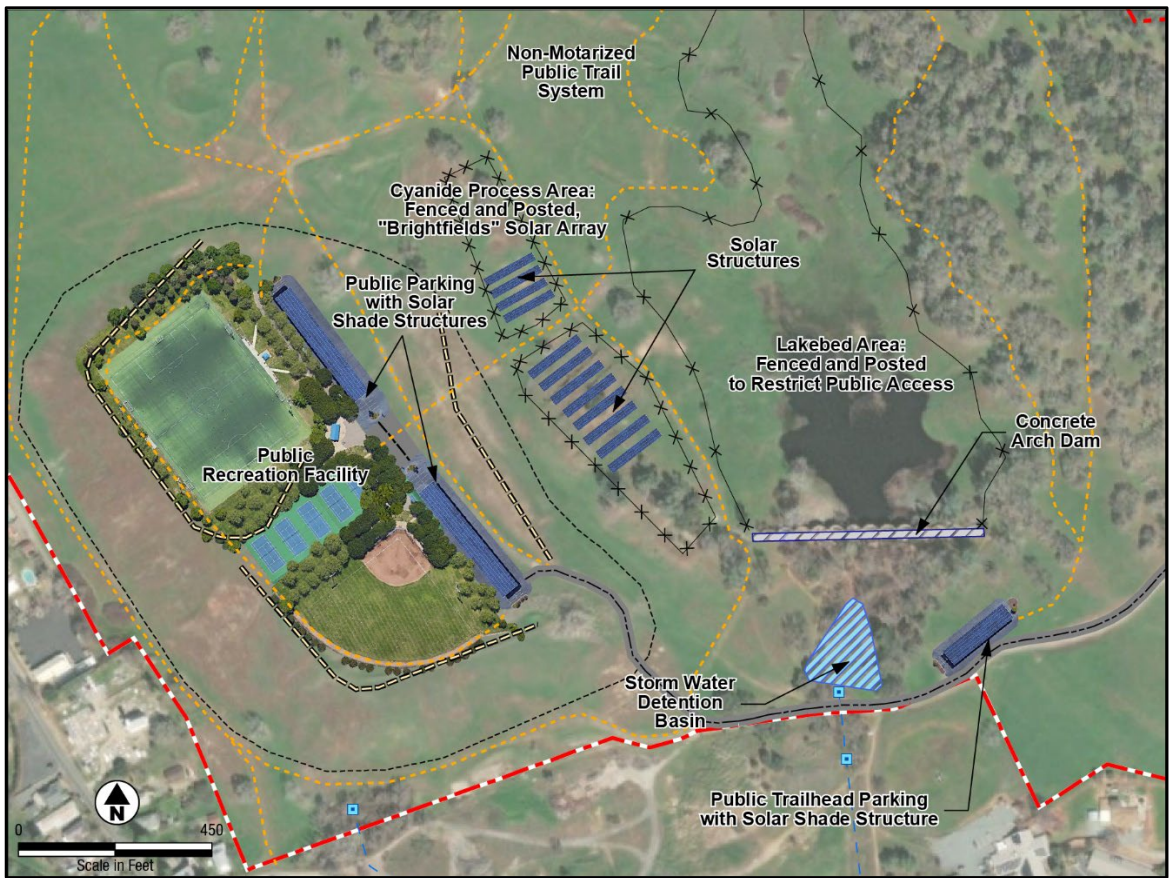
1. Excavation of isolated tailings deposits, transport within the site, and placement of the tailings at the Tailings Pile as engineered fill:
    a. Off-site transport and disposal at a licensed solid waste disposal facility of excavated material classified as Class I (hazardous) waste (if encountered).
    b. Transport of non-hazardous materials to the Tailings Pile deck and placement as engineered fill.
    c. Post-excavation sampling and analysis to verify that the isolated tailings deposits were removed.
    d. Restoration of the excavation areas, including minor regrading, installation of erosion and sediment control BMPs, and application of seed, mulch, and fertilizer.
2. Regrading and capping of the Tailings Pile:
    a. Construction of approximately 2,000 feet of drainage ditches above the Tailings Pile to direct stormwater runoff into closed pipe collectors, which covey the water to a detention basin down slope of the dam.
    b. Regrading to drain the Tailings Pile deck:
        i. Regrading of the 12.5-acre development area on the Tailings Pile deck, including the upper (northwestern) deck and the lower (southeastern) deck, so that surface runoff is directed to storm water drainage collectors and no water ponds on the Tailings Pile surface.
        ii. Regrading of the 1-acre basin at the upslope (northeastern) edge of the Tailings Pile to so that stormwater runoff is directed to storm water drainage collectors and no water ponds at the upslope edge of the Tailings Pile.
    c. Construction of the stormwater collection system, which includes flared inlets, closed pipe collectors, overside drains, stilling basins and a storm water detention basin.
    d. Compaction of the regraded surface of the Tailings Pile.
    e. Construction of the Tailings Pile cap (all thicknesses are after compaction):
    f. In the 12.5-acre development area: placement and compaction of 1 foot of clayey imported soil overlain by 1 foot of predominantly granular imported soil.
    g. In the 5.5-acres upslope (northeast) of the development area: placement and compaction of 1 foot of clayey imported soil overlain by 6 inches of predominantly granular material capable of supporting vegetation growth.
    h. On the 11-acre slopes of the Tailings Pile (12 acres considering the vertical projection): placement and compaction of 1 foot of clayey imported soil overlain by 6 inches of predominantly granular material capable of supporting vegetation growth.
3. Fencing and posting of the Lakebed Area and Cyanide Process Area to restrict public use.



Excerpt from Sheet 4, Proposed Remedial Design.

Sheet 5 is a conceptual redevelopment plan. The remedial action described in the RAP is intended to be compatible with the following redevelopment:

1. Public recreation facility, including:
   a. artificial turf fields,
   b. public parking with solar shade structures,
   c. raised-bed plantings,
   d. snack shed,
   e. restroom facility, with on-site sewage disposal (septic disposal field outside of the Tailings Pile),
   f. lighting, and
   g. underground utilities (water and electrical).
2. Public trail system for non-motorized use, including:
   a. unpaved hiking and biking trails,
   b. public trailhead parking with a solar shade structure near the site entrance, and
   c. cattle gates to retain livestock in grazing areas.
3. "Brightfields" solar arrays within the fenced Cyanide Processing Area.



Excerpt from Sheet 5, Conceptual Development Plan.

9.1 Remedial Design

Plans and specifications for the remedial action will be set forth in a RDIP for DTSC review and approval. The RDIP will contain the following elements:

1. Civil engineering design including:
   a. topographical survey;
   b. geotechnical investigation and slope stability analysis to develop factors of safety for static and dynamic loading for the proposed final cover configuration;
   c. grading plans and details;
   d. drainage plans and details, including stormwater conveyance and detention design;
   e. clean soil cover materials specifications and compaction rates; and
   f. erosion control plans and a SWPPP.
2. Site Management Plan (SMP) elements addressing:
   a. site preparation and permitting;
   b. equipment decontamination;
   c. surveying and grade control;

d. traffic control;

e. noise control;

f. dust control and monitoring, including a DMP and CAMP; and

g. management of contaminated soil, including procedures for excavation, grading, trenching (e.g., for utility lines), moisture conditioning, placement, and compaction for:

i. relocation of material classified as Class II (non-hazardous) waste within the site and

ii. off-site disposal of material classified as Class I (hazardous) waste.

3. O&M Plan specifying surface cover inspection and repair procedures and their frequency.
4. MRP to specify future monitoring requirements and design details for off-site groundwater monitoring wells downgradient of groundwater monitoring wells MW-01 and MW-02.
5. HSP addressing worker safety.

9.2 Construction Quality Assurance

The owner will retain Geocon or another qualified engineering firm to perform construction quality assurance (CQA), including observation and testing during the remedial action to verify the remediation contractor's compliance with the requirements of the RAP and RDIP. The CQA firm will designate a CQA Monitor to perform the following duties under the responsible charge of a licensed civil engineer:

1. Dust monitoring during the remedial action to verify the effectiveness of the contractor's engineering controls for dust mitigation and compliance with the DMP and CAMP;
2. Review of geochemical laboratory data and coordination with DTSC for approval of clean fill prior to transport to the site;
3. Review of geotechnical materials properties and coordination with the engineer for approval of clean fill prior to transport to the site;
4. Observation of excavation areas to verify the extent of excavation and to verify compliance with the DMP;
5. Collection of post-excavation verification samples from the base and perimeter of each excavation area pursuant to the VSAP, coordination of field/laboratory analysis and comparison to cleanup goals to verify excavation limits;
6. Selection of appropriate locations for QA/QC samples;
7. Observation of subgrade preparation prior to placement of fill;
8. Verification of fill placement methods and verification of adequate moisture content, density and relative percent compaction;
9. Review of cover soil material submittal (proposed source location for on-site borrow) and coordination with the project geotechnical engineer for review; and
10. Documentation of field activities in accordance with the recordkeeping requirements set forth in the RAP and RDIP.

9.3 Preparatory Activities

The following preparatory activities are to be performed prior to soil disturbance at the site.

9.3.1 Underground Service Alert

The contractor will mark the proposed excavation areas and contact Underground Service Alert as required by law. Underground Service Alert is responsible for contacting public utility companies, who in turn are responsible for marking the location of their underground utilities so that the utilities can be avoided during remedial action.

9.3.2 Pre-Construction Biological Surveys and Delineation

Wetland and Riparian Areas

The remedial action does not involve disturbance of the waters of the state, the wetland within the Lakebed Area, riparian habitat zones, or areas within a 100-year floodplain boundary. To reduce the risk of disturbance during the remedial action, and particularly during work near the Lakebed Area, a biologist will be retained to delineate wetland and riparian zones, and temporary orange fencing will be placed at the segments of the wetland or riparian zone boundary that are within 200 feet of the proposed work.

Elderberry Bush

One elderberry bush was identified during a site visit on May 19, 2015, west of the Lakebed Area (Figure 3). A biologist will be retained to survey the site for sensitive biological resources, including elderberry, and to develop mitigation measures. The mitigation measures, which may include the installation of temporary orange fencing and other actions recommended by the biologist, will be implemented prior to the remedial action.

Nesting Raptors

Portions of the site mapped as blue oak woodland (Figure 3) contain suitable habitat for nesting raptors and other protected bird species. The breeding season for raptors and other protected bird species in the vicinity of the site is generally from February 1 to August 31. If remedial activities are proposed in areas mapped as blue oak woodland during the breeding season, a pre-construction survey is to be performed within and adjacent to the proposed disturbance areas within 7 days prior to disturbance. Work in or adjacent to areas with nesting raptors is to be avoided during the breeding season.

9.3.3 Planning for Unanticipated Cultural Resources Discovery

Procedures to be followed in the event of unanticipated discovery of cultural resources during remedial action are to be set forth in an Unanticipated Discovery Plan (UDP) that is to be prepared as part of a future RDIP. The proposed remedial action is not anticipated to impact any known cultural resources because the remedial action consists of excavating mine tailings. However, the procedures set forth in the UDP are to be followed during all invasive and intrusive surface or subsurface site disturbances. The contractor, subcontractor and field personnel are to be familiar with the provisions of the UDP, and a copy of the UDP must be maintained at the site during remedial action.

9.3.4 Preservation of Groundwater Monitoring Wells

Groundwater monitoring wells shall be identified and preserved during the remedial action. MW-2 is located on the lower deck of the Tailings Pile and will require protection from earthmoving equipment. The well casing may need to be extended to accommodate the proposed final grade, and the well monument may need to be replaced. All well modification work is to be performed by a licensed C-57 contractor and must be observed and documented by the CQA Monitor.

9.3.5 Pre-Excavation Sampling and Analysis

Pre-excavation sampling and analysis will be performed at the boundaries of the proposed excavation areas (isolated tailings areas) to refine the limits of excavation. Pre-excavation sampling will be performed in accordance with the field sampling procedures described in a VSAP that is to be prepared as part of a future RDIP. The results of pre-excavation sampling will be submitted to the DTSC for review as part of the RDIP.

9.3.6 Import of Clean Soil

During the remedial action, clean soil may be borrowed from a clean on-site location as designated by the owner, or clean soil may be imported to the site from an off-site source. If soil is imported during the remedial action, it shall be characterized pursuant to guidelines set forth by the DTSC *Information Advisory – Clean Imported Fill Material* (2001). DTSC approval of the methodology, frequency, and results of soil sampling and analysis shall be obtained prior to importing the clean soil to the site. Import sources and characterization procedures may be set forth in a future RDIP for DTSC review.

Import soil shall be predominantly granular, non-expansive and free of deleterious material. Proposed import should be submitted to the CQA Monitor for geotechnical analysis, review and approval prior to transport to the site.

9.4 Excavation, Off-Site Transport and Disposal

Off-site disposal is required if excavated materials (from isolated tailings areas, utility trenches, etc.) are designated as Class I (hazardous) waste. If off-site disposal is required, it shall be performed in accordance with the following specifications. During all soil-disturbing activities including removal of vegetation, excavation, loading, and transport, materials shall be moistened as necessary using water trucks or hoses to avoid dust generation. All soil-disturbing activities shall be performed in accordance with a DMP to be prepared as part of the RDIP.

9.4.1 Removal of Vegetation

Before soil excavation, vegetation shall be cut off at the ground surface, segregated, and removed from the work area. Removal of vegetation is to be performed using equipment that does not disturb contaminated soil prior to excavation.

9.4.2 Excavation

Excavation includes mechanical excavation of mine waste and contaminated soil using a rubber-tired or track-mounted excavator, backhoe, scraper, or other mechanical means. Excavation shall be performed in accordance with an approved DMP and to the depths indicated by the CQA Monitor as a result of verification sampling and analysis.

9.4.3 Waste Classification for Off-site Disposal

The maximum and central-tendency concentrations of the COCs (Tables 21, 22, and 23) are lower than the TTLCs for classification as hazardous waste. However, WET arsenic concentrations (Table 4) for some tailings samples exceeded the STLC for classification as hazardous waste. Therefore, if materials are excavated that are suspected of exceeding a TTLC or STLC, they must be classified by sampling and laboratory analysis (total, WET, and TCLP) for arsenic, lead, and mercury to determine the appropriate disposal location (on-site or off-site) and to obtain landfill acceptance in the case of off-site disposal. Sampling should be performed at a minimum frequency of one 4-point composite sample per 500 cubic yards of soil. Samples may be collected in-situ or from temporary stockpiles. Details are to be specified in the RDIP. The frequency and methodology for sampling and analysis may require modification based on the requirements of the receiving landfill.

9.4.4 Off-Site Transport and Disposal

Material to be removed from the site shall be transported to a licensed Class I or Class II solid waste facility (depending upon waste characteristics) for disposal in accordance with applicable federal, state and local laws and regulations. The contractor is responsible for obtaining approval from a licensed solid waste facility prior to transport. Weight tickets and waste manifests shall be provided to the CQA Monitor for all off-site waste disposal. If off-site disposal is to be performed, a Transportation Plan should be prepared for DTSC review as part of a future RDIP.

9.5 Excavation, On-Site Transport and Placement

During all soil-disturbing activities including removal of vegetation, excavation, loading, transport, placement and compaction, materials shall be moistened as necessary using water trucks or hoses to avoid dust generation in accordance with a DMP to be prepared as part of the RDIP.

9.5.1 Removal of Vegetation

Before soil excavation, vegetation shall be cut off at the ground surface, segregated, and removed from the work area. Removal of vegetation is to be performed using equipment that does not disturb contaminated soil prior to excavation.

9.5.2 Excavation

Excavation includes mechanical excavation of mine waste and contaminated soil using a rubber-tired or track-mounted excavator, backhoe, scraper, or other mechanical means. Excavation shall be performed in accordance with an approved DMP and to the depths indicated by the CQA Monitor as a result of verification sampling and analysis.

9.5.3 On-Site Transport

Truck speed is to be limited to 15 miles per hour to reduce the chance of dust generation. The truck loading area shall be adjacent to the excavation area, so that no soil is tracked from the excavation area by trucks or other equipment. Transportation routes and staging areas are to be defined as part of a future RDIP.

9.5.4 Subgrade Preparation for Fill Placement

Subgrade shall be prepared prior to soil transport and fill placement. Vegetation is to be removed as described in Section 9.5.1. The subgrade surface is to be scarified, moisture conditioned and recompacted to a minimum of 90% of the ASTM D1557 maximum dry density.

For areas to receive fill that are steeper than 5:1, horizontal:vertical (H:V), a keyway is to be constructed at the base of the fill at least two feet deep and an equipment-width wide, as confirmed by the CQA Monitor in the field. The base of the keyway shall be in competent material as determined by the CQA Monitor in the field.

9.5.5 Separator Fabric

In areas to be developed as public recreation facilities (parking lots, ball fields, and associated facilities) the finished tailings surface (the subgrade for placement of clean soil cover) is to be covered with geotextile fabric to serve as a visible barrier to excavation. The subgrade surface must be firm and non-yielding and must be smooth enough so that the separator fabric will not be damaged during subsequent placement of cover material. The geotextile fabric must be strong enough to withstand installation without damage. The remediation contractor shall obtain approval from the CQA Monitor of separator fabric material submittal; verification of adequate moisture content, density and relative percent compaction for the tailings subgrade; and approval of the prepared fill surface prior to placement of separator fabric.

9.5.6 Fill Placement

Placement of engineered fill is to be performed by conventional means and in accordance with the provisions of this RAP and a DMP that is to be prepared as part of a future RDIP. The proposed placement areas are low spots in the southern half of the Tailings Pile as depicted on Sheet 4.

DTSC approval must be obtained in advance of the import of clean soil cover to the site as described in Section 9.3.5. Placement of contaminated materials excavated from isolated tailings areas, and placement

of clean soil cover, shall be performed in accordance with the following general specifications.

1. Fill Placement and Compaction
    a. Maintain moisture content in soil to minimize the generation of visible dust during preparation, placement and compaction.
    b. Vegetation shall be cut off at the ground surface prior to fill placement. Avoid contact with or disturbance of contaminated soil. Remove vegetation from fill and do not incorporate organic material into the fill.
    c. Oversize rock (rock that is greater than 12 inches in greatest dimension) shall be incorporated into deep fill by windrowing, so that compaction is performed around the rock, as approved by the CQA Monitor.
    d. Prepare subgrade as specified in Section 9.5.4 for approval by the CQA Monitor prior to fill placement.
    e. Soil shall be uniformly moisture conditioned to the ASTM D1557 optimum moisture content or within approximately 3 percentage points above optimum moisture content.
    f. Fill shall be constructed by placing uniformly moisture conditioned soil in maximum 8-inch-thick loose lifts (layers) prior to compacting.
    g. Fill shall be compacted to a minimum relative compaction of 90% of the ASTM D1557 maximum dry density. In areas to be paved and at other locations specified by the remedial design, the upper 8 inches of fill shall be compacted to a minimum relative compaction of 95% of the ASTM D1557 maximum dry density.
    h. The moisture content, density, and relative percent compaction of fill must be verified by the CQA Monitor during construction. The earthwork contractor shall assist the CQA Monitor by excavating test pads with the on-site earth moving equipment.
2. Fill slope construction
    a. Fill slopes will be 3:1, horizontal to vertical (H:V), or flatter, unless otherwise designed and approved by the CQA Monitor.
    b. For areas to receive fill that are steeper than 5:1, H:V, a keyway is to be constructed at the base of the fill at least two feet deep and an equipment-width wide, as confirmed by the CQA Monitor. The base of the keyway shall be in competent material as determined by the CQA Monitor.
    c. Fill is to be benched into the existing slope. Benches are to extend into competent material, as determined by the CQA Monitor.
    d. The top of the fill is to be graded to drain away from the fill slope, and runoff is to be conveyed into natural drainage courses pursuant to the grading plans to be prepared as part of the future RDIP.
    e. Place fill in horizontal lifts (layers) not exceeding eight inches in thickness. Overbuild the slope face and cut back to the desired slope gradient.
    f. Assist the CQA Monitor with preparation of test locations so that fill density and moisture can be verified.
    g. Grade the finished surface to drain away from the constructed slope face per the grading plan.

9.6 Erosion Control

Erosion controls are to be installed pursuant to a future SWPPP and the specifications of the RAP and RDIP. BMPs shall be implemented to reduce the potential for sediment discharges. BMPs are described below.

1. Exposed fill surfaces and areas disturbed by construction activity shall be hydroseeded or hand seeded/strawed with an appropriate seed mixture compatible with the soil and climate conditions of the site as recommended by the local Resource Conservation District.
1. Silt fences shall be installed at the down slope perimeter of disturbed areas.
2. Fiber rolls (straw wattles) shall be installed at the toe of slope and on contour within the placement area pursuant to the SWPPP.
3. The remediation contractor shall maintain and protect exposed soil from wind and water erosion.
4. If a storm is forecasted for the area, exposed fill areas shall be sloped to drain and compacted to facilitate runoff. Plastic sheeting shall be secured over exposed soil prior to storm events if the soil is in danger of eroding.
5. All existing surface drainage facilities must be kept free of soil and debris during construction.
6. The remediation contractor shall provide siltation control and management during construction.
7. Additional fiber rolls and silt fencing shall be stored on-site during the rainy season for installation if existing BMPs are filled with sediment.
8. Damaged or worn BMPs shall be repaired or replaced. BMPs shall be observed for damage when rain is forecasted, following rain events, and periodically as needed during prolonged rainfall.
9. Fiber rolls manufactured with natural fibers typically do not require removal and can be abandoned in place once permanent erosion control is established. Fiber rolls that do not degrade must be removed once permanent erosion control is established.

9.7 Post-Excavation Soil Sampling and Analysis

After excavation, the CQA Monitor will obtain verification soil samples from the base and perimeter of the excavations to confirm that remedial goals are achieved. Specific sampling methodology is to be established in a VSAP prepared as part of a future RDIP. General procedures are summarized below.

9.7.1 General Sampling and Analysis Procedures

Soil samples will be obtained using a pre-cleaned hand trowel or individually-wrapped disposable scoops and will be placed in re-sealable plastic bags or glass containers provided by the analytical laboratory. Laboratory analysis for total arsenic and mercury will be performed by USEPA Methods 6010B/7471A.

9.7.2 Field XRF Analysis

If specified in the VSAP and approved by the DTSC, verification soil samples may be analyzed in the field using a handheld XRF device.

XRF quantification limits must be lower than the corresponding cleanup goals. Prior to initiation of soil management activities, a calibration curve for XRF analysis will be developed using a minimum of 20 samples collected from site soil. Triplicate XRF values will be recorded for each sample and will be compared to USEPA Method 6010B results from a California-certified analytical laboratory. A regression analysis will be performed using the laboratory and XRF data, and a slope factor and R-squared value will be calculated. A chart of the initial regression analysis will be prepared, and a linear equation will be used to convert field XRF arsenic concentrations to laboratory-equivalent arsenic concentrations.

XRF data will be evaluated, and validated if appropriate, by additional laboratory analysis and regression analysis performed as part of soil verification sampling and analysis during the remedial action. If the XRF data do not meet the acceptance criteria set forth below, all final verification samples (i.e., samples obtained for verification of the final limits of excavation) will be analyzed by the laboratory.

If field XRF analysis is performed, a minimum of 10% of the field-analyzed samples will also be analyzed in the laboratory by USEPA Method 6010B. XRF results will be compared to the corresponding laboratory results for data validation purposes as described below. If there is no good correlation between the XRF results and the laboratory results, all verification soil samples will be analyzed in the laboratory. The following criteria must be satisfied if field XRF results are to be used to supplement laboratory analysis:

1. The XRF procedure must be performed in accordance with the guidelines set forth in USEPA SW-846 Method 6200 (2007), Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations In Soil and Sediment.
2. Soil moisture content must be suitable for XRF screening. Wet soil may need to be dried and homogenized in order to obtain valid XRF screening results.
3. Correlation between field XRF results and laboratory USEPA Method 6010B confirmatory results must meet the following minimum criteria:
    a. A minimum of 10% of the total number of field XRF samples must be submitted as confirmatory soil samples to a California-certified laboratory for analysis by USEPA Method 6010B.
    b. The confirmatory soil samples must be splits of the well homogenized sample material analyzed by field XRF.
    c. The confirmatory soil samples must be selected from the lower, middle, and upper range of concentrations measured by field XRF, and must include samples with analyte concentrations at or near the site ALs.
    d. The results of the confirmatory laboratory analyses and field XRF analyses must be evaluated by least squares linear regression analysis. If the measured concentrations span more than one order of magnitude, the data must be log-transformed to standardize variance, which is proportional to the magnitude of measurement.
    e. For use of field XRF results as screening-level data (i.e., for field screening purposes with all field XRF results confirmed by laboratory analysis), the correlation coefficient (R^2 value) for the regression analysis must be 0.7 or greater.

For use of field XRF results as final verification data (i.e., for verification of the limits of excavation with a minimum of 10% of the field XRF results confirmed by laboratory analysis) the correlation coefficient for the regression analysis must be 0.9 or greater, and inferential statistics (e.g., the Wilcoxon-Mann-Whitney [WMW] test [Bain and Englehart, 1992; also known as the Wilcoxon Rank Sum test]) must demonstrate that the central tendency values of the field XRF data and confirmatory laboratory data are statistically equivalent at a 99 percent confidence level.

9.7.3 Minimum Sampling Frequencies

The isolated tailings areas to be excavated are depicted on Sheet 4. The excavation size and number of verification samples are to be established in a VSAP prepared as part of a future RDIP. The minimum base sample frequency is one soil sample at the base of the excavation per 1,000 square feet of excavation area. The minimum perimeter sample frequency is one sample on the perimeter of the excavation per 30 feet of perimeter length. When excavation extends to the edge of the waste consolidation area, no perimeter verification sampling is proposed for those locations. The proposed soil verification sampling for each of the isolated tailings areas to be excavated is summarized in the following tables.

Perimeter Soil Verification Sampling	Perimeter Length (ft)	Minimum Frequency Required	Number of Proposed Verification Samples	Anticipated Frequency
Pond Area	550	1 sample/30 ft	19	1 sample/29 ft
Hot Spot at Sample SOIL16	170	1 sample/30 ft	6	1 sample/29ft
Hot Spot at Sample SOIL25	170	1 sample/30 ft	6	1 sample/29 ft
Hot Spot at Sample HA-74	320	1 sample/30 ft	11	1 sample/29 ft
Northern Area	410	1 sample/30 ft	14	1 sample/30 ft
Ridge Area[1]	580	1 sample/30 ft	20	1 sample/29 ft
Dam Area	880	1 sample/30 ft	30	1 sample/30 ft
Southeast Area	1,700	1 sample/30 ft	57	1 sample/30 ft
Lakebed Track Out Area	1,400	1 sample/30 ft	47	1 sample/30 ft

1 Not including boundaries of the Ridge Area contiguous with the Tailings Pile, Cyanide Process Area, and Lakebed Area.

Base Soil Verification Sampling	Area (sf)	Minimum Frequency Required	Number of Proposed Verification Samples	Anticipated Frequency
Pond Area	22,000	1 sample/1,000 sf	22	1 sample/1,000 sf
Hot Spot at Sample SOIL16	2,000	1 sample/1,000 sf	2	1 sample/1,000 sf
Hot Spot at Sample SOIL25	2,000	1 sample/1,000 sf	2	1 sample/1,000 sf
Hot Spot at Sample HA-74	6,000	1 sample/1,000 sf	6	1 sample/1,000 sf

Base Soil Verification Sampling	Area (sf)	Minimum Frequency Required	Number of Proposed Verification Samples	Anticipated Frequency
Northern Area	11,400	1 sample/1,000 sf	12	1 sample/950 sf
Ridge Area	26,000	1 sample/1,000 sf	26	1 sample/1,000 sf
Dam Area	22,000	1 sample/1,000 sf	22	1 sample/1,000 sf
Southeast Area	180,000	1 sample/1,000 sf	180	1 sample/1,000 sf
Lakebed Track Out Area	72,000	1 sample/1,000 sf	72	1 sample/1,000 sf

The minimum sampling frequencies presented above are recommended by the DTSC and result in approximately 554 verification soil samples. Alternative sampling frequencies for large excavation areas may be proposed in the RDIP for DTSC review.

9.7.4 Cleanup Goals

Cleanup goals must be met for a typical exposure area (decision unit) and for the site as a whole. If the number of soil samples obtained from decision units is insufficient for statistical analysis, then the maximum detected concentration will conservatively be used as the EPC to determine whether the site has been remediated sufficiently. Cleanup goals are presented in Section 6.4.

The BTV cleanup goals for arsenic are not-to-exceed values. The RBCLs for lead and mercury are UCL goals that apply to exposures for any portion of the cleanup area that represents a typical exposure area, such as a typical rural residential or commercial lot size (i.e., 10,000 square feet). The decision unit size and the statistical methodology related to the UCL goal must be established as part of a VSAP for DTSC review.

The lateral and vertical extent of the excavations may be increased locally to facilitate removal of soil containing metals concentrations that exceed the target cleanup levels. Additional samples will be obtained if needed to achieve the minimum sample frequency, based on the actual footprint area of the excavation.

If the verification sample analysis indicates target cleanup levels have been attained, no further excavation will be conducted. If the results of verification sample analysis indicate target cleanup levels have not been attained, further excavation will be conducted. Excavation will continue until the results of further verification sampling and analysis indicate that the cleanup goals are achieved.

9.7.5 Characterization for On-Site Placement

Characterization of affected mine waste and soil was performed as part of the site investigation. Mine waste and affected soil that is to be placed on-site will not require further characterization. Any soil included within areas found to be contaminated shall not be reused for any other on-site placement at locations outside of the waste management unit (the Tailings Pile) where contaminated waste is proposed to be consolidated and capped.

9.7.6 Quality Control for Soil Sampling and Analysis

The following procedures are specified in an effort to maintain consistent quality of field and laboratory data for pre-excavation and verification soil sampling and analysis. Samples will be identified with the following information:

- project number;
- date and time of sample collection; and
- sample identification number.

Individual sample containers will be placed in sealed plastic bags to prevent intrusion of moisture and damage to sample labels. Samples will be transported in a plastic container at ambient temperature under chain-of-custody documentation. Chain-of-custody forms will include the following information:

- Sample identification number;
- Signature of collector;
- Date and time of collection;
- Site name and project number;
- Sample matrix;
- Sample container description;
- Analyses requested;
- Special analytical procedures requested, if applicable;
- Remarks (expected interferences, hazards, unusual events at the time of sampling), if applicable;
- Preservatives added, if any;
- Special sample preparation, if applicable;
- Destination of samples (laboratory name);
- Signature of persons involved in chain of possession (relinquished by and received by); and
- Date and time of sample receipt at laboratory.

When transferring samples, the individuals relinquishing and receiving the samples will sign, date, and record the time on the chain-of-custody form. A separate chain-of-custody form will accompany each sample shipment. The method of shipment and courier name(s) will be entered on the chain-of-custody form.

Special Trainings and Certifications

The remediation contractor is responsible for compliance with applicable health and safety regulations and for training construction personnel who are to perform soil management tasks. Personnel performing soil sampling shall be certified under OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910). Analytical laboratories will be certified by the State of California.

Documentation and Records

The Project Manager will distribute the VSAP project staff. Project staff will review the pertinent sections of the VSAP prior to performing the relevant tasks. Chain-of-custody documentation, field maps and photographs will be maintained for a period of five years following the project completion. Sample location maps, sample collection methodology and quality control procedures, laboratory reports, chain-of-custody documentation, as-built drawings of on-site soil placement locations will be included in a summary report.

Laboratory Quality Control

The laboratory will perform laboratory quality control procedures such as method blanks and matrix spike samples to assess accuracy and bias. The laboratory RLs will be lower than the corresponding benchmark values as set forth in the VSAP.

Data Validation

Data review will be performed to assess the accuracy of data recording, processing and transmittal. Field and laboratory quality control data will be reviewed for completeness. Sample preservation and holding times will be verified. Based on a review of the quality control data with respect to the data quality objectives (precision, bias, accuracy, representativeness, comparability, completeness, and sensitivity), the laboratory data will be accepted, accepted with qualification, or rejected. If data are rejected, additional verification sampling and analysis will be performed to address any data gaps.

9.8 Land Use Covenant

A LUC agreement and O&M Agreement are required for the 19-acre Lakebed Area, the 4.0-acre Cyanide Process Area, and the 29.0-acre Tailings Pile, which is depicted on Sheet 4. A LUC is also required to restrict future residential use of portions of the site that are remediated to commercial/industrial standards. LUC agreements are intended to protect public health and the environment by:

1. Preventing inappropriate land use;
2. Increasing the probability that the public will have information about residual contamination;
3. Disclosing information for real estate transactions about residual contamination;
4. Making certain that long-term mitigation measures are carried out by protecting the engineering controls and remedy; and
5. Making certain that subsequent owners assume responsibility for preventing exposure to contamination.

The LUC for the Lakebed Area, Cyanide Process Area, Tailings Pile, Western Area, and Southern Area will address restrictions on groundwater use.

9.8.1 Deed Restriction

Deed restriction pertaining to the Lakebed Area, Cyanide Process Area, and Tailings Pile (Sheet 4) will comply with the following provisions:

1. No activities that will disturb soil (e.g., excavation, grading, removal, trenching, filling, earth movement) shall be allowed within the deed-restricted areas without a soil management plan approved by DTSC.
2. Restriction of the land use within the deed-restricted areas is to be established by LUC agreement between the property owner and DTSC. Successive owners, heirs and assignees are to be expressly bound by the covenant.
3. Prior to the sale, lease or sublease of the property containing all or a portion of the deed-restricted areas, the owner, lessor, or sublessor shall give the buyer, lessee, or sublessee notice that hazardous substances are located in the areas.
4. The land use controls shall be incorporated by reference in each and all deeds and leases for the property containing all or part of the deed-restricted areas.
5. The owner shall provide notice to DTSC not later than 30 days after any conveyance of any ownership interest in the property containing the deed-restricted areas (excluding mortgages, liens, and other non-possessory encumbrances). DTSC shall not, by reason of the covenant, have authority to approve, disapprove, or otherwise affect proposed conveyance, except as otherwise provided by law or by administrative order.
6. The LUC shall be recorded in the County of Amador.
7. The terms of the deed restriction run with the land and will continue in perpetuity unless a variance is granted or unless terminated. The property owner agrees to pay DTSC's costs in administering the deed restriction.
8. An O&M Agreement will establish requirements for monitoring, reporting and financial assurance.

The DTSC will require periodic monitoring and annual reporting to the DTSC after the remedial action is complete to verify that waste in the areas has not been disturbed and drainage and erosion controls continue to operate effectively.

Deed restriction is also required to restrict future residential land use of portions of the site outside of the areas that are remediated to commercial/industrial standards, pursuant to the general procedures described above.

9.8.2 Financial Assurance

DTSC may require financial assurance pursuant to the Hazardous Waste Control Law, as set forth in CCR Title 22, including Sections 66264.147, 66265.143, 66265.145 and 66265.147.

9.8.3 Posting

Details regarding posting are to be established in the RDIP and are subject to DTSC review.

Lakebed Area and Cyanide Process Area

The Lakebed Area and Cyanide Process Area are to be fenced and posted to restrict public access. Posting shall include permanent metal signs on metal posts on each side (north, south, east, and west), at locations that would be most likely visible to trespassers or other site visitors. The metal signs should include the following general language:

"This area is subject to a deed restriction recorded in Amador County on (insert recording date in month, day, year format) in Book (insert book number) and Page (insert page number). This Deed restriction was recorded because elevated arsenic, lead, and mercury levels are present in soil. Human contact with the soil at this location should be avoided. For more information, please contact the Department of Toxic Substances Control at (insert telephone number)."

Tailings Pile

The Tailings Pile is to be covered with a minimum of two feet of clean engineered fill and will be subject to routine inspection. Based on DTSC's review of design details presented in a future RDIP, such as the amount of additional fill proposed over the Tailings Pile area and/or the type of surface coverings (buildings, pavement) to be constructed as part of the proposed community recreation facility, permanent signage may be required to alert persons at the site that a hazard is present and that protocols are to be followed. Posting may be appropriate at the northern, southern and western perimeter of the Tailings Pile at the toe of slope, and possibly at other locations.

9.8.4 Fencing

Details regarding fencing are to be established in the RDIP and are subject to DTSC review. The Lakebed Area and Cyanide Process Area are to be fenced to restrict public access, while the Tailings Pile is to be covered with clean soil and will not be fenced.

Lakebed Area and Cyanide Process Area

The types of fencing (e.g., chain link, barbed wire, or split-rail) around the Lakebed Area and Cyanide Process Area is to be presented in an RDIP for DTSC review. The type of fencing must be commensurate with the level of public activity in the vicinity. For example, the Cyanide Process Area may require more substantial fencing than the Lakebed Area because it will be located closer to the proposed public recreation facility.

Tailings Pile

No fencing is proposed for the Tailings Pile, which is to be covered with two feet of clean soil. Posting may be appropriate at the northern, southern and western perimeter of the Tailings Pile at the toe of slope. Based on DTSC's review of design details presented in a future RDIP, such as the amount of additional fill proposed over the consolidation area and/or the type of surface coverings (buildings, pavement) to be constructed, posting may be appropriate at other locations. Details regarding posting are to be established in the RDIP and are subject to DTSC review.

9.9 Field Variances

Variances from the provisions of this RAP will be discussed with DTSC prior to any action being taken except for emergencies (when an immediate response is required). The DTSC will be notified if an emergency response is implemented. The field variances will be documented in the RACR prepared for the project.

9.10 Site Restoration

After excavation, verification that RAOs have been achieved, and consultation with the DTSC, the isolated tailings excavation areas will be re-graded to promote drainage, and erosion controls will be installed. Where appropriate, site restoration activities will include broadcasting seed, fertilizer and straw within the excavation footprint for erosion control measures. Fiber wattles and/or silt fencing will be placed along the perimeter of the down slope sides of the disturbed areas pursuant to the design drawings and SWPPP.

Erosion controls will be implemented at the re-graded and capped Tailings Pile pursuant to the grading, drainage, and erosion control plans prepared as part of the RDIP, and the SWPPP.

9.11 Management, Monitoring and Reporting

The LUC and O&M Agreement will incorporate the following procedures for management, monitoring and reporting associated with the Tailings Pile.

9.11.1 Soil Management Plan for Intrusive Cap Work

A Soil Management Plan is required to specify procedures for soil management in the event that the encapsulated mine waste and contaminated soil require future excavation and/or handling. Protocols for reducing dust emissions during excavation and/or handling are to be presented in a DMP.

9.11.2 Routine Cap Inspection and Reporting

Routine inspection of the cap and reporting to DTSC are required to verify that the cap continues to function as designed. Annual and five-year inspection forms are to be presented in the SMP as part of the RDIP.

9.11.3 Routine Groundwater Monitoring and Reporting

Routine groundwater monitoring and reporting are required to verify that the remedial action continues to be effective. Groundwater monitoring and reporting requirements are to be presented in a MRP as part of the RDIP. The MRP is to include design details for off-site groundwater monitoring wells downgradient of groundwater monitoring wells MW-01 and MW-02.

9.11.4 Routing of Public Trails

The proposed public trail system (Sheet 5) is to cross both non-mineralized and mineralized portions of the site.

Non-Mineralized Background Locations

No trail routing restrictions are proposed for non-mineralized background locations and isolated tailings areas in non-mineralized background locations that are cleaned up to unrestricted standards.

Western Area and Southern Area

The Western Area and Southern Area are between the toe of the Tailings Pile and the site boundary, are to be included in the Tailings Pile LUC, and will be subject to an O&M Agreement and SMP to restrict unauthorized disturbance. No cap is proposed. Recreational trails to be constructed in the Western Area and Southern Area (around the downslope side of the Tailings Pile) are to be routed where surface soil arsenic concentrations are equal to or less than the non-mineralized arsenic BTV (20.7 mg/kg) unless an alternative benchmark value for recreational trail use is approved by the DTSC. Sampling of surface soil along the proposed trial alignments in the Western Area and Southern Area and analysis of the soil samples for total arsenic are required prior to trail construction to verify that arsenic concentrations in surface soil are below the mineralized BTV. Alternately, the trail surface may be covered with clean aggregate with prior review and approval by the DTSC.

Naturally Mineralized Background Locations

Naturally mineralized background locations (Sheet 3) are to be restricted from future residential development. To reduce the chance of routine contact with naturally occurring, highly mineralized soil, recreational trails to be constructed in naturally mineralized background areas should be routed where surface soil arsenic concentrations are below the mineralized arsenic BTV (120 mg/kg). The soil arsenic data presented on Sheet 3 indicate that naturally occurring arsenic concentrations in the northern end of the mineralized area, north and upslope from the Cyanide Process Area, may exceed the mineralized arsenic BTV. Therefore, sampling of surface soil along the proposed trail alignments in this area and analysis of the soil samples for total arsenic are required prior to trail construction to verify that arsenic concentrations in surface soil are below the mineralized BTV. Alternately, the trail surface may be covered with clean aggregate with prior review and approval by the DTSC.

9.11.5 Operation and Maintenance Plan

An O&M Plan is required to establish procedures for long-term operation, inspection, maintenance, monitoring and regulatory reporting that are required to preserve the engineering controls (the clean cover and drainage improvements) associated with the Tailings Pile. The primary goal of the O&M Plan is to prevent uncontrolled exposures to contaminated mine waste and soil within the consolidation

area. The O&M Plan is to present procedures for regulatory notification and management of contaminated mine waste and soil, should excavation into the Tailings Pile be required in the future. The O&M Plan is intended to:

1. Minimize disturbances of encapsulated soil and rock,
2. Promote awareness of the Tailings Pile and cap system,
3. Promote timely inspection, maintenance and repair of the cap system,
4. Describe health and safety concerns related to the encapsulated mine tailings, and
5. Set forth procedures for inspection, monitoring and reporting.

The O&M Plan must incorporate the SMP and MRP and must list the required frequency of all inspection and monitoring.

9.12 Schedule

The following table presents the anticipated schedule.

Milestone	Responsible Organization	Anticipated Completion Date
Submit Draft RAP	Geocon	August 2023
Review Draft RAP	DTSC	December 2023
Submit Draft Final RAP	Geocon	February 2024
Submit CEQA Initial Study	City of Jackson	February 2024
Complete public comment period and responses	DTSC	April 2024
Submit Final RAP	Geocon	May 2024
Approve Final RAP	DTSC	July 2024
Submit Draft RDIP	Geocon	October 2024
Review Draft RDIP	DTSC	December 2024
Submit Final RDIP	Geocon	January 2025
Approval Final RDIP	DTSC	February 2025
Advertise and solicit bids for remedial action	City of Jackson	March 2025
Contract for remedial action	City of Jackson	April 2025
Perform remedial action and quality assurance	City of Jackson	May – Sept 2025
Submit Draft RACR	Geocon	October 2025
Review Draft RACR	DTSC	November 2025
Submit Final RACR	Geocon	November 2025
Approve Final RACR, execute LUC and record deed restrictions	DTSC	December 2025

CEQA = California Environmental Quality Act
LUC = Land Use Covenant
RAP = Remedial Action Plan
RACR = Remedial Action Completion Report

10.0 PUBLIC PARTICIPATION

The DTSC will conduct the appropriate and necessary public participation activities prior to and during the proposed remedial action. The public participation requirements for the RAP include:

1. The development of a public fact sheet and community profile;
2. Publishing a notice of the availability of the RAP for public review and comment;
3. Making the RAP and other supporting documents available at DTSC's office and at a local repository for at least 30 days;
4. Holding a public meeting upon request;
5. Responding to public comments received on the RAP; and
6. Providing a community update once the remedial action is completed.

Once the public comment period is completed, the DTSC will review and respond to the comments received. The RAP will be revised if necessary to address the comments received. The modified RAP will be reviewed, and if deemed adequate, approved by the DTSC for implementation.

Any interested individuals have the opportunity to learn more about the Oro de Amador property or the RAP by submitting comments to Meghan Hearne with the DTSC by telephone at 714-484-5463, or by email at Meghan.Hearne@dtsc.ca.gov. DTSC's Administrative Record for the site is available for public inspection during office hours at the following DTSC location:

California Department of Toxic Substances Control
Office of Brownfields, Project Management Unit
5796 Corporate Avenue
Cypress, California 90630
Attention: Meghan Hearne, Project Manager
meghan.hearne@dtsc.ca.gov
(714) 484-5463

Record documents are available online at the DTSC's EnviroStor data management system:

Website address: https://www.envirostor.dtsc.ca.gov/public/
EnviroStor ID: 03100004
DTSC Site Code: 102258

11.0 REMEDIAL ACTION REPORTING

The results of the remedial activities will be presented in a post-remediation report entitled RACR. The purpose of the report is to describe remedial activities and to document compliance with this RAP. The RACR will present:

- A summary of remedial activities performed;
- A description and basis for deviations, if any, from this RAP;
- Limits of excavation and volume of soil excavated;
- Results of the verification soil sampling and laboratory analyses;
- As-built drawings of the on-site placement area;
- A summary of CQA performed during placement and compaction at the approved on-site burial location; and
- A summary of site restoration activities.

The RACR will be presented to the DTSC for review. Provided that the RAOs are achieved, the post remediation report will request a *No Further Action* decision from the DTSC.

11.1 Recordkeeping

All investigation and mitigation documents (e.g., RAP, RDIP, RACR, O&M Agreement, O&M Plan, inspection forms, surveys, photographs, design specifications and as-built drawings, and appendices) will be preserved by the owner for a minimum of 7 years after the conclusion of each relevant activity. The owner may elect to maintain paper copies of the previous 12-month reports and the latest five-year report, if applicable, and keep the rest as electronic files (e.g., in PDF format).

DTSC's Administrative Record for the site is available for public inspection during office hours at the following DTSC location:

California Department of Toxic Substances Control
Office of Brownfields, Project Management Unit
5796 Corporate Avenue
Cypress, California 90630
Attention: Meghan Hearne, Project Manager
meghan.hearne@dtsc.ca.gov
(714) 484-5463

Record documents are available online at the DTSC's EnviroStor data management system:

Website address: https://www.envirostor.dtsc.ca.gov/public/
EnviroStor ID: 03100004
DTSC Site Code: 102258

11.2 Field Documentation

The CQA Monitor is responsible for maintaining a field logbook during the remedial action activities. The field logbook will serve to document observations, personnel on-site, equipment arrival and departure times, and other vital project information.

Field Log

A field logbook or consecutively numbered daily field reports shall document where, when, how, and from whom any vital project information was obtained. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound with consecutively numbered pages, or if electronic, will be consecutively numbered and contain project identification information. Entries in the field logbook will include the following for each fieldwork date:

- site name and address,
- recorder's name,
- team members and their responsibilities,
- time of site arrival/entry on site and time of site departure,
- other personnel on-site,
- summary of any on-site meetings,
- quantity of impacted soil excavated,
- quantity of excavated soils in truckloads transported on-site,
- deviations from the RAP or HSP, and
- calibration readings and equipment model for any equipment used.

The following information will be recorded during the collection of each sample:

- sample identification number,
- sample location and description,
- GPS coordinates,
- sampler's name,
- date and time of sample collection,

- designation of sample as composite or grab,
- type of sample (i.e., matrix),
- type of preservation,
- type of sampling equipment used,
- field observations and details important to analysis or integrity of samples (e.g., heavy rains, odors, colors),
- instrument readings such as XRF or photoionization detector,
- transport arrangements (e.g., courier delivery, lab pickup), and
- recipient laboratory.

Photographs

Photographs will be taken of the excavation area(s), confirmation sample locations, and other areas of interest on-site to document the remedial action.

Chain-of-Custody Records

Chain-of-custody records are used to document sample collection and shipment to laboratory for analysis. All sample shipments for analyses will be accompanied by a chain-of-custody record. Forms will be completed and sent with the samples for each laboratory and each shipment. If multiple coolers are sent to a single laboratory on a single day, chain-of-custody forms will be completed and sent with the samples for each cooler. The chain-of-custody record will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until receipt by the laboratory, the custody of the samples will be the responsibility of the sample collector.

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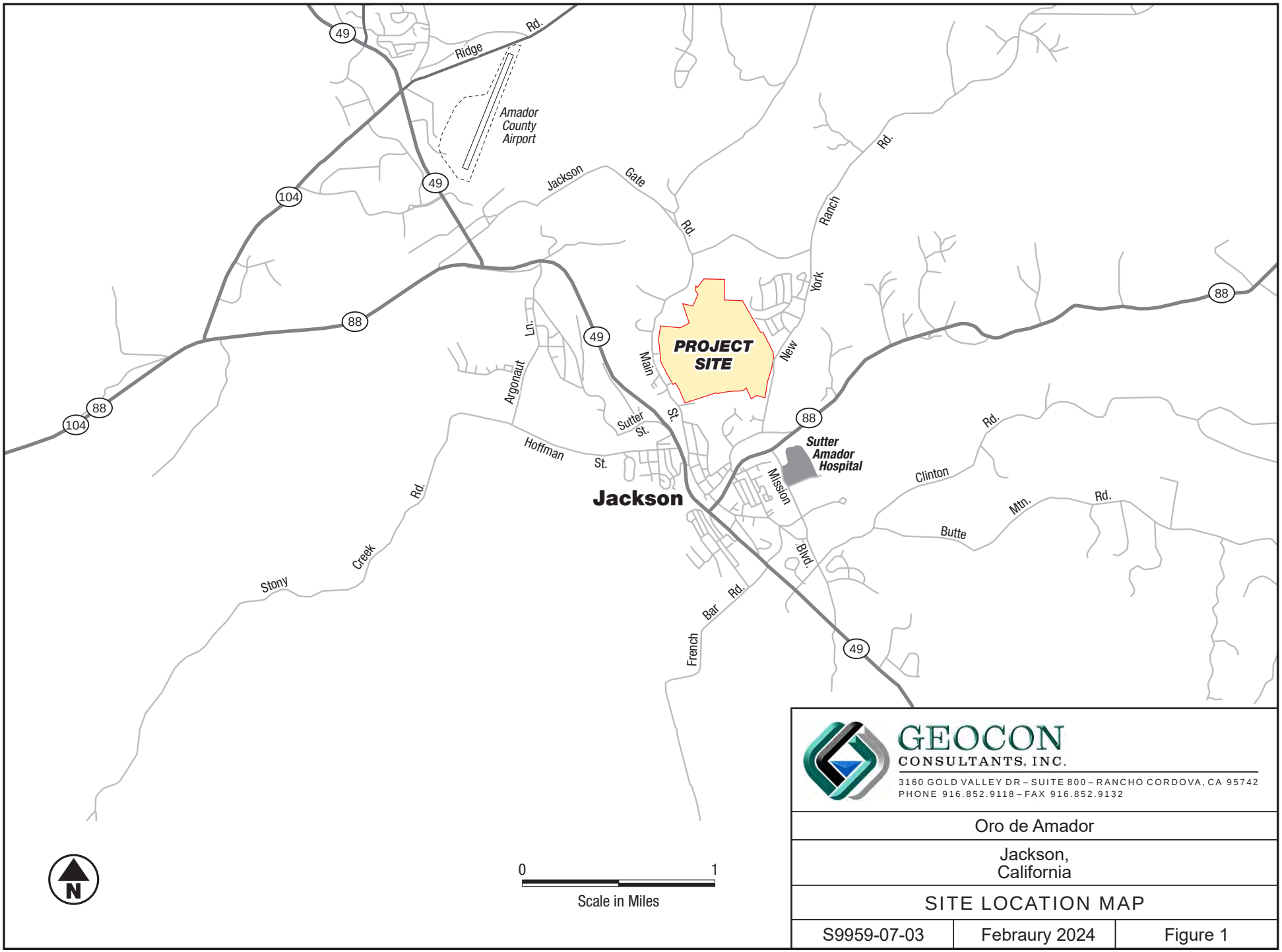
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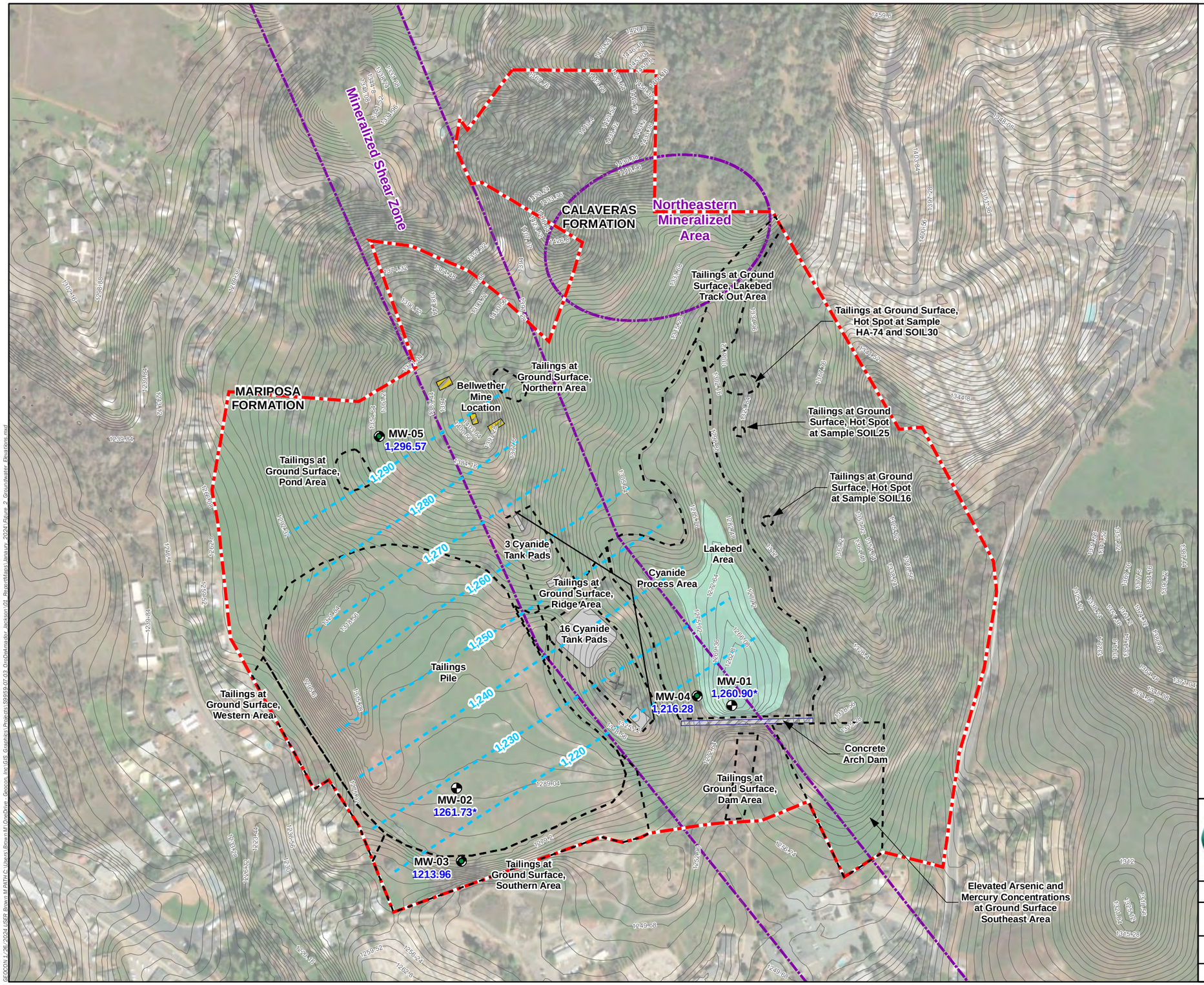
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Oro de Amador

Jackson,
California

SITE LOCATION MAP

S9959-07-03	Febraury 2024	Figure 1



CITY OF JACKSON CALIFORNIA

DTSC Department of Toxic Substances Control

Legend

- Approximate Monitoring Well Location (Dames & Moore, 1995)
- Estimated Groundwater Elevation Contour
- 3-Foot Elevation Conoturs
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- 1,265.75 Groundwater Elevation (feet above mean sea level)
- * Data not used for contouring

Note:
Groundwater elevation data from Geocon, 2023.

N

0 400

Scale in Feet

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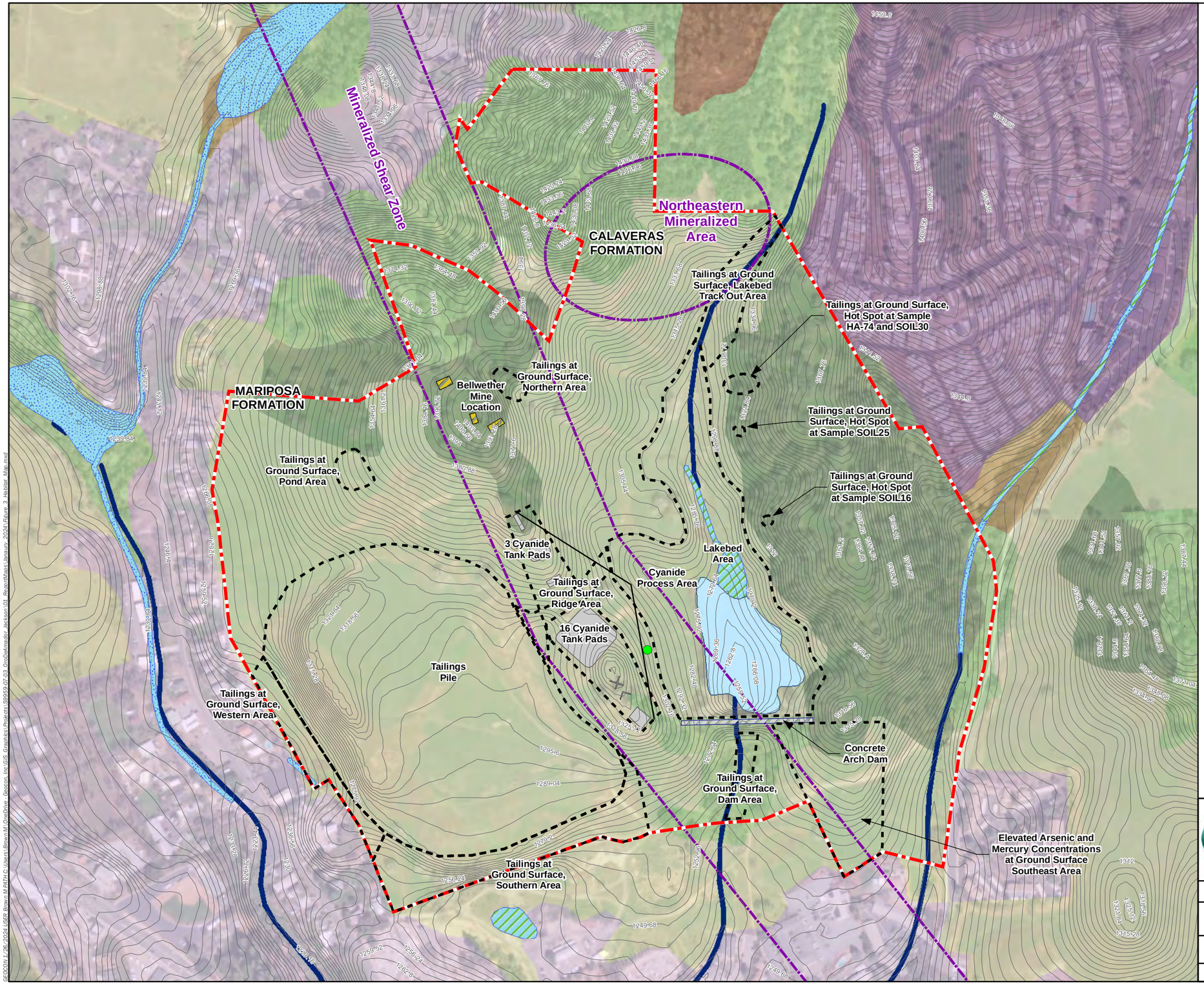
Oro de Amador

Jackson, California

GROUNDWATER ELEVATIONS

S9959-07-03	February 2024	Figure 2

GEOCON 1/26/2024 USER Brown M PATH C:\Users\Brown M\OneDrive - Geocon, Inc\GIS Graphics\Projects\S9959-07-03 OroDeAmador Jackson\01_Report\Maps\January 2024 Figure 2 Groundwater Elevations.mxd



CITY OF JACKSON CALIFORNIA

DTSC Department of Toxic Substances Control

Legend

- Elderberry Bush
- 3-Foot Elevation Conoturs
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- Blue Oak Woodland, Blue Oak-Foothill Pine (Quercus wislizeni)
- Blue Oak Woodland (Quercus douglasii)
- Annual Grassland (California Annual and Perennial Grassland)
- Mixed Chaparral (Whiteleaf Manzanita; Arctostaphylos viscida)
- Valley Foothill Riparian (Rubus armeniacus)
- Urban (Built-up and Urban Disturbance)
- Urban (Urban Window)

Wetland Data provided by the National Wetland Inventory, U.S. Fish and Wildlife Serivice

Vegetation mapping from California Department of Fish and Wildlife (CDFW) BIOS Map Viewer (available online at https://apps.wildlife.ca.gov/bios/?bookmark=940), map layer Vegetation – Northern Sierra Nevada Foothills [ds566].

Vegetation unit descriptions are from the California Wildlife Habitat Relationships System (CWHR; available online at http://www.dfg.ca.gov/biogeodata/cwhr/) and are supplemented parenthetically by unit descriptions from the National Vegetation Classification System (NVCS).

N

0 400

Scale in Feet

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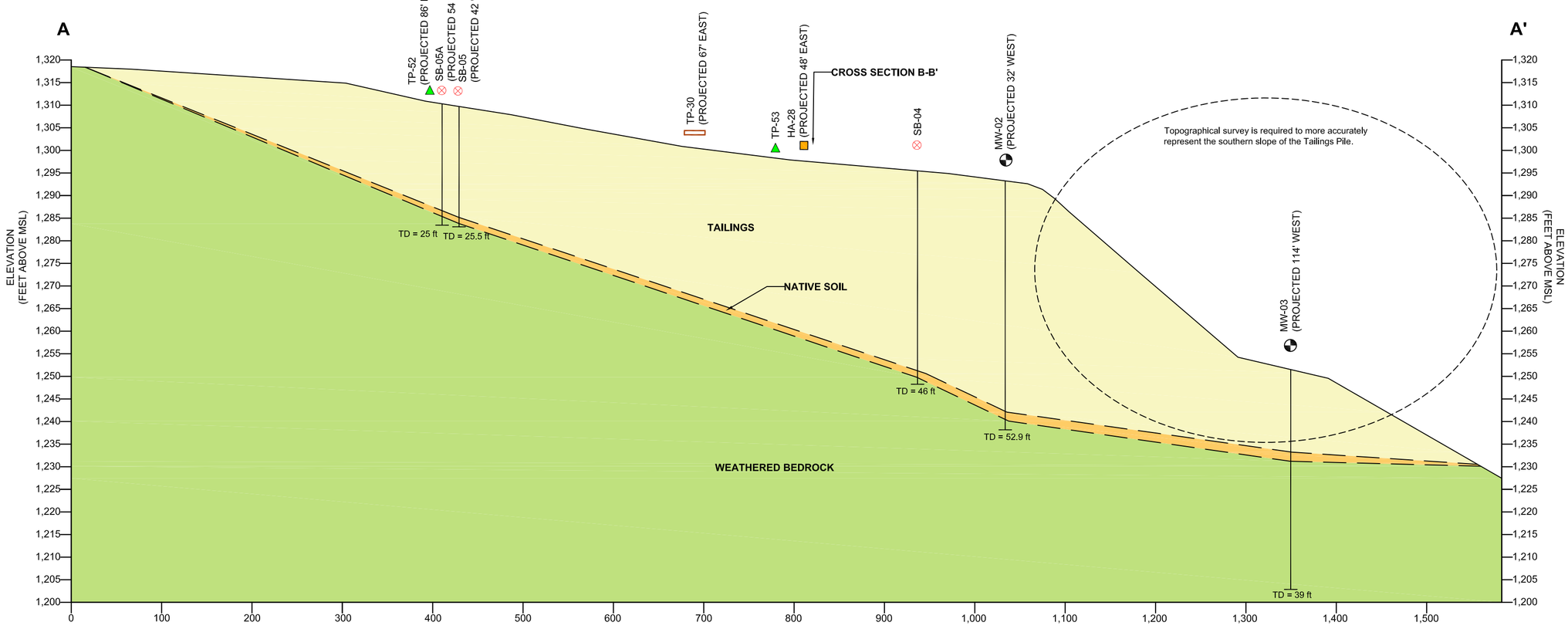
Oro de Amador

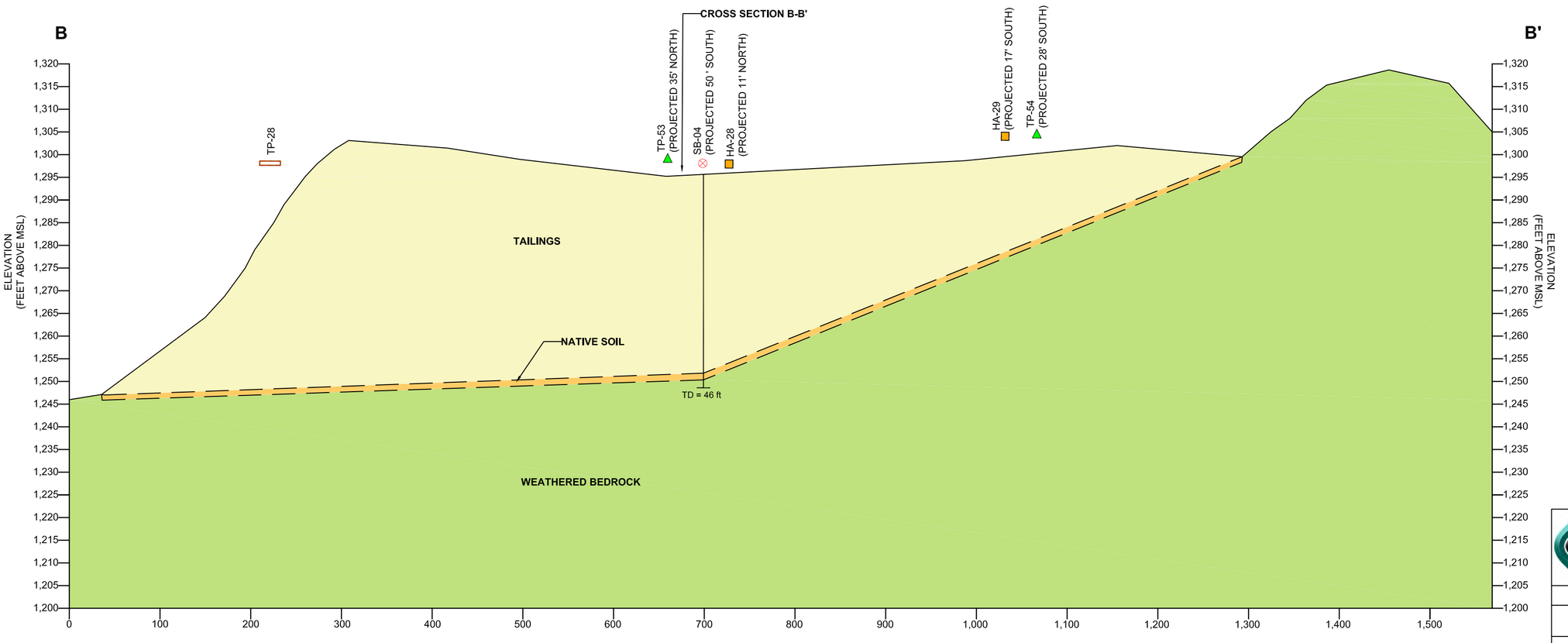
Jackson, California

HABITAT MAP

S9959-07-03	February 2024	Figure 3

GEOCON | 1/26/2024 | S:\GIS_Brown M Path\CAD\Layers\Brown M OneDrive - Geocon, Inc\GIS Graphics Projects\S9959-07-03_OroDeAmador_Jackson\01_Report\Maps\January 2024\Figure 3_Habitat_Map.mxd





Legend

SB-04 Boring Location

TP-54 Proposed Test Pit Location

HA-29 Approximate Hand Auger Location

MW-03 Approximate Monitoring Well Location

TP-30 Approximate Test Pit Location

Lithology Contacts

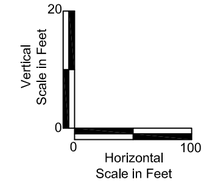
Tailings

Native Soil

Weathered Bedrock

Abbreviations:
ft = Feet
MSL = Mean Sea Level
TD = Total Depth

Notes:
1. The cross section alignments are depicted in plan view on Sheet 2.
2. The topography and cross sections are based on publicly available LiDAR data and should be used for conceptual purposes only.



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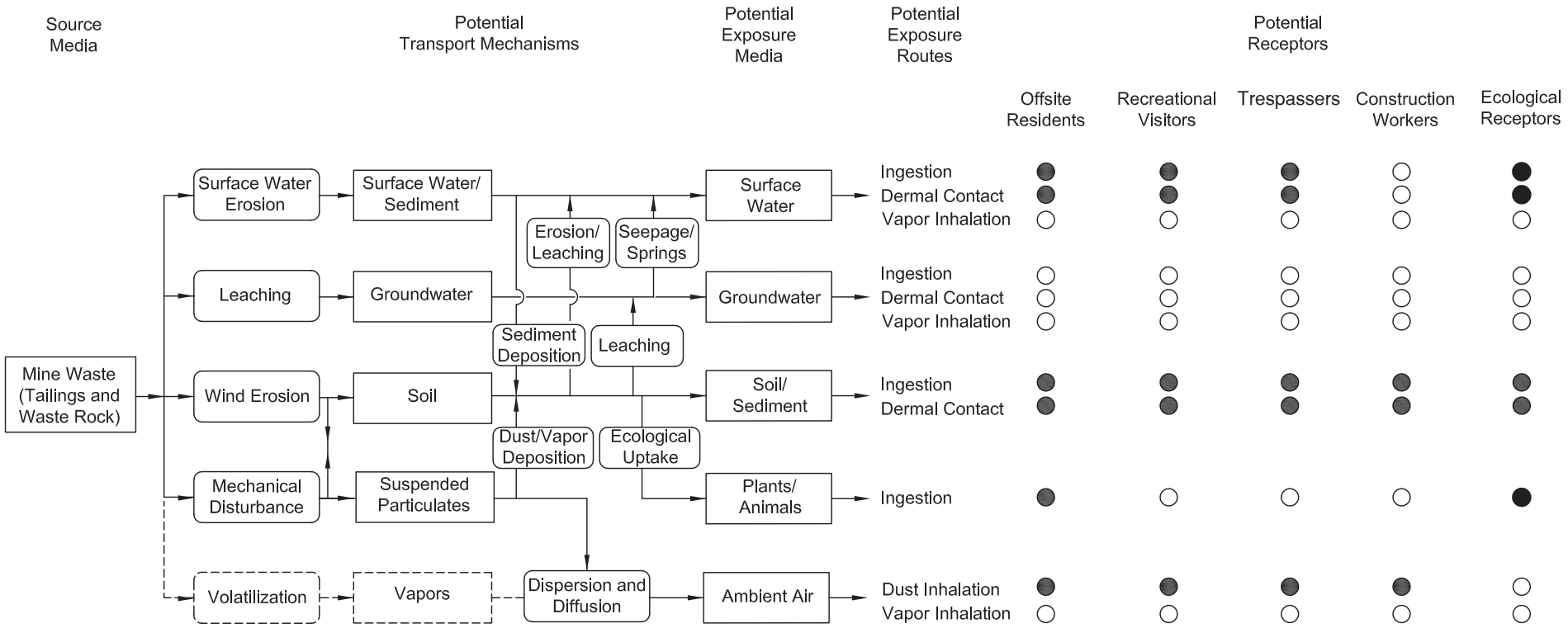
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Jackson,
California

CROSS SECTIONS A-A' AND B-B'

S9959-07-03	February 2024	Figure 4

GEOCON C:\Users\Brown MI\OneDrive - Geocon, Inc\GIS_Graphics\Projects\S9959-07-03_OroDeAmador_Jackson\01_ReportMaps\August_2023\Cross_Section_A_and_B.dwg

TYPICAL TRANSPORT MECHANISMS AND EXPOSURE MEDIA FOR HUMAN AND ECOLOGICAL RECEPTORS



Legend

- Potentially complete pathway
- Potentially incomplete pathway
- Potentially complete exposure route
- Potentially incomplete exposure route

Figure adapted from "Risk Management Criteria for Metals at BLM Mining Sites" Technical Note 390, United States Bureau of Land Management, October 2004.

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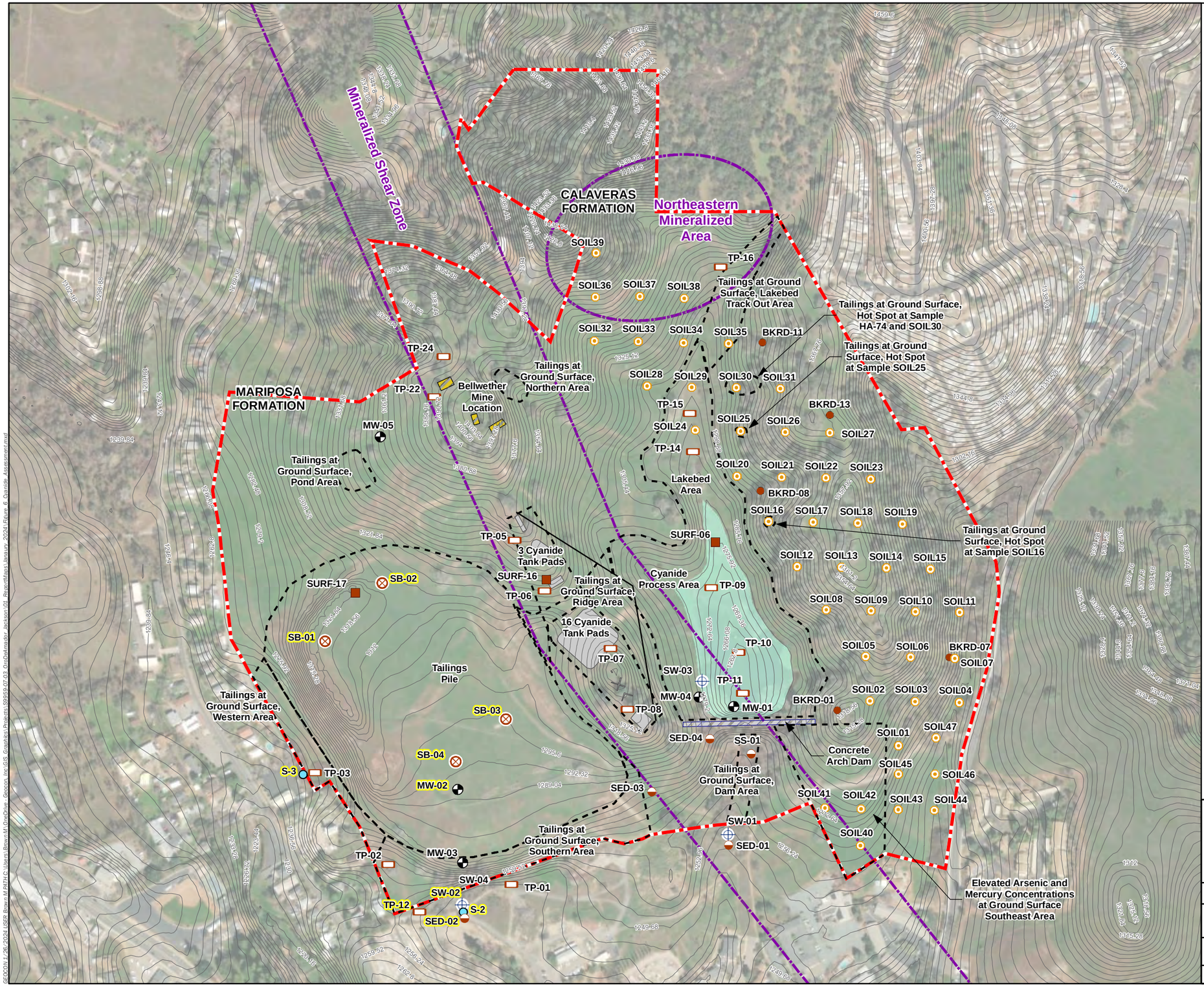
Oro de Amador Property

Jackson
Amador County, California

CONCEPTUAL MODEL DIAGRAM

S9959-07-03	February 2024	Figure 5

C:\Users\Brown M\OneDrive - Geocon, Inc\GIS_Graphics\Projects\S9959-07-03_OroDeAmador_Jackson\01_ReportMaps\January_2024\Figure_5_Conceptual_Model_Diagram.ai



CITY OF JACKSON CALIFORNIA

DTSC Department of Toxic Substances Control

Legend

- Approximate Background Sample Location (Dames & Moore, 1995)
- Approximate Sediment Sample Location (Dames & Moore, 1995)
- Approximate Soil Boring Location (Dames & Moore, 1995)
- Approximate Test Pit Sample Location (Dames & Moore, 1995)
- Approximate Surface Soil Sample Location (Dames & Moore, 1995)
- Approximate Monitoring Well Location (Dames & Moore, 1995)
- Approximate Surface Water Sample Location (Dames & Moore, 1995)
- Approximate Soil Sample Location (USEPA, 2008)
- Approximate Groundwater Seep Sample Location (Geocon, 2017)
- 3-Foot Elevation Conoturs
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- Seasonal Surface Water at Lakebed Area

Note:
Location IDs highlighted in yellow are assessment locations where cyanide was detected in one or more samples

N

0 400

Scale in Feet

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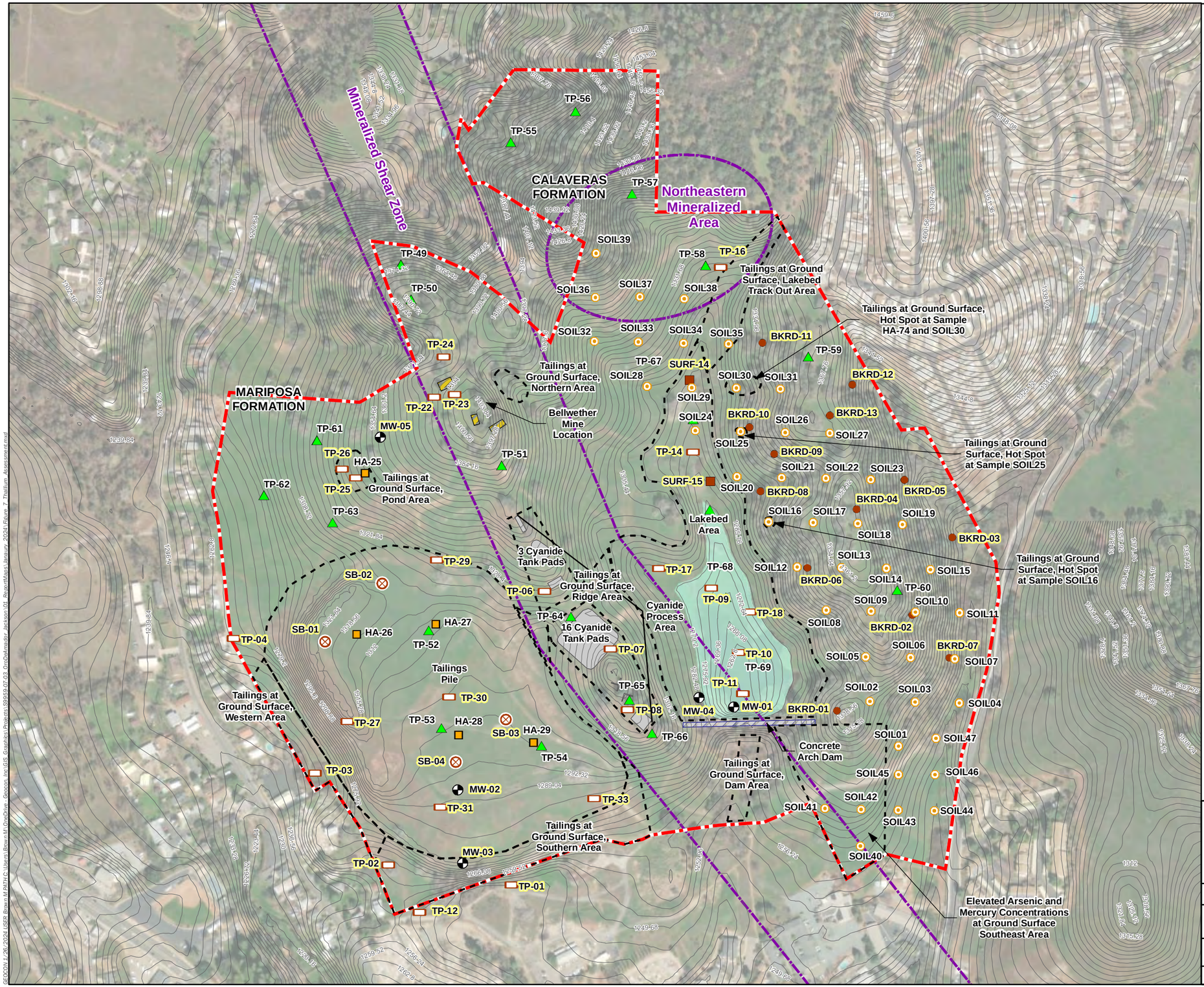
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Jackson, California

CYANIDE ASSESSMENT LOCATIONS

S9959-07-03	February 2024	Figure 6

GEOCON J:\06_2024\S9959 Brown\MXD\Brown MXD\OneDrive - Geocon, Inc\GIS Graphics\Projects\S9959-07-03_OroDeAmador_Jackson\01_ReportMaps\January_2024\Figure_6_CyanideAssessment.mxd



CITY OF JACKSON CALIFORNIA

DTSC Department of Toxic Substances Control

Legend: One or more samples obtained from each mapped location was analyzed for thallium.

- Proposed Test Pit Sample Location
- Approximate Background Sample Location (Dames & Moore, 1995)
- Approximate Soil Boring Location (Dames & Moore, 1995)
- Approximate Test Pit Sample Location (Dames & Moore, 1995)
- Approximate Surface Soil Sample Location (Dames & Moore, 1995)
- Approximate Monitoring Well Location (Dames & Moore, 1995)
- Approximate Soil Sample Location (USEPA, 2008)
- Approximate Hand Auger Sample Location (Arcadis, 2009)
- 3-Foot Elevation Conoturs
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- Seasonal Surface Water at Lakebed Area

Note:
Location IDs highlighted in yellow are assessment locations associated with thallium data obtained by Dames & Moore (1995).

N

0 400

Scale in Feet

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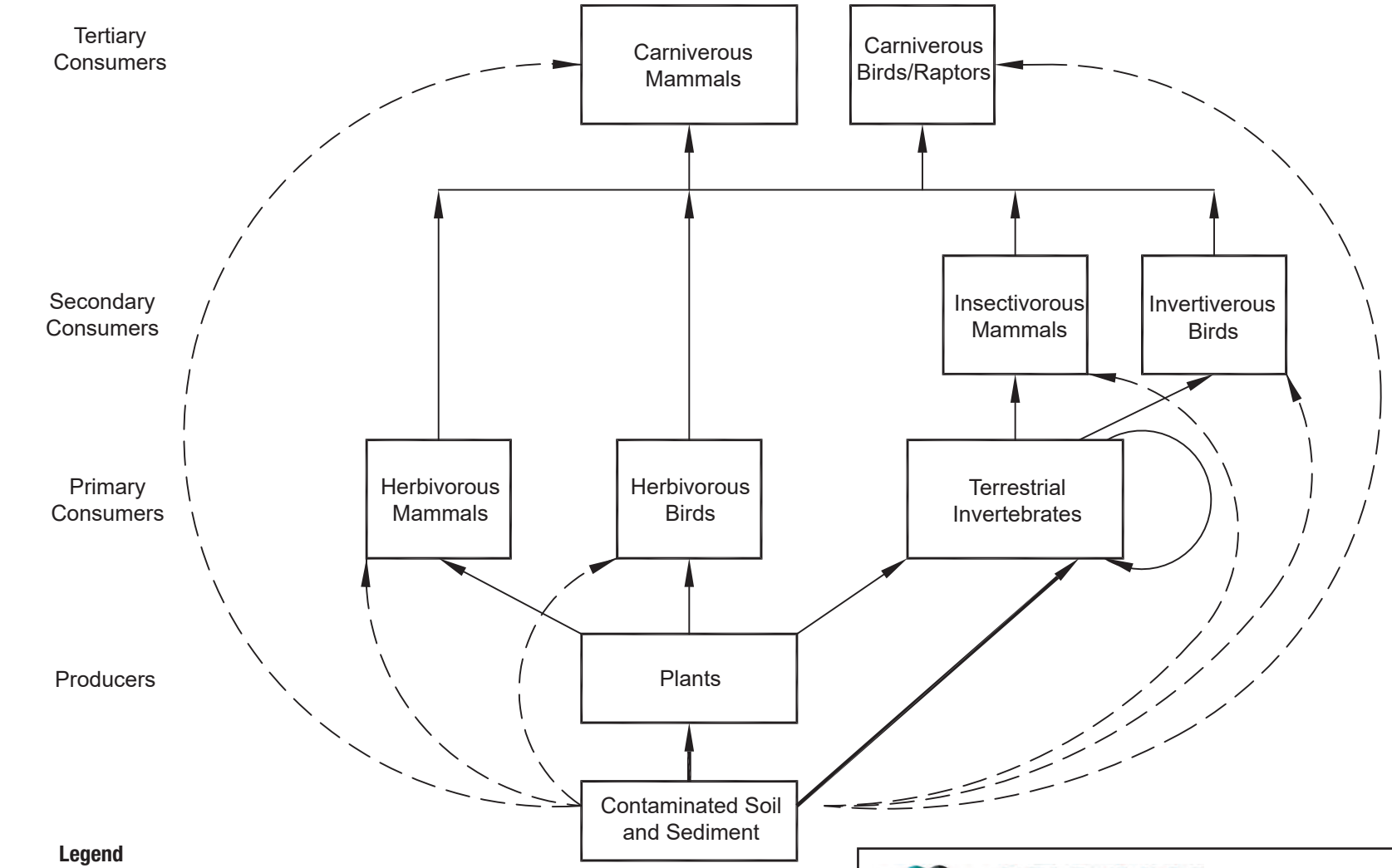
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Jackson, California

THALLIUM ASSESSMENT LOCATIONS

S9959-07-03	February 2024	Figure 7

GEOCON I:/26-2024 USER Brown M PATH:C:\Users\Brown M\OneDrive - Geocon, Inc\GIS Graphics\Projects\S9959-07-03_OroDeAmador_Jackson\01_ReportMaps\ January 2024\Figure_7_Thallium_Assessment.mxd



Legend

- Direct Exposure route for producers and invertebrates
- Indirect exposure route for consumers
- Secondary direct exposure route for consumers: incidental soil ingestion, inhalation of soil dust and dermal contact

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Amador County, California

ECOLOGICAL
CONCEPTUAL MODEL DIAGRAM

S9959-07-03	February 2024	Figure 8

C:\Users\Brown M\OneDrive - Geocon, Inc\GIS_Graphics\Projects\S9959-07-03_OroDeAmador_Jackson\01_ReportMaps\Janaury_2024\Figure_8_EcologicalConceptual_Model_Diagram.ai



Legend

- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- Cyanide Process Area Foundations
- Concrete Arch Dam
- Seasonal Surface Water at Lakebed Area

N

0 200

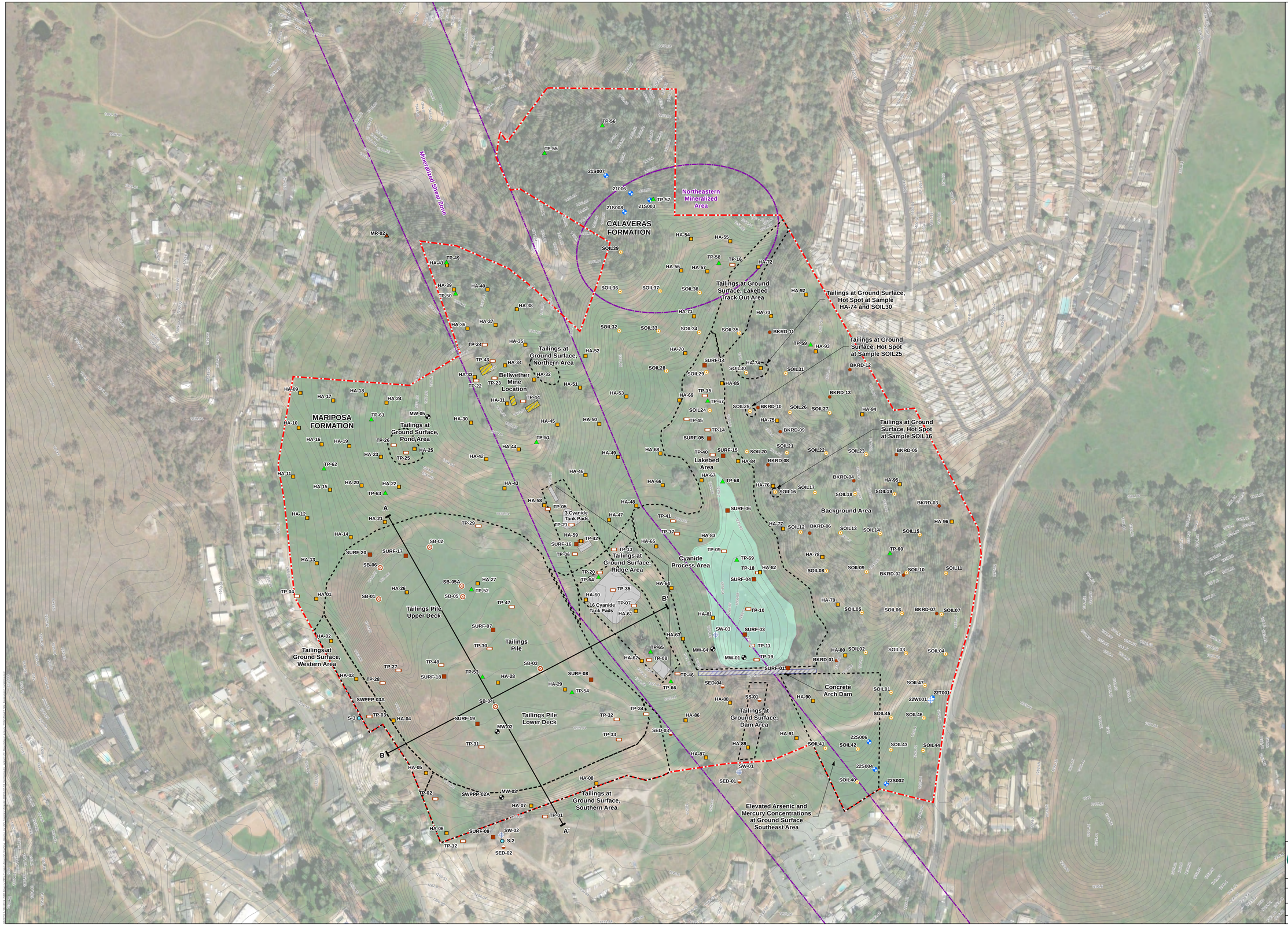
Scale in Feet

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SITE PLAN

S9959-07-03	February 2024	Sheet 1



Legend

- Proposed Test Pit Sample Location
- Approximate Background Sample Location (Dames & Moore, 1995)
- Approximate Sediment Sample Location (Dames & Moore, 1995)
- Approximate Soil Boring Location (Dames & Moore, 1995)
- Approximate Test Pit Sample Location (Dames & Moore, 1995)
- Approximate Soil Sample Location (Dames & Moore, 1995)
- Approximate Surface Soil Sample Location (Dames & Moore, 1995)
- Approximate Monitoring Well Location (Dames & Moore, 1995)
- Approximate Surface Water Sample Location (Dames & Moore, 1995)
- Approximate Soil Sample Location (USEPA, 2008)
- Approximate Hand Auger Sample Location (Arcadis, 2009)
- Approximate Surface Water Sample Location (DTSC, 2011)
- Approximate Monitoring Well Location (DTSC, 2011)
- Approximate Groundwater Seep Sample Location (Geocon, 2017)
- 3-Foot Elevation Conotours
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- Cyanide Process Area Foundations
- Concrete Arch Dam
- Seasonal Surface Water at Lakebed Area

Note:
Elevation contours derived from 3 meter DEM provided by Natural Resource Conservation Service, U.S. Department of Agriculture geospatial database.

N

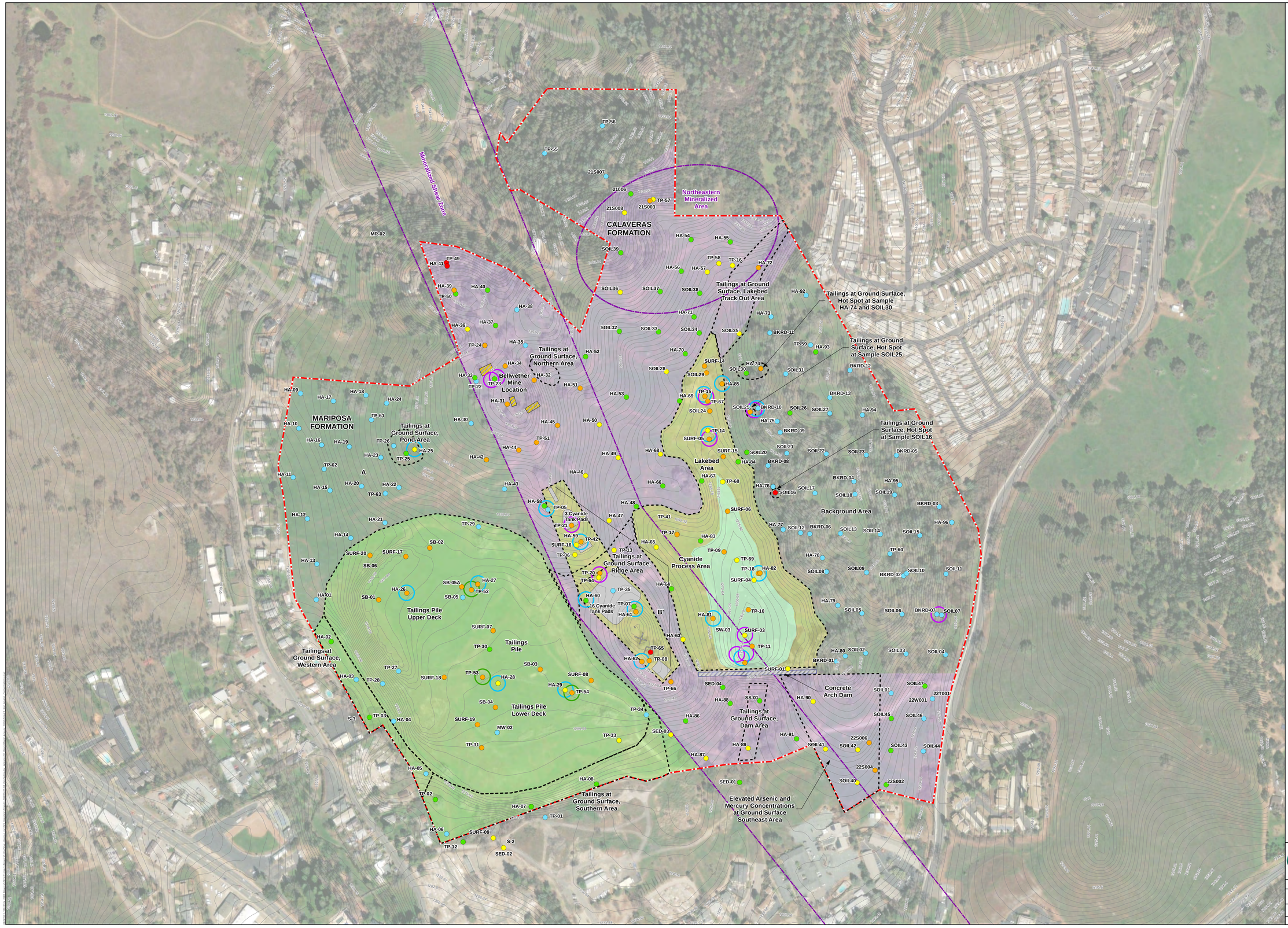
0 200
Scale in Feet

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SITE ASSESSMENT LOCATIONS

S9959-07-03	February 2024	Sheet 2



Legend

Arsenic Concentrations

- 0-21 mg/kg Less than Non-Mineralized BTV
- >21-60 mg/kg Greater than Non-Mineralized BTV and Less Than Recreational Cleanup Goal
- >60-120 mg/kg Greater than Recreational Cleanup Goal and Less Than Mineralized BTV
- >120-500 mg/kg Greater than Mineralized BTV, Within Mineralized Background Range, and less than 500 mg/kg
- >500-1,300 mg/kg Greater than Mineralized BTV, within Mineralized Background Range, and greater than 500 mg/kg

Extraction Test Locations

- SPLP Extraction
- DI-WET Extraction
- Standard WET Extraction

Proposed Land Use Controls

- Lakebed Area and Cyanide Process Area: Access is to be restricted by fencing and posting, and use is to be prohibited under a LUC.
- Tailings Pile: Unauthorized disturbance of the closure cap and underlying tailings is to be prohibited under a LUC.
- Naturally Mineralized Area: Future residential development is to be restricted under a LUC.
- 3-Foot Elevation Conoturs
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Bellwether Mine Excavations
- Cyanide Process Area Foundations
- Concrete Arch Dam
- Seasonal Surface Water at Lakebed Area

Abbreviations:

> = less than
mg/kg = milligrams per kilogram
BTV = Background Threshold Value

Note:

Elevation contours derived from 3 meter DEM provided by Natural Resource Conservation Service, U.S. Department of Agriculture geospatial database.

0 200
Scale in Feet

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SOIL ARSENIC CONCENTRATIONS

S9959-07-03	February 2024	Sheet 3



Legend

- Storm Drain Inlets (N)
- Fenceline (N)
- Surface_Drainage_Routes
- Existing Storm Drainage (E)
- Closed Pipe Collectors (N)
- Drainage Ditch (N)
- Drainage Diversion Berms (N)
- Area to be Regraded for Draining
- Seasonal Surface Water Ponding at Tailings Pile
- Detention Pond (N)
- Approximate Site Boundary
- Mineralized Shear Zone
- Assessment Area Boundary
- Tailings at Ground Surface
- Bellwether Mine Excavations
- Cyanide Process Area Foundations
- Concrete Arch Dam
- Seasonal Surface Water at Lakebed Area

Proposed Remedial Actions:

1. Excavate isolated tailings areas, perform verification sampling and analysis, and transport to Tailings Pile for placement as engineered fill.
2. Fence and post Lakebed Area and Cyanide Treatment Area.
3. Regrade Tailings Pile to drain. Drainage details are to be presented in the RDIP based on the specific redevelopment details for the sports facility.
4. Improve existing drainage diversion berms
5. Cover Tailings Pile with 2 feet of clean engineered fill. Fill may be borrowed locally (e.g., from the proposed storm water retention pond) or imported from clean off-site sources.
6. Construct drainage ditches, closed pipe collectors and overside drains to route surface water away from the tailings pile. Specific drainage collection details on the Tailings Pile deck are to be presented in the RDIP based on the specific redevelopment details.
7. Construct storm water detention pond(s) as needed to retain surface water at on-site locations away from the Tailings Pile before discharging to municipal storm drainage.

Note:
Elevation contours derived from 3 meter DEM provided by Natural Resource Conservation Service, U.S. Department of Agriculture geospatial database.

N

0 200
Scale in Feet

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PROPOSED REMEDIAL ACTION

S9959-07-03	February 2024	Sheet 4



Legend

- Storm Drain Inlets (N)
- Proposed Public Hiking/Biking Trail
- Proposed Paved Road
- Fenceline (N)
- Existing Storm Drainage (E)
- Drainage Diversion Berms (N)
- Detention Pond (N)
- Tailing Pile with Final Cover
- Approximate Site Boundary
- Concrete Arch Dam

N

0 200

Scale in Feet

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Oro de Amador
Jackson,
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CONCEPTUAL REDEVELOPMENT PLAN

S9959-07-03	February 2024	Sheet 5

TABLE 1
ASSESSMENT LOCATIONS
ORO DE AMADOR
JACKSON, CALIFORNIA

EXPLORATORY LOCATION	MEDIUM	DATA SOURCE	LATITUDE (WGS 1984; Decimal Degrees)	LONGITUDE (WGS 1984; Decimal Degrees)	NORTHING (NAD 83 CA State Plane Zone)	EASTING (NAD 83 CA State Plane Zone)
BKRD-01	Soil	D&M 1995	38.35736377	-120.7691113	1894356.137	6914623.225
BKRD-02	Soil	D&M 1995	38.35842535	-120.7680243	1894746.932	6914929.667
BKRD-03	Soil	D&M 1995	38.35928526	-120.7674419	1895062.331	6915092.404
BKRD-04	Soil	D&M 1995	38.35961636	-120.7687958	1895177.638	6914702.59
BKRD-05	Soil	D&M 1995	38.35993596	-120.7681115	1895296.678	6914897.199
BKRD-06	Soil	D&M 1995	38.35896572	-120.7695091	1894937.938	6914501.259
BKRD-07	Soil	D&M 1995	38.35793827	-120.7675051	1894571.582	6915080.939
BKRD-08	Soil	D&M 1995	38.35982949	-120.7701593	1895249.954	6914310.573
BKRD-09	Soil	D&M 1995	38.36024424	-120.7699555	1895401.774	6914366.971
BKRD-10	Soil	D&M 1995	38.36054865	-120.7703049	1895511.27	6914265.296
BKRD-11	Soil	D&M 1995	38.3614923	-120.770101	1895855.69	6914319.094
BKRD-12	Soil	D&M 1995	38.36100902	-120.7688345	1895684.62	6914684.613
BKRD-13	Soil	D&M 1995	38.36067038	-120.7691596	1895560.043	6914593.057
MR-01	Soil	D&M 1995	38.36645434	-120.7757227	1897640.84	6912682.94
MR-02	Soil	D&M 1995	38.36277085	-120.7761751	1896297.758	6912571.288
MW-01	Soil/GW	D&M 1995	38.35736229	-120.7705677	1894349.944	6914205.647
MW-02	Soil/GW	D&M 1995	38.35653105	-120.7745232	1894031.928	6913075.555
MW-03	Soil/GW	D&M 1995	38.35570805	-120.7744652	1893732.459	6913096.236
MW-04	Soil/GW	D&M 1995	38.35740779	-120.7711109	1894364.407	6914049.663
MW-05	Soil/GW	D&M 1995	38.36049064	-120.7755576	1895469.809	6912759.519
SB-01	Soil	D&M 1995	38.35821317	-120.7763809	1894637.292	6912534.648
SB-02	Soil	D&M 1995	38.35885561	-120.775558	1894874.414	6912767.426
SB-03	Soil	D&M 1995	38.3573149	-120.773824	1894320.073	6913272.178
SB-04	Soil	D&M 1995	38.35684623	-120.7745462	1894146.612	6913067.405
SB-05	Soil	D&M 1995	38.35822946	-120.7750443	1894648.388	6912917.79
SB-05A	Soil	D&M 1995	38.3583629	-120.7750568	1894696.933	6912913.564
SB-06	Soil	D&M 1995	38.35860699	-120.7763477	1894780.831	6912542.232
SED-01	Sed	D&M 1995	38.35586561	-120.7706772	1893804.506	6914181.608
SED-02	Sediment	D&M 1995	38.35508667	-120.7744466	1893506.259	6913104.603
SED-03	Sediment	D&M 1995	38.3564741	-120.7717623	1894021.879	6913867.469
SED-04	Sediment	D&M 1995	38.3570592	-120.7709241	1894238.193	6914104.938
SS-01	Sediment	D&M 1995	38.35688383	-120.7703414	1894176.591	6914272.893
SURF-01	Soil	D&M 1995	38.35728103	-120.769885	1894323.004	6914401.791
SURF-03	Soil	D&M 1995	38.35770717	-120.7705655	1894475.541	6914204.583
SURF-04	Soil	D&M 1995	38.35839726	-120.7704043	1894727.46	6914247.384
SURF-05	Soil	D&M 1995	38.36016929	-120.7710881	1895370.088	6914042.598
SURF-06	Soil	D&M 1995	38.35926456	-120.7708109	1895041.71	6914126.538
SURF-07	Soil	D&M 1995	38.35780904	-120.7745658	1894497.142	6913057.071
SURF-08	Soil	D&M 1995	38.3571675	-120.7730178	1894269.517	6913504.071
SURF-09	Soil	D&M 1995	38.35520971	-120.77461	1893550.431	6913057.15
SURF-14	Soil	D&M 1995	38.36108719	-120.7711469	1895704.112	6914021.224
SURF-15	Soil	D&M 1995	38.35994969	-120.7708669	1895290.98	6914107.111
SURF-16	Soil	D&M 1995	38.35886879	-120.7732236	1894888.242	6913436.699
SURF-17	Soil	D&M 1995	38.35875014	-120.7759398	1894834.533	6912658.465
SURF-18	Soil	D&M 1995	38.35723262	-120.7753533	1894284.196	6912834.082
SURF-19	Soil	D&M 1995	38.35663306	-120.7748348	1894067.872	6912985.697
SURF-20	Soil	D&M 1995	38.35877121	-120.776508	1894840.013	6912495.463
SW-01	Surface Water	D&M 1995	38.35598512	-120.7706838	1893847.999	6914179.147
SW-02	Surface Water	D&M 1995	38.3552357	-120.7744803	1893560.397	6913094.217
SW-03	Surface Water	D&M 1995	38.35770877	-120.7710256	1894474.339	6914072.639
SW-04	Surface Water	D&M 1995	38.35547362	-120.7739822	1893648.962	6913235.875
TP-01	Soil	D&M 1995	38.35545999	-120.7737779	1893644.788	6913294.532

TABLE 1
ASSESSMENT LOCATIONS
ORO DE AMADOR
JACKSON, CALIFORNIA

EXPLORATORY LOCATION	MEDIUM	DATA SOURCE	LATITUDE (WGS 1984; Decimal Degrees)	LONGITUDE (WGS 1984; Decimal Degrees)	NORTHING (NAD 83 CA State Plane Zone)	EASTING (NAD 83 CA State Plane Zone)
TP-02	Soil	D&M 1995	38.35570235	-120.7755225	1893726.297	6912793.079
TP-03	Soil	D&M 1995	38.3567428	-120.7765526	1894101.198	6912492.626
TP-04	Soil	D&M 1995	38.35826439	-120.7776791	1894650.935	6912162.141
TP-05	Soil	D&M 1995	38.35931417	-120.7736659	1895048.714	6913307.681
TP-06	Soil	D&M 1995	38.35874411	-120.7732495	1894842.738	6913429.889
TP-07	Soil	D&M 1995	38.35808825	-120.7723213	1894607.505	6913699.24
TP-08	Soil	D&M 1995	38.35740473	-120.7720884	1894359.504	6913769.384
TP-09	Soil	D&M 1995	38.35875515	-120.7708744	1894855.961	6914110.832
TP-10	Soil	D&M 1995	38.35802735	-120.7705004	1894592.385	6914221.668
TP-11	Soil	D&M 1995	38.35756798	-120.7704475	1894425.312	6914239.105
TP-12	Soil	D&M 1995	38.35516642	-120.7750898	1893532.812	6912919.795
TP-13	Soil	D&M 1995	38.35879668	-120.7726248	1894864.301	6913608.736
TP-14	Soil	D&M 1995	38.36027997	-120.7711117	1895410.301	6914035.297
TP-15	Soil	D&M 1995	38.36070836	-120.7711483	1895566.156	6914022.689
TP-16	Soil	D&M 1995	38.36234292	-120.7706813	1896163.188	6914148.54
TP-17	Soil	D&M 1995	38.35898208	-120.771619	1894935.71	6913896.211
TP-18	Soil	D&M 1995	38.35848118	-120.7703345	1894758.289	6914266.995
TP-19	Soil	D&M 1995	38.35739087	-120.7703804	1894361.078	6914259.201
TP-20	Soil	D&M 1995	38.35850888	-120.7728578	1894758.599	6913543.366
TP-21	Soil	D&M 1995	38.35911216	-120.7732954	1894976.585	6913414.924
TP-22	Soil	D&M 1995	38.36093572	-120.7747803	1895634.889	6912980.205
TP-23	Soil	D&M 1995	38.36096205	-120.7744904	1895645.598	6913063.21
TP-24	Soil	D&M 1995	38.36138326	-120.7746369	1895798.412	6913019.134
TP-25	Soil	D&M 1995	38.36004303	-120.7759126	1895305.441	6912659.928
TP-26	Soil	D&M 1995	38.36014114	-120.776108	1895340.415	6912603.438
TP-27	Soil	D&M 1995	38.35731645	-120.7760786	1894311.921	6912625.704
TP-28	Soil	D&M 1995	38.35716294	-120.7763362	1894255.025	6912552.601
TP-29	Soil	D&M 1995	38.35911215	-120.7747741	1894970.863	6912990.95
TP-30	Soil	D&M 1995	38.35757354	-120.7746258	1894411.152	6913041.014
TP-31	Soil	D&M 1995	38.35634425	-120.7747735	1893962.939	6913004.694
TP-32	Soil	D&M 1995	38.35666709	-120.7726164	1894088.847	6913621.631
TP-33	Soil	D&M 1995	38.35641285	-120.7725855	1893996.385	6913631.734
TP-34	Soil	D&M 1995	38.35672762	-120.7721455	1894112.713	6913756.354
TP-35	Soil	D&M 1995	38.3582875	-120.7726496	1894678.789	6913604.155
TP-40	Soil	D&M 1995	38.35996651	-120.7710361	1895296.45	6914058.505
TP-41	Soil	D&M 1995	38.3591438	-120.7716777	1894994.373	6913878.6
TP-42	Soil	D&M 1995	38.35890445	-120.7731485	1894901.517	6913458.067
TP-43	Soil	D&M 1995	38.36117832	-120.7745157	1895724.253	6913054.891
TP-44	Soil	D&M 1995	38.36066783	-120.7740384	1895540.207	6913194.227
TP-45	Soil	D&M 1995	38.36041754	-120.7714406	1895459.121	6913940.301
TP-46	Soil	D&M 1995	38.35722916	-120.7716396	1894297.308	6913898.949
TP-47	Soil	D&M 1995	38.35809401	-120.7742639	1894602.08	6913142.228
TP-48	Soil	D&M 1995	38.35737587	-120.7753963	1894336.193	6912821.05
TP-49	Soil	Geocon 2023	38.36242589	-120.7752295	1896175.794	6912844.087
TP-50	Soil	Geocon 2023	38.36203149	-120.7750907	1896032.712	6912885.83
TP-51	Soil	Geocon 2023	38.36015897	-120.7738363	1895355.688	6913254.689
TP-52	Tailings	Geocon 2023	38.35832317	-120.7749031	1894683.057	6912957.828
TP-53	Tailings	Geocon 2023	38.35722662	-120.7747447	1894284.363	6913008.634
TP-54	Tailings	Geocon 2023	38.35701725	-120.7733237	1894213.618	6913417.113
TP-55	Soil	Geocon 2023	38.3637778	-120.7736452	1896674.217	6913291.701
TP-56	Soil	Geocon 2023	38.3641136	-120.7727197	1896800.078	6913555.384

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EXPLORATORY LOCATION	MEDIUM	DATA SOURCE	LATITUDE (WGS 1984; Decimal Degrees)	LONGITUDE (WGS 1984; Decimal Degrees)	NORTHING (NAD 83 CA State Plane Zone)	EASTING (NAD 83 CA State Plane Zone)
TP-57	Soil	Geocon 2023	38.36318339	-120.7719272	1896464.414	6913787.182
TP-58	Soil	Geocon 2023	38.36237027	-120.7708956	1896172.317	6914086.945
TP-59	Soil	Geocon 2023	38.36133339	-120.7694538	1895800.336	6914505.46
TP-60	Soil	Geocon 2023	38.35870307	-120.7682353	1894847.242	6914867.801
TP-61	Soil	Geocon 2023	38.36046998	-120.7764583	1895458.809	6912501.389
TP-62	Soil	Geocon 2023	38.35986071	-120.7772223	1895233.993	6912285.313
TP-63	Soil	Geocon 2023	38.35954595	-120.776251	1895123.125	6912565.337
TP-64	Soil	Geocon 2023	38.35845601	-120.7728781	1894739.265	6913537.808
TP-65	Soil	Geocon 2023	38.357513	-120.7720647	1894399.02	6913775.649
TP-66	Soil	Geocon 2023	38.3571377	-120.7717486	1894263.583	6913868.143
TP-67	Tailings	Geocon 2023	38.3611626	-120.7714836	1895730.267	6913924.3
TP-68	Tailings	Geocon 2023	38.35884171	-120.7707631	1894887.915	6914142.32
TP-69	Tailings	Geocon 2023	38.35792297	-120.7705254	1894554.277	6914214.994
SOIL01	Soil	USEPA 2008	38.35695905	-120.7682483	1894212.112	6914872.674
SOIL02	Soil	USEPA 2008	38.35746386	-120.7686426	1894394.404	6914757.113
SOIL03	Soil	USEPA 2008	38.35744792	-120.7680018	1894391.09	6914940.941
SOIL04	Soil	USEPA 2008	38.35743198	-120.7673755	1894387.72	6915120.611
SOIL05	Soil	USEPA 2008	38.35796284	-120.7686959	1894575.898	6914739.386
SOIL06	Soil	USEPA 2008	38.35794648	-120.7680589	1894572.417	6914922.101
SOIL07	Soil	USEPA 2008	38.35792778	-120.7674279	1894568.062	6915103.121
SOIL08	Soil	USEPA 2008	38.35849033	-120.7692495	1894765.834	6914578.051
SOIL09	Soil	USEPA 2008	38.35847397	-120.7686125	1894762.352	6914760.768
SOIL10	Soil	USEPA 2008	38.35845528	-120.7679785	1894758.009	6914942.641
SOIL11	Soil	USEPA 2008	38.35844125	-120.7673505	1894755.342	6915122.784
SOIL12	Soil	USEPA 2008	38.35898048	-120.7696543	1894942.748	6914459.571
SOIL13	Soil	USEPA 2008	38.35896646	-120.7690203	1894940.104	6914641.424
SOIL14	Soil	USEPA 2008	38.3589501	-120.7683863	1894936.611	6914823.286
SOIL15	Soil	USEPA 2008	38.35892907	-120.7677582	1894931.394	6915003.464
SOIL16	Soil	USEPA 2008	38.35948802	-120.7700475	1895126.042	6914344.31
SOIL17	Soil	USEPA 2008	38.35947611	-120.7694152	1895124.158	6914525.673
SOIL18	Soil	USEPA 2008	38.35945626	-120.7687778	1895119.405	6914708.524
SOIL19	Soil	USEPA 2008	38.35944037	-120.768148	1895116.067	6914889.179
SOIL20	Soil	USEPA 2008	38.35999972	-120.7704927	1895310.651	6914214.154
SOIL21	Soil	USEPA 2008	38.35997988	-120.7698553	1895305.897	6914397.007
SOIL22	Soil	USEPA 2008	38.35996598	-120.769228	1895303.272	6914576.928
SOIL23	Soil	USEPA 2008	38.35994613	-120.7685906	1895298.519	6914759.779
SOIL24	Soil	USEPA 2008	38.36052189	-120.7710711	1895498.552	6914045.748
SOIL25	Soil	USEPA 2008	38.36050538	-120.7704313	1895495.021	6914229.253
SOIL26	Soil	USEPA 2008	38.36048556	-120.7697958	1895490.272	6914411.566
SOIL27	Soil	USEPA 2008	38.36047235	-120.7691645	1895487.911	6914592.639
SOIL28	Soil	USEPA 2008	38.36102352	-120.7717529	1895678.579	6913847.787
SOIL29	Soil	USEPA 2008	38.36100041	-120.7711174	1895672.627	6914030.119
SOIL30	Soil	USEPA 2008	38.3609905	-120.7704818	1895671.483	6914212.385
SOIL31	Soil	USEPA 2008	38.36097399	-120.7698547	1895667.903	6914392.269
SOIL32	Soil	USEPA 2008	38.36153602	-120.7724938	1895862.332	6913632.824
SOIL33	Soil	USEPA 2008	38.3615238	-120.7718703	1895860.298	6913811.675
SOIL34	Soil	USEPA 2008	38.36150135	-120.7712234	1895854.631	6913997.26
SOIL35	Soil	USEPA 2008	38.36148787	-120.7705879	1895852.188	6914179.518
SOIL36	Soil	USEPA 2008	38.36202655	-120.7724713	1896041.045	6913636.858
SOIL37	Soil	USEPA 2008	38.36202655	-120.7718359	1896043.506	6913819.05
SOIL38	Soil	USEPA 2008	38.36199961	-120.7712062	1896036.137	6913999.733

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EXPLORATORY LOCATION	MEDIUM	DATA SOURCE	LATITUDE (WGS 1984; Decimal Degrees)	LONGITUDE (WGS 1984; Decimal Degrees)	NORTHING (NAD 83 CA State Plane Zone)	EASTING (NAD 83 CA State Plane Zone)
SOIL39	Soil	USEPA 2008	38.36252032	-120.7724542	1896220.917	6913639.353
SOIL40	Soil	USEPA 2008	38.35584214	-120.768806	1893803.222	6914718.265
SOIL41	Soil	USEPA 2008	38.35626874	-120.7693032	1893956.64	6914573.613
SOIL42	Soil	USEPA 2008	38.35625486	-120.7687901	1893953.575	6914720.799
SOIL43	Soil	USEPA 2008	38.35623886	-120.7682644	1893949.792	6914871.601
SOIL44	Soil	USEPA 2008	38.35622586	-120.7677487	1893947.065	6915019.559
SOIL45	Soil	USEPA 2008	38.35664095	-120.7682509	1894096.267	6914873.487
SOIL46	Soil	USEPA 2008	38.35663249	-120.7677321	1894095.2	6915022.304
SOIL47	Soil	USEPA 2008	38.35704168	-120.7677094	1894244.295	6915026.784
HA-01	Soil	Arcadis 2009	38.35822632	-120.7773731	1894638.253	6912250.085
HA-02	Soil	Arcadis 2009	38.35769874	-120.7771451	1894447.016	6912318.025
HA-03	Soil	Arcadis 2009	38.35721798	-120.7767545	1894273.454	6912432.406
HA-04	Soil	Arcadis 2009	38.35669042	-120.7761684	1894083.606	6912603.023
HA-05	Soil	Arcadis 2009	38.3560267	-120.7756638	1893843.865	6912750.974
HA-06	Soil	Arcadis 2009	38.35526938	-120.7753491	1893569.302	6912844.932
HA-07	Soil	Arcadis 2009	38.35559702	-120.7739981	1893693.834	6913230.703
HA-08	Soil	Arcadis 2009	38.35586932	-120.7729564	1893797.026	6913528.069
HA-09	Soil	Arcadis 2009	38.36081195	-120.7775798	1895579.009	6912178.144
HA-10	Soil	Arcadis 2009	38.36037398	-120.7776123	1895419.397	6912170.979
HA-11	Soil	Arcadis 2009	38.35976227	-120.7777145	1895196.25	6912144.654
HA-12	Soil	Arcadis 2009	38.35924083	-120.7774971	1895007.206	6912209.554
HA-13	Soil	Arcadis 2009	38.35867258	-120.7773564	1894800.823	6912252.684
HA-14	Soil	Arcadis 2009	38.3589935	-120.7768108	1894919.79	6912407.555
HA-15	Soil	Arcadis 2009	38.35959182	-120.7771305	1895136.433	6912312.942
HA-16	Soil	Arcadis 2009	38.36016341	-120.7772542	1895344.099	6912274.685
HA-17	Soil	Arcadis 2009	38.36071161	-120.7770581	1895544.483	6912328.212
HA-18	Soil	Arcadis 2009	38.36077849	-120.7765381	1895570.842	6912477
HA-19	Soil	Arcadis 2009	38.36013669	-120.7768151	1895336.062	6912400.71
HA-20	Soil	Arcadis 2009	38.35963864	-120.7766275	1895155.423	6912456.939
HA-21	Soil	Arcadis 2009	38.3591776	-120.7762643	1894988.938	6912563.328
HA-22	Soil	Arcadis 2009	38.35961621	-120.7760335	1895149.55	6912627.374
HA-23	Soil	Arcadis 2009	38.35999541	-120.7763142	1895286.551	6912545.021
HA-24	Soil	Arcadis 2009	38.36067527	-120.7762129	1895534.513	6912570.741
HA-25	Soil	Arcadis 2009	38.36009143	-120.7757776	1895323.588	6912698.408
HA-26	Soil	Arcadis 2009	38.35829337	-120.7759304	1894668.237	6912663.423
HA-27	Soil	Arcadis 2009	38.35839242	-120.7748009	1894708.669	6912986.786
HA-28	Soil	Arcadis 2009	38.35714785	-120.7744997	1894256.628	6913079.267
HA-29	Soil	Arcadis 2009	38.35705169	-120.7734339	1894225.734	6913385.333
HA-30	Soil	Arcadis 2009	38.36041029	-120.7748712	1895443.204	6912956.715
HA-31	Soil	Arcadis 2009	38.36064222	-120.7742935	1895529.892	6913121.229
HA-32	Soil	Arcadis 2009	38.36093885	-120.7738602	1895639.588	6913244.012
HA-33	Soil	Arcadis 2009	38.36097929	-120.7748025	1895650.667	6912973.637
HA-34	Soil	Arcadis 2009	38.36112136	-120.7743164	1895704.283	6913112.291
HA-35	Soil	Arcadis 2009	38.36137627	-120.7739914	1895798.365	6913204.244
HA-36	Soil	Arcadis 2009	38.36158975	-120.7749096	1895872.553	6912939.924
HA-37	Soil	Arcadis 2009	38.36163021	-120.7744618	1895889.016	6913068.115
HA-38	Soil	Arcadis 2009	38.36182438	-120.7741193	1895961.047	6913165.376
HA-39	Soil	Arcadis 2009	38.36208003	-120.7751139	1896050.295	6912878.942
HA-40	Soil	Arcadis 2009	38.36207356	-120.7745815	1896049.998	6913031.621
HA-41	Soil	Arcadis 2009	38.3623826	-120.7752191	1896160.072	6912847.281
HA-42	Soil	Arcadis 2009	38.35995178	-120.7746375	1895277.142	6913025.977

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EXPLORATORY LOCATION	MEDIUM	DATA SOURCE	LATITUDE (WGS 1984; Decimal Degrees)	LONGITUDE (WGS 1984; Decimal Degrees)	NORTHING (NAD 83 CA State Plane Zone)	EASTING (NAD 83 CA State Plane Zone)
HA-43	Soil	Arcadis 2009	38.35957991	-120.7743549	1895142.817	6913108.832
HA-44	Soil	Arcadis 2009	38.3600664	-120.7741178	1895320.89	6913174.431
HA-45	Soil	Arcadis 2009	38.36036951	-120.7734974	1895433.664	6913350.832
HA-46	Soil	Arcadis 2009	38.35973273	-120.7730621	1895203.469	6913478.763
HA-47	Soil	Arcadis 2009	38.35916727	-120.7726983	1894998.966	6913585.854
HA-48	Soil	Arcadis 2009	38.35934047	-120.772263	1895063.721	6913709.807
HA-49	Soil	Arcadis 2009	38.35995432	-120.7725391	1895286.186	6913627.624
HA-50	Soil	Arcadis 2009	38.36037205	-120.7728314	1895437.169	6913541.75
HA-51	Soil	Arcadis 2009	38.36083053	-120.7731303	1895602.966	6913453.812
HA-52	Soil	Arcadis 2009	38.36122533	-120.7730361	1895747.095	6913478.882
HA-53	Soil	Arcadis 2009	38.36071081	-120.7723962	1895562.212	6913664.887
HA-54	Soil	Arcadis 2009	38.36267281	-120.7713315	1896280.798	6913960.48
HA-55	Soil	Arcadis 2009	38.36263779	-120.7707099	1896270.455	6914138.872
HA-56	Soil	Arcadis 2009	38.36227967	-120.7714964	1896136.996	6913915.148
HA-57	Soil	Arcadis 2009	38.3622635	-120.7710808	1896132.72	6914034.369
HA-58	Soil	Arcadis 2009	38.35936045	-120.7737235	1895065.344	6913290.955
HA-59	Soil	Arcadis 2009	38.35890672	-120.7731483	1894902.343	6913458.107
HA-60	Soil	Arcadis 2009	38.3581694	-120.7730829	1894634.105	6913480.492
HA-61	Soil	Arcadis 2009	38.35802085	-120.7722907	1894583.077	6913708.362
HA-62	Soil	Arcadis 2009	38.35739426	-120.772208	1894355.229	6913735.142
HA-63	Soil	Arcadis 2009	38.35766619	-120.7715464	1894456.815	6913923.517
HA-64	Soil	Arcadis 2009	38.35830184	-120.7717182	1894687.619	6913871.119
HA-65	Soil	Arcadis 2009	38.35882562	-120.7719517	1894877.445	6913801.607
HA-66	Soil	Arcadis 2009	38.35959236	-120.7718374	1895157.095	6913830.589
HA-67	Soil	Arcadis 2009	38.35964828	-120.7712181	1895179.86	6914007.89
HA-68	Soil	Arcadis 2009	38.35999154	-120.7718666	1895302.345	6913820.261
HA-69	Soil	Arcadis 2009	38.36065515	-120.7715521	1895545.214	6913907.183
HA-70	Soil	Arcadis 2009	38.36124502	-120.7714483	1895760.418	6913934.035
HA-71	Soil	Arcadis 2009	38.36170523	-120.7713023	1895928.567	6913973.612
HA-72	Soil	Arcadis 2009	38.36231033	-120.7702679	1896152.927	6914267.216
HA-73	Soil	Arcadis 2009	38.36169502	-120.7700766	1895929.605	6914325.092
HA-74	Soil	Arcadis 2009	38.36104413	-120.7702518	1895691.904	6914278.086
HA-75	Soil	Arcadis 2009	38.36038305	-120.7700021	1895452.143	6914352.921
HA-76	Soil	Arcadis 2009	38.35956317	-120.770082	1895153.276	6914334.061
HA-77	Soil	Arcadis 2009	38.35902523	-120.7699302	1894957.973	6914380.236
HA-78	Soil	Arcadis 2009	38.35866364	-120.7693117	1894828.702	6914559.367
HA-79	Soil	Arcadis 2009	38.35806587	-120.7690766	1894611.939	6914629.71
HA-80	Soil	Arcadis 2009	38.35743092	-120.7689698	1894381.137	6914663.463
HA-81	Soil	Arcadis 2009	38.35792304	-120.7710656	1894552.208	6914060.107
HA-82	Soil	Arcadis 2009	38.35848497	-120.770306	1894759.78	6914275.156
HA-83	Soil	Arcadis 2009	38.35889709	-120.7712471	1894906.204	6914003.266
HA-84	Soil	Arcadis 2009	38.35988236	-120.7706308	1895267.379	6914175.139
HA-85	Soil	Arcadis 2009	38.36086195	-120.7708709	1895623.16	6914101.464
HA-86	Soil	Arcadis 2009	38.35664373	-120.7715221	1894084.583	6913935.51
HA-87	Soil	Arcadis 2009	38.3561743	-120.7712065	1893914.863	6914028.322
HA-88	Soil	Arcadis 2009	38.35685709	-120.770811	1894165.034	6914138.361
HA-89	Soil	Arcadis 2009	38.35629377	-120.7705353	1893960.972	6914220.191
HA-90	Soil	Arcadis 2009	38.35686558	-120.7694904	1894173.251	6914516.987
HA-91	Soil	Arcadis 2009	38.35640186	-120.7697625	1894003.33	6914441.243
HA-92	Soil	Arcadis 2009	38.36195598	-120.769516	1896026.808	6914484.552
HA-93	Soil	Arcadis 2009	38.36124392	-120.7693732	1895768.068	6914528.995

TABLE 1

ASSESSMENT LOCATIONS

ORO DE AMADOR

JACKSON, CALIFORNIA

EXPLORATORY LOCATION	MEDIUM	DATA SOURCE	LATITUDE (WGS 1984; Decimal Degrees)	LONGITUDE	NORTHING (NAD 83 CA State Plane Zone)	EASTING
HA-94	Soil	Arcadis 2009	38.36044761	-120.7686457	1895480.92	6914741.528
HA-95	Soil	Arcadis 2009	38.35956479	-120.7680649	1895161.699	6914912.403
HA-96	Soil	Arcadis 2009	38.35908609	-120.7672468	1894990.561	6915149.343
21006	Soil	DTSC 2011	38.36325671	-120.7722829	1896489.736	6913684.829
21S003	Soil	DTSC 2011	38.36316672	-120.7719796	1896458.141	6913772.234
21S007	Soil	DTSC 2011	38.36347982	-120.772672	1896569.474	6913572.193
21S008	Soil	DTSC 2011	38.36302103	-120.7723868	1896403.511	6913656.217
22S002	Soil	DTSC 2011	38.35581188	-120.7683465	1893793.991	6914850.191
22S004	Soil	DTSC 2011	38.35599571	-120.7685202	1893860.257	6914799.468
22S006	Soil	DTSC 2011	38.35633957	-120.7686084	1893985.129	6914772.472
22T001	Soil	DTSC 2011	38.35688018	-120.7675907	1894185.947	6915061.61
22W001	Surface Water	DTSC 2011	38.35685207	-120.7676211	1894175.591	6915053.05

Data Sources:

D&M 1995 = Final Environmental Assessment, Kennedy Mine Tailings Site, Jackson, California (Dames & Moore, August 1995)

USEPA 2008 = Targeted Brownfields Assessment, Oro de Amador, Jackson, California (USEPA, START Team 9, September 5, 2008)

Arcadis 2009 = Final Targeted Site Investigation Summary Report for the Oro de Amador Property (LFR Inc., an Arcadis company, April 7, 2009)

DTSC 2011 = Community Wide Assessment Report, Cities of Jackson and Sutter Creek (California Department of Toxic Substances Control, July 2011)

Geocon 2023 = Performed in accordance with the Final Site Characterization Summary and SSI Workplan (Geocon, April 25, 2023)

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	<9.9	3.0	27.1	0.36	<2.5	43.7	<5.0	112	<7.5	<0.2	<9.9	12.0	0.40	<2.5	~~8.0~~	21.0	14.0	---	---	<5.0	---	<50	---
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.9	<1.0	65.9	<0.25	<2.5	23.0	<5.0	36.6	<7.5	0.029 J	<9.9	15.0	<1.0	<2.5	~~8.0~~ E	17.0	28.0	---	<5.0	---	---	---	---
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.9	<1.0	75.2	<0.25	<2.5	28.2	<5.0	36.3	<7.5	0.044 J	<9.9	18.0	<1.0	<2.5	~~6.0~~ E	17.0	32.0	---	<5.0	---	---	---	---
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.8	<1.0	244	0.28	<2.5	22.0	9.3	48.6	15.0	<0.2	<9.8	27	<0.3	<2.5	~~<49~~	25.2	58.5	---	---	<5.0	---	---	---
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.8	5.0	156	0.27	<2.5	44.9	9.3	54.8	19.0	<0.2	<9.8	33	0.30	<2.5	~~9.0~~	25.5	69.8	---	---	<5.0	---	---	---
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	<9.9	7.0	154	0.62	<2.5	45.3	11.0	69.5	8.9	<0.2	<9.9	36	<0.3	<2.5	~~9.0~~	30.4	71.8	---	---	<5.0	---	---	---
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<10.0	6.0	265	<0.25	<2.5	25.5	9.8	56.3	21.0	<0.2	<10	31	0.30	<2.5	~~10.0~~	20.0	85.7	---	---	<5.0	---	---	---
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<10.0	3.0	227	0.36	<2.5	25.7	12.0	35.4	25.0	<0.2	<10	23	<0.3	<2.5	~~9.0~~	25.6	56.8	---	---	<5.0	---	<50	---
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	<10.0	5.0	155	0.5	<2.5	32.3	13.0	58.5	12.0	<0.2	<9.8	29	<0.3	<2.5	~~9.0~~	36.3	61.1	---	---	<5.0	---	<50	---
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	<9.9	<1.0	135	0.31	<2.5	24.0	8.4	58.3	7.7	<0.2	<9.9	50.9	0.30	<2.5	~~9.0~~	18	129	---	---	<5.0	---	---	---
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	7.0	154	<0.25	<2.5	17.0	5.8	48.0	22.0	0.2	<9.9	21	<0.3	<2.5	~~7.0~~	17	61.6	---	---	<5.0	---	---	---
BKRD-06C-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,C	0.0	<9.9	7.5	151	<0.25	<2.5	19.0	6.6	61.3	25.0	<0.2	<9.9	25	0.4	<2.5	~~7.0~~	21	71.4	---	---	<5.0	---	---	---
BKRD-06F-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,F	0.0	<10.0	6.8	204	0.26	<2.5	18.0	5.7	177	26.0	<0.2	<10.0	24	<0.3	<2.5	~~7.0~~	18	86.9	---	---	<5.0	---	---	---
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	<9.9	7.0	195	0.39	<2.5	22.0	11.0	58.1	11.0	<0.2	<9.9	25	0.50	<2.5	~~8.0~~	25	51.1	---	---	<5.0	---	---	---
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	<9.9	12.0	219	0.52	<2.5	37.4	<4.9	77.3	12.0	<0.2	<9.9	42	0.50	<2.5	~~13.0~~	31	68.9	---	---	<5.0	---	---	---
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	<9.8	5.0	152	0.40	<2.5	23.0	7.4	73.6	10.0	0.035 J	<9.8	37	<1.0	<2.5	~~8.0~~ E	27	68.0	---	<5.0	---	---	---	---
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	<9.9	4.0	277	0.29	<2.5	24.0	10.0	63.1	12.0	<0.2	<9.9	24	0.50	<2.5	~~9.0~~	24.9	69.1	---	---	<5.0	---	---	---
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.8	3.0	123	0.27	2.5	24.0	7.0	116	10.0	0.03 J	<9.8	31	<1.0	<2.5	~~7.0~~ E	28.4	81.5	---	<5.0	---	---	---	---
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.9	3.0	143	0.31	<2.5	22.0	<4.9	118	11.0	0.026 J	<9.9	23	<1.0	<2.5	~~8.0~~ E	29.4	61.6	---	<5.0	---	---	---	---
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	12.0	189	0.38	<2.5	37.2	15.0	52.3	19.0	<0.2	<9.9	39	0.30	<2.5	~~8.0~~	32.6	67.9	---	---	<5.0	---	---	---
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	13.0	197	0.5	<2.5	55.0	16.0	54.7	15.0	<0.2	<9.9	61.6	0.30	<2.5	~~11.0~~	39.3	82.7	---	---	<5.0	---	---	---
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	<9.9	5.0	186	0.46	<2.5	26.7	13.0	65.9	18.0	<0.2	<9.9	34	0.70	<2.5	~~10.0~~	30.4	87.4	---	---	<5.0	---	---	---
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	<9.8	2.0	107	0.29	2.5	22.0	6.9	55.4	15.0	0.033 J	<9.8	31	<1.0	<2.5	~~8.0~~ E	20.0	71.6	---	<5.0	<5.0	---	---	---
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	<10	2.0	134	0.37	<2.5	22.0	9.9	62.2	18.0	<0.2	<10	22	0.30	<2.5	~~10.0~~	23.0	68.9	---	---	<5.0	---	---	---
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	<9.9	2.0	105	<0.25	<2.5	21.0	6.8	58.6	11.0	0.032 J	<9.9	29	<1.0	<2.5	~~7.0~~ E	20.0	72.9	---	<5.0	---	---	---	---
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	6.0	225	0.55	<2.5	34.7	11.0	64	15.0	<0.2	<9.9	33	0.50	<2.5	~~9.0~~	34.4	69.6	---	---	<5.0	---	---	---
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	<9.8	2.0	278	<0.25	<2.5	16	101.0	178	23.0	0.065 J	<9.8	111	<1.0	<2.5	~~5.0~~ E	14.0	86.3	---	<5.0	---	<50	---	---
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	<9.9	<1.0	190	<0.25	<2.5	16	49.0	172	17.0	0.039 J	<9.9	74.2	<1.0	<2.5	~~6.0~~ E	13.0	87.3	---	<5.0	---	<50	---	---
MR-01-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5	17	490	120	0.46	1.7	360	81.0	51.0	38.0	2.1	6.8	1,500	<0.25	0.85	~~<0.5~~	35.0	160	<1.0	---	---	---	---	---
MR-02-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5	20	530	66	0.54	1.5	750	86.0	53.0	14.0	0.073	8.2	1,400	<0.25	0.80	~~<0.5~~	49.0	56.0	<1.0	---	---	---	---	---
MW-01-10.0	10/27/92	D&M 1995	LKBD	SUB	KEN	T	10.0	---	184	---	---	---	3.4	---	---	52.0	6.4	---	22	---	---	---	---	---	---	---	<5.0	---	---	---
MW-01-11.5	10/27/92	D&M 1995	LKBD	SUB	CAL*	S	11.5	<9.9	25	115	1.1	2.5	71.5	32.0	58.4	<7.4	<0.2	<9.9	45	<3.0	<2.5	~~14~~	86.4	40.1	---	---	<50	---	---	---
MW-02-25.0	10/28/92	D&M 1995	TAIL	SUB	KEN	T	25.0	---	8.0	---	---	---	<2.5	---	---	19.0	2.0	---	7.8	---	---	---	---	---	---	---	---	---	<50	---
MW-02-50.0	10/28/92	D&M 1995	TAIL	SUB	CAL*	S	50.0	---	18.0	---	---	---	39.2	---	---	9.5	8.0	---	36.0	---	---	---	---	---	---	---	---	---	<50	---
SB-01-10.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	10.0	<24	178	6.2	0.48	0.89	6.1	6.7	27.8	55.1	5.2	3.6	26.7	<3.0	<0.48	~~<9.6~~	7.1	84.5	---	<0.5	---	---	---	---
SB-01-25.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	25.0	<24	143	54.9	<0.48	0.40	4.6	5.5	26.8	400.0	4.0	2.8	23	<3.0	<0.48	~~<9.7~~	5.8	68.2	---	<0.5	---	---	---	---
SB-01-33.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	33.0	<24	187	40.0	<0.48	0.57	3.0	2.9	18.9	32.3	5.0	1.5	19	<3.0	<0.48	~~<9.6~~	4.6	43.5	---	<0.5	---	---	---	---
SB-01-41.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	41.5	<25	60	67.0	0.53	1.00	26.2	12.2	32.3	14.0	<0.1	<0.99	19	<3.0	0.60	~~<9.9~~	60	57.4	---	21.9	---	---	---	---
SB-01-8.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	8.0	<25	153	28.2	<0.5	0.92	4.0	5.8	28.3	38.1	3.3	1.4	23	<3.0	<0.5	~~<9.9~~	6.8	70.3	---	<0.5	---	---	---	---
SB-02-12.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	12.0	<25	177	55.0	<0.49	0.43	2.7	6.9	30	49.7	3.0	3.0	26.4	<3.0	0.63	~~<9.8~~	6.5	72.2	---	<0.5	---	---	---	---
SB-02-17.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.0	<25	137	50.7	<0.50	<0.25	2.7	6.1	22	58.5	6.3	3.4	30.8	<3.0	<0.50	~~<9.9~~	5.2	72.7	---	12.7	---	---	---	---
SB-02-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	<24	184	52.3	<0.48	<0.24	2.9	7.4	29.3	46.5	0.6	2.3	24	<3.0	<0.48	~~<9.5~~	60	54.7	---	<0.5	---	---	---	---
SB-03-20.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	20.0	<25	125	33.6	<0.49	<0.25	2.5	2.2	18.1	23.0	0.4	1.3	22	<3.0	1.2	~~<9.9~~	4.8	109	---	0.75	---	---	---	---
SB-03-30.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	30.0	<25	93	33.9	<0.50	<0.25	2.1	1.0	6.33	11.0	1.2	3.5	12	<3.0	0.64	~~<9.9~~	1.9	33.1	---	<0.5	---	---	---	---
SB-03-31.5	08/23/90	D&M 1995	TAIL	SUB	KEN	S	31.5	<25	19	99.2	<0.50	0.79	26.5	10.0	34.8	13.0	<0.1	1.1	27.2	<3.0	<0.50	~~<10~~	52.1	64.6	---	<0.5	---	---	---	---
SB-03-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	<24	212	56	<0.48	0.34	6.7	6.8	26	15.1	0.4	4.1	27.9	<3.0	0.68	~~<9.7~~	7.8	68.3	---	---	---	---	---	---
SB-04-17.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.5	<24	144	75.9	<0.48	<0.24	8.4	5.8	22.5	85.6	10	2.7	29.3	<3.0	0.67	~~<9.5~~	8.9	78.5	---	<0.5	---	---	---	---
SB-04-36.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	36.5	<24	78	42.9	<0.48	<0.24	1.5	2.6	14.1	24.4	0.3	3.4	14	<3.0	<0.48	~~<9.5~~	2.7	52.4	---	0.88	---	---	---	---
SB-04-40.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	40.0	<25	117	57.3	<0.49	<0.24	4	4.8	23.0	42.2	7.3	3.7	20	<3.0	0.85	~~<9.8~~	8.2	54.3	---	1.1	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
SB-04-45.0	08/23/90	D&M 1995	TAIL	SUB	MAR*	S	45.0	<25	32	23.1	<0.49	<0.25	<0.98	<0.98	3.5	7.7	0.6	1.9	7.8	<3.0	0.70	~~<9.8~~	1.7	15.3	---	<0.5	---	---	---	---
SB-05-24.5	11/02/92	D&M 1995	TAIL	SUB	MAR*	S	24.5	---	4.7	---	---	---	19	---	---	<7.5	<0.2	---	15	---	---	---	---	---	---	---	---	<25	---
SB-05A-23.0	11/02/92	D&M 1995	TAIL	SUB	KEN	T	23.0	---	219	---	---	---	4.7	---	---	46.0	3.5	---	24	---	---	---	---	---	---	---	---	<25	---
SURF-01-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	76.0	---	---	---	6.8	---	---	63.0	9.7	---	20	---	---	---	---	---	---	<5.0	---	<25	---
SURF-03-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	113	---	---	---	12	---	---	47.0	5.0	---	29	---	---	---	---	---	---	<5.0	---	<50	---
SURF-04-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	106	---	---	---	4.4	---	---	49.0	7.0	---	20	---	---	---	---	---	---	<5.0	---	<50	---
SURF-05-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	160	---	---	---	4.3	---	---	20.0	1.0	---	16	---	---	---	---	---	---	<5.0	---	<50	---
SURF-06C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,C	0.0	---	81	---	---	---	<2.4	---	---	14.0	0.88	---	9.4	---	---	---	---	---	---	<5.0	---	---	---	---
SURF-06F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,F	0.0	---	151	---	---	---	5.5	---	---	24.0	1.2	---	17	---	---	---	---	---	---	<5.0	---	---	---	---
SURF-07C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	---	102	---	---	---	3.5	---	---	26.0	2.1	---	12	---	---	---	---	---	---	---	---	<50	---
SURF-07F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	---	262	---	---	---	7.0	---	---	57.0	2.3	---	27	---	---	---	---	---	---	---	---	<50	---
SURF-08-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	---	158	---	---	---	3.4	---	---	35.0	2.0	---	16	---	---	---	---	---	---	---	---	<50	---
SURF-09C-0.0	10/27/92	D&M 1995	OFF	SURF	KEN	T	0.0	---	66	---	---	---	3.1	---	---	10.0	0.6	---	8.5	---	---	---	---	---	---	---	---	<50	---
SURF-09F-0.0	10/27/92	D&M 1995	OFF	SURF	KEN	T	0.0	---	110	---	---	---	4.5	---	---	28.0	1.4	---	16	---	---	---	---	---	---	---	---	<50	---
SURF-14-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	<9.8	215	38.3	<0.24	<2.4	4	<4.9	11	22.0	0.59	<9.8	16	<1.0	<2.4	~~7.0~~	6.8	52.8	---	---	---	---	---	---
SURF-14R-0.0 (dup)	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	<10	150	54.3	<0.25	<2.5	5.2	6.8	30	14.0	0.23	<10	13	<1.0	<2.5	~~7.0~~	20	52.2	---	---	---	---	---	---
SURF-15C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,C	0.0	<9.8	161	70	<0.24	<2.4	8.3	<4.9	26	33.0	3.3	<9.8	21	<0.3	<2.4	~~9.0~~	11	57	---	---	---	---	---	---
SURF-15F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,F	0.0	<9.9	333	65	<0.25	<2.5	8.7	5.5	37	33.0	3.3	<9.9	27	<0.3	<2.5	~~12~~	12	81	---	---	---	---	---	---
SURF-16-0.0	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0	---	69	---	---	---	1690	---	---	<7.4	0.21	---	1340	---	---	---	---	---	---	<5.0	---	---	---	---
SURF-16R-0.0 (dup)	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0	---	12	---	---	---	431	---	---	<7.3	0.26	---	567	---	---	---	---	---	---	<5.0	---	---	---	---
SURF-17-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	220	---	---	---	4	---	---	35.0	2.6	---	22	---	---	---	---	---	---	<5.0	---	<50	---	---
SURF-17R-0.0 (dup)	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	230	---	---	---	6.3	---	---	55.0	1.7	---	26	---	---	---	---	---	---	<5.0	---	<50	---	---
SURF-18-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	186	---	---	---	7.5	---	---	64.0	3.87	---	27	---	---	---	---	---	---	---	---	---	---	---
SURF-19-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	141	---	---	---	16	---	---	41.0	2.65	---	28	---	---	---	---	---	---	---	---	---	---	---
SURF-20-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	214	---	---	---	3.9	---	---	23.0	0.72	---	16	---	---	---	---	---	---	---	---	---	---	---
TP-01-2.0	08/23/90	D&M 1995	OFF	SUB	KEN	T	2.0	<25	11.0	69.1	<0.49	0.42	12.6	8.1	33.3	10.0	<0.1	1.4	19.0	<3.0	<0.49	~~<9.8~~	31.1	56.8	---	<0.5	---	---	---	---
TP-02-0.5	08/23/90	D&M 1995	W&S	SURF	KEN	T	0.5	<24	35.0	90.7	<0.48	0.95	14.2	7.8	46.3	23.0	1.2	1.3	24.0	<3.0	<0.48	~~<9.5~~	39	76.5	---	<0.5	---	---	---	---
TP-03-4.0	08/23/90	D&M 1995	W&S	SUB	KEN	T	4.0	<24	38.0	21.4	<0.49	<0.24	<0.98	<0.98	7.21	7.2	<0.1	<0.98	7.3	<3.0	<0.49	~~<9.8~~	2.4	53	---	<0.5	---	---	---	---
TP-05-3.0	08/23/90	D&M 1995	PROC	SUB	MEL	S	3.0	<24	14.0	36.8	0.9	1.5	12.4	3.7	92.9	<2.4	<0.1	<0.96	13.0	<3.0	1.0	~~<9.6~~	86.6	111	---	<5.0	---	---	---	---
TP-06-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	<24	63.0	158	0.56	1.8	88.3	21.3	66.8	14.0	<0.1	<0.97	89.2	<3.0	<0.48	~~11.0~~	52.6	59.3	---	<5.0	---	---	---	---
TP-07-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	<25	52.0	73.6	0.74	1.1	228	30.7	86.7	17.0	<0.1	5.9	221	<3.0	0.99	~~<9.8~~	74.8	62.0	---	<5.0	---	---	---	---
TP-08-1.0	08/23/90	D&M 1995	PROC	SURF	MEL*	MR	1.0	<24	159	67.9	0.61	2.1	575	85.8	61.9	71.4	<0.1	13.1	930	<3.0	1.7	~~<9.8~~	60.8	84.6	---	<5.0	---	---	---	---
TP-09-5.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	5.0	<24	150	39.7	<0.49	0.81	<0.98	6.0	31.9	39.1	3.0	2.2	24.6	4.00	0.86	~~<9.8~~	7.2	56.8	---	<5.0	---	---	---	---
TP-09-8.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	8.0	<25	4.0	88.0	<0.5	0.50	4.0	4.1	41.4	4.9	0.20	2.7	26.4	<3.0	0.59	~~<9.9~~	5.7	45.5	---	<5.0	---	---	---	---
TP-10-11.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	11.0	<25	4.0	81.0	<0.49	1.6	42.8	13.0	53.9	6.5	1.1	2.8	28.5	<3.0	0.71	~~<9.8~~	44.2	40.2	---	<5.0	---	---	---	---
TP-10-4.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	4.0	<25	305	58.9	<0.5	0.81	4.2	8.1	38.5	25.0	3.0	<1.0	26.2	<3.0	<0.5	~~<10~~	9.1	65.3	---	<0.5	---	---	---	---
TP-11-12.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	12.0	<24	195	42.3	<0.49	0.98	2.4	6.1	26.2	35.9	4.0	<0.98	23.0	<3.0	<0.49	~~<9.8~~	6.5	54.3	---	<0.5	---	---	---	---
TP-11-6.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	6.0	<24	78.0	23.9	<0.49	0.87	5	4.2	13.8	21.0	3.0	2.5	21.0	<3.0	<0.49	~~<9.8~~	4.2	49	---	<5.0	---	---	---	---
TP-12-2.0	08/23/90	D&M 1995	OFF	SUB	KEN	T/S	2.0	<25	52.0	38.3	<0.49	<0.24	<0.98	2.4	11.7	18.0	0.5	<0.98	13.0	<3.0	<0.49	~~<9.8~~	4.7	56.2	---	<0.5	---	---	---	---
TP-12-4.5	08/23/90	D&M 1995	OFF	SUB	KEN	T	4.5	<24	30.0	75.3	<0.48	0.72	19.6	20.2	65	16.0	<0.1	5.5	126	<3.0	<0.48	~~<9.7~~	40.9	156	---	1.3	---	---	---	---
TP-13-0.1	10/21/92	D&M 1995	EXC-M	SURF	KEN	T	0.1	---	80.0	---	---	---	10	---	---	8.9	1.0	---	21.0	---	---	---	---	---	---	---	<5.0	---	<50	---
TP-13-2.5	10/21/92	D&M 1995	EXC-M	SUB	KEN	T	2.5	---	87.0	---	---	---	14	---	---	72.0	20	---	33.0	---	---	---	---	---	---	---	<5.0	---	<50	---
TP-13C-2.0	10/21/92	D&M 1995	EXC-M	SUB	KEN	T,C	2.0	---	44.0	---	---	---	3.1	---	---	31.0	0.9	---	11.0	---	---	---	---	---	---	---	---	---	---	---
TP-13F-2.0	10/21/92	D&M 1995	EXC-M	SUB	KEN	T,F	2.0	---	98.0	---	---	---	5.4	---	---	61.0	2.0	---	10.0	---	---	---	---	---	---	---	---	---	---	---
TP-14-1.5	10/21/92	D&M 1995	LKBD	SUB	KEN	T	1.5	---	61.0	---	---	---	9.5	---	---	26.0	5.0	---	37.0	---	---	---	---	---	---	<5.0	---	---	<50	---
TP-14-12.0	10/21/92	D&M 1995	LKBD	SUB	CAL	R	12.0	<9.9	11.0	108	0.28	<2.5	28.5	11.0	47.3	7.9	<0.2	<9.9	32.0	<0.3	<2.5	~~5.0~~	21.0	52.1	---	<5.0	---	---	<25	---
TP-14C-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,C	3.0	---	27.0	---	---	---	<2.5	---	---	11.0	0.5	---	9.3	---	---	---	---	---	---	<5.0	---	---	---	---
TP-14F-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,F	3.0	---	2.5	---	---	---	5.2	---	---	13.0	0.7	---	15.0	---	---	---	---	---	---	<5.0	---	---	---	---
TP-15-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T	3.0	---	283	---	---	---	4.9	---	---	12.0	1.0	---	15.0	---	---	---	---	---	---	<5.0	---	---	<50	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
TP-16-1.0	10/21/92	D&M 1995	LKBD	SURF	KEN	T/S	1.0	---	14.0	---	---	---	26	---	---	7.9	<0.2	---	15.0	---	---	---	---	---	---	<5.0	---	---	<50	---
TP-16-3.5	10/21/92	D&M 1995	LKBD	SUB	CAL	R	3.5	<9.8	81.2	98.6	<0.25	<2.5	19	<4.9	40.2	49.0	3.8	<9.8	22.0	0.8	<2.5	~~5.0~~	18.0	51.1	---	<5.0	---	---	<25	---
TP-17-1.1	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.1	<9.9	15.0	94.2	1.3	2.6	92.4	34.0	90.9	<7.5	<0.2	<9.9	34.0	<0.3	<2.5	~~15~~	121	46.6	---	---	<5.0	---	<50	---
TP-17C-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5	---	110	---	---	---	24.9	---	---	11.0	0.7	---	17.0	---	---	---	---	---	---	<5.0	---	<50	---
TP-17F-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5	---	189	---	---	---	34.4	---	---	32.0	2.0	---	28.0	---	---	---	---	---	---	<5.0	---	<50	---
TP-18-0.7	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.7	---	271	---	---	---	6.1	---	---	62.0	<0.2	---	26.0	---	---	---	---	---	---	<5.0	---	<50	---
TP-18-1.5	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.5	<9.9	14.0	130	0.63	<2.5	58.2	20.0	62.6	11.0	<0.2	<9.9	43.0	<0.3	<2.5	~~14~~	51.5	307	---	---	<5.0	---	<50	---
TP-20-1.5	10/22/92	D&M 1995	MBKG	SUB	MEL	MS	1.5	---	153	---	---	---	241	---	---	9.3	<0.2	---	214	---	---	---	---	---	---	<5.0	---	<50	---
TP-21-0.0	10/22/92	D&M 1995	PROC	SURF	KEN	T	0.0	---	71.0	---	---	---	50.5	---	---	44.0	0.50	---	82.5	---	---	---	---	---	---	<5.0	---	<50	---
TP-21-0.3	10/22/92	D&M 1995	PROC	SURF	MEL	MR	0.3	---	257	---	---	---	259	---	---	7.9	0.30	---	149	---	---	---	---	---	---	<5.0	---	<50	---
TP-22-0.0	01/11/93	D&M 1995	BELL	SURF	MEL	WR	0.0	<10	9.0	72.5	<0.25	<2.5	12	16.0	34.1	17.0	0.320	<10	24.0	<1.0	<2.5	~~10~~ E	24.0	60.7	---	<5.0	---	<50	---	---
TP-22-2.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	<9.9	7.0	126	<0.25	<2.5	26.3	18.0	22.0	12.0	0.018 J	<9.9	24.0	<1.0	<2.5	~~7.0~~ E	40.6	47.6	---	<5.0	---	<50	---	---
TP-22-3.0	10/23/92	D&M 1995	BELL	SUB	MEL	S	3.0	<9.8	12.0	110	0.46	<2.4	30.0	9.6	21.0	13.0	<0.2	<9.8	27.0	<0.3	<2.4	~~8.0~~	34.1	44.5	---	---	<5.0	---	<50	---
TP-22R-2.5 (dup)	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	<9.8	5.0	131	<0.25	<2.5	29.6	13.0	19.0	11.0	0.020 J	<9.8	23.0	<1.0	<2.5	~~6.0~~ E	32.8	40.9	---	<5.0	---	<50	---	---
TP-23-0.5	10/26/92	D&M 1995	BELL	SURF	MEL	WR	0.5	<9.8	51.0	111	0.56	2.7	193	25.0	105	9.1	<0.2	<9.8	174	<0.3	<2.4	~~14~~	49.0	52.2	---	---	<5.0	---	<50	---
TP-23-2.0	10/26/92	D&M 1995	MBKG	SUB	MEL	MR	2.0	<9.9	31.0	79.1	0.79	3.3	943	129	164	<7.5	<0.2	<9.9	473	<0.3	<2.5	~~36~~	53.9	51.3	---	---	<5.0	---	<50	---
TP-24-3.0	10/26/92	D&M 1995	MBKG	SUB	MEL	S	3.0	<9.9	40.0	97.2	1.6	5.4	136	29.0	115	<7.4	<0.2	<9.9	79.1	<0.3	<2.5	~~21~~	61.3	61.3	---	---	<5.0	---	<50	---
TP-24C-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,C	1.5	<9.8	139	67.0	0.82	5.0	69.0	39.0	120	11.0	0.24	<9.8	86.0	<0.3	<2.5	~~23~~	74.0	90.0	---	<5.0	---	---	---	---
TP-24F-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,F	1.5	<9.9	115	84.0	0.86	4.1	66.0	43.0	140	21.0	0.27	<9.9	100	<0.3	<2.5	~~16~~	81.0	98.0	---	<5.0	---	---	---	---
TP-25-0.2	10/27/92	D&M 1995	EXC-NM	SURF	KEN	T	0.2	---	28.0	---	---	---	16.0	---	---	70.0	15.0	---	23.0	---	---	---	---	---	---	<5.0	---	---	---	---
TP-25-1.0	10/23/92	D&M 1995	EXC-NM	SURF	MAR*	S	1.0	<10	3.0	178	0.79	4.4	21.0	10.0	96.1	<7.5	<0.2	<10	15.0	<0.3	<2.5	~~18~~	133	72.0	---	---	<5.0	---	---	---
TP-26-2.0	10/23/92	D&M 1995	EXC-NM	SUB	MAR*	S	2.0	<10	9.0	226	0.93	3.2	44.9	23.0	80.1	10.0	0.9	<10	33.0	<0.3	<2.5	~~17~~	114	86.1	---	---	<5.0	---	---	---
TP-27-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	<9.8	5.0	176	0.68	3.6	17.0	15.0	63.3	10.0	<0.2	<9.8	11.0	<0.3	<2.5	~~13~~	84.3	62.8	---	---	<5.0	---	<25	---
TP-28C-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	---	6.0	---	---	---	27.0	---	---	12.0	0.3	---	25.0	---	---	---	---	---	---	<5.0	---	---	---	---
TP-28F-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	---	6.0	---	---	---	30.8	---	---	10.0	<0.2	---	27.0	---	---	---	---	---	---	<5.0	---	---	---	---
TP-29-0.3	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.3	<9.8	21.0	219	0.49	3.5	18.0	22.0	89.8	<7.4	0.6	<9.8	21.0	<0.3	<2.5	~~18~~	121	77.4	---	---	<5.0	---	---	---
TP-30-0.2	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.2	<9.8	42.0	199	0.88	3.2	54.0	29.0	97.3	<7.4	<0.2	<9.8	43.0	<0.3	<2.5	~~20~~	116	72.4	---	---	<5.0	---	---	---
TP-31-0.3	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.3	<9.9	263	113	<0.25	<2.5	14.0	8.6	31.3	44.0	5	<9.9	25.0	0.50	<2.5	~~9.0~~	22	73.7	---	---	<5.0	---	---	---
TP-33-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	WR	0.2	<10	88	207	1.4	4.3	29.5	26.0	91.5	12.0	0.3	<10	23.0	<0.3	<2.5	~~19.0~~	148	85.2	---	---	<5.0	---	<25	---
TP-34-1.0	10/29/92	D&M 1995	TAIL	SURF	KEN	T	1.0	---	5.0	---	---	---	<2.5	---	---	11.0	0.5	---	7.0	---	---	---	---	---	---	---	---	---	<50	---
TP-35-0.0	10/29/92	D&M 1995	PROC	SURF	KEN	T	0.0	---	4.0	---	---	---	38.2	---	---	25.0	0.5	---	38.0	---	---	---	---	---	---	<5.0	---	<50	---
TP-35-0.75	10/29/92	D&M 1995	PROC	SURF	MEL*	MS	0.75	---	12.0	---	---	---	235	---	---	<7.5	<0.2	---	158	---	---	---	---	---	---	<5.0	---	<25	---
TP-40-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0	---	---	---	---	---	14.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-41-1.0	06/06/95	D&M 1995	LKBD	SURF	KEN	T/S	1.0	---	---	---	---	---	12.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-42-1.0	06/06/95	D&M 1995	PROC	SURF	MEL	S	1.0	---	---	---	---	---	180	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-43-1.0	06/06/95	D&M 1995	MBKG	SURF	MEL	S	1.0	---	---	---	---	---	620	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-44-1.0	06/06/95	D&M 1995	MBKG	SURF	MEL	S	1.0	---	---	---	---	---	140	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-45-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0	---	---	---	---	---	7.9	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-46-1.0	06/06/95	D&M 1995	PROC	SURF	KEN	S	1.0	---	---	---	---	---	320	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-47-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5	---	---	---	---	---	11.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
TP-48-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5	---	---	---	---	---	11.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---	---	---	---
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	12.4 J	171	0.35 J	0.5 J	60.3	12.4	72.2	20.7 J	0.17	---	48.6	1.0 J	0.75 J	1.6 J	30.6	73.0	---	<2.6	---	---	---	---
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	3.7 J	94.4	0.16 J	0.19 J	35.9	5.9	58.9	16.4 J	<0.045	---	20.8	0.66 J	0.45 J	1.2 J	19.1	58.1	---	<2.7	---	---	---	---
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	9.9 J	191	0.39 J	0.40 J	61.0	12.4	55.4	10.8 J	<0.052	---	43.9	1.3 J	0.70 J	1.5 J	30.7	57.8	---	<2.6	---	---	---	---
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	10.4 J	173	0.42 J	0.32 J	70.1	14.7	66.1	10.5 J	<0.027	---	47.1	1.2 J	0.70 J	1.9 J	36.8	64.2	---	<2.7	---	---	---	---
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.5	11.8 J	209	0.44 J	0.51 J	73.0	16.8	61.9	14.4 J	<0.061	---	54.9	1.2 J	0.99 J	1.6 J	42.7	86.4	---	<2.7	---	---	---	---
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.7	14.8 J	177	0.44 J	0.56 J	99.7	20.1	72.9	10.9 J	<0.11	---	64.6	1.4 J	1.1 J	1.8 J	52.5	90.1	---	<2.8	---	---	---	---
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<7.5	12.0 J	154	0.31 J	0.34 J	19.6	12.3	44.6	14.1 J	<0.094	---	22.6	0.74 J	0.64 J	1.1 J	20.1	55.0	---	<3.1	---	---	---	---
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<7.4	11.5 J	177	0.46 J	0.38 J	26.5	9.8	60.9	9.9 J	<0.10	---	25.2	0.96 J	0.79 J	1.6 J	24.3	56.6	---	<3.1	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	10.1 J	211	0.33 J	0.48 J	31.9	15.5	54.4	17.7 J	<0.034	---	38.7	1.4 J	0.42 J	1.5 J	23.7	74.6	---	<2.6	---	---	---	---
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	7.1 J	172	0.42 J	0.45 J	66.7	12.4	84.0	12.3 J	<0.042	---	59.7	1.6 J	0.63 J	1.7 J	32.8	70.9	---	<2.7	---	---	---	---
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	6.6 J	222	0.31 J	0.62 J	30.6	20.8	82.4	16.1 J	<0.069	---	50.1	1.6 J	0.77 J	1.7 J	22.9	83.3	---	<2.6	---	---	---	---
SOIL06-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	8.5 J	240	0.31 J	0.63 J	28.4	18.1	73.0	38.0 J	<0.099	---	44.4	1.4 J	0.66 J	1.5 J	22.8	85.1	---	<2.7	---	---	---	---
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	18.7 J	203	0.42 J	0.41 J	34.0	14.4	64.6	22.4 J	<0.099	---	33.3	1.2 J	0.58 J	1.6 J	25.0	66.9	---	<2.7	---	---	---	---
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	12.2 J	182	0.38 J	0.29 J	26.0	12.9	52.2	15.7 J	<0.050	---	27.0	1.0 J	0.46 J	1.3 J	22.5	52.1	---	<2.7	---	---	---	---
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.8	9.1 J	128	0.25 J	0.30 J	22.7	5.0 J	63.4	18.7 J	<0.091	---	21.2	1.4 J	0.36 J	1.2 J	18.7	61.7	---	<2.9	---	---	---	---
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	3.3 J	91.3	0.24 J	0.39 J	21.4	7.3	100.0	8.2 J	<0.038	---	61.7	1.5 J	0.69 J	1.7 J	15.5	175	---	<2.7	---	---	---	---
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.1	10.5 J	196	0.32 J	0.45 J	34.8	14.6	53.6	17.3 J	<0.065	---	37.3	1.5 J	0.60 J	1.5 J	23.6	72.7	---	<2.6	---	---	---	---
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.2	7.7 J	162	0.3 J	0.33 J	29.9	12.1	52.2	12.0 J	<0.045	---	33.2	1.2 J	0.53 J	1.5 J	22.1	59.4	---	<2.6	---	---	---	---
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	17.4 J	208	0.35 J	0.32 J	28.3	10.1	55.2	19.0 J	<0.075	---	27.3	1.3 J	0.64 J	1.4 J	22.4	57.5	---	<2.7	---	---	---	---
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	11.9 J	181	0.41 J	0.29 J	30.0	14.6	75.5	16.5 J	<0.027	---	31.1	1.2 J	0.74 J	1.8 J	26.5	26.5	---	<2.7	---	---	---	---
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.7	9.8	259	0.34 J	<0.34	25.9	10.4	61.6	23.5 J	0.086	---	34.7	1.3 J	0.8 J	0.96 J	23.5	23.5	---	<2.8	---	---	---	---
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.0	6.2	204	0.32 J	<0.15	20.9	8.8	58.3	10.3 J	0.019	---	28.8	1.2 J	0.76 J	1.1 J	20.9	20.9	---	<2.5	---	---	---	---
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.5	14.6	205	0.28 J	<0.23	28.5	11	77.9	20.0 J	<0.098	---	32.5	1.1 J	0.89 J	1.1 J	25.1	25.1	---	<2.7	---	---	---	---
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	14.4	203	0.31 J	<0.22	33.4	11.3	77.4	23.7 J	0.11	---	38.9	1.3 J	0.81 J	1.2 J	23.3	23.3	---	<2.6	---	---	---	---
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.2	4.3	140	0.26 J	<0.10	27	12.9	99.8	9.4 J	0.045 J	---	43.7	1 J	0.71 J	1.3 J	19.8	69.4	---	<2.6	---	---	---	---
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	13.9	187	0.32 J	<0.33	52	15.4	58.9	18.1 J	0.066 J	---	58.3	1.1 J	0.95 J	1.3 J	30.3	93.5	---	<2.6	---	---	---	---
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<7.3	14.4	204	0.40 J	<0.38	65.1	18.6	76.4	15.8 J	0.028 J	---	70.6	1.3 J	1 J	1.6 J	37.5	106	---	<3.0	---	---	---	---
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<7.0	9.8	174	0.30 J	<0.16	22.8	6.6	62.8	16.9 J	0.071 J	---	20.5	1.6 J	0.62 J	1.2 J	20.5	58.8	---	<2.9	---	---	---	---
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	8.3	107	0.26 J	<0.070	15.8	5.1 J	62.9	9.4 J	0.039 J	---	17	1.8 J	0.47 J	1.0 J	15.7	42.9	---	<2.7	---	---	---	---
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	9.5	112	0.3 J	<0.050	17.4	5.7 J	71.6	10.2 J	0.038 J	---	19.8	2 J	0.61 J	1.1 J	17.8	48.6	---	<2.7	---	---	---	---
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	8.3	178	0.29 J	<0.15	20.6	7.9	81.2	17.0 J	0.08 J	---	21.5	1.2 J	0.77 J	1.0 J	20.3	50.1	---	<2.6	---	---	---	---
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.3	2.8	106	0.25 J	<0.050	17.1	<4.1	65.4	13.9 J	0.052 J	---	17	0.94 J	0.42 J	1.0 J	15.9	42.3	---	<2.6	---	---	---	---
SOIL16-1	05/13/08	USEPA 2008	EXC-NM	SURF	KEN	S	0.0-0.5	<7.6	502	78	0.12 J	<0.42	7.9	10.6	81.3	386 J	28	---	37.9	4.8	5.6 J	1.4 J	<6.0	118	---	<3.2	---	---	---	---
SOIL16-3	05/13/08	USEPA 2008	EXC-NM	SUB	KEN	S	2.5-3.0	<6.6	19.2	178	0.29 J	<0.13	32.8	9	75.1	13.5 J	0.45	---	34.9	1.3 J	0.91 J	1.6 J	24.5	66.4	---	<2.7	---	---	---	---
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	11.2	186	0.29 J	<0.19	45.8	14.2	58.6	11.0 J	0.031 J	---	48.5	1.1 J	0.81 J	1.3 J	25.8	74.4	---	<2.6	---	---	---	---
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<7.2	5.5	107	0.18 J	<0.060	40.6	7.7	62.4	6.3 J	<0.12	---	32.9	1.0 J	0.69 J	1.0 J	17.6	62.2	---	<3.0	---	---	---	---
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<8.2	13.1	307	0.39 J	<0.52	59.0	29.9	90.7	26.3 J	0.12 J	---	77.7	1.4	1.3 J	1.5 J	35.4	160	---	<3.4	---	---	---	---
SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<8.9	10.6	258	0.33 J	<0.48	47.0	28.9	90.4	24.7 J	0.078 J	---	70	1.3	1.1 J	1.6 J	30.9	149	---	<3.7	---	---	---	---
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<7.5	10.1	231	0.55 J	<0.24	38.4	19.4	66.6	18.0 J	0.054 J	---	39.3	1.2	1.1 J	1.5 J	38.6	97.5	---	<3.1	---	---	---	---
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	8.4	186	0.44 J	<0.19	28.2	14.9	52.5	14.7 J	0.048 J	---	31.4	1.1	0.81 J	1.4 J	30.9	78.6	---	<2.6	---	---	---	---
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	6.2	182	0.50 J	<0.40	26.6	18.5	65.9	14.1 J	<0.028	---	35.8	0.66	0.13 J	0.94 J	37.3	85.1	---	<2.7	---	---	---	---
SOIL20-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	37.6	178	0.40 J	<0.50	58.2	19.5	63.4	17.8 J	0.26	---	55.7	1.1	0.1 J	0.75 J	35.5	75.6	---	<2.6	---	---	---	---
SOIL20-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.3	23.9	163	0.38 J	0.39 J	45.8	17.9	63.4	12.6	<0.076	---	51.6	0.66 J	<1.0	0.81 J	34.6	66.3	---	<2.6	---	---	---	---
SOIL21-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	14.1	198	0.33 J	0.37 J	22.7	7.2	91.2	15.8	0.34	---	26.9	0.54 J	0.14 J	0.82 J	28.3	75.2	---	<2.7	---	---	---	---
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	7.3	193	0.36 J	0.38 J	25.1	7.2	87.2	11.3	<0.056	---	26.3	0.94 J	<1.1	0.94 J	30.2	71.8	---	<2.7	---	---	---	---
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	11.3 J	191	0.34 J	0.71	25.4	20.1	73.4	12.6 J	0.021 J	---	35	1.2 J	<1.1	<1.0	24.7	87.7	---	<2.7	---	---	---	---
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	10.4 J	161	0.37 J	0.65	26.7	18.3	80.3	15.4 J	0.023 J	---	27.8	1.3 J	<1.1	<0.97	24.6	69.9	---	<2.7	---	---	---	---
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	9.3 J	208	0.39 J	0.60	24.8	9.2	54.1	16.2 J	0.039 J	---	21.4	1.5 J	<1.1	<0.84	27.2	59.6	---	<2.6	---	---	---	---
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	8.8 J	203	0.41 J	0.62	32.6	10.2	70.7	14.3 J	0.031 J	---	21.9	1.7 J	<1.1	<0.97	32.6	60.5	---	<2.7	---	---	---	---
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	7.5 J	192	0.37 J	0.55	23.1	10.2	60.4	14.1 J	0.022 J	---	21.7	1.5 J	<1.1	<1.0	28.7	61.7	---	<2.7	---	---	---	---
SOIL24-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	<6.8	238 J	36.9	0.011 J	<0.56	4.2	4.6 J	20.5	15.6 J	1.2	---	19.2	1.2 J	0.19 J	<0.65	4.7 J	59.4	---	<2.8	---	---	---	---
SOIL24-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	<6.6	160 J	38.7	0.07 J	<0.53	3.1	4.5 J	14.7	7.3 J	0.92	---	17.2	0.82 J	0.17 J	<0.51	3.2 J	59.9	---	<2.8	---	---	---	---
SOIL25-1	05/14/08	USEPA 2008	EXC-NM	SURF	KEN	S	0.0-0.5	<6.2	160 J	143	0.24 J	0.62	38.8	13.4	58.8	102 J	5.9	---	44.1	2.1 J	1.0 J	<0.93	27.1	66.4	---	<2.6	---	---	---	---
SOIL25-3	05/14/08	USEPA 2008	EXC-NM	SUB	KEN	S	2.5-3.0	<6.3	48.5 J	140	0.31 J	0.56	36.5	10.3	59.8	33 J	1.6	---	37.2	1.4 J	0.23 J	<0.84	24.3	53.7	---	<2.6	---	---	---	---
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	16.3	185	0.32 J	0.73	45.3	13.2	58.1	14.8 J	0.068 J	---	46.3	1.5 J	<1.0	<1.1	32.2	73.7	---	<2.6	---	---	---	---
SOIL26-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.2	24.4	136	0.29 J	0.82	167	16.2	68.5	11.6 J	<0.10	---	93.6	1.3 J	<1.0	<1.1	56.7	97.5	---	<2.6	---	---	---	---
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	17.7	207	0.39 J	0.60	26.3	9.5	64.6	15.4 J	0.048 J	---	24.7	1.5 J	0.52 J	<0.95	27.4	61.5	---	<2.7	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	12.2	195	0.38 J	<0.54	23.9	10.3	67.1	11.9 J	0.017 J	---	23.5	1.2 J	<1.1	<1.1	29.4	61.5	---	<2.7	---	---	---	---
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	11.3	198	0.34 J	<0.51	24.2	10.4	61.3	11.9 J	<0.014 J	---	21.6	1.4 J	0.15 J	<0.98	26	57.1	---	<2.7	---	---	---	---
SOIL28-1	05/14/08	USEPA 2008	MBKG	SURF	KEN	S	0.0-0.5	<6.2	83.4	100	0.28 J	0.57	40.2	8.8	70.6	95.9 J	0.072 J	---	44.6	1.2 J	<1.0	<0.88	32.0	73.3	---	<2.6	---	---	---	---
SOIL28-3	05/14/08	USEPA 2008	MBKG	SUB	KEN	S	2.5-3.0	<6.3	38.5 J	82.9	0.25 J	<0.49	31.9	6.8	77.6	13.6 J	0.042 J	---	42.8	1.6 J	<1.1	<0.087	22.3	74.5	---	<2.6	---	---	---	---
SOIL29-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	<6.6	181 J	32.7	0.07 J	<0.52	3.3	<3.8	17.0	11.8 J	0.42	---	15.1	1.2 J	0.21 J	<0.53	3.5	58.5	---	<2.7	---	---	---	---
SOIL29-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	<6.6	165 J	34.2	0.05 J	<0.48	1.8	<5.1	12.5	6.5 J	0.24	---	17.6	0.8 J	0.11 J	<0.48	2.3	59.3	---	<2.7	---	---	---	---
SOIL30-1	05/14/08	USEPA 2008	EXC-NM	SURF	KEN	S	0.0-0.5	<6.2	43.6 J	152	0.3 J	0.57	32.3	12.6	56.7	31.4 J	1.9	---	40.4	0.99 J	0.21 J	<0.89	22.3	66.6	---	<2.6	---	---	---	---
SOIL30-3	05/14/08	USEPA 2008	EXC-NM	SUB	KEN	S	2.5-3.0	<6.7	8.7 J	143	0.31 J	<0.49	43.4	13.8	64.8	9.0 J	0.023 J	---	40.1	1.1 J	<1.1	<1.0	27	61.0	---	<2.8	---	---	---	---
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	8.1 J	154	0.21 J	<0.44	16.6	9.9	54.5	30.2	0.11 J	---	17.0	0.51 J	0.27 J	<0.66	13	83.0	---	<2.6	---	---	---	---
SOIL31-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.3	3.9 J	86.3	<0.22	<0.27	17.0	6.0	58.9	15.3	<0.044	---	12.2	<3.7	0.14 J	<0.68	13.3	62.1	---	<2.6	---	---	---	---
SOIL32-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	32.1 J	112	<0.36	0.53	52.5	29.4	83.7	8.9	0.26 J	---	20.4	0.89 J	0.34 J	<1.1	96.1	62.2	---	<2.6	---	---	---	---
SOIL32-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	6.2 J	78	<0.22	<0.39	57.0	31.3	69.1	2.7	<0.048	---	17.1	0.79 J	0.37 J	<0.99	84.6	54.2	---	<2.7	---	---	---	---
SOIL33-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	29.6 J	174	<0.44	<0.45	49.9	23.9	62.2	8.4	<0.045	---	30.5	0.57 J	0.41 J	<0.94	65.2	57.8	---	<2.6	---	---	---	---
SOIL33-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<9.0	46.9 J	228	<0.55	<0.57	68.0	29.9	82.2	9.8	<0.057	---	41.0	1.0 J	0.56 J	<1.4	88.2	78.2	---	<3.8	---	---	---	---
SOIL34-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	<7.3	39.1 J	104	<0.27	<0.32	82.6	11.7	54.5	25.4	0.17 J	---	47.5	0.78 J	0.18 J	<0.79	33.5	65.2	---	<3.0	---	---	---	---
SOIL34-1 (dup)	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	<6.8	36.1 J	102	<0.26	<0.30	67.5	9.6	50.3	20.8	0.11 J	---	40.9	0.97 J	0.09 J	<0.71	29.6	57.4	---	<2.9	---	---	---	---
SOIL34-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	<6.5	12.9 J	96.6	<0.21	<0.24	54.2	9.6	58.5	7.9	<0.073	---	25.3	1.0 J	0.22 J	<0.83	48.3	44.7	---	<2.7	---	---	---	---
SOIL35-1	05/14/08	USEPA 2008	EXC-M	SURF	KEN	S	0.0-0.5	<6.2	80.9 J	104	<0.20	<0.40	19.6	6.7	39.2	51.4	4.1 J	---	20.9	1.2 J	0.69 J	<0.70	13.8	54.9	---	<2.6	---	---	---	---
SOIL35-3	05/14/08	USEPA 2008	EXC-M	SUB	KEN	S	2.5-3.0	<6.3	15.1 J	143	<0.26	<0.33	59.4	10.4	67.7	14.2	0.77 J	---	41.7	0.70 J	0.21 J	<1.0	24.7	84.8	---	<2.6	---	---	---	---
SOIL36-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.2	72.7 J	114	<0.27	<0.35	28.6	11	44.7	13.0	0.3 J	---	34.1	0.82 J	0.23 J	<0.85	21.6	51.3	---	<2.6	---	---	---	---
SOIL36-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.2	36.3 J	86.2	<0.22	<0.26	21.5	7.1	56.9	6.8	<0.044	---	27.1	0.73 J	0.17 J	<0.71	18.2	49.8	---	<2.6	---	---	---	---
SOIL37-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.2	56.6 J	230	<0.38	<0.43	49.7	23.1	60.5	18.4	0.23 J	---	48.5	0.82 J	0.71 J	<0.84	32.5	60.2	---	<2.6	---	---	---	---
SOIL37-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	32.0	180	<0.38	0.37 J	271	11.6	84.8	8.3	<0.041	---	115	0.66 J	<1.1	0.96 J	51.4	105	---	<2.7	---	---	---	---
SOIL38-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.2	23.5 J	143	<0.30	<0.30	63.3	14.2	47.9	12.7	<0.057	---	41.7	0.54 J	0.19 J	<0.80	35.4	58.0	---	<2.6	---	---	---	---
SOIL38-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<7.0	16.8 J	159	<0.29	<0.30	62.4	18.6	47.3	10.9	<0.043	---	46.8	0.79 J	0.23 J	<0.90	34.4	66.6	---	<2.9	---	---	---	---
SOIL39-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	45.5 J	185	<0.22	0.55 J	41.1	18.6	47.4	16.8	0.22 J	---	45	0.61 J	0.55 J	<0.69	21.6	87.3	---	<2.7	---	---	---	---
SOIL39-1 (dup)	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	43.6 J	194	<0.21	0.52 J	43.4	18.9	48.5	16.6	0.21 J	---	44.8	1.2 J	0.61 J	<0.66	22.6	89.0	---	<2.7	---	---	---	---
SOIL39-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.5	25.2 J	208	<0.20	<0.34	31.9	35.9	62.5	14.7	<0.094	---	58.5	0.71 J	0.68 J	<0.56	10.9	68.4	---	<2.7	---	---	---	---
SOIL40-1	05/15/08	USEPA 2008	EXC-M	SURF	CAL*	S	0.0-0.5	<6.2	81.2	126	0.44 J	0.38 J	29.4	12.9	64.4	42.1	2.8	---	22.8	1.3 J	0.35 J	0.82 J	41.1	57.7	---	<2.6	---	---	---	---
SOIL40-3	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	2.5-3.0	<6.6	4.3	228	0.38 J	0.47 J	7.5	22.3	59.1	2.7	0.042 J	---	11.6	0.59 J	<1.1	1.2 J	127	73.3	---	<2.7	---	---	---	---
SOIL40-5	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	4.5-6.0	<6.7	5.1	200	0.45 J	0.50 J	10	28.5	86.9	3.2	0.055 J	---	11.5	1.1 J	<1.1	0.95 J	119	82.4	---	<2.8	---	---	---	---
SOIL41-1	05/15/08	USEPA 2008	EXC-M	SURF	CAL*	S	0.0-0.5	<6.6	76.1	113	0.38 J	0.38 J	48	16.6	59.8	31.7	1.8	---	46	0.87 J	0.23 J	0.76 J	53.1	62.6	---	<2.8	---	---	---	---
SOIL41-3	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	2.5-3.0	<6.8	18.0	132	0.44 J	0.33 J	82.1	20.2	68.0	6.7	<0.029	---	65.2	0.65 J	<1.1	0.91 J	74	50.8	---	<2.8	---	---	---	---
SOIL41-5	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	4.5-6.0	<6.9	20.8	131	0.4 J	0.50 J	42.5	28.1	121	9.8	0.46	---	38.3	0.98 J	<1.2	1.2 J	110	70.1	---	<2.9	---	---	---	---
SOIL42-1	05/15/08	USEPA 2008	EXC-M	SURF	CAL*	S	0.0-0.5	<6.2	80.4	115	0.35 J	0.46 J	71.3	12	66.7	27.8	1.10	---	63.6	1.7 J	0.1 J	0.75 J	30.2	67.2	---	<2.6	---	---	---	---
SOIL42-3	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	2.5-3.0	<6.4	59.2	104	0.4 J	0.38 J	74.9	10.2	69.6	12.0	0.42	---	55.4	0.77 J	<1.1	0.92 J	33.2	58.2	---	<2.7	---	---	---	---
SOIL42-5	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	4.5-6.0	<6.4	41.5	83.5	0.32 J	0.29 J	45.7	5.6	68.4	11.6	0.33	---	32.4	2.2 J	<1.1	0.88 J	24.8	39.6	---	<2.7	---	---	---	---
SOIL43-1	05/15/08	USEPA 2008	MBKG	SURF	CAL*	S	0.0-0.5	1.1 J	55.4	141	0.4 J	0.53	181	19.4	81.7	20.4	0.74	---	133	1.2 J	0.05 J	0.97 J	41.2	92.2	---	<2.6	---	---	---	---
SOIL43-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	10.2	73.6	0.19 J	0.21 J	39.2	3.50 J	50.8	8.5	0.071 J	---	33.9	1.1 J	<1.1	0.86 J	15.0	34.4	---	<2.7	---	---	---	---
SOIL43-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.7	12.2	66.0	0.23 J	0.39 J	46.5	4.70 J	92.0	15.0	0.086 J	---	40.2	1.7 J	<1.1	0.97 J	23.2	44.5	---	<2.8	---	---	---	---
SOIL44-1	05/15/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<7.9	13.5 J	124	0.21 J	0.41 J	15	14.2	38.9	12.6 J	0.15	---	21.6	1.1 J	<1.3	<3.3	17.0	59.5	---	<3.3	---	---	---	---
SOIL44-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<9.9	12.9 J	149	0.47 J	0.39 J	28.7	12.3	63.9	16.5 J	0.23	---	28.1	1.0 J	<1.7	0.81 J	33.1	61.6	---	<4.1	---	---	---	---
SOIL44-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<8.2	9.6 J	768	0.47 J	0.50 J	29.1	17.0	62.5	16.3 J	0.03 J	---	34.5	0.88 J	0.34 J	0.82 J	37.3	62.9	---	<3.4	---	---	---	---
SOIL45-1	05/15/08	USEPA 2008	MBKG	SURF	CAL*	S	0.0-0.5	<8.1	57.3 J	170	0.36 J	0.55 J	78.6	16.2	64.7	24.1 J	0.49	---	56.7	<4.7	<1.3	0.62 J	35.2	73.6	---	<3.4	---	---	---	---
SOIL45-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	19.8 J	138	0.30 J	0.36 J	66	14.8	56.3	11.3 J	0.066 J	---	46.0	0.85 J	<1.1	0.58 J	31	57.1	---	<2.8	---	---	---	---
SOIL45-3 (dup)	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.4	19.3 J	135	0.31 J	0.35 J	58.3	15.6	53.1	11.1 J	0.074 J	---	46.5	0.63 J	<1.1	0.5 J	29.1	55.8	---	<2.7	---	---	---	---
SOIL45-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.4	10.5 J	98.6	0.22 J	0.22 J	42	8.2	45.5	10.7 J	0.049 J	---	26.7	0.74 J	<1.1	0.56 J	22.7	41.1	---	<2.7	---	---	---	---
SOIL46-1	05/15/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	10.0 J	127	0.25 J	0.34 J	14.7	9.5	34.9	21.4 J	0.15	---	15.3	0.83 J	<1.1	0.26 J	19.8	52.8	---	<2.7	---	---	---	---
SOIL46-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.5	9.5 J	113	0.34 J	0.36 J	23.7	10.2	41.8	14.6 J	0.22	---	21.2	0.76 J	<1.1	0.39 J	26.8	47.9	---	<2.7	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
SOIL46-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.7	10.1 J	121	0.35 J	0.45 J	27.9	18.1	54.3	7.7 J	0.11 J	---	31.5	0.65 J	<1.1	0.70 J	30.5	56.3	---	<2.8	---	---	---	---
SOIL47-1	05/15/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	20.7 J	108	0.20 J	0.36 J	66.4	28.8	67.7	13.2 J	0.10 J	---	59.7	0.99 J	<1.1	0.28 J	32.9	75.5	---	<2.7	---	---	---	---
SOIL47-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	31.7 J	98.7	0.21 J	0.36 J	61.8	17.8	63.5	13.7 J	0.25	---	62.5	<3.9	<1.1	0.48 J	29.0	73.1	---	<2.8	---	---	---	---
SOIL47-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.8	29.5 J	90.5	0.20 J	0.28 J	10	16.9	63.6	11.6 J	0.25	---	70.7	0.97 J	<1.1	0.84 J	30.0	73.0	---	<2.8	---	---	---	---
21S003	Nov-09	DTSC 2011	MBKG	SURF	CAL*	S	Surface	---	230	---	---	---	26	---	---	57	2.9	---	---	---	---	---	---	---	---	---	---	---	---	---
21S006	Nov-09	DTSC 2011	MBKG	SURF	CAL	S	Surface	---	24	---	---	---	58	---	---	28	0.22	---	---	---	---	---	---	---	---	---	---	---	---	---
21S007	Nov-09	DTSC 2011	BKG	SURF	CAL	S	Surface	---	21	---	---	---	83	---	---	13	<0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
21S008	Nov-09	DTSC 2011	MBKG	SURF	CAL	S	Surface	---	65	---	---	---	36	---	---	9.8	<0.1	---	---	---	---	---	---	---	---	---	---	---	---	---
22S002	Nov-09	DTSC 2011	MBKG	SURF	CAL*	S	Surface	---	51	---	---	---	43	---	---	30	1.4	---	---	---	---	---	---	---	---	---	---	---	---	---
22S004	Nov-09	DTSC 2011	EXC-M	SURF	CAL*	S	Surface	---	140	---	---	---	48	---	---	52	3.3	---	---	---	---	---	---	---	---	---	---	---	---	---
22S006	Nov-09	DTSC 2011	EXC-M	SURF	CAL*	S	Surface	---	240	---	---	---	70	---	---	68	4.4	---	---	---	---	---	---	---	---	---	---	---	---	---
22T001	Nov-09	DTSC 2011	MBKG	SURF	CAL	S	Surface	---	20	---	---	---	21	---	---	19	0.2	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-1-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	8.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-10-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-11-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-11-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-12-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-13-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-14-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-15-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-16-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-17-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-18-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-19-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	8.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-2-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR*	S	0.5	---	59	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-20-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	9.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-21-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-22-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-23-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-24-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	8.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-25-0.5	02/09/09	Arcadis 2009	EXC-NM	SURF	KEN	S	0.5	0.99	98	55	0.16	0.39	5.4	4.0	23	40	7.5	<0.25	15	<0.5	0.40	<0.5	8.4	39	---	---	---	---	---	---
HA-25-2.0	02/09/09	Arcadis 2009	EXC-NM	SUB	MAR	S	2.0	---	3.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-26-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	<0.5	110	72	0.29	0.54	7.1	8.5	36	21	1.4	0.27	14	<0.5	<0.25	<0.5	30	53	---	---	---	---	---	---
HA-26-0.5 (dup)	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	<0.5	93	52	0.25	0.44	5.8	6.5	30	17	1.1	<0.25	12	<0.5	<0.25	<0.5	22	44	---	---	---	---	---	---
HA-26-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	230	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-27-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	<0.5	9.9	85	0.5	0.37	17	7.7	51	9.5	0.13	<0.25	9.6	<0.5	<0.25	<0.5	55	30	---	---	---	---	---	---
HA-27-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-28-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	<0.5	27	83	0.23	<0.25	19	6.0	24	9.4	0.20	0.82	14	<0.5	<0.25	<0.5	28	42	---	---	---	---	---	---
HA-28-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	110	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-29-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	<0.5	13	94	0.35	0.46	15	13	32	9.9	0.099	0.54	13	<0.5	<0.25	<0.5	48	53	---	---	---	---	---	---
HA-29-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	85	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-3-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-30-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-31-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-32-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	150	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-33-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-34-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	210	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-35-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
HA-36-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	77	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-37-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-37-0.5 (dup)	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-38-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-39-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	360	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-4-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-40-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-41-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	550	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-42-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	350	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-42-0.5 (dup)	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	330	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-43-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-44-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	140	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-45-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	220	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-46-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	87	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-47-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	81	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-48-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-49-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	120	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-5-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-50-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-51-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-52-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-53-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	33	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	34	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-54-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	49	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-55-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	43	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-56-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-57-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-58-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	110	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-58-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-59-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	290	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-59-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	270	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-6-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-60-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-60-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	7.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-61-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	180	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-61-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	34	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-61-2.0 (dup)	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-62-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	410	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-62-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL*	S	2.0	---	260	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-63-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	63	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-64-0.5	02/10/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-65-0.5	02/10/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5	---	94	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-66-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	35	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-67-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5	---	50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-68-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL*	S	0.5	---	92	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-69-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-69-0.5 (dup)	02/12/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-7-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR*	S	0.5	---	46	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-70-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL*	S	0.5	---	41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
HA-71-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL*	S	0.5	---	47	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-72-0.5	02/12/09	Arcadis 2009	EXC-M	SURF	CAL*	S	0.5	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-74-0.5	02/12/09	Arcadis 2009	EXC-NM	SURF	CAL*	S	0.5	---	230	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	8.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-77-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-77-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-78-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	4.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-79-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	4.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-8-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-80-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	6.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-81-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	240	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-81-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0	---	320	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-82-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-82-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0	---	280	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-83-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	39	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-84-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	43	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-85-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-85-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0	---	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-86-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	39	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-86-0.5 (dup)	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-87-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	77	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-88-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-89-0.5	02/13/09	Arcadis 2009	EXC-M	SURF	KEN	S	0.5	---	120	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-9-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-90-0.5	02/13/09	Arcadis 2009	EXC-M	SURF	MEL	S	0.5	---	68	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-91-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	33	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	6.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	5.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-95-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-96-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-96-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	8.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49-0.0	05/22/23	Geocon 2023	MBKG	SURF	MEL	MS	0.0-0.5	---	950	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	12	620	22	1.2	5.8	180	140	130	18	0.14	<1.0	790	<2.5	<1.0	<4.0	31	53	---	---	---	---	---	37
TP-49-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	480	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49-4.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	4.5-5.0	---	510	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49R-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	17	760	27	1.5	6.2	210	100	140	20	<0.10	<1.0	910	<2.5	<1.0	<4.0	34	56	---	---	---	---	---	50
TP-50-0.0	05/22/23	Geocon 2023	MBKG	SURF	MEL	MS	0.0-0.5	---	58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-50-0.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	0.5-1.0	<2.5	5.4	54	1.2	1.4	10	9.0	74	3.6	<0.10	<1.0	32	<2.5	<1.0	<4.0	29	44	---	---	---	---	---	29
TP-50-1.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.0-1.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-50-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-0.0	05/22/23	Geocon 2023	MBKG	SURF	MEL	MS	0.0-0.5	---	280	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	<2.5	59	60	2.1	3.1	19	19	72	<2.5	<0.10	<1.0	60	<2.5	<1.0	<4.0	91	61	---	---	---	---	---	7.8
TP-51-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	42	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-4.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	4.5-5.0	---	14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51R-4.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	4.5-5.0	---	8.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-52-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0	---	190	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
TP-52-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	<2.5	120	47	<1.0	1	3.6	4.9	22	23	2.1	1.0	13	<2.5	<1.0	<4.0	6.6	46	---	---	---	---	---	950
TP-53-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0	---	69	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-53-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	<2.5	180	78	<1.0	1.2	9.7	6.2	23	51	6.6	1.6	19	<2.5	<1.0	<4.0	15	60	---	---	---	---	---	4600
TP-54-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0	---	250	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-54-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	<2.5	220	65	<1.0	1.3	7.0	6.9	33	52	3.3	1.3	20	<2.5	<1.0	<4.0	12	71	---	---	---	---	---	890
TP-55-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	7.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-55-1.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.0-1.5	---	4.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-56-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	<2.5	7	140	<1.0	2	88	28	83	8.9	<0.10	<1.0	53	<2.5	<1.0	<4.0	20	130	---	---	---	---	---	15
TP-56-2.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	2.0-2.5	---	2.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57-0.0	05/23/23	Geocon 2023	MBKG	SURF	CAL*	MS	0.0-0.5	---	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57-1.5	05/23/23	Geocon 2023	MBKG	SUB	CAL*	MS	1.5-2.0	<2.5	52	160	1.3	2.2	53	16	57	26	1.4	2.1	60	<2.5	<1.0	<4.0	35	77	---	---	---	---	---	130
TP-57-3.0	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	3.0-3.5	---	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57-4.5	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	4.5-5.0	---	58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57R-0.0	05/23/23	Geocon 2023	MBKG	SURF	CAL*	MS	0.0-0.5	---	41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-0.0	05/23/23	Geocon 2023	MBKG	SURF	CAL	MS	0.0-0.5	---	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-1.5	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	1.5-2.0	---	32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-3.0	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	3.0-3.5	---	79	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-4.5	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	4.5-5.0	---	26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	<2.5	<1.0	110	<1.0	1.5	14	3.8	62	9.6	<0.10	3.7	19	<2.5	<1.0	<4.0	19	57	---	---	---	---	---	41
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	3.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60R-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5	---	4.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	<2.5	1.2	140	12	2.9	11	15	71	5.1	<0.10	<1.0	9.4	<2.5	<1.0	<4.0	99	54	---	---	---	---	---	51
TP-61-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5	---	2.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	<2.5	<1.0	170	12	2.9	24	18	74	4.0	<0.10	<1.0	15	<2.5	<1.0	<4.0	130	56	---	---	---	---	---	53
TP-62-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5	---	4.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	<2.5	<1.0	160	12	2.9	22	19	75	3.2	<0.10	<1.0	13	<2.5	<1.0	<4.0	130	52	---	---	---	---	---	40
TP-63-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5	---	2.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63R-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5	---	2.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-64-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	<2.5	110	63	<1.0	2.3	67	12	49	18	0.44	<1.0	75	<2.5	<1.0	<4.0	20	71	---	---	---	---	---	340
TP-64-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-64R-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	<2.5	96	52	<1.0	1.7	59	10	44	22	0.46	<1.0	65	<2.5	1.0	<4.0	17	77	---	---	---	---	---	370
TP-65-0.0	05/22/23	Geocon 2023	PROC	SURF	KEN	S-FILL	0.0-0.5	---	260	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-65-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MS	3.0-3.5	20	1300	71	<5.0	6.6	450	110	170	360	0.13	120	1000	<2.5	<1.0	<4.0	53	120	---	---	---	---	---	290
TP-65-SURFACE	05/22/23	Geocon 2023	PROC	SURF	N/A	ASPH	0.0-0.5	<2.5	18	11	<1.0	<1.0	12	1.0	7.2	7.2	0.2	<1.0	9.1	<2.5	<1.0	<4.0	3.3	15	---	---	---	---	---	930
TP-66-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL*	S-FILL	0.0-0.5	5.8	450	100	1.4	2.7	150	24	60	42	0.24	2.3	180	<2.5	2.1	<4.0	39	100	---	---	---	---	---	1200
TP-66-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 2
SOIL ANALYTICAL DATA - TITLE 22 METALS, HEXAVALENT CHROMIUM, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide	Total Sulfur
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																							
TP-67-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-67-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	<2.5	88	130	1.2	2.4	80	20	65	5.5	<0.10	3.9	67	<2.5	<1.0	<4.0	41	73	---	---	---	---	---	40
TP-68-0.0	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.0-0.5	<2.5	81	30	<1.0	1.2	4.5	2.5	22	14	0.99	<1.0	12	<2.5	<1.0	<4.0	7.8	43	---	---	---	---	---	180
TP-68-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	<2.5	68	33	<1.0	1.0	8.6	3.8	26	12	0.89	<1.0	12	<2.5	<1.0	<4.0	7.7	31	---	---	---	---	---	78
TP-68R-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	---	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-69-1.5	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	1.5-2.0	---	120	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-69-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	<2.5	110	94	<1.0	1.4	14	7.0	27	43	5.4	1.5	30	<2.5	<1.0	<4.0	19	68	---	---	---	---	---	76
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150	na	na	na
Basis for Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL	na	na	na
Minimum Detected Concentration								0.99	1.2	6.2	0.011	0.19	1.5	1.0	3.5	2.7	0.017	0.27	7.0	0.30	0.05	0.26	1.7	14.0	ND<1.0	0.75	ND<5.0	ND<50	ND<50	7.8
Maximum Detected Concentration								20	**1,300**	768	12	6.6	1,690	140	178	400	**28**	120	1,500	4.8	5.6	1.9	148	307	ND<1.0	21.9	ND<5.0	ND<50	ND<50	4,600
Mean Detected Concentration								11.7	**79.1**	131	0.68	1.2	58.7	16.7	60.4	25.5	**1.7**	6.1	68.4	1.1	0.66	1.13	33.9	67.2	na	6.4	na	na	na	473

Notes:

HA-12-0.5
- Sample depth in feet below surface
- Exploratory trench or boring number

E = reanalysis
J = estimated value
C = coarse fraction (retained on #200 sieve)
F = fine fraction (passing #200 sieve)
R (in sample name) = replicate sample
< = analyte not detected at a concentration equal to or greater than the reported value
Maximum detected concentrations and average concentrations in **bold** font exceed a soil screening level value.
1 Thallium data obtained by D&M (1995), in strikethrough font, are excluded from the assessment. See Section 4.3.1.4 of the Remedial Action Plan.

Depth Interval:
SURF = surface (upper foot)
SUB = subsurface (below upper foot)

Media:
MR = mineralized rock
MS = mineralized soil
R = weathered rock
S = native soil
SC = Tailings Pile soil cover
T = mine tailings
T/S = tailings/soil mixture
WR = mine waste rock

Assessment Areas:
BKG = Background Area and other non-mineralized background locations
MBKG = Naturally mineralized background locations
BELL = Bellwether Mine Area. Small historical mining claim in mineralized bedrock.
EXC-M = Isolated tailings areas to be excavated from mineralized background locations
EXC-NM = Isolated tailings areas to be excavated from non-mineralized background locations
LKBD = Lakebed Area, former tailings impoundment
PROC = Cyanide Process Area, on mineralized ridge
TAIL = Tailings Pile, 29-acre land disposal area
W&S = West Area and South Area, tailings at the ground surface at the toe of the Tailings Pile
OFF = Off-site locations

Geology:
CAL = Calaveras formation, eastern side of the Site
MAR = Mariposa formation, western side of the Site
MEL = Melones fault, mineralized ridge crossing north-south through the central portion of the Site
KEN = Imported tailings from Kennedy Mine
* = May be influenced by overlying or adjacent waste

Data Sources:

D&M 1995 = Final Environmental Assessment, Kennedy Mine Tailings Site, Jackson, California (Dames & Moore, August 1995)
USEPA 2008 = Targeted Brownfields Assessment, Oro de Amador, Jackson, California (USEPA, START Team 9, September 5, 2008)
Arcadis 2009 = Final Targeted Site Investigation Summary Report for the Oro de Amador Property (LFR Inc., an Arcadis company, April 7, 2009)
DTSC 2011 = Community Wide Assessment Report, Cities of Jackson and Sutter Creek (California Department of Toxic Substances Control, July 2011)

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
LAKEBED AREA - FENCE AND POST UNDER LAND USE COVENANT																										
HA-65-0.5	02/10/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5	---	94	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-67-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5	---	50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-81-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	240	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-81-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0	---	320	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-82-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-82-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0	---	280	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-83-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	39	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-84-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	43	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-85-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5	---	160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-85-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0	---	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-01-10.0	10/27/92	D&M 1995	LKBD	SUB	KEN	T	10.0	---	184	---	---	---	3.4	---	---	52.0	6.4	---	22	---	---	---	---	---	---	<5.0
MW-01-11.5	10/27/92	D&M 1995	LKBD	SUB	CAL*	S	11.5	<9.9	25	115	1.1	2.5	71.5	32.0	58.4	<7.4	<0.2	<9.9	45	<3.0	<2.5	~~14~~	86.4	40.1	---	---	<50
SURF-01-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	76.0	---	---	---	6.8	---	---	63.0	9.7	---	20	---	---	---	---	---	---	<5.0
SURF-03-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	113	---	---	---	12	---	---	47.0	5.0	---	29	---	---	---	---	---	---	<5.0
SURF-04-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	106	---	---	---	4.4	---	---	49.0	7.0	---	20	---	---	---	---	---	---	<5.0
SURF-05-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	---	160	---	---	---	4.3	---	---	20.0	1.0	---	16	---	---	---	---	---	---	<5.0
SURF-06C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,C	0.0	---	81	---	---	---	<2.4	---	---	14.0	0.88	---	9.4	---	---	---	---	---	<5.0	---
SURF-06F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,F	0.0	---	151	---	---	---	5.5	---	---	24.0	1.2	---	17	---	---	---	---	---	<5.0	---
SURF-14-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	<9.8	215	38.3	<0.24	<2.4	4	<4.9	11	22.0	0.59	<9.8	16	<1.0	<2.4	~~7.0~~	6.8	52.8	---	---	---
SURF-14R-0.0 (dup)	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	<10	150	54.3	<0.25	<2.5	5.2	6.8	30	14.0	0.23	<10	13	<1.0	<2.5	~~7.0~~	20	52.2	---	---	---
SURF-15C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,C	0.0	<9.8	161	70	<0.24	<2.4	8.3	<4.9	26	33.0	3.3	<9.8	21	<0.3	<2.4	~~9.0~~	11	57	---	---	---
SURF-15F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,F	0.0	<9.9	333	65	<0.25	<2.5	8.7	5.5	37	33.0	3.3	<9.9	27	<0.3	<2.5	~~12~~	12	81	---	---	---
TP-09-5.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	5.0	<24	150	39.7	<0.49	0.81	<0.98	6.0	31.9	39.1	3.0	2.2	24.6	4.00	0.86	~~<9.8~~	7.2	56.8	---	<5.0	---
TP-09-8.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	8.0	<25	4.0	88.0	<0.5	0.50	4.0	4.1	41.4	4.9	0.20	2.7	26.4	<3.0	0.59	~~<9.9~~	5.7	45.5	---	<5.0	---
TP-10-11.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	11.0	<25	4.0	81.0	<0.49	1.6	42.8	13.0	53.9	6.5	1.1	2.8	28.5	<3.0	0.71	~~<9.8~~	~~44.2~~	40.2	---	<5.0	---
TP-10-4.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	4.0	<25	305	58.9	<0.5	0.81	4.2	8.1	38.5	25.0	3.0	<1.0	26.2	<3.0	<0.5	~~<10~~	9.1	65.3	---	<0.5	---
TP-11-12.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	12.0	<24	195	42.3	<0.49	0.98	2.4	6.1	26.2	35.9	4.0	<0.98	23.0	<3.0	<0.49	~~<9.8~~	6.5	54.3	---	<0.5	---
TP-11-6.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	6.0	<24	78.0	23.9	<0.49	0.87	5	4.2	13.8	21.0	3.0	2.5	21.0	<3.0	<0.49	~~<9.8~~	4.2	49	---	<5.0	---
TP-14-1.5	10/21/92	D&M 1995	LKBD	SUB	KEN	T	1.5	---	61.0	---	---	---	9.5	---	---	26.0	5.0	---	37.0	---	---	---	---	---	---	<5.0	---
TP-14-12.0	10/21/92	D&M 1995	LKBD	SUB	CAL	R	12.0	<9.9	11.0	108	0.28	<2.5	28.5	11.0	47.3	7.9	<0.2	<9.9	32.0	<0.3	<2.5	~~5.0~~	21.0	52.1	---	<5.0	---
TP-14C-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,C	3.0	---	27.0	---	---	---	<2.5	---	---	11.0	0.5	---	9.3	---	---	---	---	---	---	<5.0	---
TP-14F-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,F	3.0	---	2.5	---	---	---	5.2	---	---	13.0	0.7	---	15.0	---	---	---	---	---	---	<5.0	---
TP-15-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T	3.0	---	283	---	---	---	4.9	---	---	12.0	1.0	---	15.0	---	---	---	---	---	---	<5.0	---
TP-16-1.0	10/21/92	D&M 1995	LKBD	SURF	KEN	T/S	1.0	---	14.0	---	---	---	26	---	---	7.9	<0.2	---	15.0	---	---	---	---	---	---	<5.0	---
TP-16-3.5	10/21/92	D&M 1995	LKBD	SUB	CAL	R	3.5	<9.8	81.2	98.6	<0.25	<2.5	19	<4.9	40.2	49.0	3.8	<9.8	22.0	0.8	<2.5	~~5.0~~	18.0	51.1	---	<5.0	---
TP-17-1.1	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.1	<9.9	15.0	94.2	1.3	2.6	92.4	34.0	90.9	<7.5	<0.2	<9.9	34.0	<0.3	<2.5	~~15~~	121	46.6	---	---	<5.0
TP-17C-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5	---	110	---	---	---	24.9	---	---	11.0	0.7	---	17.0	---	---	---	---	---	---	---	<5.0
TP-17F-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5	---	189	---	---	---	34.4	---	---	32.0	2.0	---	28.0	---	---	---	---	---	---	---	<5.0
TP-18-0.7	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.7	---	271	---	---	---	6.1	---	---	62.0	<0.2	---	26.0	---	---	---	---	---	---	---	<5.0
TP-18-1.5	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.5	<9.9	14.0	130	0.63	<2.5	58.2	20.0	62.6	11.0	<0.2	<9.9	43.0	<0.3	<2.5	~~14~~	51.5	307	---	---	<5.0
TP-40-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0	---	---	---	---	---	14.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-41-1.0	06/06/95	D&M 1995	LKBD	SURF	KEN	T/S	1.0	---	---	---	---	---	12.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-45-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0	---	---	---	---	---	7.9	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-67-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-67-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	<2.5	88	130	1.2	2.4	80	20	65	5.5	<0.10	3.9	67	<2.5	<1.0	<4.0	41	73	---	---	---

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
TP-68-0.0	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.0-0.5	<2.5	81	30	<1.0	1.2	4.5	2.5	22	14	0.99	<1.0	12	<2.5	<1.0	<4.0	7.8	43	---	---	---
TP-68-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	<2.5	68	33	<1.0	1.0	8.6	3.8	26	12	0.89	<1.0	12	<2.5	<1.0	<4.0	7.7	31	---	---	---
TP-68R-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	---	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-69-1.5	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	1.5-2.0	---	120	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-69-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	<2.5	110	94	<1.0	1.4	14	7.0	27	43	5.4	1.5	30	<2.5	<1.0	<4.0	19	68	---	---	---
SOIL24-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	<6.8	238 J	36.9	0.011 J	<0.56	4.2	4.6 J	20.5	15.6 J	1.2	---	19.2	1.2 J	0.19 J	<0.65	4.7 J	59.4	---	<2.8	---
SOIL24-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	<6.6	160 J	38.7	0.07 J	<0.53	3.1	4.5 J	14.7	7.3 J	0.92	---	17.2	0.82 J	0.17 J	<0.51	3.2 J	59.9	---	<2.8	---
SOIL29-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	<6.6	181 J	32.7	0.07 J	<0.52	3.3	<3.8	17.0	11.8 J	0.42	---	15.1	1.2 J	0.21 J	<0.53	3.5	58.5	---	<2.7	---
SOIL29-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	<6.6	165 J	34.2	0.05 J	<0.48	1.8	<5.1	12.5	6.5 J	0.24	---	17.6	0.8 J	0.11 J	<0.48	2.3	59.3	---	<2.7	---
Minimum Detected Concentration								ND<25	2.5	23.9	0.011	0.5	1.8	2.5	11	4.9	0.200	1.5	9.3	0.80	0.11	ND<4	2.3	31.0	ND<1.0	ND<5.0	ND<5.0
Maximum Detected Concentration								ND<25	333	130	1.30	2.6	92	34	91	63	9.70	3.9	67.0	4.0	0.86	ND<4***	121	307	ND<1.0	ND<5.0	ND<5.0
Mean Detected Concentration								na	126	66.8	0.52	1.4	17.2	10.7	35.4	23.9	2.47	2.6	23.4	1.5	0.41	na	22.3	65.4	na	na	na
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150
Basis for Commercial Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL

Notes:

*** As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
CYANIDE PROCESS AREA - FENCE AND POST UNDER LAND USE COVENANT																											
HA-58-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	110	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-58-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-59-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	290	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-59-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	270	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-60-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-60-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	7.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-61-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	180	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-61-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	34	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-61-2.0 (dup)	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0	---	31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-62-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5	---	410	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-62-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL*	S	2.0	---	260	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SURF-16-0.0	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0	---	69	---	---	---	1690	---	---	<7.4	0.21	---	1340	---	---	---	---	---	---	<5.0	---
SURF-16R-0.0 (dup)	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0	---	12	---	---	---	431	---	---	<7.3	0.26	---	567	---	---	---	---	---	---	<5.0	---
TP-05-3.0	08/23/90	D&M 1995	PROC	SUB	MEL	S	3.0	<24	14.0	36.8	0.9	1.5	12.4	3.7	92.9	<2.4	<0.1	<0.96	13.0	<3.0	1.0	~~<9.6~~	86.6	111	---	<5.0	---
TP-06-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	<24	63.0	158	0.56	1.8	88.3	21.3	66.8	14.0	<0.1	<0.97	89.2	<3.0	<0.48	~~11.0~~	52.6	59.3	---	<5.0	---
TP-07-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	<25	52.0	73.6	0.74	1.1	228	30.7	86.7	17.0	<0.1	5.9	221	<3.0	0.99	~~<9.8~~	74.8	62.0	---	<5.0	---
TP-08-1.0	08/23/90	D&M 1995	PROC	SURF	MEL*	MR	1.0	<24	159	67.9	0.61	2.1	575	85.8	61.9	71.4	<0.1	13.1	930	<3.0	1.7	~~<9.8~~	60.8	84.6	---	<5.0	---
TP-21-0.0	10/22/92	D&M 1995	PROC	SURF	KEN	T	0.0	---	71.0	---	---	---	50.5	---	---	44.0	0.50	---	82.5	---	---	---	---	---	---	---	<5.0
TP-21-0.3	10/22/92	D&M 1995	PROC	SURF	MEL	MR	0.3	---	257	---	---	---	259	---	---	7.9	0.30	---	149	---	---	---	---	---	---	---	<5.0
TP-35-0.0	10/29/92	D&M 1995	PROC	SURF	KEN	T	0.0	---	4.0	---	---	---	38.2	---	---	25.0	0.5	---	38.0	---	---	---	---	---	---	---	<5.0
TP-35-0.75	10/29/92	D&M 1995	PROC	SURF	MEL*	MS	0.75	---	12.0	---	---	---	235	---	---	<7.5	<0.2	---	158	---	---	---	---	---	---	---	<5.0
TP-42-1.0	06/06/95	D&M 1995	PROC	SURF	MEL	S	1.0	---	---	---	---	---	180	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-46-1.0	06/06/95	D&M 1995	PROC	SURF	KEN	S	1.0	---	---	---	---	---	320	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-64-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	<2.5	110	63	<1.0	2.3	67	12	49	18	0.44	<1.0	75	<2.5	<1.0	<4.0	20	71	---	---	---
TP-64R-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	<2.5	96	52	<1.0	1.7	59	10	44	22	0.46	<1.0	65	<2.5	1.0	<4.0	17	77	---	---	---
TP-65-0.0	05/22/23	Geocon 2023	PROC	SURF	KEN	S-FILL	0.0-0.5	---	260	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-65-SURFACE	05/22/23	Geocon 2023	PROC	SURF	N/A	ASPH	0.0-0.5	<2.5	18	11	<1.0	<1.0	12	1.0	7.2	7.2	0.2	<1.0	9.1	<2.5	<1.0	<4.0	3.3	15	---	---	---
TP-66-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL*	S-FILL	0.0-0.5	5.8	450	100	1.4	2.7	150	24	60	42	0.24	2.3	180	<2.5	2.1	<4.0	39	100	---	---	---
Minimum Detected Concentration								5.8	4.0	11	0.56	1.1	12	1.0	7.2	7.2	0.20	2.3	9.1	ND<3.0	0.99	ND<4	3.3	15	ND<1.0	ND<5.0	ND<5.0
Maximum Detected Concentration								5.8	450	158	1.4	2.7	1,690	86	93	71	0.5	13	1,340	ND<3.0	2.1	ND<4***	87	111	ND<1.0	ND<5.0	ND<5.0
Mean Detected Concentration								5.8	128	70.3	0.84	1.9	275	23.6	58.6	26.9	0.3	7.1	280	na	1.4	na	44.3	72.5	na	na	na
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150
Basis for Commercial Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL

Notes:

*** As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
TAILINGS PILE - CAP UNDER LAND USE COVENANT																										
HA-4-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-26-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	<0.5	110	72	0.29	0.54	7.1	8.5	36	21	1.4	0.27	14	<0.5	<0.25	<0.5	30	53	---	---	---
HA-26-0.5 (dup)	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	<0.5	93	52	0.25	0.44	5.8	6.5	30	17	1.1	<0.25	12	<0.5	<0.25	<0.5	22	44	---	---	---
HA-26-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	230	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-27-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	<0.5	9.9	85	0.5	0.37	17	7.7	51	9.5	0.13	<0.25	9.6	<0.5	<0.25	<0.5	55	30	---	---	---
HA-27-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-28-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	<0.5	27	83	0.23	<0.25	19	6.0	24	9.4	0.20	0.82	14	<0.5	<0.25	<0.5	28	42	---	---	---
HA-28-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	110	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-29-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	<0.5	13	94	0.35	0.46	15	13	32	9.9	0.099	0.54	13	<0.5	<0.25	<0.5	48	53	---	---	---
HA-29-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0	---	85	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MW-02-25.0	10/28/92	D&M 1995	TAIL	SUB	KEN	T	25.0	---	8.0	---	---	---	<2.5	---	---	19.0	2.0	---	7.8	---	---	---	---	---	---	---	---
MW-02-50.0	10/28/92	D&M 1995	TAIL	SUB	CAL*	S	50.0	---	18.0	---	---	---	39.2	---	---	9.5	8.0	---	36.0	---	---	---	---	---	---	---	---
SB-01-10.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	10.0	<24	178	6.2	0.48	0.89	6.1	6.7	27.8	55.1	5.2	3.6	26.7	<3.0	<0.48	~~<9.6~~	7.1	84.5	---	<0.5	---
SB-01-25.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	25.0	<24	143	54.9	<0.48	0.40	4.6	5.5	26.8	400.0	4.0	2.8	23	<3.0	<0.48	~~<9.7~~	5.8	68.2	---	<0.5	---
SB-01-33.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	33.0	<24	187	40.0	<0.48	0.57	3.0	2.9	18.9	32.3	5.0	1.5	19	<3.0	<0.48	~~<9.6~~	4.6	43.5	---	<0.5	---
SB-01-41.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	41.5	<25	60	67.0	0.53	1.00	26.2	12.2	32.3	14.0	<0.1	<0.99	19	<3.0	0.60	~~<9.9~~	60	57.4	---	21.9	---
SB-01-8.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	8.0	<25	153	28.2	<0.5	0.92	4.0	5.8	28.3	38.1	3.3	1.4	23	<3.0	<0.5	~~<9.9~~	6.8	70.3	---	<0.5	---
SB-02-12.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	12.0	<25	177	55.0	<0.49	0.43	2.7	6.9	30	49.7	3.0	3.0	26.4	<3.0	0.63	~~<9.8~~	6.5	72.2	---	<0.5	---
SB-02-17.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.0	<25	137	50.7	<0.50	<0.25	2.7	6.1	22	58.5	6.3	3.4	30.8	<3.0	<0.50	~~<9.9~~	5.2	72.7	---	12.7	---
SB-02-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	<24	184	52.3	<0.48	<0.24	2.9	7.4	29.3	46.5	0.6	2.3	24	<3.0	<0.48	~~<9.5~~	60	54.7	---	<0.5	---
SB-03-20.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	20.0	<25	125	33.6	<0.49	<0.25	2.5	2.2	18.1	23.0	0.4	1.3	22	<3.0	1.2	~~<9.9~~	4.8	109	---	0.75	---
SB-03-30.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	30.0	<25	93	33.9	<0.50	<0.25	2.1	1.0	6.33	11.0	1.2	3.5	12	<3.0	0.64	~~<9.9~~	1.9	33.1	---	<0.5	---
SB-03-31.5	08/23/90	D&M 1995	TAIL	SUB	KEN	S	31.5	<25	19	99.2	<0.50	0.79	26.5	10.0	34.8	13.0	<0.1	1.1	27.2	<3.0	<0.50	~~<10~~	52.1	64.6	---	<0.5	---
SB-03-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	<24	212	56	<0.48	0.34	6.7	6.8	26	15.1	0.4	4.1	27.9	<3.0	0.68	~~<9.7~~	7.8	68.3	---	---	---
SB-04-17.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.5	<24	144	75.9	<0.48	<0.24	8.4	5.8	22.5	85.6	10	2.7	29.3	<3.0	0.67	~~<9.5~~	8.9	78.5	---	<0.5	---
SB-04-36.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	36.5	<24	78	42.9	<0.48	<0.24	1.5	2.6	14.1	24.4	0.3	3.4	14	<3.0	<0.48	~~<9.5~~	2.7	52.4	---	0.88	---
SB-04-40.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	40.0	<25	117	57.3	<0.49	<0.24	4	4.8	23.0	42.2	7.3	3.7	20	<3.0	0.85	~~<9.8~~	8.2	54.3	---	1.1	---
SB-04-45.0	08/23/90	D&M 1995	TAIL	SUB	MAR*	S	45.0	<25	32	23.1	<0.49	<0.25	<0.98	<0.98	3.5	7.7	0.6	1.9	7.8	<3.0	0.70	~~<9.8~~	1.7	15.3	---	<0.5	---
SB-05-24.5	11/02/92	D&M 1995	TAIL	SUB	MAR*	S	24.5	---	4.7	---	---	---	19	---	---	<7.5	<0.2	---	15	---	---	---	---	---	---	---	---
SB-05A-23.0	11/02/92	D&M 1995	TAIL	SUB	KEN	T	23.0	---	219	---	---	---	4.7	---	---	46.0	3.5	---	24	---	---	---	---	---	---	---	---
SURF-07C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	---	102	---	---	---	3.5	---	---	26.0	2.1	---	12	---	---	---	---	---	---	---	<5.0
SURF-07F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	---	262	---	---	---	7.0	---	---	57.0	2.3	---	27	---	---	---	---	---	---	---	<5.0
SURF-08-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	---	158	---	---	---	3.4	---	---	35.0	2.0	---	16	---	---	---	---	---	---	---	<5.0
SURF-17-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	220	---	---	---	4	---	---	35.0	2.6	---	22	---	---	---	---	---	---	<5.0	---
SURF-17R-0.0 (dup)	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	230	---	---	---	6.3	---	---	55.0	1.7	---	26	---	---	---	---	---	---	<5.0	---
SURF-18-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	186	---	---	---	7.5	---	---	64.0	3.87	---	27	---	---	---	---	---	---	---	---
SURF-19-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	141	---	---	---	16	---	---	41.0	2.65	---	28	---	---	---	---	---	---	---	---
SURF-20-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0	---	214	---	---	---	3.9	---	---	23.0	0.72	---	16	---	---	---	---	---	---	---	---
TP-27-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	<9.8	5.0	176	0.68	3.6	17.0	15.0	63.3	10.0	<0.2	<9.8	11.0	<0.3	<2.5	~~13~~	84.3	62.8	---	---	<5.0
TP-28C-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	---	6.0	---	---	---	27.0	---	---	12.0	0.3	---	25.0	---	---	---	---	---	---	---	<5.0
TP-28F-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	---	6.0	---	---	---	30.8	---	---	10.0	<0.2	---	27.0	---	---	---	---	---	---	---	<5.0
TP-29-0.3	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.3	<9.8	21.0	219	0.49	3.5	18.0	22.0	89.8	<7.4	0.6	<9.8	21.0	<0.3	<2.5	~~18~~	121	77.4	---	---	<5.0
TP-30-0.2	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.2	<9.8	42.0	199	0.88	3.2	54.0	29.0	97.3	<7.4	<0.2	<9.8	43.0	<0.3	<2.5	~~20~~	116	72.4	---	---	<5.0
TP-31-0.3	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.3	<9.9	263	113	<0.25	<2.5	14.0	8.6	31.3	44.0	5	<9.9	25.0	0.50	<2.5	~~9.0~~	22	73.7	---	---	<5.0
TP-33-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	WR	0.2	<10	88	207	1.4	4.3	29.5	26.0	91.5	12.0	0.3	<10	23.0	<0.3	<2.5	~~19.0~~	148	85.2	---	---	<5.0
TP-34-1.0	10/29/92	D&M 1995	TAIL	SURF	KEN	T	1.0	---	5.0	---	---	---	<2.5	---	---	11.0	0.5	---	7.0	---	---	---	---	---	---	---	---

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
TP-47-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5	---	---	---	---	---	11.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-48-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5	---	---	---	---	---	11.0	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
TP-52-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0	---	190	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-52-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	<2.5	120	47	<1.0	1	3.6	4.9	22	23	2.1	1.0	13	<2.5	<1.0	<4.0	6.6	46	---	---	---
TP-53-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0	---	69	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-53-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	<2.5	180	78	<1.0	1.2	9.7	6.2	23	51	6.6	1.6	19	<2.5	<1.0	<4.0	15	60	---	---	---
TP-54-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0	---	250	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-54-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	<2.5	220	65	<1.0	1.3	7.0	6.9	33	52	3.3	1.3	20	<2.5	<1.0	<4.0	12	71	---	---	---
Minimum Detected Concentration								ND<25	4.7	6.2	0.23	0.34	1.5	1.0	3.5	7.7	0.10	0.27	7.0	ND<3.0	0.60	ND<4	1.7	15.3	ND<1.0	0.75	ND<5.0
Maximum Detected Concentration								ND<25	263	219	1.4	4.3	54	29	97	400	10	4.1	43	ND<3.0	1.2	ND<4***	148	109	ND<1.0	21.9	ND<5.0
Mean Detected Concentration								na	118	78.1	0.55	1.3	12.0	8.8	34.1	39.5	2.6	2.2	20.6	na	0.75	na	32.8	61.0	na	7.5	na
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150
Basis for Commercial Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL

Notes:

*** As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
EXCAVATE ISOLATED TAILINGS AREAS (POND AREA AND HOT SPOTS AT SOIL16, SOIL25, SOIL30 AND HA-74) FROM NON-MINERALIZED BACKGROUND LOCATIONS - PLACE AS ENGINEERED FILL IN TAILINGS PILE																											
HA-25-0.5	02/09/09	Arcadis 2009	EXC-NM	SURF	KEN	S	0.5	0.99	98	55	0.16	0.39	5.4	4.0	23	40	7.5	<0.25	15	<0.5	0.40	<0.5	8.4	39	---	---	---
HA-25-2.0	02/09/09	Arcadis 2009	EXC-NM	SUB	MAR	S	2.0	---	3.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-25-0.2	10/27/92	D&M 1995	EXC-NM	SURF	KEN	T	0.2	---	28.0	---	---	---	16.0	---	---	70.0	15.0	---	23.0	---	---	---	---	---	---	---	<5.0
TP-25-1.0	10/23/92	D&M 1995	EXC-NM	SURF	MAR*	S	1.0	<10	3.0	178	0.79	4.4	21.0	10.0	96.1	<7.5	<0.2	<10	15.0	<0.3	<2.5	~~18~~	133	72.0	---	---	<5.0
TP-26-2.0	10/23/92	D&M 1995	EXC-NM	SUB	MAR*	S	2.0	<10	9.0	226	0.93	3.2	44.9	23.0	80.1	10.0	0.9	<10	33.0	<0.3	<2.5	~~17~~	114	86.1	---	---	<5.0
SOIL16-1	05/13/08	USEPA 2008	EXC-NM	SURF	KEN	S	0.0-0.5	<7.6	502	78	0.12 J	<0.42	7.9	10.6	81.3	386 J	28	---	37.9	4.8	5.6 J	1.4 J	<6.0	118	---	<3.2	---
SOIL16-3	05/13/08	USEPA 2008	EXC-NM	SUB	KEN	S	2.5-3.0	<6.6	19.2	178	0.29 J	<0.13	32.8	9	75.1	13.5 J	0.45	---	34.9	1.3 J	0.91 J	1.6 J	24.5	66.4	---	<2.7	---
SOIL25-1	05/14/08	USEPA 2008	EXC-NM	SURF	KEN	S	0.0-0.5	<6.2	160 J	143	0.24 J	0.62	38.8	13.4	58.8	102 J	5.9	---	44.1	2.1 J	1.0 J	<0.93	27.1	66.4	---	<2.6	---
SOIL25-3	05/14/08	USEPA 2008	EXC-NM	SUB	KEN	S	2.5-3.0	<6.3	48.5 J	140	0.31 J	0.56	36.5	10.3	59.8	33 J	1.6	---	37.2	1.4 J	0.23 J	<0.84	24.3	53.7	---	<2.6	---
HA-74-0.5	02/12/09	Arcadis 2009	EXC-NM	SURF	CAL*	S	0.5	---	230	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOIL30-1	05/14/08	USEPA 2008	EXC-NM	SURF	KEN	S	0.0-0.5	<6.2	43.6 J	152	0.3 J	0.57	32.3	12.6	56.7	31.4 J	1.9	---	40.4	0.99 J	0.21 J	<0.89	22.3	66.6	---	<2.6	---
SOIL30-3	05/14/08	USEPA 2008	EXC-NM	SUB	KEN	S	2.5-3.0	<6.7	8.7 J	143	0.31 J	<0.49	43.4	13.8	64.8	9.0 J	0.023 J	---	40.1	1.1 J	<1.1	<1.0	27	61.0	---	<2.8	---
Minimum Detected Concentration								0.99	3.0	55	0.12	0.39	5.4	4.0	23	9.0	0.02	ND<10	15	0.99	0.21	1.4	8.4	39	NA	ND<3.2	ND<5.0
Maximum Detected Concentration								0.99	502	226	0.93	4.4	45	23	96	386	28	ND<10	44	4.8	5.6	1.6***	133	118	NA	ND<3.2	ND<5.0
Mean Detected Concentration								0.99	96	144	0.38	1.6	27.9	11.9	66.2	77.2	6.8	na	32.1	1.9	1.4	1.5	47.6	69.9	na	na	na
Cleanup Goal								--	20.7	--	--	--	--	--	--	80	1.0	--	--	--	--	--	--	--	--	--	--
Basis for Cleanup Goal								--	BTV	--	--	--	--	--	--	RBCL	RBCL	--	--	--	--	--	--	--	--	--	--
Residential Screening Level								31	0.11	15,000	16	7.1	1.2E+05	23	3,100	80	1.0	390	820	390	390	0.78	390	2.3E+04	0.3	23	23
Basis for Residential Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	RSL	RSL	RSL

Notes:

*** Thallium concentrations are considered representative of background as discussed in Section 4.4.15 of the RAP. As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
EXCAVATE ISOLATED TAILINGS AREAS (RIDGE, DAM, SOUTHEAST, AND LAKEBED TRACK OUT AREAS) FROM MINERALIZED BACKGROUND LOCATIONS - PLACE AS ENGINEERED FILL IN TAILINGS PILE																											
TP-13-0.1	10/21/92	D&M 1995	EXC-M	SURF	KEN	T	0.1	---	80.0	---	---	---	10	---	---	8.9	1.0	---	21.0	---	---	---	---	---	---	---	<5.0
TP-13-2.5	10/21/92	D&M 1995	EXC-M	SUB	KEN	T	2.5	---	87.0	---	---	---	14	---	---	72.0	20	---	33.0	---	---	---	---	---	---	---	<5.0
TP-13C-2.0	10/21/92	D&M 1995	EXC-M	SUB	KEN	T,C	2.0	---	44.0	---	---	---	3.1	---	---	31.0	0.9	---	11.0	---	---	---	---	---	---	---	---
TP-13F-2.0	10/21/92	D&M 1995	EXC-M	SUB	KEN	T,F	2.0	---	98.0	---	---	---	5.4	---	---	61.0	2.0	---	10.0	---	---	---	---	---	---	---	---
HA-89-0.5	02/13/09	Arcadis 2009	EXC-M	SURF	KEN	S	0.5	---	120	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-90-0.5	02/13/09	Arcadis 2009	EXC-M	SURF	MEL	S	0.5	---	68	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOIL40-1	05/15/08	USEPA 2008	EXC-M	SURF	CAL*	S	0.0-0.5	<6.2	81.2	126	0.44 J	0.38 J	29.4	12.9	64.4	42.1	2.8	---	22.8	1.3 J	0.35 J	0.82 J	41.1	57.7	---	<2.6	---
SOIL40-3	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	2.5-3.0	<6.6	4.3	228	0.38 J	0.47 J	7.5	22.3	59.1	2.7	0.042 J	---	11.6	0.59 J	<1.1	1.2 J	127	73.3	---	<2.7	---
SOIL40-5	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	4.5-6.0	<6.7	5.1	200	0.45 J	0.50 J	10	28.5	86.9	3.2	0.055 J	---	11.5	1.1 J	<1.1	0.95 J	119	82.4	---	<2.8	---
SOIL41-1	05/15/08	USEPA 2008	EXC-M	SURF	CAL*	S	0.0-0.5	<6.6	76.1	113	0.38 J	0.38 J	48	16.6	59.8	31.7	1.8	---	46	0.87 J	0.23 J	0.76 J	53.1	62.6	---	<2.8	---
SOIL41-3	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	2.5-3.0	<6.8	18.0	132	0.44 J	0.33 J	82.1	20.2	68.0	6.7	<0.029	---	65.2	0.65 J	<1.1	0.91 J	74	50.8	---	<2.8	---
SOIL41-5	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	4.5-6.0	<6.9	20.8	131	0.4 J	0.50 J	42.5	28.1	121	9.8	0.46	---	38.3	0.98 J	<1.2	1.2 J	110	70.1	---	<2.9	---
SOIL42-1	05/15/08	USEPA 2008	EXC-M	SURF	CAL*	S	0.0-0.5	<6.2	80.4	115	0.35 J	0.46 J	71.3	12	66.7	27.8	1.10	---	63.6	1.7 J	0.1 J	0.75 J	30.2	67.2	---	<2.6	---
SOIL42-3	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	2.5-3.0	<6.4	59.2	104	0.4 J	0.38 J	74.9	10.2	69.6	12.0	0.42	---	55.4	0.77 J	<1.1	0.92 J	33.2	58.2	---	<2.7	---
SOIL42-5	05/15/08	USEPA 2008	EXC-M	SUB	CAL	S	4.5-6.0	<6.4	41.5	83.5	0.32 J	0.29 J	45.7	5.6	68.4	11.6	0.33	---	32.4	2.2 J	<1.1	0.88 J	24.8	39.6	---	<2.7	---
22S004	Nov-09	DTSC 2011	EXC-M	SURF	CAL*	S	Surface	---	140	---	---	---	48	---	---	52	3.3	---	---	---	---	---	---	---	---	---	---
22S006	Nov-09	DTSC 2011	EXC-M	SURF	CAL*	S	Surface	---	240	---	---	---	70	---	---	68	4.4	---	---	---	---	---	---	---	---	---	---
HA-72-0.5	02/12/09	Arcadis 2009	EXC-M	SURF	CAL*	S	0.5	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOIL35-1	05/14/08	USEPA 2008	EXC-M	SURF	KEN	S	0.0-0.5	<6.2	80.9 J	104	<0.20	<0.40	19.6	6.7	39.2	51.4	4.1 J	---	20.9	1.2 J	0.69 J	<0.70	13.8	54.9	---	<2.6	---
SOIL35-3	05/14/08	USEPA 2008	EXC-M	SUB	KEN	S	2.5-3.0	<6.3	15.1 J	143	<0.26	<0.33	59.4	10.4	67.7	14.2	0.77 J	---	41.7	0.70 J	0.21 J	<1.0	24.7	84.8	---	<2.6	---
Minimum Detected Concentration								ND<7	4.3	83.5	0.32	0.29	3.1	5.6	39.2	2.7	0.04	NA	10.0	0.6	0.10	0.75	13.8	39.6	NA	ND<2.9	ND<5.0
Maximum Detected Concentration								ND<7	240*	228	0.45	0.50	82	28.5	121	72.0	20.0	NA	65.2	2.2	0.69	1.20	127	84.8	NA	ND<2.9	ND<5.0
Mean Detected Concentration								na	74.5	135	0.40	0.41	37.7	15.8	70.1	29.8	2.7	na	32.3	1.1	0.32	0.93	59.2	63.8	na	na	na
Cleanup Goal								--	120	--	--	--	--	--	--	500	4.4	--	--	--	--	--	--	--	--	--	--
Basis for Cleanup Goal								--	BTV	--	--	--	--	--	--	RBCL	RBCL	--	--	--	--	--	--	--	--	--	--
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150
Basis for Commercial Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL

Notes:

* Arsenic concentrations detected in naturally mineralized soil and bedrock range up to 1,300 mg/kg. Residential use is to be restricted, and no public trails are to be constructed in soil with arsenic concentrations exceeding the BTV for arsenic in mineralized soil.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
WESTERN AREA AND SOUTHERN AREA, TAILINGS AT THE GROUND SURFACE AT THE TOE OF THE TAILINGS PILE - RESTRICT UNDER TAILNGS PILE LUC																											
TP-02-0.5	08/23/90	D&M 1995	W&S	SURF	KEN	T	0.5	<24	35	90.7	<0.48	0.95	14.2	7.8	46.3	23.0	1.2	1.3	24.0	<3.0	<0.48	~~<9.5~~	39	76.5	---	<0.5	---
TP-03-4.0	08/23/90	D&M 1995	W&S	SUB	KEN	T	4.0	<24	38	21.4	<0.49	<0.24	<0.98	<0.98	7.21	7.2	<0.1	<0.98	7.3	<3.0	<0.49	~~<9.8~~	2.4	53	---	<0.5	---
HA-2-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR*	S	0.5	---	59	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-3-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-5-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-6-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-7-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR*	S	0.5	---	46	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-8-0.5	02/09/09	Arcadis 2009	W&S	SURF	MAR	S	0.5	---	28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Minimum Detected Concentration								ND<24	11	21	ND<0.5	0.95	14.2	7.8	7.2	7.2	1.2	1.3	7.3	ND<3.0	ND<0.5	NA	2.4	53	NA	ND<5.0	NA
Maximum Detected Concentration								ND<24	59*	91	ND<0.5	0.95	14.2	7.8	46.3	23.0	1.2	1.3	24.0	ND<3.0	ND<0.5	NA***	39	76.5	NA	ND<5.0	NA
Mean Detected Concentration								na	29.8	56.1	na	0.95	14.2	7.8	26.8	15.1	1.2	1.3	15.7	na	na	na	20.7	64.8	na	na	na
Cleanup Goal								--	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Basis for Cleanup Goal								--	RBCL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150
Basis for Commercial Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL

Notes:

* Soil excavation is to be restricted under the Tailings Pile LUC, and and no public trails are to be constructed in soil with arsenic concentrations exceeding the arsenic RBCL for trail use.

*** As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
MINERALIZED BACKGROUND - RESTRICT RESIDENTIAL DEVELOPMENT AND RESTRICT TRAILS IN SOIL WITH ARSENIC CONCENTRATIONS GREATER THAN THE MINERALIZED ARSENIC BTV																											
HA-31-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-32-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	150	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-33-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-34-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	210	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-35-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-36-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	77	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-37-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-37-0.5 (dup)	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-38-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-39-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	360	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-40-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-41-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	550	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-42-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	350	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-42-0.5 (dup)	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	330	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-44-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	140	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-45-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	220	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-46-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	87	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-47-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	81	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-49-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	120	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-50-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-51-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-52-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-53-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	33	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	34	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-54-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	49	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-55-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	43	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-56-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-57-0.5	02/13/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-63-0.5	02/10/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	63	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-64-0.5	02/10/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-66-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	35	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-68-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL*	S	0.5	---	92	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-69-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-69-0.5 (dup)	02/12/09	Arcadis 2009	MBKG	SURF	CAL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-70-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL*	S	0.5	---	41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-71-0.5	02/12/09	Arcadis 2009	MBKG	SURF	CAL*	S	0.5	---	47	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-86-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	39	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-86-0.5 (dup)	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	50	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-87-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	77	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-88-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-91-0.5	02/13/09	Arcadis 2009	MBKG	SURF	MEL	S	0.5	---	33	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-20-1.5	10/22/92	D&M 1995	MBKG	SUB	MEL	MS	1.5	---	153	---	---	---	241	---	---	9.3	<0.2	---	214	---	---	---	---	---	---	---	<5.0
TP-23-2.0	10/26/92	D&M 1995	MBKG	SUB	MEL	MR	2.0	<9.9	31.0	79.1	0.79	3.3	943	129	164	<7.5	<0.2	<9.9	473	<0.3	<2.5	~~36~~	53.9	51.3	---	---	<5.0
TP-24-3.0	10/26/92	D&M 1995	MBKG	SUB	MEL	S	3.0	<9.9	40.0	97.2	1.6	5.4	136	29.0	115	<7.4	<0.2	<9.9	79.1	<0.3	<2.5	~~21~~	61.3	61.3	---	---	<5.0
TP-43-1.0	06/06/95	D&M 1995	MBKG	SURF	MEL	S	1.0	---	---	---	---	---	620	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
TP-44-1.0	06/06/95	D&M 1995	MBKG	SURF	MEL	S	1.0	---	---	---	---	---	140	---	---	---	---	---	---	---	---	---	---	---	<1.0	---	---
21S003	Nov-09	DTSC 2011	MBKG	SURF	CAL*	S	Surface	---	230	---	---	---	26	---	---	57	2.9	---	---	---	---	---	---	---	---	---	---
21S006	Nov-09	DTSC 2011	MBKG	SURF	CAL	S	Surface	---	24	---	---	---	58	---	---	28	0.22	---	---	---	---	---	---	---	---	---	---
21S008	Nov-09	DTSC 2011	MBKG	SURF	CAL	S	Surface	---	65	---	---	---	36	---	---	9.8	<0.1	---	---	---	---	---	---	---	---	---	---
22S002	Nov-09	DTSC 2011	MBKG	SURF	CAL*	S	Surface	---	51	---	---	---	43	---	---	30	1.4	---	---	---	---	---	---	---	---	---	---
22T001	Nov-09	DTSC 2011	MBKG	SURF	CAL	S	Surface	---	20	---	---	---	21	---	---	19	0.2	---	---	---	---	---	---	---	---	---	---
TP-49-0.0	05/22/23	Geocon 2023	MBKG	SURF	MEL	MS	0.0-0.5	---	950	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	12	620	22	1.2	5.8	180	140	130	18	0.14	<1.0	790	<2.5	<1.0	<4.0	31	53	---	---	---
TP-49-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	480	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49-4.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	4.5-5.0	---	510	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49R-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	17	760	27	1.5	6.2	210	100	140	20	<0.10	<1.0	910	<2.5	<1.0	<4.0	34	56	---	---	---
TP-50-0.0	05/22/23	Geocon 2023	MBKG	SURF	MEL	MS	0.0-0.5	---	58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-50-0.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	0.5-1.0	<2.5	5.4	54	1.2	1.4	10	9.0	74	3.6	<0.10	<1.0	32	<2.5	<1.0	<4.0	29	44	---	---	---
TP-50-1.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.0-1.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-50-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-0.0	05/22/23	Geocon 2023	MBKG	SURF	MEL	MS	0.0-0.5	---	280	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-1.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	1.5-2.0	<2.5	59	60	2.1	3.1	19	19	72	<2.5	<0.10	<1.0	60	<2.5	<1.0	<4.0	91	61	---	---	---
TP-51-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	42	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-4.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	4.5-5.0	---	14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51R-4.5	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	4.5-5.0	---	8.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57-0.0	05/23/23	Geocon 2023	MBKG	SURF	CAL*	MS	0.0-0.5	---	37	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57-1.5	05/23/23	Geocon 2023	MBKG	SUB	CAL*	MS	1.5-2.0	<2.5	52	160	1.3	2.2	53	16	57	26	1.4	2.1	60	<2.5	<1.0	<4.0	35	77	---	---	---
TP-57-3.0	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	3.0-3.5	---	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57-4.5	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	4.5-5.0	---	58	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57R-0.0	05/23/23	Geocon 2023	MBKG	SURF	CAL*	MS	0.0-0.5	---	41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-0.0	05/23/23	Geocon 2023	MBKG	SURF	CAL	MS	0.0-0.5	---	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-1.5	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	1.5-2.0	---	32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-3.0	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	3.0-3.5	---	79	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58-4.5	05/23/23	Geocon 2023	MBKG	SUB	CAL	MR	4.5-5.0	---	26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-64-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-65-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MS	3.0-3.5	20	1300	71	<5.0	6.6	450	110	170	360	0.13	120	1000	<2.5	<1.0	<4.0	53	120	---	---	---
TP-66-3.0	05/22/23	Geocon 2023	MBKG	SUB	MEL	MR	3.0-3.5	---	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOIL28-1	05/14/08	USEPA 2008	MBKG	SURF	KEN	S	0.0-0.5	<6.2	83.4	100	0.28 J	0.57	40.2	8.8	70.6	95.9 J	0.072 J	---	44.6	1.2 J	<1.0	<0.88	32.0	73.3	---	<2.6	---
SOIL28-3	05/14/08	USEPA 2008	MBKG	SUB	KEN	S	2.5-3.0	<6.3	38.5 J	82.9	0.25 J	<0.49	31.9	6.8	77.6	13.6 J	0.042 J	---	42.8	1.6 J	<1.1	<0.087	22.3	74.5	---	<2.6	---
SOIL32-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.3	32.1 J	112	<0.36	0.53	52.5	29.4	83.7	8.9	0.26 J	---	20.4	0.89 J	0.34 J	<1.1	96.1	62.2	---	<2.6	---
SOIL32-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.5	6.2 J	78	<0.22	<0.39	57.0	31.3	69.1	2.7	<0.048	---	17.1	0.79 J	0.37 J	<0.99	84.6	54.2	---	<2.7	---
SOIL33-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.3	29.6 J	174	<0.44	<0.45	49.9	23.9	62.2	8.4	<0.045	---	30.5	0.57 J	0.41 J	<0.94	65.2	57.8	---	<2.6	---
SOIL33-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<9.0	46.9 J	228	<0.55	<0.57	68.0	29.9	82.2	9.8	<0.057	---	41.0	1.0 J	0.56 J	<1.4	88.2	78.2	---	<3.8	---
SOIL34-1	05/14/08	USEPA 2008	MBKG	SURF	KEN	S	0.0-0.5	<7.3	39.1 J	104	<0.27	<0.32	82.6	11.7	54.5	25.4	0.17 J	---	47.5	0.78 J	0.18 J	<0.79	33.5	65.2	---	<3.0	---
SOIL34-1 (dup)	05/14/08	USEPA 2008	MBKG	SURF	KEN	S	0.0-0.5	<6.8	36.1 J	102	<0.26	<0.30	67.5	9.6	50.3	20.8	0.11 J	---	40.9	0.97 J	0.09 J	<0.71	29.6	57.4	---	<2.9	---
SOIL34-3	05/14/08	USEPA 2008	MBKG	SUB	KEN	S	2.5-3.0	<6.5	12.9 J	96.6	<0.21	<0.24	54.2	9.6	58.5	7.9	<0.073	---	25.3	1.0 J	0.22 J	<0.83	48.3	44.7	---	<2.7	---
SOIL36-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.2	72.7 J	114	<0.27	<0.35	28.6	11	44.7	13.0	0.3 J	---	34.1	0.82 J	0.23 J	<0.85	21.6	51.3	---	<2.6	---
SOIL36-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.2	36.3 J	86.2	<0.22	<0.26	21.5	7.1	56.9	6.8	<0.044	---	27.1	0.73 J	0.17 J	<0.71	18.2	49.8	---	<2.6	---
SOIL37-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.2	56.6 J	230	<0.38	<0.43	49.7	23.1	60.5	18.4	0.23 J	---	48.5	0.82 J	0.71 J	<0.84	32.5	60.2	---	<2.6	---
SOIL37-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	32.0	180	<0.38	0.37 J	271	11.6	84.8	8.3	<0.041	---	115	0.66 J	<1.1	0.96 J	51.4	105	---	<2.7	---
SOIL38-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.2	23.5 J	143	<0.30	<0.30	63.3	14.2	47.9	12.7	<0.057	---	41.7	0.54 J	0.19 J	<0.80	35.4	58.0	---	<2.6	---

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
SOIL38-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<7.0	16.8 J	159	<0.29	<0.30	62.4	18.6	47.3	10.9	<0.043	---	46.8	0.79 J	0.23 J	<0.90	34.4	66.6	---	<2.9	---
SOIL39-1	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	45.5 J	185	<0.22	0.55 J	41.1	18.6	47.4	16.8	0.22 J	---	45	0.61 J	0.55 J	<0.69	21.6	87.3	---	<2.7	---
SOIL39-1 (dup)	05/14/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	43.6 J	194	<0.21	0.52 J	43.4	18.9	48.5	16.6	0.21 J	---	44.8	1.2 J	0.61 J	<0.66	22.6	89.0	---	<2.7	---
SOIL39-3	05/14/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.5	25.2 J	208	<0.20	<0.34	31.9	35.9	62.5	14.7	<0.094	---	58.5	0.71 J	0.68 J	<0.56	10.9	68.4	---	<2.7	---
SOIL43-1	05/15/08	USEPA 2008	MBKG	SURF	CAL*	S	0.0-0.5	1.1 J	55.4	141	0.4 J	0.53	181	19.4	81.7	20.4	0.74	---	133	1.2 J	0.05 J	0.97 J	41.2	92.2	---	<2.6	---
SOIL43-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	10.2	73.6	0.19 J	0.21 J	39.2	3.50 J	50.8	8.5	0.071 J	---	33.9	1.1 J	<1.1	0.86 J	15.0	34.4	---	<2.7	---
SOIL43-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.7	12.2	66.0	0.23 J	0.39 J	46.5	4.70 J	92.0	15.0	0.086 J	---	40.2	1.7 J	<1.1	0.97 J	23.2	44.5	---	<2.8	---
SOIL44-1	05/15/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<7.9	13.5 J	124	0.21 J	0.41 J	15	14.2	38.9	12.6 J	0.15	---	21.6	1.1 J	<1.3	<3.3	17.0	59.5	---	<3.3	---
SOIL44-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<9.9	12.9 J	149	0.47 J	0.39 J	28.7	12.3	63.9	16.5 J	0.23	---	28.1	1.0 J	<1.7	0.81 J	33.1	61.6	---	<4.1	---
SOIL44-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<8.2	9.6 J	768	0.47 J	0.50 J	29.1	17.0	62.5	16.3 J	0.03 J	---	34.5	0.88 J	0.34 J	0.82 J	37.3	62.9	---	<3.4	---
SOIL45-1	05/15/08	USEPA 2008	MBKG	SURF	CAL*	S	0.0-0.5	<8.1	57.3 J	170	0.36 J	0.55 J	78.6	16.2	64.7	24.1 J	0.49	---	56.7	<4.7	<1.3	0.62 J	35.2	73.6	---	<3.4	---
SOIL45-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	19.8 J	138	0.30 J	0.36 J	66	14.8	56.3	11.3 J	0.066 J	---	46.0	0.85 J	<1.1	0.58 J	31	57.1	---	<2.8	---
SOIL45-3 (dup)	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.4	19.3 J	135	0.31 J	0.35 J	58.3	15.6	53.1	11.1 J	0.074 J	---	46.5	0.63 J	<1.1	0.5 J	29.1	55.8	---	<2.7	---
SOIL45-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.4	10.5 J	98.6	0.22 J	0.22 J	42	8.2	45.5	10.7 J	0.049 J	---	26.7	0.74 J	<1.1	0.56 J	22.7	41.1	---	<2.7	---
SOIL46-1	05/15/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	10.0 J	127	0.25 J	0.34 J	14.7	9.5	34.9	21.4 J	0.15	---	15.3	0.83 J	<1.1	0.26 J	19.8	52.8	---	<2.7	---
SOIL46-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.5	9.5 J	113	0.34 J	0.36 J	23.7	10.2	41.8	14.6 J	0.22	---	21.2	0.76 J	<1.1	0.39 J	26.8	47.9	---	<2.7	---
SOIL46-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.7	10.1 J	121	0.35 J	0.45 J	27.9	18.1	54.3	7.7 J	0.11 J	---	31.5	0.65 J	<1.1	0.70 J	30.5	56.3	---	<2.8	---
SOIL47-1	05/15/08	USEPA 2008	MBKG	SURF	CAL	S	0.0-0.5	<6.4	20.7 J	108	0.20 J	0.36 J	66.4	28.8	67.7	13.2 J	0.10 J	---	59.7	0.99 J	<1.1	0.28 J	32.9	75.5	---	<2.7	---
SOIL47-3	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	2.5-3.0	<6.6	31.7 J	98.7	0.21 J	0.36 J	61.8	17.8	63.5	13.7 J	0.25	---	62.5	<3.9	<1.1	0.48 J	29.0	73.1	---	<2.8	---
SOIL47-5	05/15/08	USEPA 2008	MBKG	SUB	CAL	S	4.5-6.0	<6.8	29.5 J	90.5	0.20 J	0.28 J	10	16.9	63.6	11.6 J	0.25	---	70.7	0.97 J	<1.1	0.84 J	30.0	73.0	---	<2.8	---
TP-22-0.0	01/11/93	D&M 1995	BELL	SURF	MEL	WR	0.0	<10	9.0	72.5	<0.25	<2.5	12	16.0	34.1	17.0	0.320	<10	24.0	<1.0	<2.5	~~10~~ E	24.0	60.7	---	<5.0	---
TP-22-2.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	<9.9	7.0	126	<0.25	<2.5	26.3	18.0	22.0	12.0	0.018 J	<9.9	24.0	<1.0	<2.5	~~7.0~~ E	40.6	47.6	---	<5.0	---
TP-22-3.0	10/23/92	D&M 1995	BELL	SUB	MEL	S	3.0	<9.8	12.0	110	0.46	<2.4	30.0	9.6	21.0	13.0	<0.2	<9.8	27.0	<0.3	<2.4	~~8.0~~	34.1	44.5	---	---	<5.0
TP-22R-2.5 (dup)	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	<9.8	5.0	131	<0.25	<2.5	29.6	13.0	19.0	11.0	0.020 J	<9.8	23.0	<1.0	<2.5	~~6.0~~ E	32.8	40.9	---	<5.0	---
TP-23-0.5	10/26/92	D&M 1995	BELL	SURF	MEL	WR	0.5	<9.8	51.0	111	0.56	2.7	193	25.0	105	9.1	<0.2	<9.8	174	<0.3	<2.4	~~14~~	49.0	52.2	---	---	<5.0
TP-24C-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,C	1.5	<9.8	139	67.0	0.82	5.0	69.0	39.0	120	11.0	0.24	<9.8	86.0	<0.3	<2.5	~~23~~	74.0	90.0	---	<5.0	---
TP-24F-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,F	1.5	<9.9	115	84.0	0.86	4.1	66.0	43.0	140	21.0	0.27	<9.9	100	<0.3	<2.5	~~16~~	81.0	98.0	---	<5.0	---
Minimum Detected Concentration								1.1	5	22	0.19	0.21	10	3.5	19	2.7	0.018	2.1	15.3	0.54	0.05	0.26	10.9	34.4	ND<1.0	ND<5.0	ND<5.0
Maximum Detected Concentration								20	1,300*	768	2.1	6.6	943	140	170	360	2.9	120	1,000	1.7	0.71	0.97***	96.1	120	ND<1.0	ND<5.0	ND<5.0
Mean Detected Concentration								12.5	103	130	0.61	1.7	97	25.8	69.9	23.4	0.32	61.1	112	0.91	0.35	0.66	39.3	63.7	na	na	na
Cleanup Goal								--	120	--	--	--	--	--	--	--	4.4	--	--	--	--	--	--	--	--	--	--
Basis for Cleanup Goal								--	BTV	--	--	--	--	--	--	--	RBCL	--	--	--	--	--	--	--	--	--	--
Commercial Screening Level								470	0.36	220,000	230	79	1.8E+06	350	47,000	500	4.4	5,800	11,000	5,800	5,800	12	5,800	3.5E+05	6.2	150	150
Basis for Commercial Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	DTSC-SL	RSL	RSL

Notes:

* Arsenic concentrations detected in naturally mineralized soil and bedrock range up to 1,300 mg/kg. Residential use is to be restricted, and no public trails are to be constructed in soil with arsenic concentrations exceeding the BTV for arsenic in mineralized soil.

*** As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
NON-MINERALIZED BACKGROUND - NO ACTION																											
HA-1-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	8.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-10-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-11-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-11-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-12-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-13-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-14-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-15-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-16-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-17-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-18-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	7.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-19-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	8.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-20-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	9.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-21-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-22-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-23-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	6.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-24-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	8.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-30-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-43-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-48-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	8.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-77-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-77-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-78-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	4.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-79-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	4.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-80-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	6.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-9-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5	---	11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	6.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	5.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-95-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	7.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-96-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HA-96-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	---	8.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	<9.9	3.0	27.1	0.36	<2.5	43.7	<5.0	112	<7.5	<0.2	<9.9	12.0	0.40	<2.5	~~8.0~~	21.0	14.0	---	---	<5.0
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.9	<1.0	65.9	<0.25	<2.5	23.0	<5.0	36.6	<7.5	0.029 J	<9.9	15.0	<1.0	<2.5	~~8.0~~ E	17.0	28.0	---	<5.0	---
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.9	<1.0	75.2	<0.25	<2.5	28.2	<5.0	36.3	<7.5	0.044 J	<9.9	18.0	<1.0	<2.5	~~6.0~~ E	17.0	32.0	---	<5.0	---
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.8	<1.0	244	0.28	<2.5	22.0	9.3	48.6	15.0	<0.2	<9.8	27	<0.3	<2.5	~~<49~~	25.2	58.5	---	---	<5.0
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.8	5.0	156	0.27	<2.5	44.9	9.3	54.8	19.0	<0.2	<9.8	33	0.30	<2.5	~~9.0~~	25.5	69.8	---	---	<5.0
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	<9.9	7.0	154	0.62	<2.5	45.3	11.0	69.5	8.9	<0.2	<9.9	36	<0.3	<2.5	~~9.0~~	30.4	71.8	---	---	<5.0
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<10.0	6.0	265	<0.25	<2.5	25.5	9.8	56.3	21.0	<0.2	<10	31	0.30	<2.5	~~10.0~~	20.0	85.7	---	---	<5.0
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<10.0	3.0	227	0.36	<2.5	25.7	12.0	35.4	25.0	<0.2	<10	23	<0.3	<2.5	~~9.0~~	25.6	56.8	---	---	<5.0
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	<10.0	5.0	155	0.5	<2.5	32.3	13.0	58.5	12.0	<0.2	<9.8	29	<0.3	<2.5	~~9.0~~	36.3	61.1	---	---	<5.0
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	<9.9	<1.0	135	0.31	<2.5	24.0	8.4	58.3	7.7	<0.2	<9.9	50.9	0.30	<2.5	~~9.0~~	18	129	---	---	<5.0

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	7.0	154	<0.25	<2.5	17.0	5.8	48.0	22.0	0.2	<9.9	21	<0.3	<2.5	~~7.0~~	17	61.6	---	---	<5.0
BKRD-06C-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,C	0.0	<9.9	7.5	151	<0.25	<2.5	19.0	6.6	61.3	25.0	<0.2	<9.9	25	0.4	<2.5	~~7.0~~	21	71.4	---	---	<5.0
BKRD-06F-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,F	0.0	<10.0	6.8	204	0.26	<2.5	18.0	5.7	177	26.0	<0.2	<10.0	24	<0.3	<2.5	~~7.0~~	18	86.9	---	---	<5.0
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	<9.9	7.0	195	0.39	<2.5	22.0	11.0	58.1	11.0	<0.2	<9.9	25	0.50	<2.5	~~8.0~~	25	51.1	---	---	<5.0
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	<9.9	12.0	219	0.52	<2.5	37.4	<4.9	77.3	12.0	<0.2	<9.9	42	0.50	<2.5	~~13.0~~	31	68.9	---	---	<5.0
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	<9.8	5.0	152	0.40	<2.5	23.0	7.4	73.6	10.0	0.035 J	<9.8	37	<1.0	<2.5	~~8.0~~ E	27	68.0	---	<5.0	---
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	<9.9	4.0	277	0.29	<2.5	24.0	10.0	63.1	12.0	<0.2	<9.9	24	0.50	<2.5	~~9.0~~	24.9	69.1	---	---	<5.0
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.8	3.0	123	0.27	2.5	24.0	7.0	116	10.0	0.03 J	<9.8	31	<1.0	<2.5	~~7.0~~ E	28.4	81.5	---	<5.0	---
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	<9.9	3.0	143	0.31	<2.5	22.0	<4.9	118	11.0	0.026 J	<9.9	23	<1.0	<2.5	~~8.0~~ E	29.4	61.6	---	<5.0	---
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	12.0	189	0.38	<2.5	37.2	15.0	52.3	19.0	<0.2	<9.9	39	0.30	<2.5	~~8.0~~	32.6	67.9	---	---	<5.0
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	13.0	197	0.5	<2.5	55.0	16.0	54.7	15.0	<0.2	<9.9	61.6	0.30	<2.5	~~11.0~~	39.3	82.7	---	---	<5.0
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	<9.9	5.0	186	0.46	<2.5	26.7	13.0	65.9	18.0	<0.2	<9.9	34	0.70	<2.5	~~10.0~~	30.4	87.4	---	---	<5.0
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	<9.8	2.0	107	0.29	2.5	22.0	6.9	55.4	15.0	0.033 J	<9.8	31	<1.0	<2.5	~~8.0~~ E	20.0	71.6	---	<5.0	<5.0
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	<10	2.0	134	0.37	<2.5	22.0	9.9	62.2	18.0	<0.2	<10	22	0.30	<2.5	~~10.0~~	23.0	68.9	---	---	<5.0
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	<9.9	2.0	105	<0.25	<2.5	21.0	6.8	58.6	11.0	0.032 J	<9.9	29	<1.0	<2.5	~~7.0~~ E	20.0	72.9	---	<5.0	---
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	<9.9	6.0	225	0.55	<2.5	34.7	11.0	64	15.0	<0.2	<9.9	33	0.50	<2.5	~~9.0~~	34.4	69.6	---	---	<5.0
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	<9.8	2.0	278	<0.25	<2.5	16	101.0	178	23.0	0.065 J	<9.8	111	<1.0	<2.5	~~5.0~~ E	14.0	86.3	---	<5.0	---
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	<9.9	<1.0	190	<0.25	<2.5	16	49.0	172	17.0	0.039 J	<9.9	74.2	<1.0	<2.5	~~6.0~~ E	13.0	87.3	---	<5.0	---
21S007	Nov-09	DTSC 2011	BKG	SURF	CAL	S	Surface	---	21	---	---	---	83	---	---	13	<0.1	---	---	---	---	---	---	---	---	---	---
TP-55-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	7.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-55-1.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.0-1.5	---	4.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-56-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	<2.5	7	140	<1.0	2	88	28	83	8.9	<0.10	<1.0	53	<2.5	<1.0	<4.0	20	130	---	---	---
TP-56-2.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	2.0-2.5	---	2.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	<2.5	<1.0	110	<1.0	1.5	14	3.8	62	9.6	<0.10	3.7	19	<2.5	<1.0	<4.0	19	57	---	---	---
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	---	3.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60R-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5	---	4.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	<2.5	1.2	140	12	2.9	11	15	71	5.1	<0.10	<1.0	9.4	<2.5	<1.0	<4.0	99	54	---	---	---
TP-61-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5	---	2.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	<2.5	<1.0	170	12	2.9	24	18	74	4.0	<0.10	<1.0	15	<2.5	<1.0	<4.0	130	56	---	---	---
TP-62-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5	---	4.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	<2.5	<1.0	160	12	2.9	22	19	75	3.2	<0.10	<1.0	13	<2.5	<1.0	<4.0	130	52	---	---	---
TP-63-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5	---	<2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5	---	2.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63R-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5	---	2.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	12.4 J	171	0.35 J	0.5 J	60.3	12.4	72.2	20.7 J	0.17	---	48.6	1.0 J	0.75 J	1.6 J	30.6	73.0	---	<2.6	---
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	3.7 J	94.4	0.16 J	0.19 J	35.9	5.9	58.9	16.4 J	<0.045	---	20.8	0.66 J	0.45 J	1.2 J	19.1	58.1	---	<2.7	---
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	9.9 J	191	0.39 J	0.40 J	61.0	12.4	55.4	10.8 J	<0.052	---	43.9	1.3 J	0.70 J	1.5 J	30.7	57.8	---	<2.6	---
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	10.4 J	173	0.42 J	0.32 J	70.1	14.7	66.1	10.5 J	<0.027	---	47.1	1.2 J	0.70 J	1.9 J	36.8	64.2	---	<2.7	---
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.5	11.8 J	209	0.44 J	0.51 J	73.0	16.8	61.9	14.4 J	<0.061	---	54.9	1.2 J	0.99 J	1.6 J	42.7	86.4	---	<2.7	---
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.7	14.8 J	177	0.44 J	0.56 J	99.7	20.1	72.9	10.9 J	<0.11	---	64.6	1.4 J	1.1 J	1.8 J	52.5	90.1	---	<2.8	---
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<7.5	12.0 J	154	0.31 J	0.34 J	19.6	12.3	44.6	14.1 J	<0.094	---	22.6	0.74 J	0.64 J	1.1 J	20.1	55.0	---	<3.1	---
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<7.4	11.5 J	177	0.46 J	0.38 J	26.5	9.8	60.9	9.9 J	<0.10	---	25.2	0.96 J	0.79 J	1.6 J	24.3	56.6	---	<3.1	---
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	10.1 J	211	0.33 J	0.48 J	31.9	15.5	54.4	17.7 J	<0.034	---	38.7	1.4 J	0.42 J	1.5 J	23.7	74.6	---	<2.6	---
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	7.1 J	172	0.42 J	0.45 J	66.7	12.4	84.0	12.3 J	<0.042	---	59.7	1.6 J	0.63 J	1.7 J	32.8	70.9	---	<2.7	---
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	6.6 J	222	0.31 J	0.62 J	30.6	20.8	82.4	16.1 J	<0.069	---	50.1	1.6 J	0.77 J	1.7 J	22.9	83.3	---	<2.6	---
SOIL06-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	8.5 J	240	0.31 J	0.63 J	28.4	18.1	73.0	38.0 J	<0.099	---	44.4	1.4 J	0.66 J	1.5 J	22.8	85.1	---	<2.7	---
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	18.7 J	203	0.42 J	0.41 J	34.0	14.4	64.6	22.4 J	<0.099	---	33.3	1.2 J	0.58 J	1.6 J	25.0	66.9	---	<2.7	---
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	12.2 J	182	0.38 J	0.29 J	26.0	12.9	52.2	15.7 J	<0.050	---	27.0	1.0 J	0.46 J	1.3 J	22.5	52.1	---	<2.7	---
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.8	9.1 J	128	0.25 J	0.30 J	22.7	5.0 J	63.4	18.7 J	<0.091	---	21.2	1.4 J	0.36 J	1.2 J	18.7	61.7	---	<2.9	---
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	3.3 J	91.3	0.24 J	0.39 J	21.4	7.3	100.0	8.2 J	<0.038	---	61.7	1.5 J	0.69 J	1.7 J	15.5	175	---	<2.7	---
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.1	10.5 J	196	0.32 J	0.45 J	34.8	14.6	53.6	17.3 J	<0.065	---	37.3	1.5 J	0.60 J	1.5 J	23.6	72.7	---	<2.6	---
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.2	7.7 J	162	0.3 J	0.33 J	29.9	12.1	52.2	12.0 J	<0.045	---	33.2	1.2 J	0.53 J	1.5 J	22.1	59.4	---	<2.6	---
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	17.4 J	208	0.35 J	0.32 J	28.3	10.1	55.2	19.0 J	<0.075	---	27.3	1.3 J	0.64 J	1.4 J	22.4	57.5	---	<2.7	---
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	11.9 J	181	0.41 J	0.29 J	30.0	14.6	75.5	16.5 J	<0.027	---	31.1	1.2 J	0.74 J	1.8 J	26.5	26.5	---	<2.7	---
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.7	9.8	259	0.34 J	<0.34	25.9	10.4	61.6	23.5 J	0.086	---	34.7	1.3 J	0.8 J	0.96 J	23.5	23.5	---	<2.8	---
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.0	6.2	204	0.32 J	<0.15	20.9	8.8	58.3	10.3 J	0.019	---	28.8	1.2 J	0.76 J	1.1 J	20.9	20.9	---	<2.5	---
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.5	14.6	205	0.28 J	<0.23	28.5	11	77.9	20.0 J	<0.098	---	32.5	1.1 J	0.89 J	1.1 J	25.1	25.1	---	<2.7	---
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	14.4	203	0.31 J	<0.22	33.4	11.3	77.4	23.7 J	0.11	---	38.9	1.3 J	0.81 J	1.2 J	23.3	23.3	---	<2.6	---
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.2	4.3	140	0.26 J	<0.10	27	12.9	99.8	9.4 J	0.045 J	---	43.7	1 J	0.71 J	1.3 J	19.8	69.4	---	<2.6	---
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	13.9	187	0.32 J	<0.33	52	15.4	58.9	18.1 J	0.066 J	---	58.3	1.1 J	0.95 J	1.3 J	30.3	93.5	---	<2.6	---
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<7.3	14.4	204	0.40 J	<0.38	65.1	18.6	76.4	15.8 J	0.028 J	---	70.6	1.3 J	1 J	1.6 J	37.5	106	---	<3.0	---
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<7.0	9.8	174	0.30 J	<0.16	22.8	6.6	62.8	16.9 J	0.071 J	---	20.5	1.6 J	0.62 J	1.2 J	20.5	58.8	---	<2.9	---
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	8.3	107	0.26 J	<0.070	15.8	5.1 J	62.9	9.4 J	0.039 J	---	17	1.8 J	0.47 J	1.0 J	15.7	42.9	---	<2.7	---
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	9.5	112	0.3 J	<0.050	17.4	5.7 J	71.6	10.2 J	0.038 J	---	19.8	2 J	0.61 J	1.1 J	17.8	48.6	---	<2.7	---
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	8.3	178	0.29 J	<0.15	20.6	7.9	81.2	17.0 J	0.08 J	---	21.5	1.2 J	0.77 J	1.0 J	20.3	50.1	---	<2.6	---
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.3	2.8	106	0.25 J	<0.050	17.1	<4.1	65.4	13.9 J	0.052 J	---	17	0.94 J	0.42 J	1.0 J	15.9	42.3	---	<2.6	---
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	11.2	186	0.29 J	<0.19	45.8	14.2	58.6	11.0 J	0.031 J	---	48.5	1.1 J	0.81 J	1.3 J	25.8	74.4	---	<2.6	---
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<7.2	5.5	107	0.18 J	<0.060	40.6	7.7	62.4	6.3 J	<0.12	---	32.9	1.0 J	0.69 J	1.0 J	17.6	62.2	---	<3.0	---
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<8.2	13.1	307	0.39 J	<0.52	59.0	29.9	90.7	26.3 J	0.12 J	---	77.7	1.4	1.3 J	1.5 J	35.4	160	---	<3.4	---
SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<8.9	10.6	258	0.33 J	<0.48	47.0	28.9	90.4	24.7 J	0.078 J	---	70	1.3	1.1 J	1.6 J	30.9	149	---	<3.7	---
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<7.5	10.1	231	0.55 J	<0.24	38.4	19.4	66.6	18.0 J	0.054 J	---	39.3	1.2	1.1 J	1.5 J	38.6	97.5	---	<3.1	---
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	8.4	186	0.44 J	<0.19	28.2	14.9	52.5	14.7 J	0.048 J	---	31.4	1.1	0.81 J	1.4 J	30.9	78.6	---	<2.6	---
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	6.2	182	0.50 J	<0.40	26.6	18.5	65.9	14.1 J	<0.028	---	35.8	0.66	0.13 J	0.94 J	37.3	85.1	---	<2.7	---
SOIL20-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	37.6	178	0.40 J	<0.50	58.2	19.5	63.4	17.8 J	0.26	---	55.7	1.1	0.1 J	0.75 J	35.5	75.6	---	<2.6	---
SOIL20-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.3	23.9	163	0.38 J	0.39 J	45.8	17.9	63.4	12.6	<0.076	---	51.6	0.66 J	<1.0	0.81 J	34.6	66.3	---	<2.6	---
SOIL21-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	14.1	198	0.33 J	0.37 J	22.7	7.2	91.2	15.8	0.34	---	26.9	0.54 J	0.14 J	0.82 J	28.3	75.2	---	<2.7	---
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.4	7.3	193	0.36 J	0.38 J	25.1	7.2	87.2	11.3	<0.056	---	26.3	0.94 J	<1.1	0.94 J	30.2	71.8	---	<2.7	---
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	11.3 J	191	0.34 J	0.71	25.4	20.1	73.4	12.6 J	0.021 J	---	35	1.2 J	<1.1	<1.0	24.7	87.7	---	<2.7	---
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	10.4 J	161	0.37 J	0.65	26.7	18.3	80.3	15.4 J	0.023 J	---	27.8	1.3 J	<1.1	<0.97	24.6	69.9	---	<2.7	---
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	9.3 J	208	0.39 J	0.60	24.8	9.2	54.1	16.2 J	0.039 J	---	21.4	1.5 J	<1.1	<0.84	27.2	59.6	---	<2.6	---

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
SAMPLE ID								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	8.8 J	203	0.41 J	0.62	32.6	10.2	70.7	14.3 J	0.031 J	---	21.9	1.7 J	<1.1	<0.97	32.6	60.5	---	<2.7	---
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.5	7.5 J	192	0.37 J	0.55	23.1	10.2	60.4	14.1 J	0.022 J	---	21.7	1.5 J	<1.1	<1.0	28.7	61.7	---	<2.7	---
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.2	16.3	185	0.32 J	0.73	45.3	13.2	58.1	14.8 J	0.068 J	---	46.3	1.5 J	<1.0	<1.1	32.2	73.7	---	<2.6	---
SOIL26-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.2	24.4	136	0.29 J	0.82	167	16.2	68.5	11.6 J	<0.10	---	93.6	1.3 J	<1.0	<1.1	56.7	97.5	---	<2.6	---
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.4	17.7	207	0.39 J	0.60	26.3	9.5	64.6	15.4 J	0.048 J	---	24.7	1.5 J	0.52 J	<0.95	27.4	61.5	---	<2.7	---
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	12.2	195	0.38 J	<0.54	23.9	10.3	67.1	11.9 J	0.017 J	---	23.5	1.2 J	<1.1	<1.1	29.4	61.5	---	<2.7	---
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.6	11.3	198	0.34 J	<0.51	24.2	10.4	61.3	11.9 J	<0.014 J	---	21.6	1.4 J	0.15 J	<0.98	26	57.1	---	<2.7	---
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	<6.3	8.1 J	154	0.21 J	<0.44	16.6	9.9	54.5	30.2	0.11 J	---	17.0	0.51 J	0.27 J	<0.66	13	83.0	---	<2.6	---
SOIL31-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	<6.3	3.9 J	86.3	<0.22	<0.27	17.0	6.0	58.9	15.3	<0.044	---	12.2	<3.7	0.14 J	<0.68	13.3	62.1	---	<2.6	---
Minimum Detected Concentration								ND<10	1.2	27.1	0.16	0.19	11	3.8	35.4	3.2	0.017	3.7	9.4	0.30	0.10	0.75	13	14	NA	ND<5.0	ND<5.0
Maximum Detected Concentration								ND<10	37.6*	307	12.0	2.9	167	101**	178	38.0	0.34	3.7	111	2.0	1.3	1.9***	130	175	NA	ND<5.0	ND<5.0
Mean Detected Concentration								na	9.2	175	0.81	0.84	34.6	13.9	70.6	15.2	0.070	3.7	35.6	1.1	0.65	1.3	29.2	69.7	na	na	na
Cleanup Goal								--	20.7	--	--	--	--	--	--	--	1.0	--	--	--	--	--	--	--	--	--	--
Basis for Cleanup Goal								--	BTV	--	--	--	--	--	--	--	RBCL	--	--	--	--	--	--	--	--	--	--
Residential Screening Level								31	0.11	15,000	16	7.1	1.2E+05	23	3,100	80	1.0	390	820	390	390	0.78	390	2.3E+04	0.3	23	23
Basis for Residential Screening Level								RSL	DTSC-SL	RSL	DTSC-SL	DTSC-SL	RSL	RSL	RSL	DTSC-SL	DTSC-SL	RSL	DTSC-SL	RSL	RSL	RSL	RSL	RSL	RSL	RSL	RSL

Notes:

* Arsenic was detected at three background locations (HA-93, SOIL20, and SOIL26) at concentrations exceeding the BTV. These concentrations are considered representative of background as discussed in Section 4.6.5.8 of the RAP.

** Cobalt was detected at three background locations (BKRD-13, SOIL18, and TP-56) at concentrations exceeding the RSL for cobalt in residential soil. Cobalt is not a contaminant of concern, and the detected concentrations appear to be repreasentative of natural background variation.

*** Thallium concentrations are considered representative of background as discussed in Section 4.4.15 of the RAP. As discussed in Section 4.3.1.4 of the RAP, anomalous thallium data from D&M 1995 shown in strikethrough font could not be validated and are excluded.

TABLE 2A

SOIL ANALYTICAL DATA - METALS AND CYANIDE, SORTED BY DECISION UNIT

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA / DECISION UNIT	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium (1)	Vanadium	Zinc	Hexavalent Chromium	Total Cyanide	Reactive Cyanide
								EPA Methods 6010B/7471A(Hg)/7191(CrVI)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
OFF-SITE SAMPLES - NOT ADDRESSED BY RAP																											
TP-01-2.0	08/23/90	D&M 1995	OFF	SUB	KEN	T	2.0	<25	11.0	69.1	<0.49	0.42	12.6	8.1	33.3	10	<0.1	1.4	19.0	<3.0	<0.49	~~<9.8~~	31.1	56.8	---	<0.5	---
TP-12-2.0	08/23/90	D&M 1995	OFF	SUB	KEN	T/S	2.0	<25	52.0	38.3	<0.49	<0.24	<0.98	2.4	11.7	18	0.5	<0.98	13.0	<3.0	<0.49	~~<9.8~~	4.7	56.2	---	<0.5	---
TP-12-4.5	08/23/90	D&M 1995	OFF	SUB	KEN	T	4.5	<24	30.0	75.3	<0.48	0.72	19.6	20.2	65	16	<0.1	5.5	126	<3.0	<0.48	~~<9.7~~	40.9	156	---	1.3	---
MR-01-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5	17	490	120	0.46	1.7	360	81.0	51	38	2.1	6.8	1,500	<0.25	0.85	~~<0.5~~	35.0	160	<1.0	---	---
MR-02-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5	20	530	66	0.54	1.5	750	86.0	53	14	0.073	8.2	1,400	<0.25	0.80	~~<0.5~~	49.0	56.0	<1.0	---	---
SURF-09C-0.0	10/27/92	D&M 1995	OFF	SURF	KEN	T	0.0	---	66	---	---	---	3.1	---	---	10	0.6	---	8.5	---	---	---	---	---	---	---	<5.0
SURF-09F-0.0	10/27/92	D&M 1995	OFF	SURF	KEN	T	0.0	---	110	---	---	---	4.5	---	---	28	1.4	---	16	---	---	---	---	---	---	---	<5.0
Minimum Detected Concentration								17	11	38.3	0.46	0.42	3.1	2.4	11.7	10	0.073	1.4	8.5	ND<3.0	0.80	NA	4.7	56	ND<1.0	1.3	ND<5.0
Maximum Detected Concentration								20	530	120	0.54	1.7	750	86	65	38	2.1	8.2	1,500	ND<3.0	0.85	NA***	49	160	ND<1.0	1.3	ND<5.0
Mean Detected Concentration								18.5	184	73.7	0.50	1.1	192	39.5	42.8	19.1	0.93	5.5	440	na	0.83	na	32.1	97.0	na	1.3	na

Notes:

HA-12-0.5
- Sample depth in feet below surface
- Exploratory trench or boring number

< = analyte not detected at a concentration equal to or greater than the reported value
BTV = background threshold value
C = coarse fraction (retained on #200 sieve)
E = reanalysis
F = fine fraction (passing #200 sieve)
J = estimated value
NA = not analyzed
na = not applicable
R (in sample name) = replicate sample
RBCL = risk-based cleanup level

Geology:
CAL = Calaveras formation, eastern side of the Site
MAR = Mariposa formation, western side of the Site
MEL = Melones fault, naturally mineralized
KEN = Imported tailings from Kennedy Mine
* = May be influenced by overlying or adjacent waste

Media:
MR = mineralized rock
MS = mineralized soil
R = weathered rock
S = native soil
SC = Tailings Pile soil cover
T = mine tailings
T/S = tailings/soil mixture
WR = mine waste rock

Assessment Areas / Decision Units:
BKG = Non-mineralized background - No action
MBKG = Mineralized background - Restrict residential development and restrict trails where arsenic is greater than the mineralized arsenic BTV
BELL = Bellwether Mine waste rock - Restrict as other mineralized background
EXC-M = Isolated tailings areas in mineralized background - Excavate and transport to the Tailings Pile
EXC-NM = Isolated tailings areas in non-mineralized background - Excavate and transport to the Tailings Pile
LKBD = Lakebed Area - Fence and post under land use covenant
PROC = Cyanide Process Area - Fence and post under land use covenant
TAIL = Tailings Pile - Cap under land use covenant
W&S = West Area and South Area - Restrict soil excavation under Tailings Pile LUC , restrict trails where arsenic exceeds the arsenic RBCL for trail use
OFF = Off-site locations

Data Sources:
D&M 1995 = Final Environmental Assessment, Kennedy Mine Tailings Site, Jackson, California (Dames & Moore, August 1995)
USEPA 2008 = Targeted Brownfields Assessment, Oro de Amador, Jackson, California (USEPA, START Team 9, September 5, 2008)
Arcadis 2009 = Final Targeted Site Investigation Summary Report for the Oro de Amador Property (LFR Inc., an Arcadis company, April 7, 2009)
DTSC 2011 = Community Wide Assessment Report, Cities of Jackson and Sutter Creek (California Department of Toxic Substances Control, July 2011)

TABLE 3
SOIL ANALYTICAL DATA - SELECTED INORGANIC CONSTITUENTS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	Aluminum	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium
		EPA Method 6010; reported in milligrams per kilogram (mg/kg)						
SURFACE SOIL (0-2')								
BKRD-01-0.5	10/28/92	---	291	23,900	355	14.0	197	5.0
BKRD-02-0.0	10/26/92	---	---	---	---	---	---	---
BKRD-03-0.0	10/26/92	---	---	---	---	520	---	---
BKRD-03-1.5	10/28/92	---	---	---	---	---	---	---
BKRD-04-0.0	10/26/92	---	---	---	---	---	---	---
BKRD-05-0.0	10/26/92	---	4,980	21,800	2,740	1,570	445	13.0
BKRD-05-2.0	10/28/92	---	913	32,400	3,190	923	720	19.0
BKRD-06-0.0	10/26/92	---	---	---	---	---	---	---
BKRD-07-0.2	10/28/92	---	---	---	---	---	---	---
BKRD-07-1.5	10/28/92	---	---	---	---	---	---	---
BKRD-08-1.5	1/11/93	---	---	---	---	---	---	---
BKRD-09-0.0	10/28/92	---	---	---	---	---	---	---
BKRD-10-0.0	10/28/92	---	---	---	---	---	---	---
BKRD-11-0.2	10/28/92	---	---	---	---	---	---	---
BKRD-11-1.0	1/11/93	---	---	---	---	---	---	---
BKRD-12-0.0	10/28/92	---	---	---	---	780	---	---
BKRD-13-0.0	1/11/93	---	459	27,400	1,060	1,980	640	15.0
BKRD-13-0.0 (dup)	1/11/93	---	408	26,100	1,450	1,300	690	8.0
TP-17-0.5	10/22/92	---	9,840	30,300	6,960	---	254	52.4
TP-17-1.1	10/22/92	---	3,410	46,000	9,170	665	494	13.0
TP-18-1.5	10/22/92	---	3,350	42,600	4,990	177	260	186
TP-25-0.2	10/27/92	---	---	---	---	---	---	---
TP-25-1.0	10/23/90	---	---	---	---	---	---	---
TP-26-2.0	10/23/90	---	---	---	---	---	---	---
TP-27-0.5	10/23/92	---	1,490	46,700	4,460	653	2,830	45
TP-33-0.2	10/27/92	---	9,240	61,000	7,700	1,110	2,430	73
TP-35-0.8	10/27/92	---	3,650	52,700	15,100	---	635	51
SOIL01-1	05/13/08	11,700	947	28,800	3,300	571	1,150	29.8 J
SOIL02-1	05/13/08	10,600	688	29,100	2,560	510	1,070	28.6 J
SOIL03-1	05/13/08	14,400	1,940	32,600	4,540	761	1,470	25.8 J
SOIL04-1	05/13/08	8,900	1,260	21,000	1,930	551	753	56.8 J
SOIL05-1	05/13/08	10,600	1,470	25,700	3,230	494	1,440	24.7 J
SOIL06-1	05/13/08	10,600	1,690	30,200	2,930	1,110	1,330	22.0 J
SOIL07-1	05/13/08	10,200	2,010	27,100	2,470	1,130	1,540	24.7 J
SOIL08-1	05/13/08	8,770	1,340	24,600	2,480	411	1,410	22.8 J
SOIL09-1	05/13/08	10,300	1,390	25,300	3,180	501	1,300	24.3 J
SOIL10-1	05/13/08	9,430	1,990	24,100	2,330	571	1,360	23.2 J
SOIL11-1	05/13/08	10,200	2,280	25,500	2,940	1,300	1,600	27.2 J
SOIL12-1	05/13/08	10,200	2,030	33,200	2,820	879	1,580	30.3 J
SOIL12-1 (dup)	05/13/08	10,600	2,070	30,600	3,230	839	1,420	23.3 J
SOIL13-1	05/13/08	12,700	1,190	31,500	4,400	805	1,160	26.6 J
SOIL14-1	05/13/08	9,050	1,010	26,300	2,180	476	1,370	30.8 J
SOIL15-1	05/13/08	6,960	1,280	27,000	1,200	736	844	15.5 J
SOIL16-1	05/13/08	2,980	1,450	31,800	823	295	760	42.4 J
SOIL17-1	05/13/08	11,800	809	28,800	4,170	518	1,180	22.2 J
SOIL18-1	05/13/08	15,000	4,590	40,700	5,330	1,310	1,980	29.6 J
SOIL19-1	05/13/08	17,200	1,290	35,900	4,110	1,200	1,850	25.6 J
SOIL19-1 (dup)	05/13/08	13,900	1,070	30,100	3,330	925	1,470	26.1 J
SOIL20-1	05/14/08	12,900	1,250	30,700	3,570	1,730	1,400 J	22.3 J
SOIL21-1	05/14/08	13,600	569	26,000	2,870	356	1,450 J	28.4 J

TABLE 3
SOIL ANALYTICAL DATA - SELECTED INORGANIC CONSTITUENTS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	Aluminum	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium
		EPA Method 6010; reported in milligrams per kilogram (mg/kg)						
SOIL22-1	05/14/08	10,300	654	31,600	2,110	877	1,100 J	18.1 J
SOIL23-1	05/14/08	9,510	1,250	28,700	1,990	591	1,250 J	23.1 J
SOIL24-1	05/14/08	1,690	19,500	18,800	6,870	379	599 J	52.7 J
SOIL25-1	05/14/08	9,390	924	28,900	3,180	328	939 J	25.2 J
SOIL26-1	05/14/08	12,200	1,030	31,800	4,110	548	1,090 J	16.6 J
SOIL27-1	05/14/08	10,100	1,510	28,400	2,150	577	1,170 J	18.9 J
SOIL28-1	05/14/08	11,100	1,240	28,700	4,590	136	1,930 J	18.0 J
SOIL29-1	05/14/08	1,120	16,800	17,300	6,440	352	295 J	46.2 J
SOIL30-1	05/14/08	9,200	910	24,600	2,770	283	852 J	19.0 J
SOIL31-1	05/14/08	5,940	980	18,500	2,080	688	692 J	<11.3
SOIL32-1	05/14/08	11,500	2,670	39,200	6,550	728	1,750 J	<35.7
SOIL33-1	05/14/08	10,200	2,150	31,900	5,530	1,010	<451	<24.3
SOIL34-1	05/14/08	9,990	1,260	26,700	6,440	232	<323	<20.0
SOIL34-1 (dup)	05/14/08	8,860	1,290	23,900	5,380	200	<307	<18.2
SOIL35-1	05/14/08	4,630	1,060	18,100	1,870	212	<398	<15.5
SOIL36-1	05/14/08	6,110	1,430	23,600	2,490	351	1,020 J	13.5 J
SOIL37-1	05/14/08	7,760	1,300	27,700	3,160	1,660	934 J	15.4 J
SOIL38-1	05/14/08	9,250	947	24,800	4,950	318	993 J	16.3 J
SOIL39-1	05/14/08	7,510	1,520	24,000	3,340	1,050	1,200 J	12.1 J
SOIL39-1 (dup)	05/14/08	8,130	1,550	22,600	3,700	1,100	1,260 J	12.4 J
SOIL40-1	05/15/08	8,950	1,620	27,100	2,310	543	2,170 J	33.4 J
SOIL41-1	05/15/08	10,800	1,700	29,500	3,480	592	1,910 J	36.2 J
SOIL42-1	05/15/08	10,500	1,920	27,600	3,220	481	1,050 J	31.0 J
SOIL43-1	05/15/08	13,900	1,590	34,400	4,880	528	1,300 J	20.7 J
SOIL44-1	05/15/08	5,020	2,360	18,800	2,050	1,120 J	257 J	47.3 J
SOIL45-1	05/15/08	9,820	1,880	33,000	3,760	749 J	1,140 J	16.3 J
SOIL46-1	05/15/08	5,460	924	17,900	1,610	638 J	337 J	14.0 J
SOIL47-1	05/15/08	9,890	6,870	24,200	6,290	539 J	1,550 J	13.5 J
SUBSURFACE SOIL (2-5')								
BKRD-05-3.0	10/28/92	---	---	---	---	---	---	---
TP-05-3.0	8/23/90	---	---	---	---	---	---	---
TP-22-3.0	10/23/92	---	2,120	25,600	2,570	378	1,320	25.0
TP-24-3.0	10/26/92	---	2,350	74,000	6,300	1,100	880	35.0
SOIL01-3	05/13/08	10,800	683	18,500	4,360	146	883	20.7 J
SOIL02-3	05/13/08	13,200	592	31,900	3,220	427	1,010	27.6 J
SOIL03-3	05/13/08	17,500	1,040	38,500	7,270	698	1,410	37.8 J
SOIL04-3	05/13/08	9,300	1,160	30,200	1,750	449	733	52.0 J
SOIL05-3	05/13/08	13,200	480 J	35,700	3,290	303	892	27.6 J
SOIL06-3	05/13/08	10,100	2,660	27,900	2,880	1,230	1,410	24.5 J
SOIL07-3	05/13/08	9,520	1,260	23,800	2,060	890	1,270	22.5 J
SOIL08-3	05/13/08	11,800	427 J	30,000	4,190	246	975	18.6 J
SOIL09-3	05/13/08	9,520	851	23,000	2,730	342	967	22.2 J
SOIL10-3	05/13/08	11,700	462 J	29,000	2,480	501	1,290	26.0 J
SOIL11-3	05/13/08	9,680	1,030	23,300	2,270	736	1,290	26.7 J
SOIL12-3	05/13/08	9,260	706	30,600	2,280	483	1,000	15.3 J
SOIL13-3	05/13/08	15,300	997	39,800	5,310	830	1,260	31.8 J
SOIL14-3	05/13/08	8,830	<484	20,800	1,720	104	854	17.4 J
SOIL14-3 (dup)	05/13/08	9,400	<522	24,400	2,020	116	860	19.8 J
SOIL15-3	05/13/08	7,530	594	24,400	1,760	164	560	34.0 J
SOIL16-3	05/13/08	9,920	900	33,700	2,330	362	1,130	22.5 J
SOIL17-3	05/13/08	11,400	680	24,600	4,670	135	667	20.7 J

TABLE 3
SOIL ANALYTICAL DATA - SELECTED INORGANIC CONSTITUENTS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE / SAMPLE ID	SAMPLE DATE	Aluminum	Calcium	Iron	Magnesium	Manganese	Potassium	Sodium
		EPA Method 6010; reported in milligrams per kilogram (mg/kg)						
SOIL18-3	05/13/08	14,300	3,720	37,900	5,020	995	1,720	32.9 J
SOIL19-3	05/13/08	17,100	632	30,900	3,740	929	1,350 J	30.8 J
SOIL20-3	05/14/08	12,900	1,120	29,100	3,400	1,300	1,230 J	23.2 J
SOIL21-3	05/14/08	14,200	790	28,500	2,920	362	1,580 J	27.1 J
SOIL22-3	05/14/08	10,200	<523	29,900	2,190	778	846 J	30.8 J
SOIL23-3	05/14/08	10,500	970	33,500	2,210	477	1,170 J	23.4 J
SOIL23-3 (dup)	05/14/08	10,400	1,210	28,100	2,280	530	1,210 J	28.2 J
SOIL24-3	05/14/08	1,160	17,400	14,400	5,230	313	385 J	48.4 J
SOIL25-3	05/14/08	10,200	702	24,800	3,010	279	903 J	17.9 J
SOIL26-3	05/14/08	18,300	<457	38,800	9,610	334	848 J	21.9 J
SOIL27-3	05/14/08	10,700	699	29,000	2,410	471	1,040 J	19.8 J
SOIL27-3 (dup)	05/14/08	9,680	660	26,700	2,290	963	950 J	25.2 J
SOIL28-3	05/14/08	12,200	1,410	27,800	5,930	161	921 J	23.4 J
SOIL29-3	05/14/08	887	14,100	12,500	4,780	294	258 J	50.7 J
SOIL30-3	05/14/08	11,400	485 J	27,100	3,930	120	814 J	22.8 J
SOIL31-3	05/14/08	6,140	807	18,100	2,850	273	<416	<524
SOIL32-3	05/14/08	13,800	3,090	32,200	10,600	930	<346	<38.4
SOIL33-3	05/14/08	13,800	2,770	43,300	7,400	1,310	<651	<35.3
SOIL34-3	05/14/08	10,400	1,450	24,500	5,600	282	<121	<21.9
SOIL35-3	05/14/08	13,500	1,600	26,300	8,270	197	<362	<14.8
SOIL36-3	05/14/08	7,080	952	21,000	3,190	281	675 J	10.7 J
SOIL37-3	05/14/08	20,400	2,070	40,600	11,500	462	479 J	34.8 J
SOIL38-3	05/14/08	10,600	1,230	26,400	6,340	407	1,040 J	20.2 J
SOIL39-3	05/14/08	6,710	646	19,500	2,440	911	284 J	<539
SOIL40-3	05/15/08	19,300	4,230	48,200	8,720	792	623 J	62.2 J
SOIL40-5	05/15/08	20,900	4,210	48,600	9,410	690	679 J	69.5 J
SOIL41-3	05/15/08	13,100	1,860	34,100	4,360	704	1,380 J	32.6 J
SOIL41-5	05/15/08	19,000	3,770	43,000	7,800	770	958 J	56.8 J
SOIL42-3	05/15/08	10,800	795	31,100	2,970	243	896 J	23.7 J
SOIL42-5	05/15/08	8,750	585	25,100	1,770	157	890 J	25.9 J
SOIL43-3	05/15/08	9,690	945	17,400	1,820	70	859 J	47.6 J
SOIL43-5	05/15/08	11,700	1,060	29,700	2,050	76	730 J	19.7 J
SOIL44-3	05/15/08	9,910	2,180	31,800	3,070	627 J	700 J	58.2 J
SOIL44-5	05/15/08	9,140	1,790	32,800	2,850	4,170 J	697 J	52.5 J
SOIL45-3	05/15/08	8,540	1,100	25,800	3,360	609 J	838 J	11.8 J
SOIL45-3 (dup)	05/15/08	8,220	1,070	25,500	3,270	658 J	786 J	11.9 J
SOIL45-5	05/15/08	8,130	905	20,400	3,160	338 J	772 J	11.7 J
SOIL46-3	05/15/08	5,270	659	26,700	1,520	556 J	348 J	11.7 J
SOIL46-5	05/15/08	6,480	848	32,900	3,010	1,080 J	381 J	17.9 J
SOIL47-3	05/15/08	10,200	1,970	25,000	6,640	382 J	549 J	13.8 J
SOIL47-5	05/15/08	10,900	1,230	25,300	7,680	387 J	546 J	14.8 J

Notes:

HA-12-0.5

Sample depth in feet below surface grade
Boring number

< - less than laboratory reporting limits.

--- = not analyzed

J = concentration is estimated

TABLE 4
SOIL ANALYTICAL DATA - EXTRACTABLE METALS
ORO DE AMADOR
JACKSON, CALIFORNIA

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Arsenic	Chromium	Lead	Manganese	Mercury	Nickel	Selenium	Silver
Synthetic Precipitation Leaching Procedure (SPLP, EPA Method 1312; Results in milligrams per liter (mg/l)														
TP-52-3.0	05/23/23	Geocon 2023	TAIL	KEN	T	3.0-3.5	0.0026	---	<0.0003	---	<0.0001	---	0.0014 J	<0.00024
TP-53-3.0	05/23/23	Geocon 2023	TAIL	KEN	T	3.0-3.5	0.0049	---	<0.0003	---	<0.0001	---	0.0024 J	<0.00024
TP-54-3.0	05/23/23	Geocon 2023	TAIL	KEN	T	3.0-3.5	0.0019	---	<0.0003	---	<0.0001	---	0.0017 J	<0.00024
Mean Detection by SPLP							0.0031	---	<0.0003	---	<0.0001	---	0.0018 J	<0.00024
Maximum Detection by SPLP							0.0049	---	<0.0003	---	<0.0001	---	0.0024 J	<0.00024
Standard WET / EPA Method 6010B/7471A; Results in mg/l														
BKRD-07-1.5	10/28/92	D&M 1995	BKG	CAL	S	1.5	<0.05	<0.05	<0.15	---	0.0076	<0.1	---	---
BKRD-10-0.0	10/28/92	D&M 1995	BKG	CAL	S	0.0	0.064	<0.05	0.26**	---	<0.003	0.25	---	---
MW-01-10.0	10/27/92	D&M 1995	LKBD	KEN	T	10.0	4.4	0.10	2.49	---	---	---	---	---
MW-01-11.5	10/27/92	D&M 1995	LKBD	CAL*	S	11.5	8.2	1.19	0.18	---	---	---	---	---
SURF-03-0.0	10/26/92	D&M 1995	LKBD	KEN	T	0.0	1.9	0.063	1.1	---	---	---	---	---
SURF-05-0.0	10/26/92	D&M 1995	LKBD	KEN	T	0.0	8.5	0.076	1.4	---	---	---	---	---
TP-15-3.0	10/21/92	D&M 1995	LKBD	KEN	T	3.0	27	0.11	1.3	---	---	---	---	---
TP-20-1.5	10/22/92	D&M 1995	PROC	MEL	MS	1.5	0.49	0.15	<0.15	---	<0.003	0.76	---	---
TP-21-0.3	10/22/92	D&M 1995	PROC	MEL	MR	0.3	0.54	<0.05	<0.15	---	<0.003	0.21	---	---
TP-23-0.5	10/26/92	D&M 1995	BELL	MEL	WR	0.5	0.23	0.10	<0.15	---	<0.003	0.52	---	---
TP-23-2.0	10/26/92	D&M 1995	BELL	MEL	MR	2.0	0.44	0.26	<0.15	---	<0.003	5.86	---	---
Mean Detection by Standard WET							5.18	0.26	0.26	---	0.0076	1.52	---	---
Maximum Detection by Standard WET							27.00	1.19	0.26	---	0.0076	5.86	---	---
DI-WET / EPA Method 6010B; Results in mg/l														
BKRD-10-0.0	10/28/92	D&M 1995	BKG	CAL	S	0.0	---	---	<0.15	---	---	---	---	---
MW-01-11.5	10/27/92	D&M 1995	LKBD	CAL*	S	11.5	0.0055	---	---	---	---	---	---	---
SURF-05-0.0	10/26/92	D&M 1995	LKBD	KEN	T	0.0	0.0130	---	---	---	---	---	---	---
TP-15-3.0	10/21/92	D&M 1995	LKBD	KEN	T	3.0	0.0089	---	---	---	---	---	---	---
HA-25-2.0	02/09/09	Arcadis 2009	TAIL	MAR	S	2.0	<0.005	---	---	<0.005	---	---	---	---
HA-26-2.0	02/09/09	Arcadis 2009	TAIL	KEN	T	2.0	<0.005	---	---	<0.005	---	---	---	---
HA-27-2.0	02/09/09	Arcadis 2009	TAIL	KEN	T	2.0	<0.005	---	---	<0.005	---	---	---	---
HA-28-2.0	02/09/09	Arcadis 2009	TAIL	KEN	T	2.0	0.0081	---	---	0.34	---	---	---	---
HA-29-2.0	02/09/09	Arcadis 2009	TAIL	KEN	T	2.0	0.0068	---	---	<0.005	---	---	---	---
HA-58-2.0	02/13/09	Arcadis 2009	PROC	MEL	S	2.0	0.026	---	---	0.039	---	---	---	---
HA-59-2.0	02/13/09	Arcadis 2009	PROC	MEL	S	2.0	0.094	---	---	0.13	---	---	---	---
HA-60-2.0	02/13/09	Arcadis 2009	PROC	MEL	S	2.0	0.011	---	---	0.053	---	---	---	---
HA-61-2.0	02/13/09	Arcadis 2009	PROC	MEL	S	2.0	0.0083	---	---	0.072	---	---	---	---
HA-61R-2.0 (dup)	02/13/09	Arcadis 2009	PROC	MEL	S	2.0	0.0076	---	---	0.069	---	---	---	---
HA-62-2.0	02/13/09	Arcadis 2009	PROC	MEL*	S	2.0	0.066	---	---	0.062	---	---	---	---
HA-81-2.0	02/12/09	Arcadis 2009	LKBD	KEN	T/S	2.0	<0.005	---	---	<0.005	---	---	---	---
HA-82-2.0	02/12/09	Arcadis 2009	LKBD	KEN	T/S	2.0	<0.005	---	---	<0.005	---	---	---	---
HA-85-2.0	02/12/09	Arcadis 2009	LKBD	KEN	T/S	2.0	0.0089	---	---	0.0068	---	---	---	---
HA-85R-2.0 (dup)	02/12/09	Arcadis 2009	LKBD	KEN	T/S	2.0	0.0079	---	---	<0.005	---	---	---	---
Mean Detection by DI-WET							0.021	---	---	0.096	---	---	---	---
Maximum Detection by DI-WET							0.094	---	---	0.34	---	---	---	---

Notes:

DI-WET = Title 22 Waste Extraction Test with deionized water extractant solution
Standard WET = Title 22 Waste Extraction Test with citrate buffer extractant solution
BKG = Background Area. Upland eastern portion of the Site, undisturbed oak woodland.
BELL = Bellwether Mine Area. Small historical mining claim in mineralized bedrock.
LKBD = Lakebed Area. Former tailings impoundment, approximately 16 acres.

< = less than laboratory reporting limit
--- = not analyzed
MR = mineralized rock
MS = mineralized soil
S = native soil
T = mine tailings

TABLE 4
SOIL ANALYTICAL DATA - EXTRACTABLE METALS
ORO DE AMADOR
JACKSON, CALIFORNIA

PROC = Cyanide Process Area. On ridge west of Lakebed Area and East of Tailings Pile. T/S = tailings/soil mixture

TAIL = Tailings Pile. Tailings land disposal area, approximately 29 acres. WR = mine waste rock

CAL = Calaveras Formation, MAR = Mariposa Formation, MEL = Melones Fault/mineralized zone, KEN = Kennedy Mine tailings

D&M 1995 = Final Environmental Assessment, Kennedy Mine Tailings Site, Jackson, California (Dames & Moore, August 1995)

Arcadis 2009 = Final Targeted Site Investigation Summary Report for the Oro de Amador Property (LFR Inc., an Arcadis company, April 7, 2009)

J = The reported concentration is less than the laboratory reporting limit but greater than the method detection limit and is therefore an estimate.

* = Metail concentrations may be influenced by overlying or adjacent waste

** = DI-WET lead was originally reported for Sample BKRD-10-0.0 at a concentration of 16.7 mg/l and was subsequently reanalyzed.

TABLE 5

SOIL ANALYTICAL DATA - ACID BASE ACCOUNTING, PASTE pH, AND SULFUR FORMS

ORO DE AMADOR

JACKSON, CALIFORNIA

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	MEDIUM	SAMPLE DEPTH (feet)	PASTE pH	SULFUR FORMS (%)			AGP	ANP	NNP	NP/AGP
							TOTAL SULFUR	SULFIDE	SULFATE				
TP-40-2.0	06/06/95	D&M 1995	LKBD	T	2.0	8.24	0.02	<0.001	0.02	<0.03	45.7	45.7	>1500
TP-41-1.0	06/06/95	D&M 1995	LKBD	T/S	1.0	8.12	0.088	<0.001	0.088	<0.03	40	40	>1300
TP-45-2.0	06/06/95	D&M 1995	LKBD	T	2.0	8.64	0.064	<0.001	0.064	<0.03	47.6	47.6	>1500
TP-47-1.5	06/06/95	D&M 1995	TAIL	T	1.5	7.83	0.82	0.12	0.7	3.8	41.8	38	11
TP-48-1.5	06/06/95	D&M 1995	TAIL	T	1.5	8.09	0.96	0.04	0.92	1.2	46.6	45.4	38.8

Notes:

AGP = Acid Generating Potential

ANP = Neutralizing Potential

NNP = Net Neutralizing Potential

< = less than the laboratory reporting limit

> = greater than

Assessment Areas:

LKBD = Lakebed Area. Former tailings impoundment, approximately 16 acres.

TAIL = Tailings Pile. Tailings land disposal area, approximately 29 acres.

Media:

S = soil

T = mine tailings

TABLE 6
MINERALOGICAL ANALYSIS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Quartz	Plagioclase	K-Feldspar	Calcite	Siderite	Ferron Dolomite	Goethite	Pyrite	Gypsum	Bassanite	~Hexahydrite	~Sanderite	Amphibole	Talc	Mixed-layer Illite Smectite	Illite + Mica	Chlorite	Vermiculite	Smectite	Amorphous (A) / Below Detect	Arsenic	Chromium	Lead	Mercury	Nickel
SAMPLE ID								Mineralogical Composition (%)																				EPA Methods 6010B/7471A(Hg)				
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	57	7	--	--	--	--	5	--	--	--	--	--	--	--	--	11	8	--	2	10	13.0	55.0	15.0	<0.2	61.6
MW-01-10.0	10/27/92	D&M 1995	LKBD	SUB	KEN	T	10.0	52	5	--	--	1	8	--	3	--	--	--	--	--	--	--	30	1	--	--	--	184	3.4	52.0	6.4	22
MW-01-11.5	10/27/92	D&M 1995	LKBD	SUB	CAL*	S	11.5	52	10	--	--	--	1(?)	14	--	--	--	--	--	4	--	--	3	6	--	--	10	25	71.5	<7.4	<0.2	45
SB-05A-23.0	11/02/92	D&M 1995	TAIL	SUB	KEN	T	23.0	44	7	--	tr	2	10	--	5	--	--	--	--	--	--	--	30	2	--	--	--	219	4.7	46.0	3.5	24
SB-05-24.5	11/02/92	D&M 1995	TAIL	SUB	MAR*	S	24.5	48	7	--	--	--	--	6	--	--	--	--	--	--	--	30	1	6	--	--	2	4.7	19	<7.5	<0.2	15
SURF-01-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	45	5	--	--	--	--	--	^4	4	3	2	9	--	--	--	13	--	--	--	'15	76.0	6.8	63.0	9.7	20
SURF-05-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0	68	9	--	tr	2	8	1	--	--	--	--	--	--	--	--	10	1	--	--	--	160	4.3	20.0	1.0	16
SURF-08-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0	60	2	--	--		3	--	^10	1	--	19	--	--	--	--	5	--	--	--	--	158	3.4	35.0	2.0	16
SURF-15C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,C	0.0	46	10	--	1	1	5	--	1	--	--	--	--	--	--	--	33	3	--	--	--	161	8.3	33.0	3.3	21
SURF-15F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,F	0.0	61	10	--	1	1	13	1(?)	tr	--	--	--	--	--	--	--	11	2	--	--	--	333	8.7	33.0	3.3	27
SURF-16-0.0	01/11/93	D&M 1995	PROC	SURF	MEL	MR	0.0	75	--	--	--	--	--	7	--	--	--	--	--	--	--	--	tr	*18	--	--	--	69	1690	<7.4	0.21	1340
SURF-16R-0.0 (dup)	01/11/93	D&M 1995	PROC	SURF	MEL	MR	0.0	32	28	--	--	--	--	1(?)	tr(?)	--	--	--	--	--	--	--	10	*15	--	--	14	12	431	<7.3	0.26	567
TP-15-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T	3.0	67	8	--	1	1	7	1(?)	1	--	--	--	--	--	--	--	10	2	--	2	--	283	4.9	12.0	1.0	15.0
TP-23-2.0	10/26/92	D&M 1995	BELL	SUB	MEL	MR	2.0	30	3	--	--	--	--	12	--	--	--	--	--	--	--	1(?)	5	*10	29	--	10	31.0	943	<7.5	<0.2	473

Notes:

^ = possibly arsenopyrite

' = possibly other poorly x/n sulfates

* = may include minor mixed-layer chlorite-vermiculite

(A) = amorphous content may represent iron and/or manganese hydroxides-oxides and very poorly crystilline clays

tr = trace

(?) = tentative identification

C = coarse fraction (retained on #200 sieve)

F = fine fraction (passing #200 sieve)

R (in sample name) = replicate sample

Media:

MR = mineralized rock

S = native soil

T = mine tailings

Depth Interval:

SURF = surface (upper foot)

SUB = subsurface (below upper foot)

Data Sources:

D&M 1995 = Final Environmental Assessment, Kennedy Mine Tailings Site, Jackson, California (Dames & Moore, August 1995)

USEPA 2008 = Targeted Brownfields Assessment, Oro de Amador, Jackson, California (USEPA, START Team 9, September 5, 2008)

Arcadis 2009 = Final Targeted Site Investigation Summary Report for the Oro de Amador Property (LFR Inc., an Arcadis company, April 7, 2009)

DTSC 2011 = Community Wide Assessment Report, Cities of Jackson and Sutter Creek (California Department of Toxic Substances Control, July 2011)

Assessment Areas:

BKG = Background Area. Upland eastern portion of the Site, undisturbed oak woodland.

BELL = Bellwether Mine Area. Small historical mining claim in mineralized bedrock.

LKBD = Lakebed Area. Former tailings impoundment, approximately 16 acres.

PROC = Cyanide Process Area. On ridge west of Lakebed Area and East of Tailings Pile.

TAIL = Tailings Pile. Tailings land disposal area, approximately 29 acres.

Geology:

CAL = Calaveras formation, eastern side of the Site

MAR = Mariposa formation, western side of the Site

MEL = Melones fault, mineralized ridge crossing north-south through the central portion of the Site

KEN = Imported tailings from Kennedy Mine

* = May be influenced by overlying or adjacent waste

TABLE 7
ARSENIC RELATIVE BIOAVAILABILITY, TITLE 22 METALS, AND TOTAL SULFUR
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	SAMPLE DEPTH (feet)	Arsenic RBA	Total Arsenic, Whole Sample	Arsenic, <60 Mesh (<250 um) Faction	Antimony	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Total Sulfur
SAMPLE ID								CAB	EPA Methods 6010B/7471A(Hg) Results in milligrams per kilogram (mg/kg)																		
TP-49-1.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	1.5-2.0	6.5	620	1500	12	22	1.2	5.8	180	140	130	18	0.14	<1.0	790	<2.5	<1.0	<4.0	31	53	37
TP-49-4.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	4.5-5.0	7.2	510	1200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51-0.0	05/22/23	Geocon 2023	BELL	SURF	MEL	MS	0.0-0.5	18	280	380	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-52-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	23	120	210	<2.5	47	<1.0	1	3.6	4.9	22	23	2.1	1	13	<2.5	<1.0	<4.0	6.6	46	950
TP-53-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	16	180	320	<2.5	78	<1.0	1.2	9.7	6.2	23	51	6.6	1.6	19	<2.5	<1.0	<4.0	15	60	4600
TP-54-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	25	220	300	<2.5	65	<1.0	1.3	7	6.9	33	52	3.3	1.3	20	<2.5	<1.0	<4.0	12	71	890
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	<12	7	15	<2.5	140	<1.0	2	88	28	83	8.9	<0.10	<1.0	53	<2.5	<1.0	<4.0	20	130	15
TP-58-3.0	05/23/23	Geocon 2023	BKG	SUB	CAL	MR	3.0-3.5	9.4 J	79	150	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	19 J	1.2	10	<2.5	140	12	2.9	11	15	71	5.1	<0.10	<1.0	9.4	<2.5	<1.0	<4.0	99	54	51
TP-64-3.0	05/22/23	Geocon 2023	PROC	SUB	MEL	MR	3.0-3.5	13	100	180	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-65-3.0	05/22/23	Geocon 2023	PROC	SUB	MEL*	MS	3.0-3.5	13	1300	2400	20	71	<5.0	6.6	450	110	170	360	0.13	120	1000	<2.5	<1.0	<4.0	53	120	290
TP-66-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL*	FILL	0.0-0.5	43	450	1000	5.8	100	1.4	2.7	150	24	60	42	0.24	2.3	180	<2.5	2.1	<4.0	39	100	1200

Notes:

TP-49-1.5
- Sample depth in feet below surface
- Exploratory trench or boring number

< = analyte not detected at a concentration equal to or greater than the reported value

* = May be influenced by overlying or adjacent waste

CAB = California Arsenic Bioaccessibility method, DTSC Human Health Risk Assessment (HHRA) Note 6, 2017

RBA = relative bioavailability

Depth Interval:

SUB = subsurface (below upper foot)

SURF = surface (upper foot)

Media:

FILL = fill soil

MR = mineralized rock

MS = mineralized soil

S = native soil

T = mine tailings

Assessment Areas:

BKG = Background Area. Upland eastern portion of the Site, undisturbed oak woodland.

BELL = Bellwether Mine Area. Small historical mining claim in mineralized bedrock.

PROC = Cyanide Process Area. On ridge west of Lakebed Area and East of Tailings Pile.

TAIL = Tailings Pile. Tailings land disposal area, approximately 29 acres.

Geology:

CAL = Calaveras formation, eastern side of the site

KEN = Imported tailings from Kennedy Mine

MAR = Mariposa formation, western side of the site

MEL = Melones fault, mineralized ridge crossing north-south through the central portion of the Sste

TABLE 8
GROUNDWATER ANALYTICAL DATA - METALS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SAMPLE ID		EPA Method 6010B/200.8 and 7471A/E245.2 [1] Results in milligrams per liter (mg/l)																			
MW-1	2/11/93 [2]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	02/11/09	---	---	**0.026** F	---	---	---	---	---	---	---	---	0.0047	---	---	---	---	---	---	---	---
	05/30/23	**0.25**	0.0012	**0.054**	0.054	---	<0.0005	0.0012	0.0079	0.0054	**4.8**	0.002	**0.94**	<0.0002	---	0.039	---	<0.0005	<0.0005	0.0058	<0.02
MW-2	02/11/93	---	---	**0.049**	0.068	<0.005	<0.05	<0.05	<0.1	<0.05	**1.8**	<0.15	**0.56**	<0.0002	<0.2	<0.1	<0.005	<0.05	<0.1	<0.05	<0.05
	06/22/93	---	<0.002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	02/11/09	---	---	**0.061** F	---	---	---	---	---	---	---	---	**0.59**	---	---	---	---	---	---	---	---
	05/30/23	<0.25	<0.0025	**0.052**	0.057	---	<0.0025	<0.0025	0.0026	0.0076	**0.85**	<0.0025	**0.31**	<0.0002	---	0.0064	---	<0.0025	<0.0025	<0.0025	<0.1
	5/30/23 R	<0.25	<0.0025	**0.038**	0.056	---	<0.0025	<0.0025	0.0027	0.012	**0.62**	<0.0025	**0.31**	<0.0002	---	0.0067	---	<0.0025	<0.0025	<0.0025	<0.1
MW-3	02/11/93	---	---	<0.005	0.14	<0.005	<0.05	<0.05	<0.1	<0.05	<0.3	<0.15	**2.7**	<0.0002	<0.2	<0.1	<0.005	<0.05	<0.1	<0.05	0.37
	06/22/93	---	0.0051	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	02/11/09	---	---	<0.001 F	---	---	---	---	---	---	---	---	**1.7**	---	---	---	---	---	---	---	---
	05/30/23	<0.1	<0.0025	0.0061	0.037	---	<0.0025	<0.0025	0.0093	0.011	**160**	<0.0025	**1.7**	<0.0002	---	0.08	---	<0.0025	<0.0025	<0.0025	0.14
MW-4	02/11/93	---	---	<0.005	<0.05	<0.005	<0.05	<0.05	<0.1	<0.05	<0.3	<0.15	<0.02	<0.0002	<0.2	<0.1	<0.005	<0.05	<0.1	<0.05	<0.05
	06/22/93	---	0.0053	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	02/11/09	---	---	0.0012 F	---	---	---	---	---	---	---	---	0.0077	---	---	---	---	---	---	---	---
	05/30/23	<0.25	<0.0025	<0.0025	<0.025	---	<0.0025	<0.0025	<0.0025	<0.0075	<0.25	<0.0025	<0.25	<0.0002	---	<0.0025	---	<0.0025	<0.0025	<0.0025	<0.1
MW-5	02/11/93	---	---	<0.005	<0.05	<0.005	<0.05	<0.05	<0.1	<0.05	**0.45**	<0.15	**0.37**	<0.0002	<0.2	<0.1	<0.005	<0.05	<0.1	<0.05	<0.05
	06/22/93	---	<0.002	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	02/11/09	---	---	0.0023 F	---	---	---	---	---	---	---	---	0.01	---	---	---	---	---	---	---	---
	05/30/23	<0.25	<0.0025	<0.0025	0.035	---	<0.0025	<0.0025	<0.0025	<0.0075	**0.93**	<0.0025	<0.25	<0.0002	---	<0.0025	---	<0.0025	<0.0025	<0.0025	<0.1
Benchmark		0.2	0.006	0.01	1.0	0.004	0.005	0.05	0.05	1.0	0.3	0.015	0.05	0.002	0.01	0.1	0.05	0.01	0.002	0.1	5
Basis for Benchmark		Secondary MCL	Primary MCL	Primary MCL	Primary MCL	Primary MCL	Primary MCL	Primary MCL	Ag	Secondary MCL	Secondary MCL	Primary MCL	Secondary MCL	Primary MCL	Ag	Primary MCL	Primary MCL	Secondary MCL	Primary MCL	Ag	Secondary MCL
Mean Detected Concentration		**0.25**	0.0039	**0.032**	0.064	na	na	0.0012	0.0056	0.009	**24.2**	0.002	**0.77**	na	na	0.033	na	na	na	0.0058	0.26
Maximum Detected Concentration		**0.25**	0.0053	**0.061**	0.14	ND<0.005	ND<0.0025	0.0012	0.0093	0.012	**160**	0.002	**2.7**	ND<0.0002	ND<0.2	0.08	ND<0.005	ND<0.0025	ND<0.0025	0.0058	0.37

Notes:

1 MW-1 was not sampled in 1993 because the well was in standing water.

2 Samples obtained 05/30/23 were analyzed for mercury by Method E245.2 and other metals by Method 200.8.

--- = not analyzed

< = less than laboratory reporting limit

Ag = acricultural water quality goal, Food and Agriculture Organization of United Nations

F = Analysis performed on a filtered groundwater sample and results were reported as "dissolved." Results for unfiltered samples were reported as "total."

MCL = Maximum Contaminant Level for drinking water

mg/l = milligram per liter

R = replicate sample

Values in **bold** font exceed the listed benchmark.

TABLE 9
GROUNDWATER ANALYTICAL DATA - SELECTED INORGANIC CONSTITUENTS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	CALCIUM	MAGNESIUM	POTASSIUM	SODIUM	CYANIDE		
						Total	Amenable[2]	WAD[2]
SAMPLE ID		EPA Method 6010B				SM 4500CN-E	SM 4500-CN-GE	SM 4500-CN-I / Kelada-01
		Results in milligrams per liter (mg/l)						
MW-1	2/11/93[1]	---	---	---	---	---	---	---
	02/11/09	---	---	---	---	<0.01	---	---
	05/30/23	230	120	8.0	8.1	0.0012	Note 2	<0.001
MW-2	02/11/93	160	210	3.1	14	0.11	---	---
	02/11/09	---	---	---	---	**0.19**	---	---
	05/30/23	100	180	2.6	8.8	0.016	Note 2	0.0016
	5/30/23 R	100	180	2.5	8.9	0.017	<0.001	---
MW-3	02/11/93	200	61	23	58	<0.02	---	---
	02/11/09	---	---	---	---	<0.01/<0.01	---	---
	05/30/23	190	67	2.1	38	<0.001	Note 2	<0.001
MW-4	02/11/93	66	30	1.5	25	<0.02	---	---
	02/11/09	---	---	---	---	<0.01	---	---
	05/30/23	80	28	0.33	21	0.0015	Note 2	<0.001
MW-5	02/11/93	48	15	1.7	18	<0.02	---	---
	02/11/09	---	---	---	---	<0.01	---	---
	05/30/23	52	14	3.0	15	<0.001	<0.001	---
Benchmark		NE	NE	NE	NE	0.15		
Basis for Benchmark		NE	NE	NE	NE	Primary MCL		
Mean Detected Concentration		123	91	4.8	21	0.06	ND	0.0016
Maximum Detected Concentration		230	210	23	58	0.19	ND	0.0016

Notes:

1 MW-1 was not sampled in 1993 because the well was in standing water.

2 The initial testing in May 2023 for Amenable Cyanide provided an invalid result for four of the samples due to interference during the chlorination step. According to Method 4500-CN-G, when this known interference is observed, Weak Acid Dissociable Cyanide is analyzed by SM4500-CN-I as an alternative to determining free cyanide. Therefore, MAI reported Weak Acid Dissociable Cyanide instead of the Amenable Cyanide requested.

F = Analysis performed on a filtered groundwater sample and results were reported as "dissolved." Results for unfiltered samples were reported as "total."

--- = not analyzed
< = less than laboratory reporting limit
MAI = McCampbell Analytical, Inc.
MCL = Maximum Contaminant Level for drinking water
ND = not detected
NE = not established
PHG = Public Health Goal
R = replicate sample
SM = standard method
WAD = weal acid dissociable

TABLE 10

GROUNDWATER GENERAL PARAMETERS, MAY 2023

ORO DE AMADOR

JACKSON, CALIFORNIA

ANALYTE	Unit	MW-1	MW-2	MW-2 R	MW-3	MW-4	MW-5	Benchmark	Basis for Benchmark
Major Ions									
Calcium, dissolved	mg/l	230	100	100	190	80	52	--	na
Magnesium, dissolved	mg/l	120	180	180	67	28	14	--	na
Potassium, dissolved	mg/l	8	2.6	2.5	2.1	0.33	3.0	--	na
Sodium, dissolved	mg/l	8.1	8.8	8.9	38	21	15	69	Ag
Chloride	mg/l	3.9	2.4	2.4	5.6	4.9	3.7	106	Ag
Total alkalinity	mg/l	438	734	735	185	234	146	--	na
Carbonate	mg/l	<10	<10	<10	<10	<10	<10	--	na
Bicarbonate	mg/l	438	734	735	185	234	146	--	na
Hydroxide	mg/l	<10	<10	<10	<10	<10	<10	--	na
Nitrate as N	mg/l	<0.2	<0.4	<0.4	<0.2	3.8	0.13	10	na
Nitrate as NO_3^-	mg/l	<0.88	<1.8	<1.8	<0.88	17	0.59	44.3	Primary MCL
Nitrite as N	mg/l	<0.2	<0.4	<0.4	<0.2	<0.1	<0.1	10	Primary MCL
Nitrite as NO_2^-	mg/l	<0.66	<1.3	<1.3	<0.66	<0.33	<0.33	3.29	Primary MCL
Nitrate and Nitrite as N	mg/l	<0.2	<0.4	<0.4	<0.2	3.8	0.13	10	Primary MCL
Sulfate	mg/l	**590**	**230**	**220**	**650**	91	69	250	Secondary MCL
General Parameters									
pH	su	7.04	6.79		**5.81**	6.83	6.02	6.0 - 8.0	Secondary MCL
Electrical conductivity (EC)	umhos/cm	**1068**	**1810**		**1347**	634	411	900	Secondary MCL
Temperature	degrees C	17.5	18.4		18.8	17.4	16.0	--	na
Turbidity	NTU	**6.1**	0.0		**13.4**	0.0	0.0	1.0	Primary MCL
Dissolved oxygen (DO)	mg/l	9.97	8.76		3.18	7.41	9.76	--	na
Oxidation-reduction potential (ORP)	mV	-180	-81		-18	72	138		na
Total Dissolved Solids	mg/l	**1250**	**818**	**858**	**1010**	330	226	500	Secondary MCL
Total Suspended Solids	mg/l	13.6	6.0	6.4	260	3.0	21.4	--	na
Hardness (as $CaCO_3$)	mg/l	1140	958	960	766	280	195	--	na
Measurements and Observations									
Color	na	clear	clear		rusty	clear	clear	--	na
Odor	na	sulphur	no odor		no odor	no odor	no odor	--	na
Depth to Water	feet	4.36	30.04		7.90	15.51	41.41	--	na
Total Depth	feet	17.50	54.75		40.00	69.60	65.60	--	na
Top of Casing Elevation[1]	feet AMSL	1278.40	1294.10		1253.96	1285.88	1362.17	--	na
Groundwater Elevation[2]	feet AMSL	1260.90	1261.73		1213.96	1216.28	1296.57	--	na

Notes:

1 As reported by Dames & Moore (1995), except for MW-1. The top of the well casing for MW-1 was repaired by removing the top 0.833 feet of casing; therefore, the top of casing elevation is 0.833 feet lower than the elevation reported by Dames & Moore (1995).

2 Groundwater elevation = top of casing elevation - depth to water

Ag = Agricultural water quality limit

AMSL = above mean sea level

C = Celsius

MCL = Maximum Contaminant Level

mg/l= milligram per liter

mV = millivolt

na = not applicable

NTU = nepthelometric turbidity unit

ORP = oxidation / reduction potential

R= replicate sample

su = standard unit

umho/cm = micromho per centimeter

TABLE 11
SURFACE WATER ANALYTICAL DATA - TITLE 22 METALS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium (1)	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SAMPLE ID		Arsenic by EPA Method 7060, Selenium by EPA Method 7740, Mercury by EPA Method 7470/7471, and Others by EPA Method 6010 Results in milligrams per kilogram (mg/l)																
Upgradient Locations ("Background")																		
SW-4	02/12/93	<0.2	<0.005	<0.05	<0.005	<0.05	<0.05	<0.1	<0.05	<0.15	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
SW-5	02/12/93	<0.2	<0.005	0.053	<0.005	<0.05	<0.05	<0.1	<0.05	<0.15	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
SW-5 (dup)	02/12/93	<0.2	<0.005	0.053	<0.005	<0.05	<0.05	<0.1	<0.05	**0.023**	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
SW-6	02/12/93	<0.2	<0.005	<0.05	<0.005	<0.05	<0.05	<0.1	<0.05	<0.15	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
Mean Detected Conc.		na	na	0.053	na	na	na	na	na	0.023	na	na	na	na	na	na	na	na
Maximum Detected Conc.		ND<0.02	ND<0.005	0.053	ND<0.005	ND<0.05	ND<0.05	ND<0.1	ND<0.05	**0.023**	ND<0.0004	ND<0.2	ND<0.1	ND<0.005	ND<0.05	ND<1.0	ND<0.05	ND<0.05
Site and Downgradient Locations																		
SW-1	02/12/93	<0.2	0.0088	<0.05	<0.005	<0.05	<0.05	<0.1	<0.05	<0.15	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
	02/12/93	---	0.0071 F	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SW-2	02/12/93	<0.2	0.0077	0.052	<0.005	<0.05	<0.05	<0.1	<0.05	<0.15	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
SW-3	02/12/93	<0.2	**0.010**	<0.05	<0.005	<0.05	<0.05	<0.1	<0.05	<0.15	<0.0004	<0.2	<0.1	<0.005	<0.05	<1.0	<0.05	<0.05
Mean Detected Conc.		na	0.008	0.052	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Maximum Detected Conc.		ND<0.02	**0.010**	0.052	ND<0.005	ND<0.05	ND<0.05	ND<0.1	ND<0.05	ND<0.15	ND<0.0004	ND<0.2	ND<0.1	ND<0.005	ND<0.05	ND<1.0	ND<0.05	ND<0.05
Benchmark Concentration		0.006	0.01	1.0	0.004	0.0017*	0.18	0.05	0.0063	0.0016*	0.00005	0.01	0.036*	0.005	0.0017*	0.0017	0.1	0.082*
Basis for Benchmark		Primary MCL	Primary MCL	Primary MCL	Primary MCL	CTR CCC	CTR CCC	Ag	CTR CCC	CTR CCC	CTR HH	Ag	CTR CCC	CTR CCC	CTR CCC	CTR HH	Ag	CTR CCC

Notes:

1 Total Cr results are compared to Cr (III) benchmarks: Cr (VI) was not detected in site media.

Ag = Agricultural water quality limit

CCC = CTR Criteria Continuous Concentration for freshwater short-term exposure

Concentrations in **bold** font exceed the referenced benchmark concentration.

CTR = California Toxics Rule

F = Filtered water sample reported as "dissolved" constituents. All other samples are unfiltered.

HH = CTR Human Health criterion (one-per-million risk for carcinogens) for consumption of water and aquatic organisms

MCL = Maximum Contaminant Level, lower value of US EPA or California Department of Public Health

mg/l = milligram per liter

--- = not analyzed

* = value is hardness-dependent

< = less than the laboratory reporting limit

TABLE 12
SURFACE WATER ANALYTICAL DATA - SELECTED INORGANIC CONSTITUENTS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	CALCIUM	IRON	MAGNESIUM	MANGANESE	POTASSIUM	SODIUM	CYANIDE (Total)	
SAMPLE ID		EPA 6010/7610 (Potassium)/7770 (Sodium)						SM 4500CN-E	
		Results in milligrams per liter (mg/l)							
Upgradient Locations ("Background")									
SW-4	02/12/93	2.5	**0.54**	2.4	<0.02	2.2	1.9	<0.02	
SW-5	02/12/93	18	<0.3	7.7	**0.052**	1.2	6.6	<0.02	
SW-6	02/12/93	22	**0.34**	10	<0.02	1.5	4.7	<0.02	
Mean Detected Concentration		20	**0.44**	6.7	**0.052**	1.6	4.4	na	
Maximum Detected Concentration		22	**0.54**	10	**0.052**	2.2	6.6	ND<0.02	
Site and Downgradient Locations									
SW-1	02/12/93	37	<0.3	20	0.05	2.7	5.4	<0.02	
SW-2	02/12/93	95	**1.1**	56	**0.11**	4.0	3.9	**0.26**	
	03/18/93	---	---	---	---	---	---	**0.36**	F
SW-3	02/12/93	22	**0.71**	13	**0.071**	2.6	3.6	<0.02	
SW-7	04/01/93	---	---	---	---	---	---	<0.02	
SW-8	04/01/93	---	---	---	---	---	---	<0.02	
Mean Detected Concentration		51	**0.91**	30	**0.08**	3.1	4.3	**0.31**	
Maximum Detected Concentration		95	**1.1**	56	**0.11**	4.0	5.4	**0.36**	
Benchmark Concentration		NE	0.3	NE	0.05	NE	NE	0.15	
Basis for Benchmark Concentration		NE	Secondary MCL	NE	Secondary MCL	NE	NE	Primary MCL	

Notes:

Concentrations in **bold** font exceed the referenced benchmark concentration.

F = Filtered water sample reported as "dissolved" constituents. All other samples are unfiltered.

MCL = Maximum Contaminant Level, lower value of US EPA or California Department of Public Health

NE = not established

--- = not analyzed

< = Less than laboratory reporting limit

TABLE 13
SEDIMENT ANALYTICAL DATA - TITLE 22 METALS, CYANIDE AND SULFUR FORMS
ORO DE AMADOR
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	DATA SOURCE	AREA	MEDIUM	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Total Cyanide	Reactive Cyanide	Total Sulfide	Reactive Sulfide
SAMPLE ID					EPA Methods 6010B/7471A(Hg)/9012A(CN) Results in milligrams per kilogram (mg/kg)																				
SS-1	03/18/93	D&M 1995	LKBD	SS	<25	**45**	35.2	<0.5	0.36	2.5	3.8	11.9	12.0	*0.2*	2.10	14.0	<3.0	<3.0	<9.9	5.6	47.4	<0.5	---	---	---
SED-01	03/18/93	D&M 1995	LKBD	SS	<10	**39**	78.0	<0.25	<2.5	26	11	29.0	8.3	*0.61*	<10	17.0	<0.25	<2.5	<50	29	78.0	<2.0	---	---	<25
SED-02	03/18/93	D&M 1995	TAIL	SS	<10	**89**	77.0	0.32	<2.5	17	8.9	28.0	24.0	**1.8**	<10	20.0	<0.25	<2.5	<50	26	63.0	2.0	<5.0	---	<25
SED-03	03/18/93	D&M 1995	TAIL	SS	<10	**110**	67.0	<0.25	<2.5	9.7	5.6	26.0	35.0	**2.0**	<10	16.0	0.25	<2.5	<50	16	58.0	---	---	---	<25
SED-04	03/18/93	D&M 1995	LKBD	SS	<10	**51**	140	0.53	<2.5	*55*	19	*52.0*	21.0	**2.0**	<10	*44.0*	<0.25	<2.5	<50	57	46.0	<2.0	---	---	<25
SED-06	04/01/93	D&M 1995	PROC	SS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	<2.0	---	---	---
SED-06R	04/01/93	D&M 1995	PROC	SS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	<2.0	---		
SQGs for Freshwater Ecosystems			TEC		NE	9.79	NE	NE	0.99	43.4	NE	31.6	35.8	0.18	NE	22.7	NE	NE	NE	NE	121	NE	NE	NE	NE
			PEC		NE	33	NE	NE	4.98	111	NE	149	128	1.06	NE	48.6	NE	NE	NE	NE	459	NE	NE	NE	NE
Mean Detected Concentration					na	67	79	0.43	0.36	22	10	29	20	1.3	2.1	22	0.25	na	na	27	58	na	na	na	na
Maximum Detected Concentration					ND<25	110	140	0.53	0.36	55	19	52	35	2.0	2.1	44	0.25	ND<2.5	ND<50	57	78	2.0	ND<5.0	na	ND<25

Notes:

SQG = Sediment quality guidelines (SQGs) for metals in freshwater ecosystems, from MacDonald, D.D., Ingersoll, C.G., and Berger, T.A., "Development and Evaluation of Consensus-Based Sediment Quality Guideline for Freshwater Ecosystems," Archives of Environmental Contamination and Toxicology, Vol. 39, January 13, 2000.

Values in **bold** font exceed a referenced PEC.

TEC = Threshold Effect Concentration (concentration below which harmful effects are unlikely to be observed)

PEC = Probable Effect Concentration (concentration above which harmful effects are likely to be observed)

SS = soil sediment

D&M 1995 = Final Environmental Assessment, Kennedy Mine Tailings Site, Jackson, California (Dames & Moore, August 1995)

LKBD = Lakebed Area. Former tailings impoundment, approximately 16 acres.

PROC = Cyanide Process Area. On ridge west of Lakebed Area and East of Tailings Pile.

TAIL = Tailings Pile. Tailings land disposal area, approximately 29 acres.

< = less than laboratory reporting limits.

--- = not analyzed

TABLE 14

SEEP WATER ANALYTICAL DATA - TITLE 22 METALS

ORO DE AMADOR PROPERTY

JACKSON, CALIFORNIA

SAMPLE ID	SAMPLE DATE	Total (unfiltered)	Dissolved (filtered)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
S-2	5/16/2017	x		<0.020	**0.20**	0.10	<0.0010	<0.010	<0.010	0.014	<0.020	<0.050	<0.0010	<0.50	0.013	<0.020	<0.010	<0.20	<0.020	<0.020
S-2	5/31/2017		x	<0.020	<0.010	0.10	<0.0010	<0.010	<0.010	0.011	<0.020	<0.050	<0.0010	<0.50	0.011	<0.020	<0.010	<0.20	<0.020	<0.020
S-2	11/8/2017	x		---	**0.82**	---	<0.0050	---	---	---	---	**0.0052**	**0.00039**	---	---	<0.005	---	<0.010	---	---
S-2D (dup)	11/8/2017	x		---	0.0077	---	<0.0050	---	---	---	---	<0.0050	<0.00020	---	---	<0.005	---	<0.010	---	---
S-3	5/16/2017	x		<0.020	<0.010	0.19	<0.0010	<0.010	<0.010	<0.010	<0.020	<0.050	<0.0010	<0.50	<0.010	<0.020	<0.010	<0.20	<0.020	<0.020
S-3	5/31/2017		x	<0.020	<0.010	0.18	<0.0010	<0.010	<0.010	<0.010	<0.020	<0.050	<0.0010	<0.50	<0.010	<0.020	<0.010	<0.20	<0.020	<0.020
S-3	11/8/2017	x		---	0.0086	---	<0.0050	---	---	---	---	<0.0050	<0.00020	---	---	<0.005	---	<0.010	---	---
Benchmark Concentration				0.006	0.01	1.0	0.004	0.0017*	0.18	0.05	0.0063	0.0016*	0.00005	0.01	0.036*	0.005	0.0017*	0.0017	0.1	0.082*
Basis for Benchmark				Primary MCL	Primary MCL	Primary MCL	Primary MCL	CTR CCC	CTR CCC	Ag	CTR CCC	CTR CCC	CTR HH	Ag	CTR CCC	CTR CCC	CTR CCC	CTR HH	Ag	CTR CCC

Notes:

1 Total Cr results are compared to Cr (III) benchmarks: Cr (VI) was not detected in site media.

Ag = Agricultural water quality limit

CCC = CTR Criteria Continuous Concentration for freshwater short-term exposure

Concentrations in **bold** font exceed the referenced benchmark concentration.

CTR = California Toxics Rule

F = Filtered water sample reported as "dissolved" constituents. All other samples are unfiltered.

HH = CTR Human Health criterion (one-per-million risk for carcinogens) for consumption of water and aquatic organisms

MCL = Maximum Contaminant Level, lower value of US EPA or California Department of Public Health

mg/l = milligram per liter

--- = not analyzed

* = value is hardness-dependent

< = less than the laboratory reporting limit

TABLE 15
SEEP WATER ANALYTICAL DATA - SELECTED INORGANIC CONSTITUENTS
ORO DE AMADOR PROPERTY
JACKSON, CALIFORNIA

ANALYTE	SAMPLE DATE	Total (unfiltered)	Dissolved (filtered)	ALUMINUM	BORON	CALCIUM	IRON	MAGNESIUM	MANGANESE	POTASSIUM	SODIUM
SAMPLE ID				EPA 6010/7610 (Potassium)/7770 (Sodium); Results in milligrams per liter (mg/l)							
S-2	5/16/2017	x		**0.14**	<0.20	170	**12**	160	**3.8**	2.1	16
S-2	5/31/2017		x	0.056	<0.20	---	**0.36**	---	**4.4**	2.4	14
S-2	11/8/2017	x		---	---	240	**31**	240	**3.0**	<5.0	19
S-2D (dup)	5/16/2017	x		---	---	160	0.30	100	**0.31**	<2.0	17
S-3	5/16/2017	x		**0.11**	<0.20	170	**0.86**	280	**1.3**	2.6	9.8
S-3	5/31/2017		x	0.057	<0.20	---	0.14	---	**1.0**	2.5	10
S-3	11/8/2017	x		---	---	260	**0.53**	380	**0.40**	<5.0	12
Benchmark Concentration				0.1	0.7	NE	0.3	NE	0.05	NE	NE
Basis for Benchmark Concentration				CTR CCC	Ag	NE	Secondary MCL	NE	Secondary MCL	NE	NE

Notes:

Concentrations in **bold** font exceed the referenced benchmark concentration.

CCC = CTR Criteria Continuous Concentration for freshwater short-term exposure

CTR = California Toxics Rule

MCL = Maximum Contaminant Level, lower value of US EPA or California Department of Public Health

NE = not established

--- = not analyzed

< = Less than laboratory reporting limit

TABLE 16

SEEP WATER ANALYTICAL DATA - GENERAL MINERALS, CYANIDE, AND CONVENTIONAL CHEMISTRY ANALYTES

ORO DE AMADOR PROPERTY

JACKSON, CALIFORNIA

SAMPLE ID	SAMPLE DATE	Total (unfiltered)	Dissolved (filtered)	pH (standard pH unit)	SPECIFIC CONDUCTANCE (µmhos/cm)	SULFIDE	TOTAL DISSOLVED SOLIDS	BICARBONATE ALKALINITY as CaCO3	CARBONATE ALKALINITY as $CaCO_3$	HYDROXIDE ALKALINITY as $CaCO_3$	TOTAL ALKALINITY as $CaCO_3$	HARDNESS, TOTAL	CYANIDE (AMENABLE)	CYANIDE (TOTAL)	CHLORIDE	NITRATE (as N)	NITRITE (as N)	SULFATE (as SO_4)	SULFITE
S-2	5/16/2017	x		6.98	**1,800**	<0.10	**1,300**	570	<5.0	<5.0	570	1,080	0.35	**0.35**	2.4	<0.20	<0.20	**520**	<10
S-2	11/8/2017	x		---	---	<1.0	**2,000**	840	<5.0	<5.0	840	1,600	<0.010	0.046	3.5	0.44	<0.40	**1,200**	---
S-2D	11/8/2017	x		---	---	<1.0	**1,000**	280	<5.0	<5.0	280	830	<0.010	0.18	4.0	<0.40	<0.40	**690**	---
S-3	5/16/2017	x		7.66	**2,200**	<0.10	**1,700**	820	<5.0	<5.0	820	1,570	0.23	**0.23**	1.4	<0.20	<0.20	**720**	<10
S-3	11/8/2017	x		---	---	<1.0	**2,300**	660	<5.0	<5.0	660	2,200	<0.010	0.018	2.8	<0.40	<0.40	**1,800**	---
Benchmark Concentration				6.5-8.5	900	NE	500.0	NE	NE	NE	NE	NE	NE	0.15	250	10	1.0	250	NE
Basis for Benchmark Concentration				Secondary MCL	Secondary MCL	NE	Secondary MCL	NE	NE	NE	NE	NE	NE	Primary MCL	Secondary MCL	Primary MCL	Primary MCL	Secondary MCL	NE

Notes:

Concentrations in milligrams per liter (mg/l) unless otherwise noted.

MCL = Maximum Contaminant Level for drinking water

µmhos/cm = micromhos per centimeter

< = Less than the laboratory reporting limit

--- = Not analyzed/not available

TABLE 17

HISTORICAL DATA COMPARISON - TAILINGS PILE GROUNDWATER AND SEEP WATER

ORO DE AMADOR PROPERTY

JACKSON, CALIFORNIA

Sample ID	Unit	MW-2	MW-3	SW-02	Water Quality Goals (1)			
Date Collected		2/11/1993	2/11/1993	2/12/1993	Drinking Water		Freshwater Aquatic Toxicity	
Location		Perched GW	Bedrock GW	(3)	Limit	Basis	Limit	Basis
General Minerals								
Calcium	mg/L	160	200	95				
Magnesium	mg/L	210	61	56				
Sodium	mg/L	14	**58**	3.9	20	EPA advisory level (2)		
Potassium	mg/L	3.1	23	4				
Chloride	mg/L	3.7	22	2.7	250	Secondary MCL	230	aquatic toxicity 4-day avg.
Nitrate as N	mg/L	0.07	<0.03	1.7				
Nitrite as N	mg/L	0.07	<0.03	NA				
Sulfate as SO4	mg/L	**680**	**680**	**320**	250	Secondary MCL		
pH	mg/L	7	6.8	7.5	6.0 - 8.0	Secondary MCL		
Specific Conductance (EC)	umhos/cm	**2200**	**1700**	**930**	900	Secondary MCL		
Sulfide	mg/L	<2.00	<1.00	<1.00				
Total Dissolved Solids	mg/L	NA	NA	NA	500	Secondary MCL		
Bicarbonate Alkalinity as CaCO3	mg/L	620	240	NA				
Carbonate Alkalinity as CaCO3	mg/L	<5	<5	NA				
Hydroxide Alkalinity as CaCO3	mg/L	<5	<5	NA				
Total Alkalinity as CaCO3	mg/L	620	240	160				
Hardness, Total	mg/L	NA	NA	NA				
Cyanide								
Cyanide (total)	mg/L	**11**	<0.02	**0.44**	0.15	Primary MCL	0.0052	aquatic toxicity 4-day avg.
Cyanide (amenable)	mg/L	NA	NA	NA				
Metals								
Aluminum	mg/L	NA	NA	NA	0.2	Secondary MCL	0.087	aquatic toxicity 4-day avg.
Antimony	mg/L	<0.002	NA	<0.200				
Arsenic	mg/L	**0.049**	<0.005	0.0077	0.01	Primary MCL		
Barium	mg/L	0.068	0.14	0.052	1.0	Primary MCL		
Beryllium	mg/L	<0.001	<0.001	<0.005				
Boron	mg/L	NA	NA	NA				
Cadmium	mg/L	<0.001	<0.001	<0.050				
Chromium	mg/L	<0.050	<0.050	<0.050				
Cobalt	mg/L	<0.100	<0.100	<0.100				
Copper	mg/L	<0.050	<0.050	<0.050				
Iron	mg/L	**1.8**	<0.30	**1.1**	0.3	Secondary MCL	1.0	aquatic toxicity 4-day avg.
Lead	mg/L	<0.001	0.0016	<0.150				
Manganese	mg/L	**0.56**	**2.2**	**0.11**	0.05	Secondary MCL		
Mercury	mg/L	<0.0002	<0.0002	<0.0004				
Molybdenum	mg/L	<0.200	<0.200	<0.200				
Nickel	mg/L	<0.100	<0.100	<0.100				
Selenium	mg/L	<0.005	<0.005	<0.005				
Silver	mg/L	<0.050	<0.050	<0.050				
Thallium	mg/L	<0.002	<0.002	<1.000				
Vanadium	mg/L	<0.050	<0.050	<0.050				
Zinc	mg/L	<0.050	0.37	<0.050				

Notes:

(1) Source: http://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/docs/wq_assessment_thresholds.xlsx

(2) For health-restricted diets

(3) Inlet to Placer Drive Storm Drain

Concentrations in **bold** font exceed the Primary or Secondary MCL.

Concentrations in unlerlined font exceed the aquatic toxicity criterion.

TABLE 18

SUMMARY OF STAISTICAL ANALYSIS - ALL VALIDATED SOIL METALS DATA

SOIL, TAILINGS AND WEATHERED ROCK, ENTIRE SITE

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Tl	V	Zn
Population	222	437	222	222	222	283	222	222	274	274	112	266	222	222	138	222	222
Detections	6	416	222	149	124	275	209	222	258	182	36	266	123	93	70	221	222
Max Non-Detect	25	2	na	5	2.6	2.5	5.1	na	7.5	0.2	10	na	4.7	2.5	4	6.0	na
Min Non-Detect	0.5	1	na	0.2	0.05	0.98	0.98	na	2.4	0.01	0.25	na	0.25	0.25	0.08	6.0	na
% Non-Detect	97	5	0	33	44	3	6	0	6	34	68	0	45	58	49	0	0
Min Detect[1]	0.99	1.2	6.2	0.011	0.19	1.5	1.0	3.5	2.70	0.017	0.27	7.0	0.30	0.05	0.26	1.7	14
Max Detect[1]	20	1,300	768	12	6.6	1,690	140	178	400	28	120	1,340	4.8	5.6	1.9	148	307
Mean Detect	9.5	77.0	132	0.68	1.22	55.1	16.1	60.5	25.5	1.67	6.00	58.0	1.09	0.653	1.13	33.8	66.8
SD Detects[2]	8.12	125	76.8	1.66	1.37	135	18.5	30.4	42.2	3.28	19.7	142	0.59	0.63	0.40	28.1	28.1
CV Detects[2]	0.856	1.62	0.584	2.42	1.12	2.46	1.15	0.502	1.65	1.97	3.28	2.45	0.539	0.964	0.350	0.831	0.421
Outlier Values[3]	none	multiple	768	multiple	multiple	multiple	multiple	multiple	multiple	multiple	120	multiple	none	5.6	none	multiple	multiple
Distribution[2]	Normal	Non-parametric	Normal	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Non-parametric	Normal	Non-parametric	Non-parametric
UCL method[2]	95% KM (t)	95% KM (t)	95% Student's-t	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	95% Student's-t	95% KM (t)	95% KM (t)	95% KM Approx. Gamma	95% Student's-t	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	95% Student's-t
UCL value[2]	1.56	83.1	140	0.69	0.94	66.7	17.3	63.9	28.4	1.66	4.57	72.4	0.96	0.59	0.94	36.8	70.0

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg)

2 At five percent signifcance level based on Rosner's or Dixon's Outlier Test

3 Distribution, UCL method, and CV, SD, and UCL calculations by ProUCL 5.2 (USEPA, 2022).

CV = coefficient of variation

KM = Kaplan Meier

SD = standard deviation

UCL = upper confidence limit on the arithmetic mean

TABLE 19

SUMMARY OF STAISTICAL ANALYSIS - NON-MINERALIZED BACKROUND

SOIL AND WEATHERED ROCK, OUTLYING VALUES CULLED

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	As	Pb	Hg	Se	Ag
Population	147	87	87	87	87
Detections	128	84	42	68	42
Max Non-Detect	2	7.5	0.2	2.5	2.5
Min Non-Detect	1	7.5	0.01	0.3	1.0
% Non-Detect	13	3	52	22	52
Min Detect[1]	1.2	2.7	0.02	0.3	0.13
Max Detect[1]	20.7	26.3	0.23	2.0	1.3
Mean Detect	8.91	14.4	0.07	1.07	0.68
SD Detects[2]	4.4	5.0	0.06	0.410	0.252
CV Detects[2]	0.493	0.351	0.807	0.384	0.369
Outlier Values[3]	none	none	none	none	none
Distribution[2]	Approximate Normal	Normal	Non-parametric	Approximate Normal	Normal
UCL method[2]	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)
UCL value[2]	8.55	15.0	0.061	1.05	0.726
BTV method[2]	95% USL	95% USL	95% USL	95% USL	95% USL
BTV value[2]	20.7	26.3	0.23	2.5	2.50

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg).

2 Using the fourth spread procedure and at five percent signifcance level based on Rosner's or Dixon's Outlier Test.

3 Distribution, UCL/BTV method and CV, SD, UCL/BTV calculations by ProUCL 5.2 (USEPA, 2022).

BTV = background threshold value

CV = coefficient of variation

KM = Kaplan-Meier

SD = standard deviation

USL = upper simultaneous limit

TABLE 20

SUMMARY OF STAISTICAL ANALYSIS - MINERALIZED BACKROUND

SOIL AND WEATHERED ROCK, OUTLYING VALUES CULLED

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	As	Pb	Hg	Se	Ag
Population	47	13	13	13	13
Detections	45	10	4	9	8
Max Non-Detect	2	7.5	0.2	2.5	2.5
Min Non-Detect	2	2.5	0.04	0.3	1.0
% Non-Detect	4	23	69	31	38
Min Detect[1]	5.4	3.6	0.21	0.5	0.17
Max Detect[1]	120.0	18.4	0.3	1.2	0.71
Mean Detect	48.2	12.2	0.24	0.76	0.42
SD Detects[2]	27.4	5.4	0.09	0.241	0.221
CV Detects[2]	0.592	0.529	0.929	0.354	0.526
Outlier Values[3]	none	none	none	none	none
Distribution[2]	Normal	Normal	Normal	Normal	Normal
UCL method[2]	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)	95% KM (t)
UCL value[2]	52.30	13.1	0.160	0.82	0.570
BTV method[2]	95% USL	95% USL	95% USL	95% USL	95% USL
BTV value[2]	120.0	18.4	0.30	2.5	2.50

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg).

2 Using the fourth spread procedure and at five percent signifcance level based on Rosner's or Dixon's Outlier Test.

3 Distribution, UCL/BTV method and CV, SD, UCL/BTV calculations by ProUCL 5.2 (USEPA, 2022).

BTV = background threshold value

CV = coefficient of variation

KM = Kaplan-Meier

SD = standard deviation

USL = upper simultaneous limit

TABLE 21

SUMMARY OF STAISTICAL ANALYSIS - LAKEBED AREA

TAILINGS AND SOIL

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	As	Pb	Hg	Se	Ag
Population	65	46	46	35	35
Detections	65	44	37	20	17
Max Non-Detect	na	7.5	0.2	3	2.5
Min Non-Detect	na	7.4	0.07	0.3	0.49
% Non-Detect	0	4	20	43	52
Min Detect[1]	4.0	4.9	0.023	0.66	0.09
Max Detect[1]	320	102	9.7	4.0	1.0
Mean Detect	108	26.9	2.22	1.25	0.393
SD Detects[2]	83.0	22.8	2.41	0.73	0.32
CV Detects[2]	0.772	0.847	1.09	0.587	0.813
Outlier Values[3]	multiple	multiple	multiple	none	none
Distribution[2]	Approximate Normal	Lognormal	Approximate Normal	Non-Parametric	Non-Parametric
UCL method[2]	95% Student's-t	KM H	95% KM (t)	95% KM (t)	95% KM (t)
UCL value[2]	125	33.4	2.38	1.26	0.464

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg).

2 Using the fourth spread procedure and at five percent signifcance level based on Rosner's or Dixon's Outlier Test.

3 Distribution, UCL method and CV, SD, UCL calculations by ProUCL 5.2 (USEPA, 2022).

CV = coefficient of variation

KM = Kaplan-Meier

SD = standard deviation

UCL = upper confidence limit

TABLE 22

SUMMARY OF STAISTICAL ANALYSIS - CYANIDE PROCESS AREA

SOIL AND WEATHERED ROCK

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	As	Pb	Hg	Se	Ag
Population	28	16	15	8	8
Detections	28	12	10	0	5
Max Non-Detect	na	7.5	0.2	3.0	1.0
Min Non-Detect	na	2.4	0.1	2.5	0.48
% Non-Detect	0	25	33	100	38
Min Detect[1]	4.0	7.2	0.2	na	0.99
Max Detect[1]	450	72	1.0	na	2.1
Mean Detect	125	29.1	0.411	na	1.36
SD Detects[2]	125	23.2	0.239	na	0.515
CV Detects[2]	0.996	0.797	0.582	na	0.379
Outlier Values[3]	none	72	none	none	none
Distribution[2]	Gamma	Normal	Normal	na	Normal
UCL method[2]	95% Adjusted Gamma	95% KM (t)	95% KM (t)	na	95% KM (t)
UCL value[2]	185	33.0	0.421	na	1.51

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg).

2 Using the fourth spread procedure and at five percent signifcance level based on Rosner's or Dixon's Outlier Test.

3 Distribution, UCL method and CV, SD, UCL calculations by ProUCL 5.2 (USEPA, 2022).

CV = coefficient of variation

KM = Kaplan-Meier

SD = standard deviation

UCL = upper confidence limit

TABLE 23

SUMMARY OF STAISTICAL ANALYSIS - TAILINGS PILE

TAILINGS AND SOIL

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	As	Pb	Hg	Se	Ag
Population	67	55	55	37	37
Detections	67	51	45	1	9
Max Non-Detect	na	7.4	0.1	0.3	0.25
Min Non-Detect	na	7.5	0.2	3.0	2.5
% Non-Detect	0	7	18	97	76
Min Detect[1]	3.0	7.2	0.1	0.5	0.4
Max Detect[1]	263	400	15	0.5	1.2
Mean Detect	101	36.3	2.84	0.5	0.708
SD Detects[2]	125	23.2	5.91	na	0.515
CV Detects[2]	0.996	0.797	2.697	na	0.379
Outlier Values[3]	none	400	15	none	none
Distribution[2]	Approximate Gamma	Approximate Gamma	Gamma	na	Normal
UCL method[2]	95% Adjusted Gamma	95% KM (t)	95% KM (t)	na	95% KM (t)
UCL value[2]	125	50.5	3.2	na	0.50

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg).

2 Using the fourth spread procedure and at five percent signifcance level based on Rosner's or Dixon's Outlier Test.

3 Distribution, UCL method and CV, SD, UCL calculations by ProUCL 5.2 (USEPA, 2022).

CV = coefficient of variation

KM = Kaplan-Meier

SD = standard deviation

UCL = upper confidence limit

TABLE 24

SUMMARY OF STAISTICAL ANALYSIS - BELLWETHER MINE

WASTE ROCK

ORO DE AMADOR

JACKSON, CALIFORNIA

CONSTITUENT	As	Pb	Hg	Se	Ag
Population	7	7	7	7	7
Detections	7	7	5	0	0
Max Non-Detect	na	na	0.2	1.0	2.5
Min Non-Detect	na	na	0.2	0.3	2.5
% Non-Detect	0	0	29	100	100
Min Detect[1]	5.0	9.1	0.018	na	na
Max Detect[1]	139	21	0.32	na	na
Mean Detect	48.3	13.4	0.174	na	na
SD Detects[2]	56.46	4.14	0.144	na	0.515
CV Detects[2]	1.169	0.308	0.829	na	0.379
Outlier Values[3]	na	na	na	na	na
Distribution[2]	na	na	na	na	na
UCL method[2]	na	na	na	na	na
UCL value[2]	na	na	na	na	na

Notes:

1 Soil concentrations are shown in milligrams per kilograms (mg/kg).

2 Using the fourth spread procedure and at five percent signifcance level based on Rosner's or Dixon's Outlier Test.

3 Distribution, UCL method and CV, SD, UCL calculations by ProUCL 5.2 (USEPA, 2022).

CV = coefficient of variation

KM = Kaplan-Meier

SD = standard deviation

UCL = upper confidence limit

TABLE 25
SUMMARY OF GROUNDWATER AND SURFACE WATER DATA AND BENCHMARK VALUES
ORO DE AMADOR
JACKSON, CALIFORNIA

Constituent	Groundwater														Surface Water								Groundwater Benchmarks		Surface Water Benchmarks	
	Extractable Metals in Mine Tailings by SPLP		Shallow Groundwater in Tailings at the Lakebed Area (MW-1)		Groundwater in Fractured Rock Beneath the Lakebed Area (MW-4)		Perched Groundwater in the Tailings Pile (MW-2)		Shallow Groundwater at the Toe of the Tailngs Pile (MW-3)		Groundwater Seeps at the Toe of the Tailings Pile (S-2 and S-3)		Upgradient Background Groundwater (MW-5)		Seasonal Surface Water at the Lakebed Area (SW-3)		Surface Water Downgradient of Lakebed Area (SW-1)		Surface Water Downgradient of Tailings Pile (SW-2)		Upgradient Background Surface Water (SW-4, SW-5, and SW-6)		Benchmark Value for Water Quality (ug/L)	Source of Benchmark Value	Benchmark Value for Water Quality (ug/L)	Source of Benchmark Value
	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)				
Arsenic	4.9	3.13	**54**	**40**	1.2	1.2	**61**	**50**	6.1	3.0	**820**	**150**	2.5	2.0	10	10	8.8	8.0	7.7	7.7	<5	<5	10	Primary MCL	10	Primary MCL
Cadmium	na	na	<0.5	<0.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<10	<10	<2.5	<2.5	<50	<50	<50	<50	<50	<50	<50	<50	5	Primary MCL	1.7	CTR CCC*
Iron	na	na	**4,800**	**4,800**	<250	<250	**1,800**	**1,090**	**160,000**	**80,150**	**31,000**	**6,456**	930	690	**22,000**	**22,000**	<300	<300	**1,100**	**1,100**	**340**	245	300	Secondary MCL	300	Secondary MCL
Lead	<0.3	<0.3	2.0	2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.2	3.4	<2.5	<2.5	<150	<150	<150	<150	<150	<150	**23**	**23**	15	Primary MCL	1.6	CTR CCC*
Manganese	na	na	**940**	**472**	7.7	7.7	**590**	**443**	**2,700**	**2,033**	**4,400**	**2,030**	370	168	**71**	**71**	50	50	**110**	**110**	**52**	31	50	Secondary MCL	50	Secondary MCL
Mercury	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.39	0.20	<0.2	<0.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2	Primary MCL	0.05	CTR HH
Selenium	2.4 J	1.8 J	na	na	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	50	Primary MCL	5.0	CTR CCC
Silver	<0.24	<0.24	<5	<5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<10	<10	<2.5	<2.5	<50	<50	<50	<50	<50	<50	<50	<50	10	Secondary MCL	1.7	CTR CCC*
Cyanide, total	na	na	1.2	1.2	1.5	1.5	**190**	83.3	<1	<1	**350**	**197**	<1	<1	<20	<20	<20	<20	**360**	**310**	<20	<20	150	Primary MCL	150	Primary MCL
Cyanide, free[1]	na	na	<1	<1	<1	<1	1.6	1.1	<1	<1	**350**	**119**	<1	<1	na	na	na	na	na	na	na	na				

Notes:

1 Free cyanide is reported as amenable or weak acid dissociable (WAD) cyanide.

* CTR value is hardness dependent. Converted values were calculated based on a hardness of 86 mg/L as $CaCO_3$ (mean value for upgradient surface water locations SW-5 and SW-6).

Mean values were calculated using 0.5*MDL for non-detections when the detection limits were sufficiently low. Mean values for single data points are reported as the maximum value.

Concentrations in underlined font exceed background. Concentrations in **bold** font exceed a benchmark concentration.

Ag = Agricultrual Water Quality Goal

CCC = Criteria Continuous Concentration (CCC): aquatic life extended exposure (4 days) without observed deleterious effects

CMC = Criterion Maximum Concentration, freshwater, short-term exposure

CTR = California Toxics Rule

SPLP = Synthetic Precipitation Leaching Procedure

HH = Human health (one-per-million risk for carcinogens) for consumption of water and aquatic organisms.

MCL = Maximum Contaminant Level

ug/L = micrograms per liter

TABLE 26

SUMMARY OF DECISION UNITS AND APPLICABLE CLEANUP GOALS

ORO DE AMADOR

JACKSON, CALIFORNIA

DECISION UNIT	BACKGROUND CONDITION	PROPOSED LAND USE	APPLICABLE CLEANUP GOALS						EXCEEDANCES		
			Arsenic		Lead		Mercury				
			BTV, Non-Mineralized	BTV, Mineralized	RBCL, Unrestricted	RBCL, Commercial/ Industrial	RBCL, Unrestricted	RBCL, Commercial/ Industrial	Arsenic	Lead	Mercury
Lakebed Area	Non-Mineralized	Fenced	None[1]						Not applicable[1]		
Cyanide Process Area	Mineralized	Fenced	None[1]						Not applicable[1]		
Tailings Pile	Non-Mineralized	Public Park	X[2]		X[2]		X[2]		Numerical goals apply only to imported cover soil[2]		
Isolated Tailings Areas to be excavated from in non-mineralized background locations											
Pond Area	Non-Mineralized	Unrestricted	X[3]		X[3]		X[3]		HA-25-0.5 (98 mg/kg); TP-25-2.0 (28 mg/kg)	None	HA-25-0.5 (7.5 mg/kg); TP-25-2.0 (15 mg/kg)
Hot Spot Sample SOIL16	Non-Mineralized	Unrestricted	X[3]		X[3]		X[3]		SOIL16-1 (502 mg/kg)	SOIL16-1 (386 mg/kg)	SOIL16-1 (28 mg/kg)
Hot Spot Sample SOIL25	Non-Mineralized	Unrestricted	X[3]		X[3]		X[3]		SOIL25-1 (160 mg/kg); SOIL25-3 (48.5 mg/kg)	SOIL25-1 (102 mg/kg)	SOIL25-1 (5.9 mg/kg); SOIL25-3 (1.6 mg/kg)
Hot Spot Sample HA-74	Non-Mineralized	Unrestricted	X[3]		X[3]		X[3]		HA-74-0.5 (230 mg/kg); SOIL30-1 (43.6 mg/kg)	None	SOIL30-1 (1.9 mg/kg)
Isolated Tailings Areas to be excavated from in mineralized background locations											
Northern Area	Mineralized	Trail		X[4]		X[4]		X[4]	HA-32-0.5 (150 mg/kg)	None	None
Ridge Area[8]	Mineralized	Trail		X[4]		X[4]		X[4]	None	None	TP-13-2.5 (20 mg/kg)
Dam Area	Mineralized	Trail		X[4]		X[4]		X[4]	None	None	None
Southeast Area	Mineralized	Trail		X[4]		X[4]		X[4]	22S004 (140 mg/kg); 22S006 (240 mg/kg)	None	None
Lakebed Track Out Area	Mineralized	Trail		X[4]		X[4]		X[4]	HA-72-0.5 (130 mg/kg)	None	None

TABLE 26

SUMMARY OF DECISION UNITS AND APPLICABLE CLEANUP GOALS

ORO DE AMADOR

JACKSON, CALIFORNIA

DECISION UNIT	BACKGROUND CONDITION	PROPOSED LAND USE	APPLICABLE CLEANUP GOALS						EXCEEDANCES		
			Arsenic		Lead		Mercury				
			BTV, Non-Mineralized	BTV, Mineralized	RBCL, Unrestricted	RBCL, Commercial/ Industrial	RBCL, Unrestricted	RBCL, Commercial/ Industrial	Arsenic	Lead	Mercury
Isolated Tailings Areas to be restricted under the Tailings Pile LUC											
Western Area	Non-Mineralized	Trail	X[5]			X[5]		X[5]	TP-02-0.5 (35 mg/kg); HA-7-05 (46 mg/kg); HA-08-0.5 (28 mg/kg)	None	None
Southern Area	Non-Mineralized	Trail	X[5]			X[5]		X[5]	TP-03-4.0 (38 mg/kg); HA-2-05 (59 mg/kg)	None	None
Mineralized Background	Mineralized	Trail		X[6]		X[6]		X[6]	See Sheet 3	None	None
Non-Mineralized Background	Non-Mineralized	Unrestricted	X[7]		X[7]		X[7]		HA-48-0.5 (27 mg/kg); SOIL20-1 (37.6 mg/kg); SOIL20-3 (23.9 mg/kg); SOIL26-3 (24.4 mg/kg);	None	None

Notes:

1 Not applicable. Access to the Lakebed Area and Cyanide Process Area is to be restricted by fencing and posting, and use is to be prohibited under a LUC.

2 Soil to be imported to the site for use as the Tailings Pile closure cap must meet criteria for unrestricted land use pursuant to the DTSC *Information Advisory – Clean Imported Fill Material* (2001). Arsenic concentrations in imported soil must comply with the non-mineralized arsenic BTV of 20.7 mg/kg. The closure cap is intended to provide a physical barrier above the tailings that is suitable for park use, including but not limited to sports fields and trails Unauthorized disturbance of the closure cap and underlying tailings is to be prohibited under a LUC.

3 The Pond Area and other Hot Spots in non-mineralized background locations are to be cleaned up to unrestricted land use criteria, including the non-mineralized arsenic BTV, as no land use controls are proposed.

4 The North Area, Ridge Area, Dam Area, Southeast Area, and Lakebed Track Out Area are in mineralized background locations. The mineralized area (Sheet 3) is to be restricted from future residential land use. Therefore, these areas are to be cleaned up to commercial/industrial standards except for arsenic, which is to be cleaned up to the mineralized arsenic BTV. The listed RBCLs are acceptable under the recreational exposure scenarios evaluated.

5 The Western Area and Southern Area, downslope of the Tailings Pile, is in a non-mineralized loacation and is to be restricted from reidential development under the Tailings Pile LUC and will be subject to the O&M Plan and Soil Management Plan restricting unauthorized soil disturbance. Trails in the Western Area and Southern Area must be routed where arsenic is below the non-mineralized BTV unless an alternative benchmark value for recreational trail use is approved by the DTSC.

6 The mineralized area (Sheet 3) will be subject to a LUC restricting residential use. Trails within the mineralized zone are to be routed where surface arsenic concentrations are below the mineralized arsenic BTV.

7 No land use restrictions are proposed for the non-mineralized remainder of the site.

8 The Ridge Area crosses through the Cyanide Process Area.

LUC = land use covenant, O&M = Operation and Maintenance

TABLE 27

SUMMARY OF QUANTITY ESTIMATES

ORO DE AMADOR

JACKSON, CALIFORNIA

DECISION UNIT	BACKGROUND CONDITION	PROPOSED LAND USE	QUANTITY ESTIMATES*				
			SURFACE AREA		PERIMETER	DEPTH	IN-PLACE VOLUME
			square feet	acres	feet	feet	cubic yards
Lakebed Area**	Non-Mineralized	Fenced	675,000	15.5	4,400	varies	250,000**
Cyanide Process Area	Mineralized	Fenced	181,000	4.2	2,300	1.0	6,704
Tailings Pile**	Non-Mineralized	Public Park	1,265,000	29.0	4,300	varies	1,000,000**
Isolated Tailings Areas to be excavated from in non-mineralized background locations							
Pond Area	Non-Mineralized	Unrestricted	22,000	0.5	550	2.0	1,630
Hot Spot Sample SOIL16	Non-Mineralized	Unrestricted	2,000	0.05	170	2.0	148
Hot Spot Sample SOIL25	Non-Mineralized	Unrestricted	2,000	0.05	170	2.0	148
Hot Spot Sample HA-74	Non-Mineralized	Unrestricted	6,000	0.14	320	2.0	444
Isolated Tailings Areas to be excavated from in mineralized background locations							
Northern Area	Mineralized	Trail	11,400	0.26	410	1.0	422
Ridge Area***	Mineralized	Trail	26,000	0.6	580	1.0	963
Dam Area	Mineralized	Trail	22,000	0.5	880	1.0	815
Southeast Area	Mineralized	Trail	180,000	4.1	1,700	1.0	6,667
Lakebed Track Out Area	Mineralized	Trail	72,000	1.7	1,400	1.0	2,667
Isolated Tailings Areas to be restricted under the Tailings Pile LUC							
Western Area	Non-Mineralized	Trail	68,000	1.6	2,000	2.0	5,037
Southern Area	Non-Mineralized	Trail	160,000	3.7	3,000	4.0	23,704
Mineralized Background	Mineralized	Trail	2,350,000	54	na	na	na
Non-Mineralized Background	Non-Mineralized	Unrestricted	2,700,000	62	na	na	na

Notes:

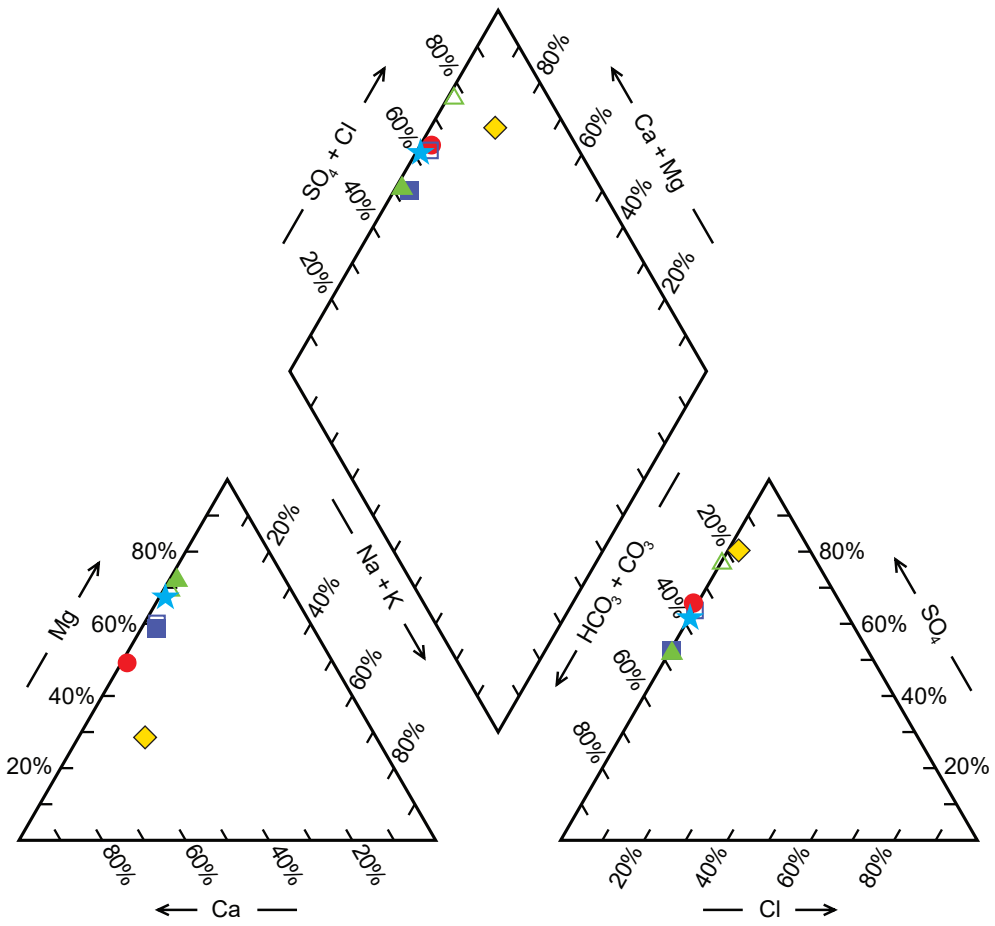
* Quantity estimates for areas of proposed excavation are based on available laboratory data and are to be refined by pre-excavation soil sampling and analysis. The results of pre-excavation soil sampling and analysis and revised quantity estimates are to be presented in the RDIP.

** Quantity estimates for the Lakebed Area and Tailings Pile were provided by Dames & Moore (1995). These estimates are to be updated based on the results of topographic survey. Topographic contours and revised quantity estimates are to be presented in the RDIP.

***The estimated surface area does not include the potion of the Ridge Area within the Cyanide Process Area. The estimated perimeter length does not include segments of the Ridge Area perimeter that are contiguous with the Lakebed Area, Cyanide Process Area, and Tailings Pile.

na = not applicable to background areas

RDIP = Remedial Design and Implementation Plan



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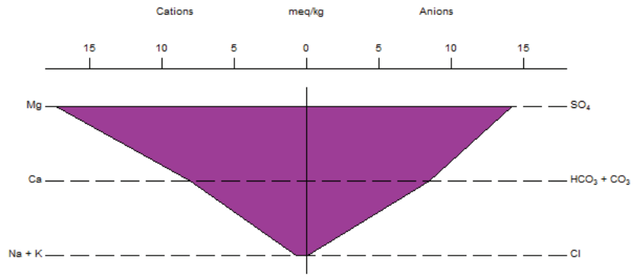
Oro de Amador

Jackson,
California

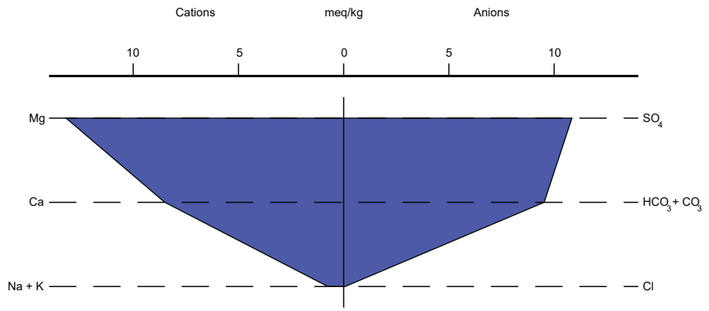
PIPER DIAGRAM

S9959-03-02	February 2024	Chart 1

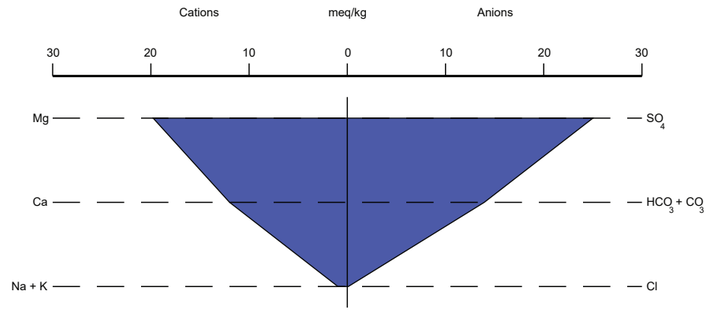
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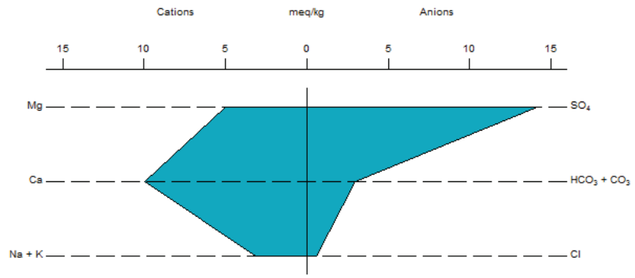
S-2
May 2017



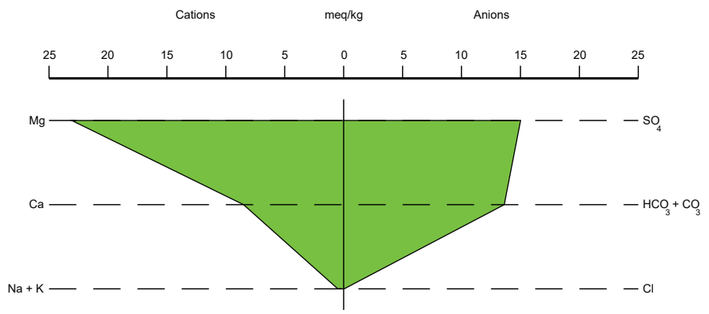
S-2
Nov 2017



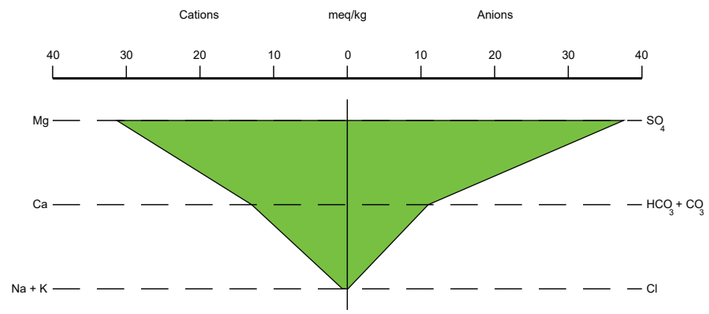
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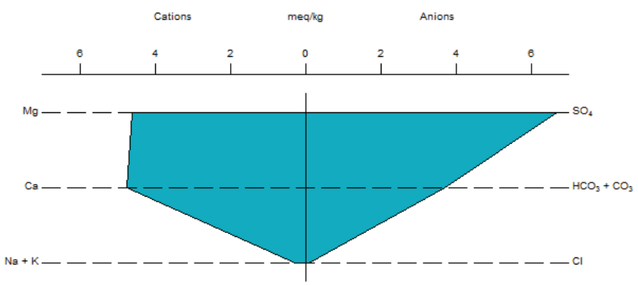
S-3
May 2017



S-3
Nov 2017



SW-02



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

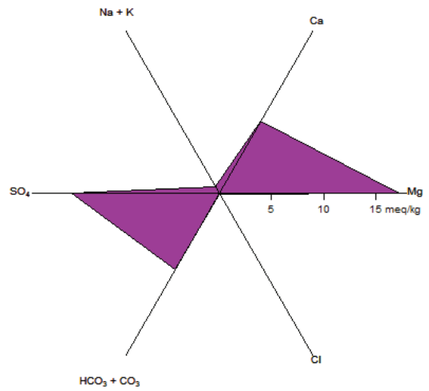
Oro de Amador

Jackson, California

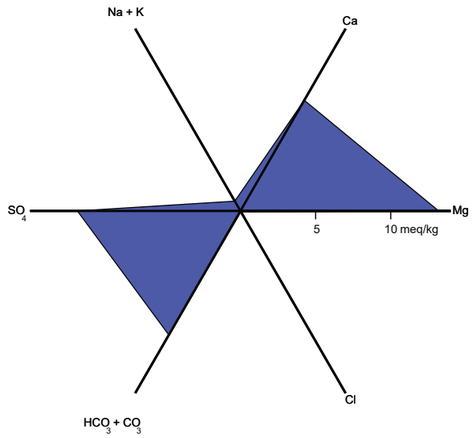
Stiff Plots of General Mineral Water Quality Data

S9959-03-02	February 2024	Chart 2

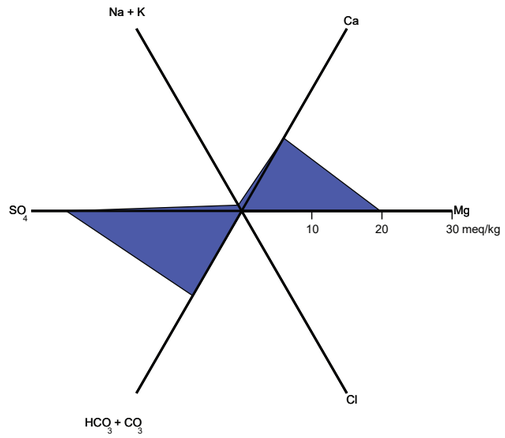
MW-2



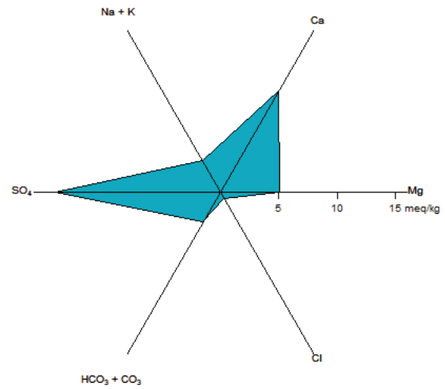
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May 2017



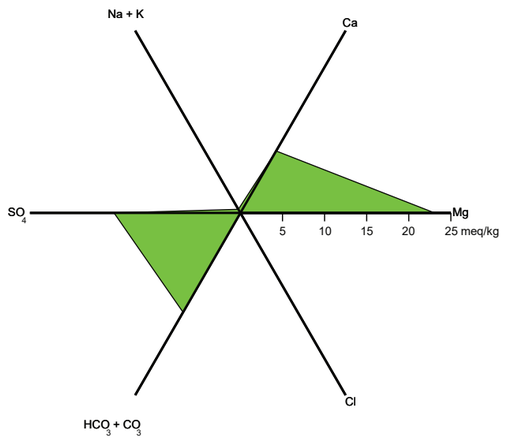
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Nov 2017



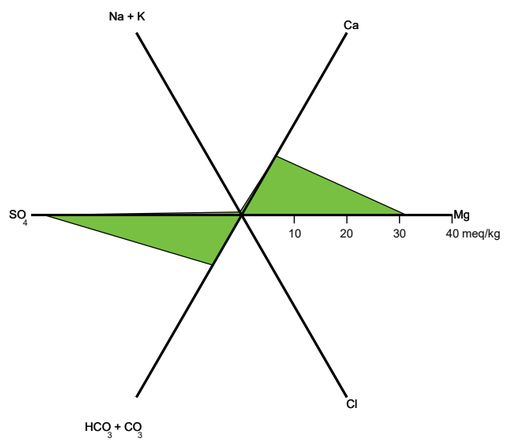
MW-3



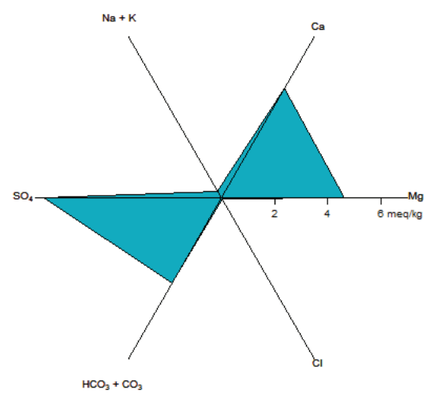
S-3
May 2017



S-3
Nov 2017



SW-02



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Jackson, California

Radial Plots of General Mineral Water Quality Data

S9959-03-02	February 2024	Chart 3

APPENDIX A

TABLE A1

ADMINISTRATIVE RECORD LIST

ORO DE AMADOR

JACKSON, CALIFORNIA

DOCUMENT DATE	DOCUMENT AUTHOR	DOCUMENT TITLE
August 1995	D&M	Final Environmental Assessment
September 2008	USEPA	Targeted Brownfields Assessment
April 2009	Arcadis	Final Targeted Site Investigation Summary Report
July 2011	DTSC	Community Wide Assessment Report
March 2015	DTSC	Voluntary Cleanup Agreement between the DTSC and the City of Jackson
July 2022	DTSC	Equitable Community Revitalization Grant #2022-00962 awarded to the City of Jackson
April 2023	Geocon	Final Site Characterization Summary and Supplemental Site Investigation Workplan
April 2023	DTSC	Conditional Approval of Supplemental Site Investigation Workplan

Notes:

DTSC = California Enviornmental Protection Agency, Department of Toxic Substances Control

USEPA = United States Environmental Protection Agency, Region IX

Arcadis = LFR Inc., an Arcadis Company

Geocon = Geocon Consultants, Inc.

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E



Photo 1. Kennedy Mine headframe (offsite), view to northwest from Tailings Pile (onsite). October 13, 2022.

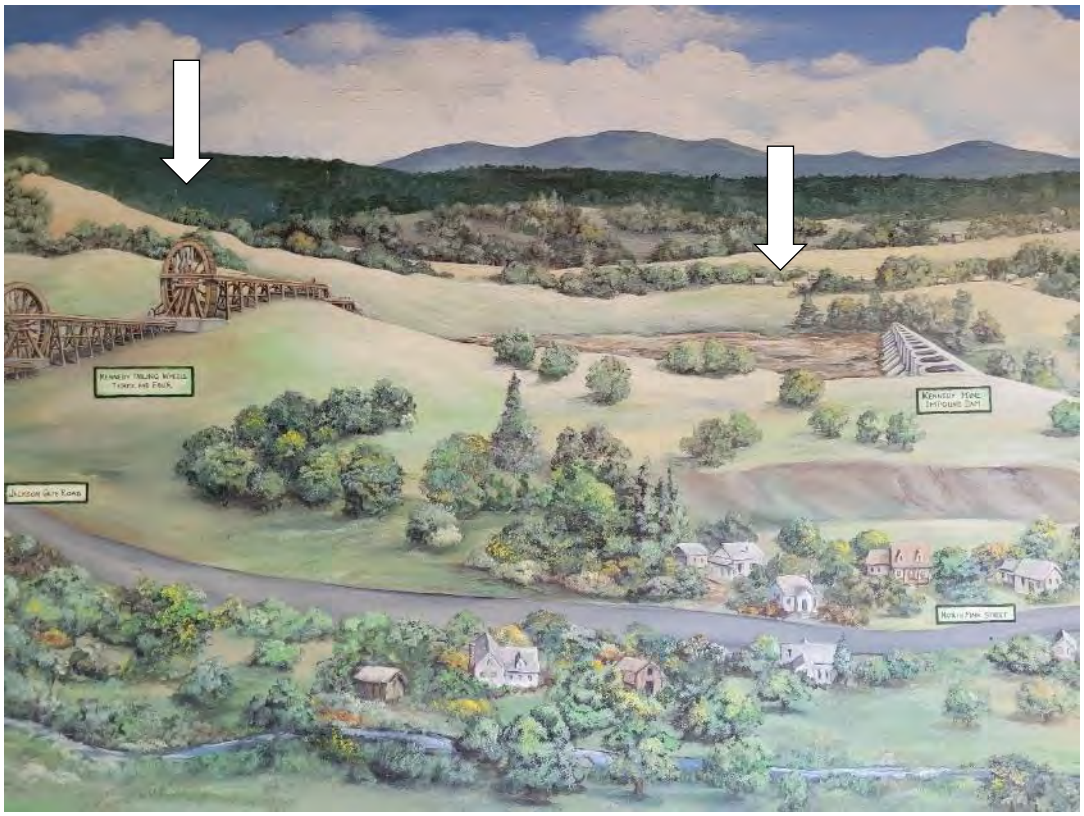


Photo 2. Artist's rendition of historical tailings wheels (left, offsite) conveying mine tailings from the Kennedy Mine (offsite, out of frame) to the tailings impoundment (right, onsite). Exhibit at City of Jackson Kennedy Tailing Wheels Park.



Photo 3. Tailings wheel No. 1 (offsite), October 13, 2022.



Photo 4. Tailings wheel No. 1 and flume (offsite) October 13, 2022.



Photo 5. Tailings wheel No. 4 (offsite) at at City of Jackson Kennedy Tailing Wheels Park, October 13, 2022.



Photo 6. View to southeast along historical tailings conveyance route from top of ridge near tailings wheel No. 4. An apparent concrete outlet structure is visible in the near background, and the tailings impoundment and concrete arch dam are visible in the far background. October 13, 2022



Photo 7. View to northwest from northern (upstream) end of tailings impoundment back towards ridgetop tailings wheel No. 4 location. October 13, 2022.



Photo 8. Riveted steel pipe segment at northern (upstream) end of tailings impoundment. October 13, 2022.



Photo 9. Background Area, eastern uplands portion of Site. October 13, 2022.



Photo 10. Cattle and dust from cattle in Background Area. October 13, 2022.



Photo 11. Cattle path in northern (upstream) end of tailings impoundment. October 13, 2022.



Photo 12. Native soil above western side of tailings impoundment. October 13, 2022.



Photo 13. Outcrop of Calaveras formation above northern end of tailings impoundment, eastern side of Site. Orientation trends northwest with near-vertical dip to east. October 13, 2022.

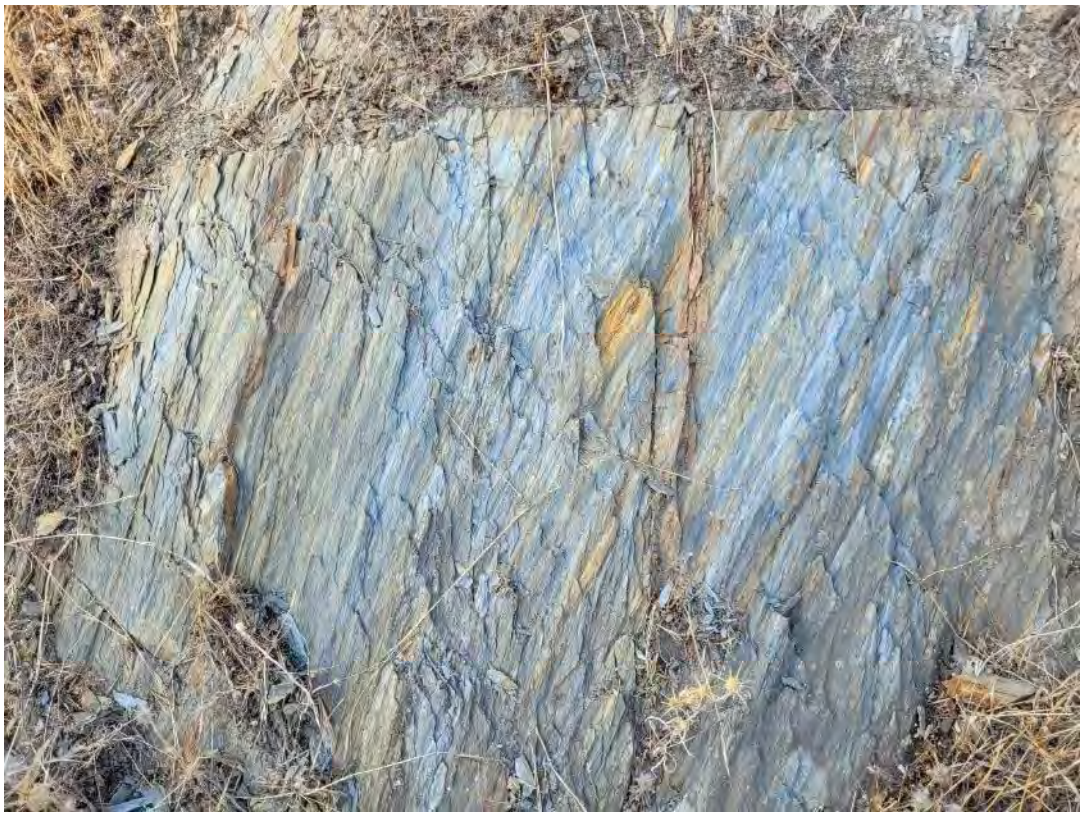


Photo 14. The Calaveras formation is generally described as highly foliated metasedimentary and metavolcanic rocks with chert layers. October 13, 2022.



Photo 15. Outcrop of Calaveras formation and quartz in road cut southeast of tailings dam, eastern side of Site. October 13, 2022.



Photo 16. Outcrop of Calaveras formation near western tailings dam abutment, eastern side of Site. October 13, 2022.



Photo 17. Outcrop of mineralized Mariposa formation at Bellwether Mine location. October 13, 2022.



Photo 18. Outcrop of Mariposa formation near southeastern corner of Tailings Pile, western side of Site. October 13, 2022.



Photo 19. The Mariposa formation is generally described as black slate interbedded with argillaceous (clayey) metasedimentary rocks. October 13, 2022.



Photo 20. Outcrop of quartz (left) and Calaveras formation (right; not tailings) downslope of western tailings dam abutment. October 13, 2022.



Photo 21. Outcrop of quartz in Melones fault zone near southern end of Cyanide Process Area. October 13, 2022.



Photo 22. Outcrop of quartz in Melones fault zone near western tailings dam abutment, October 13, 2022.



Photo 23. Weathered, mineralized bedrock at northern end of Cyanide Process Area, October 13, 2022.



Photo 24. Outcrop of quartz in Melones fault zone at Cyanide Process Area. October 13, 2022.



Photo 25. Lakebed Area (former tailings impoundment), view to south. Typical vegetation covering the remnant mine tailings (sand and silt). The concrete arch dam is visible in the background, and the primary water level control structure is visible on the right. October 13, 2022.



Photo 26. Tailings dam, upstream face, view to west-southwest. October 13, 2022.



Photo 27. 46 Tailings dam, upstream face, west side. Approximately 10-inch diameter hole chipped in concrete arch (approximate middle of photo). October 13, 2022.



Photo 28. Tailings exposed at the eastern tailings dam abutment within the hydraulically contained Lakebed Area. October 13, 2022.



Photo 29. Lakebed Area (tailings impoundment). View of typical vegetation and primary control structure in background. Tailings are exposed in the cattle path in the foreground. Consolidated, silty tailings in right foreground. October 13, 2022.



Photo 30. Lakebed Area (tailings impoundment), view to north. Palustrine (marsh) wetland vegetation and poor tailings cover in seasonally-inundated area in foreground, near face of dam. Contol structure visible in background. October 13, 2022.



Photo 31. Central portion of Lakebed Area (tailings impoundment). Primary water level control structure and 12-inch diameter steel pipe inlet (foreground, right). Concrete arch dam visible in background. October 13, 2022.



Photo 32. Lakebed Area (tailings impoundment), typical sandy tailings exposed at locations of poor vegetation cover. October 13, 2022.



Photo 33. Upstream (northern) portion of Lakebed Area (tailings impoundment), view to northeast. Upstream control structure (vertical steel pipe) may have been associated with a temporary dam constructed during tailings removal. October 13, 2022.



Photo 34. Upstream control structure with removable inlet plates histoically used to control the water level. October 13, 2022.



Photo 35. Top of western end of concrete arch dam at tailings impoundment, view to east. Access to top of dam is restricted by a locked gate and fence. October 13, 2022.



Photo 36. Thin layer of tailings on trail surface downstream of concrete arch dam. Tailings layer is thin (typically less than one inch) and is underlain by native soil. Exposed native soil is visible in background, right. October 13, 2022.



Photo 37. Cyanide Process Area circa 1948-50, view to south-southwest, showing the 19 tanks. An apparent office building roof is visible in the foreground at the northern end of the Cyanide Process Area. The Lakebed Area is to left and Tailings Pile to right (Wagner, 1970; Ms. Emmet H. Garbarini collection).



Photo 38. Northern end of Cyanide Process Area, view of former tank foundations to south-southeast. The concrete slab and anchor bolts are likely associated with the office building visible in the foreground of the historical photograph (Photo 37). October 13, 2022.



Photo 39. Concrete slab at northern end of Cyanide Process Area. October 13, 2022.

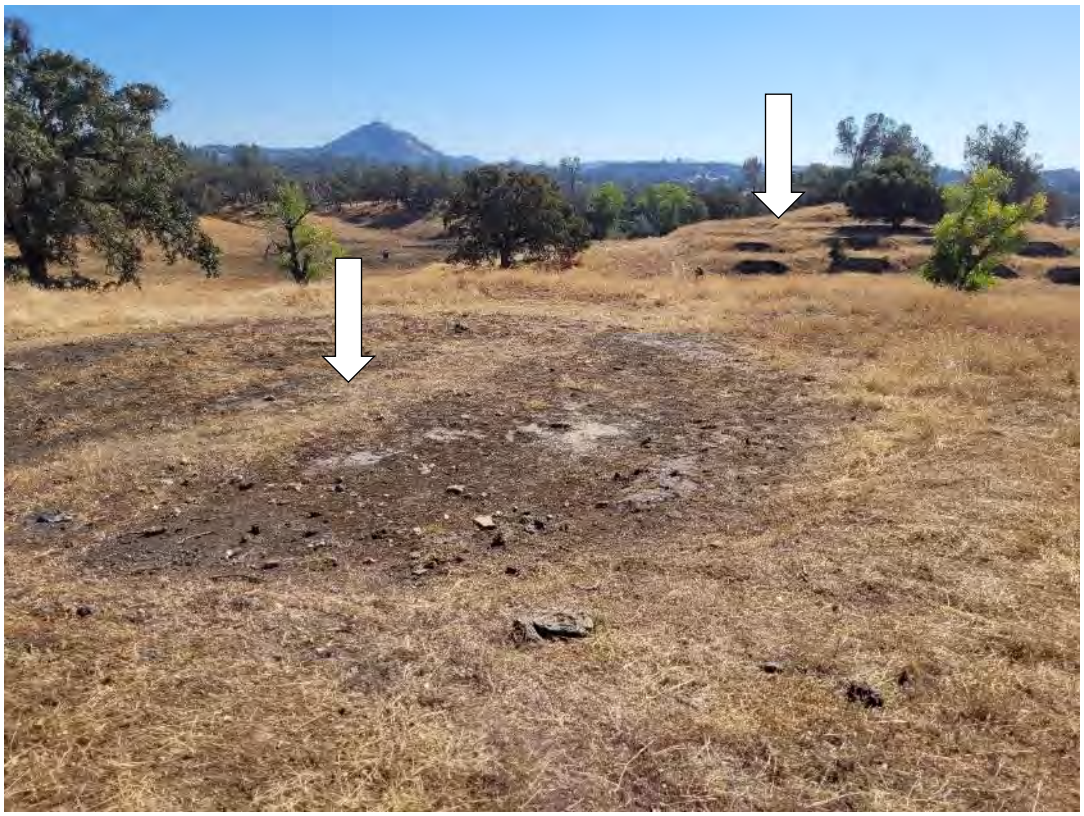


Photo 40. One of three northern tank locations at the Cyanide Process Area, view to southeast. Other tank locations are visible in background right. Jackson Butte is visible in background left. October 13, 2022.



Photo 41. Concrete foundations at the Cyanide Process Area below (south) of the northern tank locations, view to southeast. Southern tank locations are visible int he background. October 13, 2022.



Photo 42. Typical former cyanide tank location with retaining wall and ceramic piping. October 13, 2022.



Photo 43. Typical ceramic drainage pipe at center of former tank footprint. Pipe is roughly 18 inches in diameter. October 13, 2022.



Photo 44. Concrete-lined trenches to the south of the tanks at the Cyanide Process Area. Trenches are roughly 3 feet wide and 6 feet deep. October 13, 2022.



Photo 45. Southernmost concrete foundations at Cyanide Process Area, view to southwest. October 13, 2022.



Photo 46. The Tailings Pile comprises approximately 29 acres of the southwestern portion of the Site. Typical surface conditions with soil cover and vegetation. October 13, 2022.



Photo 47. Southwest-facing slope of Tailings Pile, view to north-northeast from southwestern Site boundary. October 13, 2022.



Photo 48. Southwest-facing slope of Tailings Pile. The residences visible in the background are located across Kennedy Street from the toe of the tailings pile. The Kennedy Mine headframe (offsite) is visible in far background right. October 13, 2022.



Photo 49. Tailings Pile deck, southern end, area of seasonal ponding and poor vegetation cover near monitoring well MW-2. October 13, 2022.



Photo 50. Tailings pile deck, southern end, view to southwest. Monitoring well MW-2 in foreground. Seasonal ponding area from previous photo in background. October 13, 2022.



Photo 51. Monitoring well MW-3, immediately southeast of the Tailings Pile. October 13, 2022.



Photo 52. Monitoring well MW-5, north of the Tailings Pile, view to northwest. Kennedy Mine headframe (offsite) in background. October 13, 2022.



Photo 53. A shallow, bermed depression near MW-5 may have been used for cattle watering. The thin layer of tailings in the base of shallow depression may have been transported by pumping of water from the Lakebed Area. View to southwest. October 13, 2022.



Photo 54. Concrete foundations associated with a former concrete plant immediately south of the Tailings Pile near the southern site boundary. October 13, 2022.



Photo 55. Southern end of Tailings Pile, view to west. Former cement plant borrow area is visible in near background, to right and up slope of tree. Note lack of significant vegetation growth because soil cover was removed. Church and cemetery are visible in far background. October 13, 2022.



Photo 56. Tailings Pile eastern deck. Area of excavation through cover soil and into tailings. Note poor vegetation growth on exposed tailings. Cyanide Process Area and former cyanide tank locations are visible in the background. October 13, 2022.



Photo 57. Tailings Pile, northern end, view to southwest, October 13, 2022.



Photo 58. Bellwether Mine location, one of three fenced excavations. October 13, 2022.



Photo 59. Bellwether Mine location, second of three fenced excavations. October 13, 2022.



Photo 60. Bellwether Mine location, third of three fenced excavations. Minor fence damage from treefall. October 13, 2022.



Photo 61. Bellwether Mine location, trench in weathered bedrock approximately 30 feet wide and 150 feet long near the northern Site boundary. Trench spoils were likely deposited offsite (downslope to the north). October 13, 2022.



Photo 62. View to east of water level in Lakebed Area, April 27, 2023. Concrete arch dam visible to right.



Photo 63. View to the northeast of test pit TP-49 on the mineralized ridge near the northern site boundary, May 22, 2023.

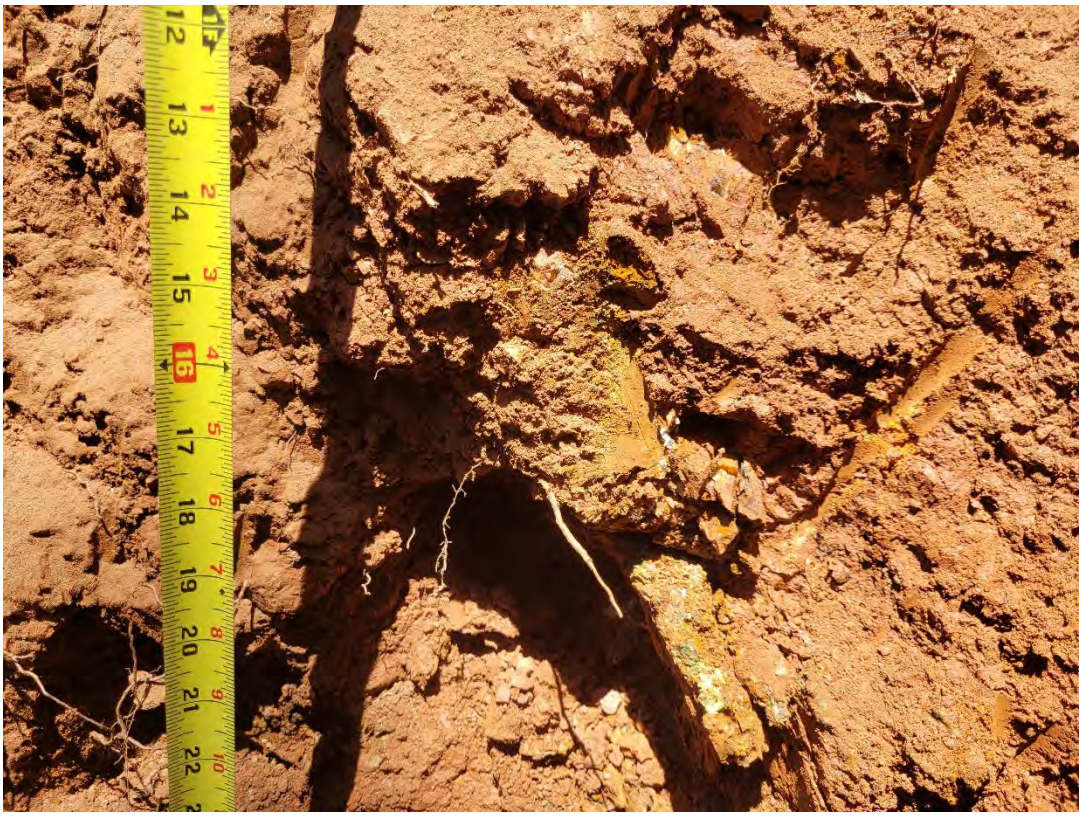


Photo 64. TP-49 soil condions, May 22, 2023.



Photo 65. TP-49 mineralized bedrock with copper, manganese and iron oxides, May 22, 2023.



Photo 66. Test pit TP-50 on mineralized ridge, view to north, May 22, 2023.



Photo 67. TP-50 weathered, mineralized bedrock at ground surface, May 22, 2023.



Photo 68. View to the north of test pit TP-51 in an existing road cut on the mineralized ridge above the Process Area, May 22, 2023.



Photo 69. TP-51 weathered bedrock in upper two feet, May 22, 2023.

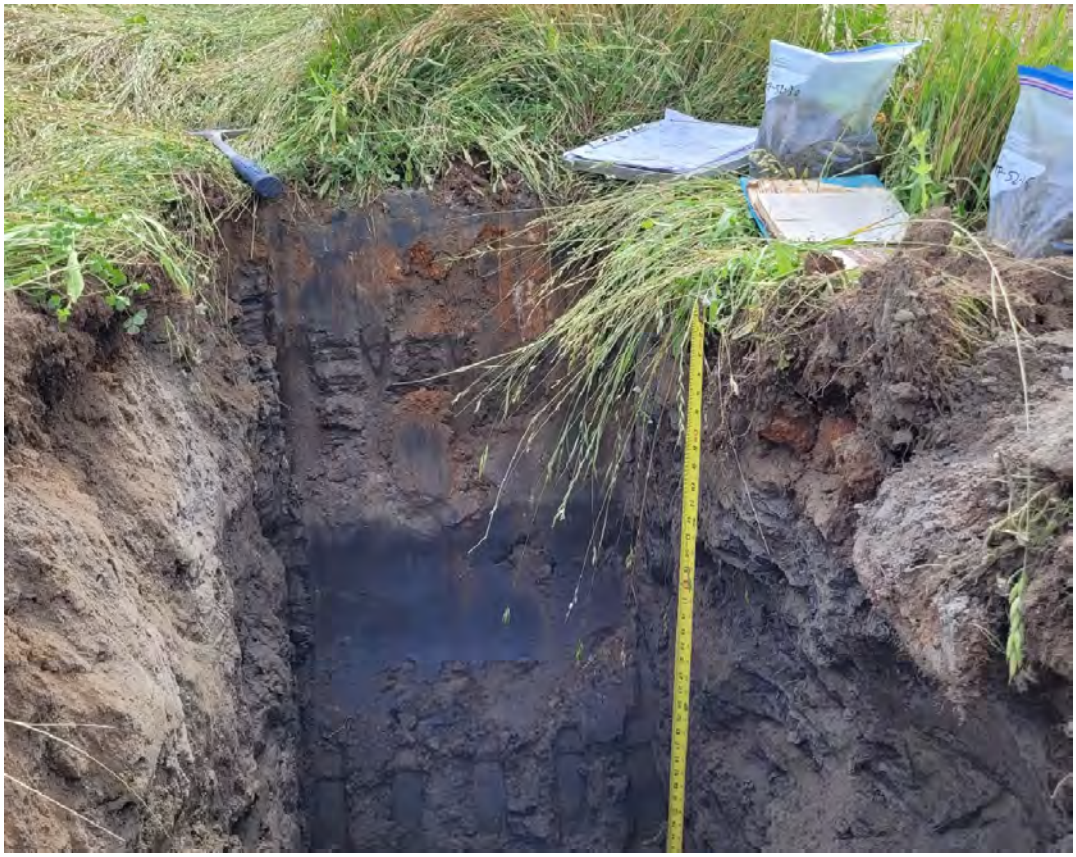


Photo 70. View to the east of test pit TP-52 on the Tailings Pile deck, May 23, 2023.



Photo 71. View to the south of test pit TP-52 on the Tailings Pile deck, May 23, 2023.



Photo 72. TP-52 tailings, May 23, 2023.



Photo 73. View to the southeast of test pit TP-54 on the Tailings Pile deck, May 23, 2023.

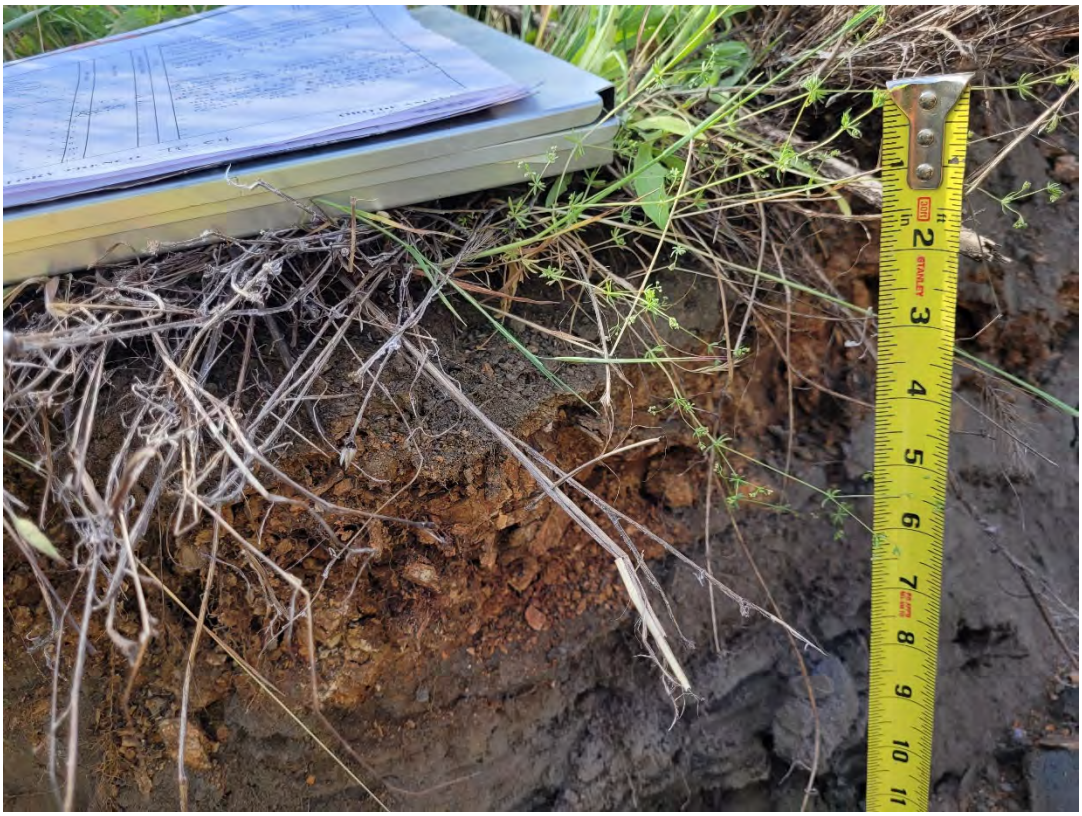


Photo 74. TP-54 cover soil, May 23, 2023.

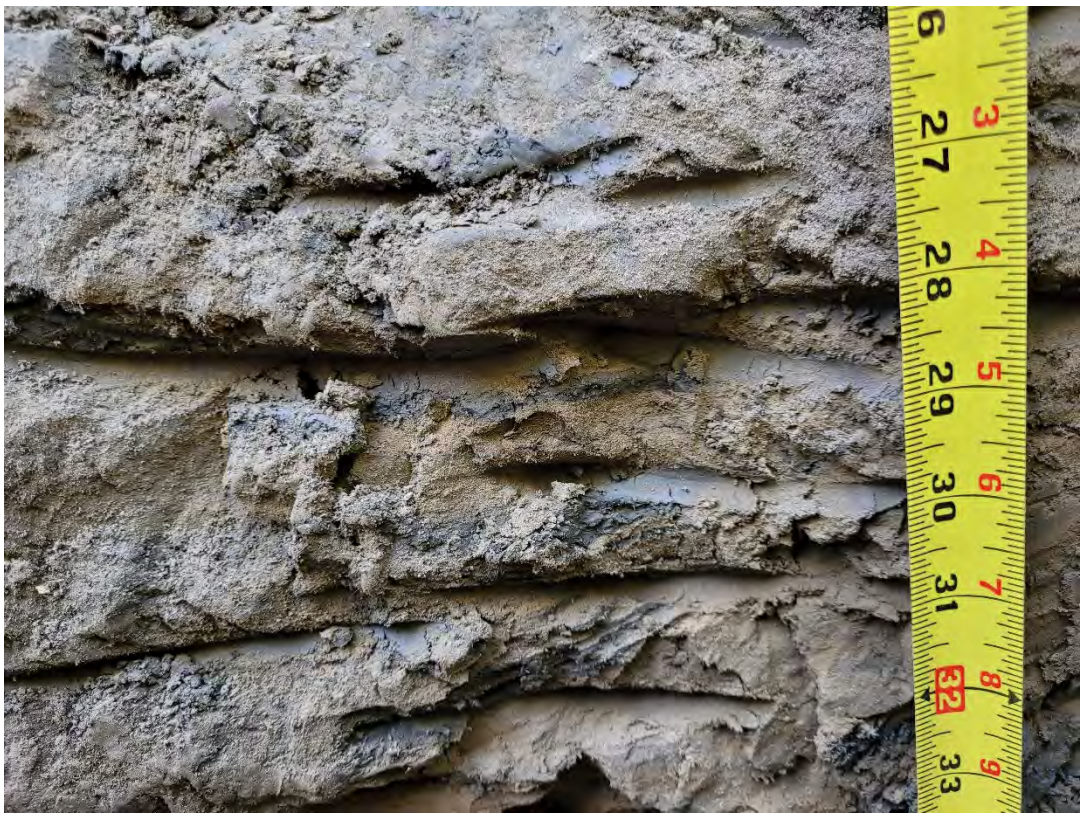


Photo 75. TP-54 sandy tailings, May 23, 2023.



Photo 76. TP-54 silty tailings, May 23, 2023.



Photo 77. View to the northeast of hand auger location TP-56, not accessible to backhoe, May 23, 2023.



Photo 78. View to south of test pit TP-58, May 23, 2023.



Photo 79. View to north of soil and weathered rock conditions in TP-58, May 23, 2023.

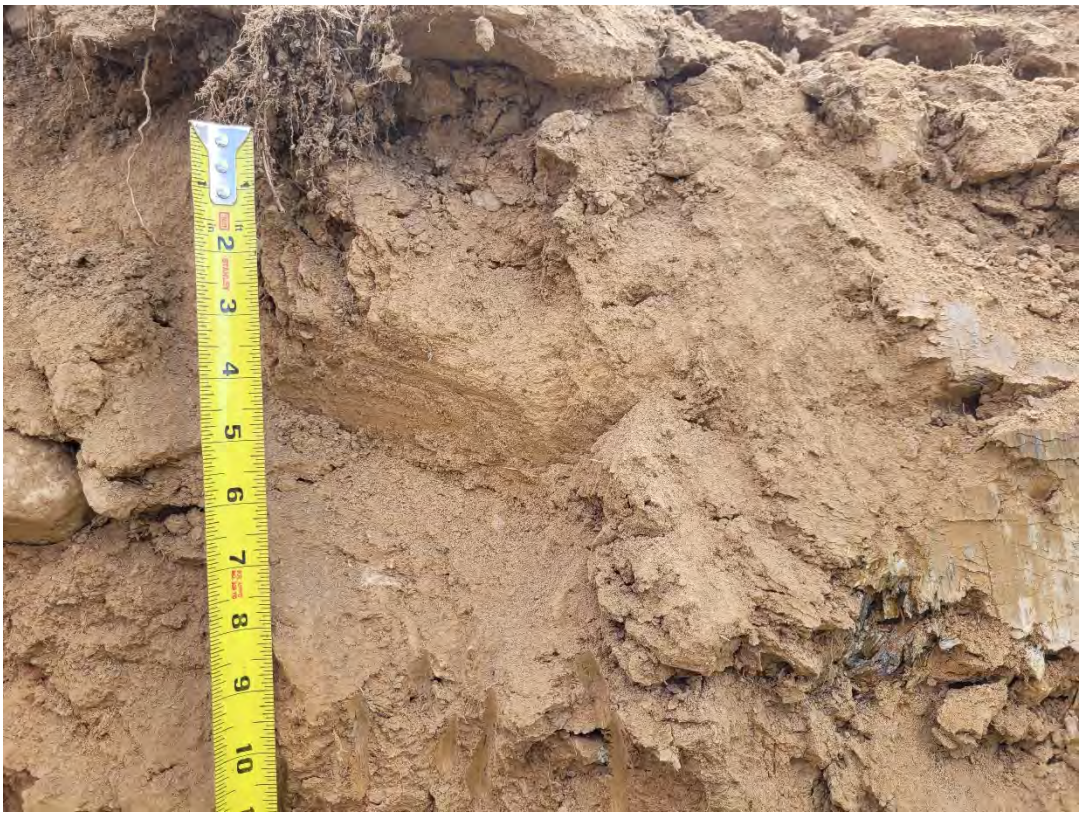


Photo 80. TP-58 soil conditions, May 23, 2023.



Photo 81. TP-58 weathered rock conditions, May 23, 2023.



Photo 82. View to the southeast of test pit TP-59 in Background Area, May 22, 2023.



Photo 83. TP-59 soil conditions, May 22, 2023.



Photo 84. TP-59 weathered rock condtitions, May 22, 2023.



Photo 85. TP-60 soil conditions in Background Area, May 22, 2023.



Photo 86. TP-60 weathered rock conditions, May 22, 2023.

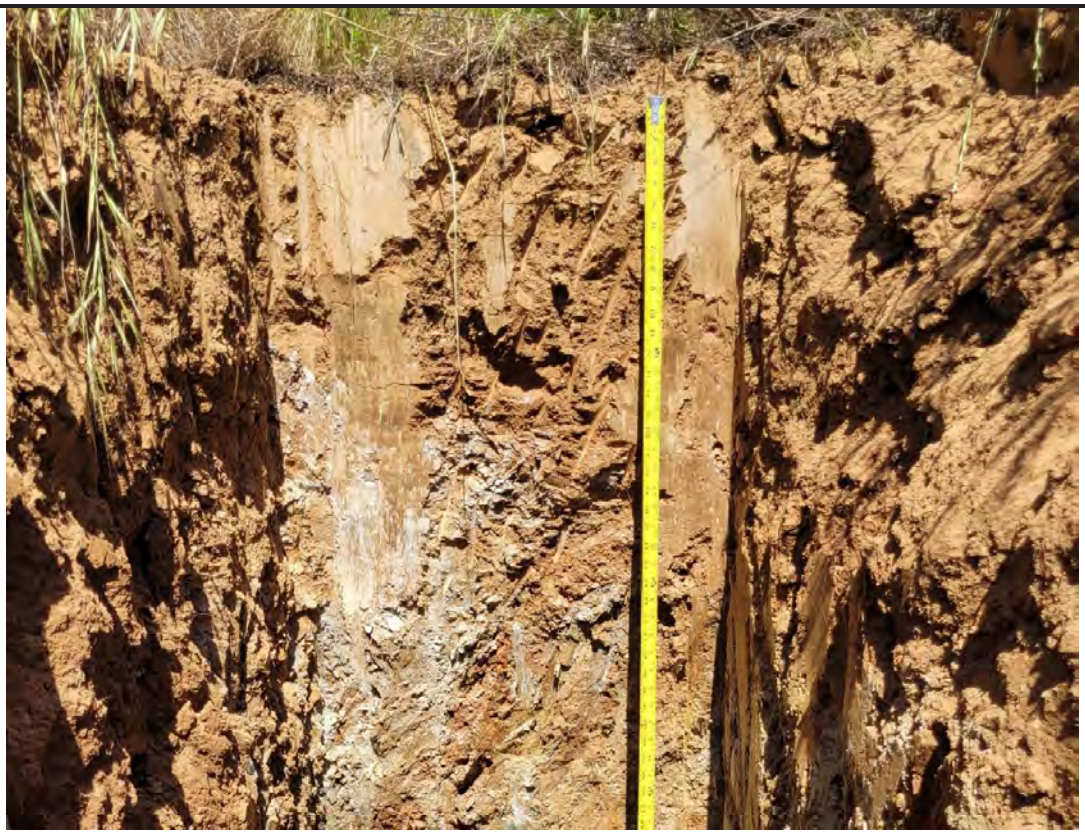


Photo 87. View to the east of soil and weathered rock conditions in test pit TP-61, May 22, 2023.



Photo 88. TP-61 soil conditions, May 22, 2023.



Photo 89. TP-61 weathered rock conditions, May 22, 2023.



Photo 90. TP-62 soil conditions May 22, 2023.

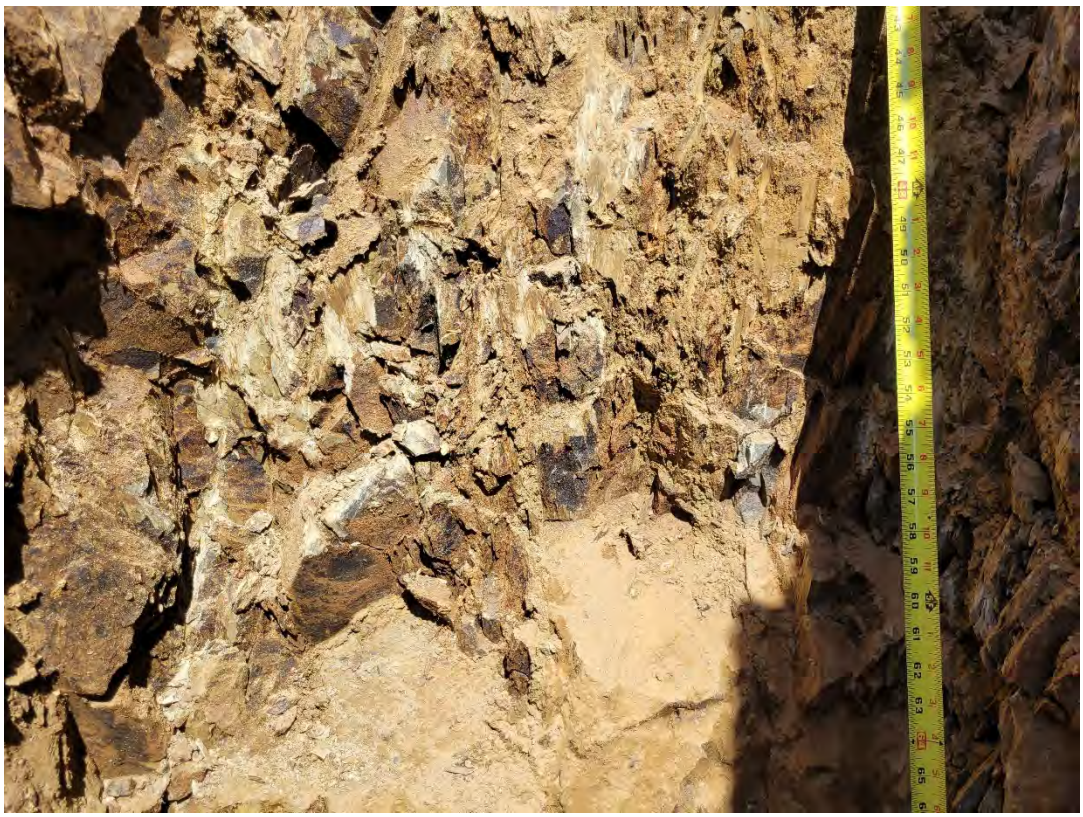


Photo 91. TP-62 weathered rock conditions, May 22, 2023.



Photo 92. View to the northeast of test pit TP-63, May 22, 2023.



Photo 93. TP-63 weathered rock conditions, May 22, 2023.



Photo 94. View to the south of test pit TP-65 and adjacent concrete-lined process trench.



Photo 95. View to the south of test pit TP-66 at the southeastern (downslope) end of the Process Area. Concrete slab-on-grade and shallow pipes in foreground, May 23, 2023.



Photo 96. Chunk of oiled surface covering obtained from the surface of TP-66, May 22, 2023.



Photo 97. Fill exposed in side wall of test pit TP-66, May 22, 2023.



Photo 98. View to the north of shallow tailings underlain by weathered bedrock in test pit TP-67, May 23, 2023.



Photo 99. View to the north of shallow tailings underlain by weathered rock in standing water in TP-68, May 23, 2023.



Photo 100. TP-68 shallow tailings underlain by weathered rock, May 23, 2023.



Photo 101. View to the north of test pit TP-69 in the Lakebed Area, May 23, 2023.



Photo 102. Tailings excavated from TP-69 in the Lakebed Area, May 23, 2023.



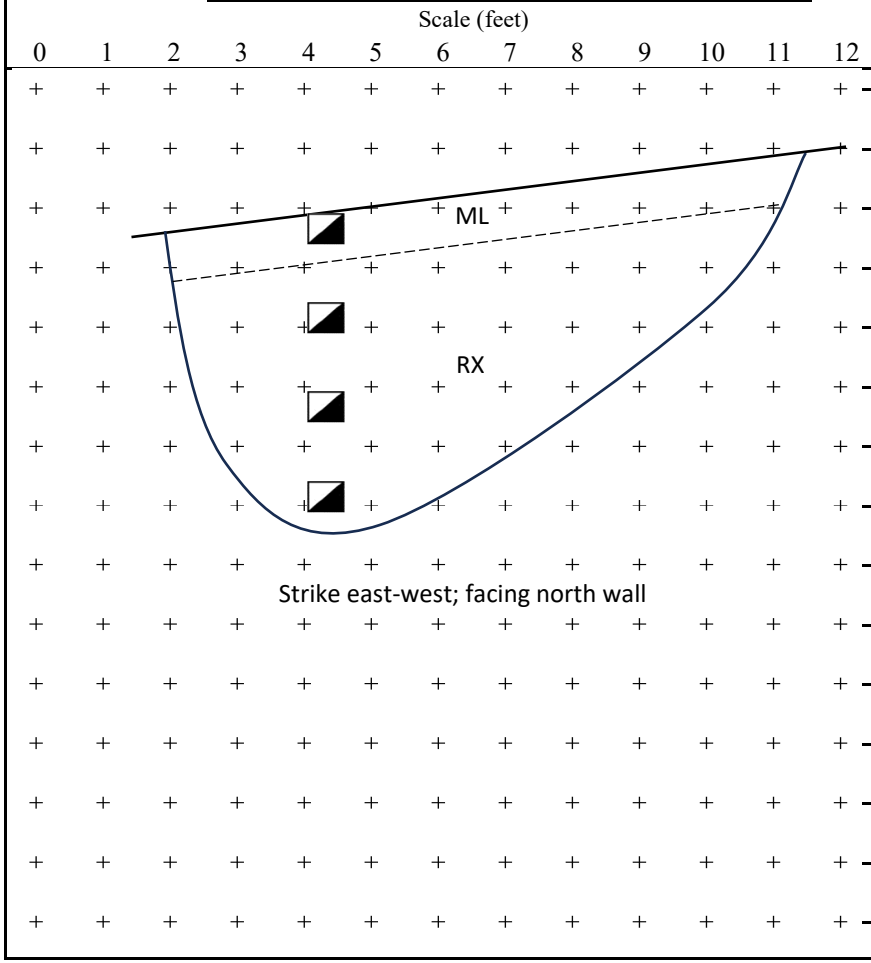
Photo 103. TP-69 standing water and caving conditions, May 23, 2023.

APPENDIX F

Date:	05/22/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Grasses and oak trees, slope 20% to the northwest
+1				
				Subsurface Conditions
0	TP-49-0.0		ML	Clayey silt with gravel-size to cobble-size rock fragments, moist, medium, red (2.5 YR 4/8) NATIVE SOIL
1	TP-49-1.5			Agrillaceous metasedimentary bedrock, highly weathered, excavates as clayey silt with with abundant residual rock structure, moist, medium, red (2.5 YR 4/8), with green copper, black manganese oxide and red iron staining WEATHERED BEDROCK
2				
3	TP-49-3.0		RX	
4				
5	TP-49-4.5			
6				Total depth 5.5 feet
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

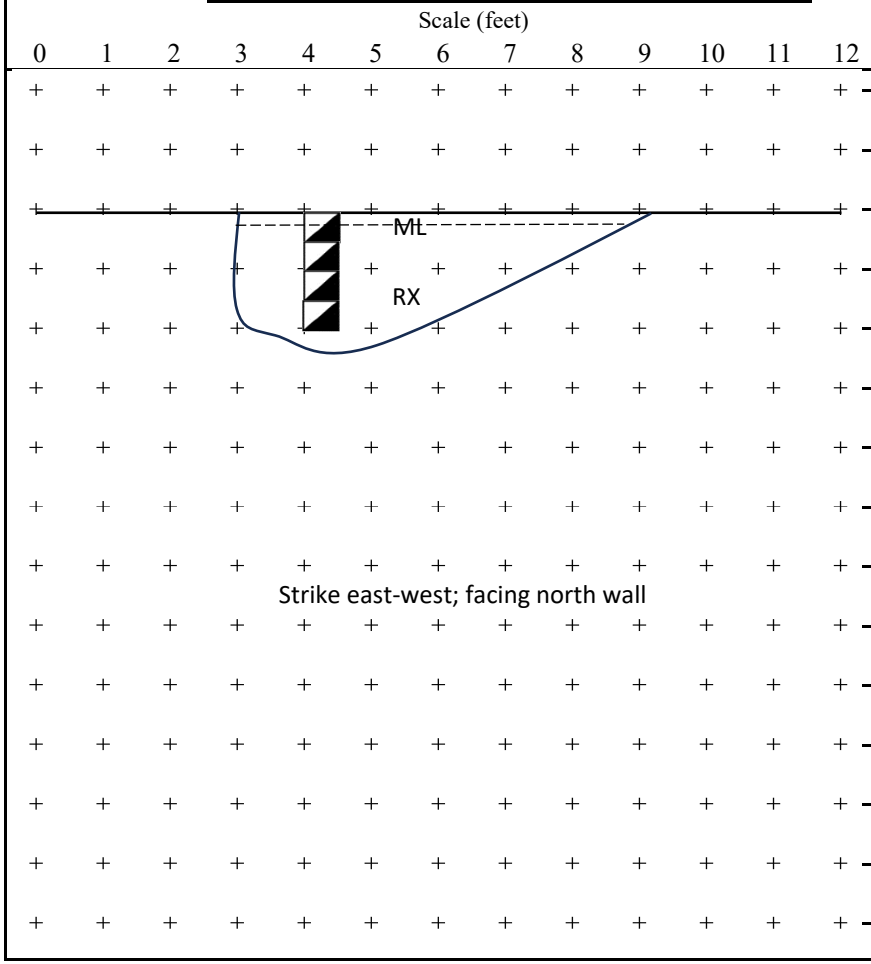
EXPLORATORY TRENCH TP-49

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Grasses and scattered oak trees, slope 10% to the west
+2				
+1				
				Subsurface Conditions
0	TP-50-0.0		ML	Sandy silt with clay, slightly moist, hard, yellowish red (2.5 YR 5/8) to red (2.5 YR 3/6), blocky, 0.25 to 2 mm roots and pores NATIVE SOIL
1	TP-50-0.5			
2	TP-50-1.0		RX	Agrillaceous metasedimentary bedrock, highly to moderately weathered, thin films of yellowish red fines and trace iron and manganese oxide staining between leaves, difficult to break with hands WEATHERED BEDROCK
3	TP-50-1.5			
4				
5				Refusal in bedrock at 2.3 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

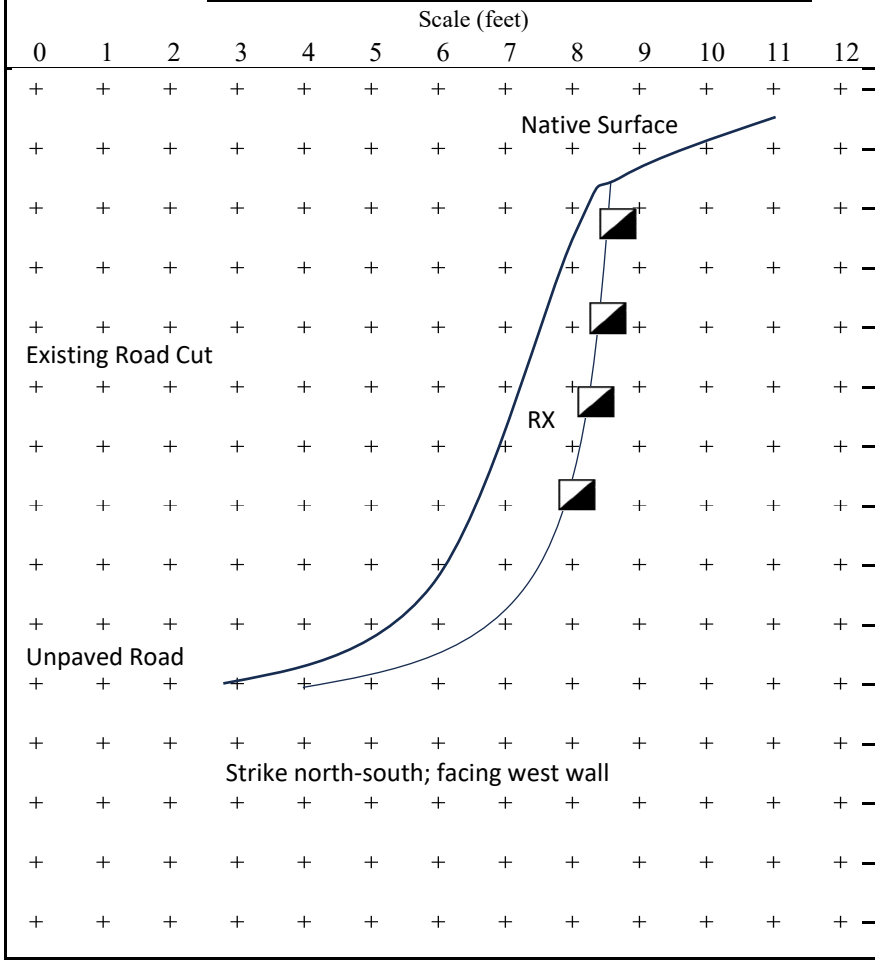
EXPLORATORY TRENCH TP-50

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Sparse grass, large oak tree, upslope from process area; exploratory trench excacvatd into existing road cut in bedrock revealing undisturbed bedrock profile; road base is flat, native ground surface above road cut slopes 20% to the south-southeast
+2				
+1				
				Subsurface Conditions
0	TP-51-0.0		ML	Agrillaceous metasedimentary bedrock, highly weathered, thin films of yellowish-red (5 YR 5/8) to red (2.5 YR 3/6) fines, trace iron and manganese oxide staining between leaves, difficult to break with hands WEATHERED BEDROCK
1	TP-51-1.5			
2				
3	TP-51-3.0		RX	
4				
5	TP-51-4.5			
6				
7				
8				Total depth 8.0 feet
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

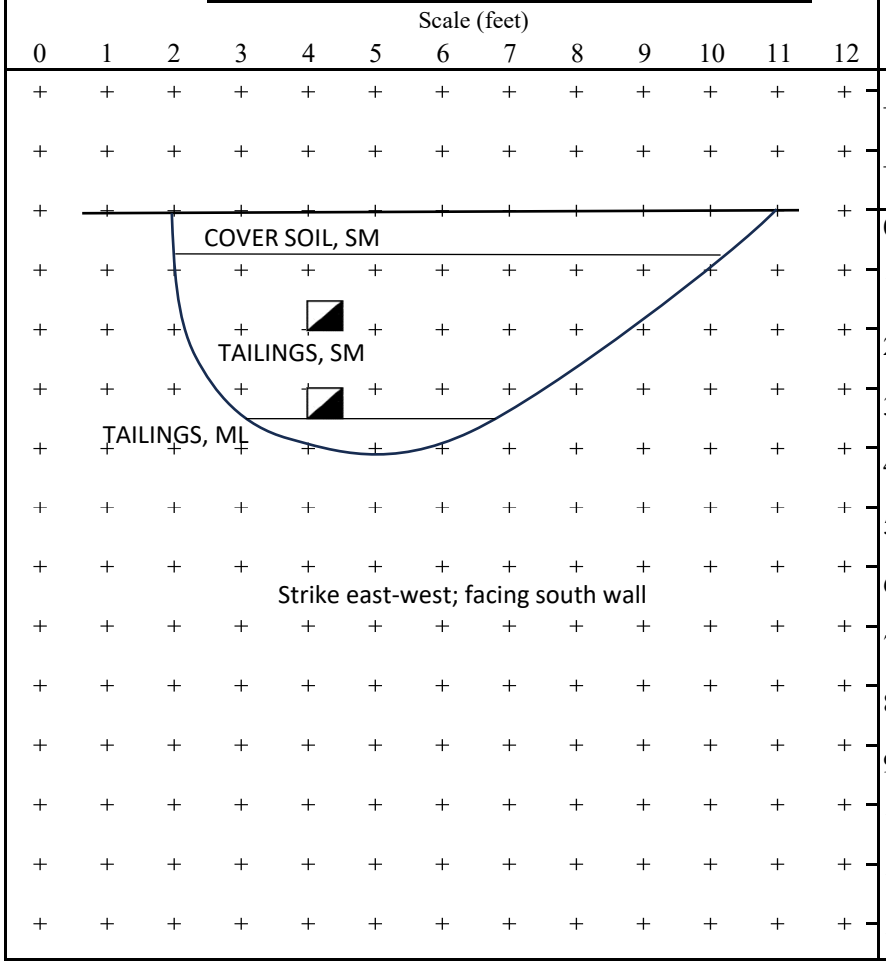
EXPLORATORY TRENCH TP-51

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/23/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Dense grasses on Tailings Pile deck, slope 2% to the southeast
+2				
+1				
				Subsurface Conditions
0			SM	Silty sand with gravel-sized rock fragments, dry, medium dense, yellowish-red (5 YR 5/6), 0.5 to 1.0 mm roots, material originates from borrowed agrillaceous metasedimentary bedrock FILL: TAILINGS PILE COVER SOIL
1	TP-52-1.5			
2				
3	TP-52-3.0		SM	Silty fine sand, slighlty moist to moist, loose, dark gray to bluish black (GLEY 2 4/5B to 2.5/5B), 0.25-0.5 mm angular grains, primarily quartz, common fine interbeds of silt (description below) FILL: TAILINGS
4			ML	Silt with minor fine sand, moist, soft, sticky, bluish black (GLEY 2 2.5/5B) FILL: TAILINGS
5				
6				Total depth 4.0 feet
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

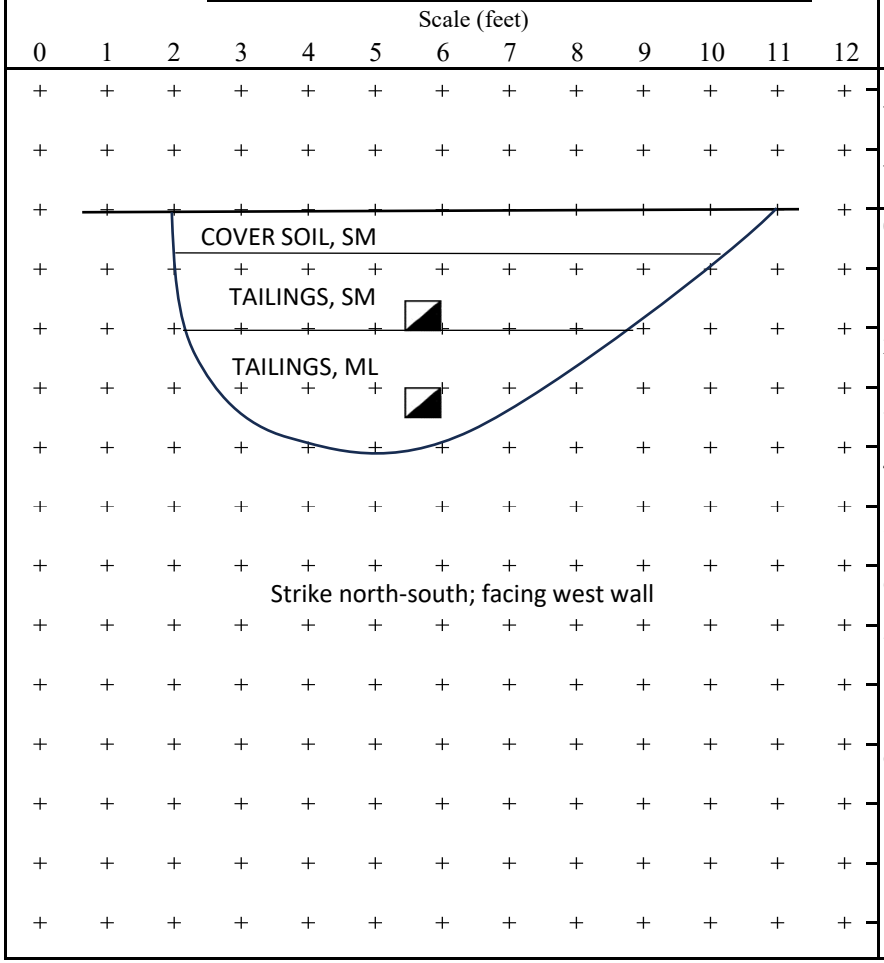
EXPLORATORY TRENCH TP-52

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/23/23
Water Level:	none
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Dense grasses on Tailings Pile deck, slope 2% to the southeast
+2				
+1				
				Subsurface Conditions
0			SM	Silty sand with gravel-sized rock fragments, dry, loose, yellowish-red (5 YR 5/6), 0.5 to 1.0 mm roots, material originates from borrowed agrillaceous metasedimentary bedrock FILL: TAILINGS PILE COVER SOIL
1	TP-53-1.5			
2			SM	Silty fine sand, slighlty moist, loose, bluish black (GLEY 2 4/5B), 0.25-0.5 mm angular grains, primarily quartz FILL: TAILINGS
3	TP-53-3.0			
4			ML	Silt with minor fine sand, damp, soft, sticky, bluish black (GLEY 2 2.5/5B) FILL: TAILINGS
5				Total depth 4.0 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

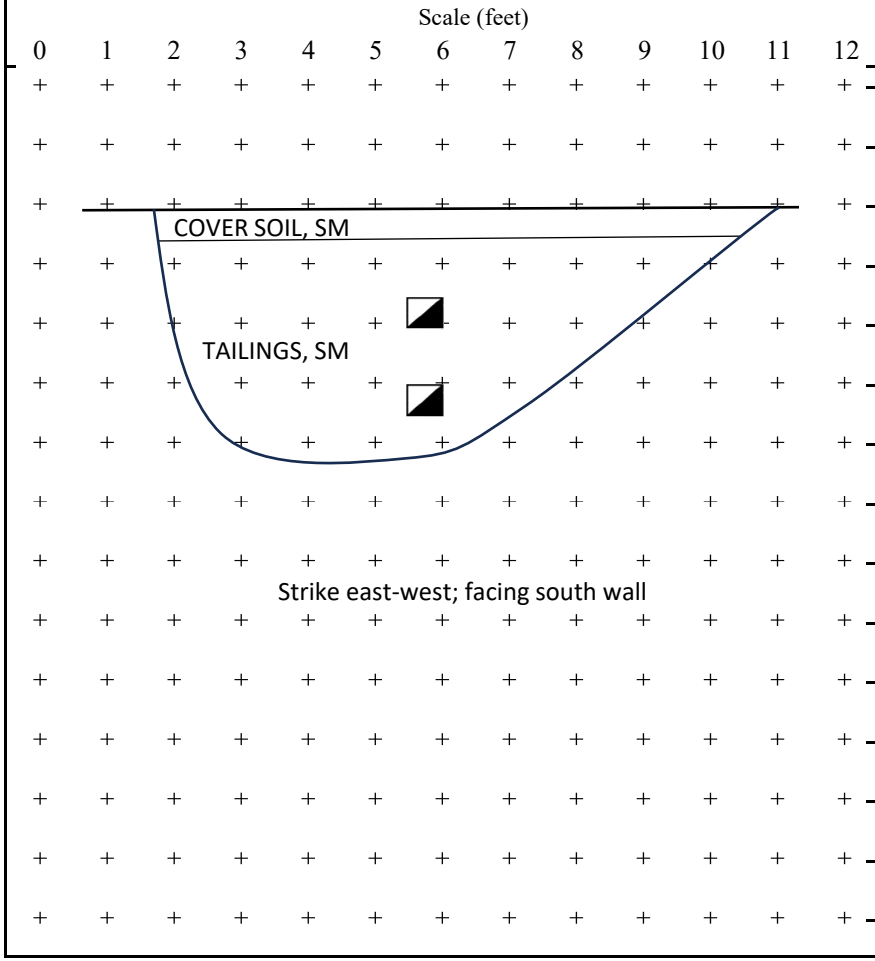
EXPLORATORY TRENCH TP-53

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/23/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Dense grasses on Tailings Pile deck, slope 2% to the south
+1				
				Subsurface Conditions
0			SM	Silty sand with minor gravel-sized rock fragments, dry, loose, yellowish-red (5 YR 5/6), fine roots, material originates from borrowed agrillaceous metasedimentary bedrock FILL: TAILINGS PILE COVER SOIL
1	TP-54-1.5			
2				
3	TP-54-3.0		SM	Silty fine sand, slighlty moist to moist, loose, bluish black (GLEY 2 4/5B to 2.5/5B), 0.25-0.5 mm angular grains, primarily quartz, common thin (<1 inch thick) interbeds of silt (silt description in TP-52) FILL: TAILINGS
4				Total depth 4.0 feet
5				
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

EXPLORATORY TRENCH TP-54

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/23/23
Water Level:	none
Orientation:	not applicable
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	Hand Auger
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact

Scale (feet)

0 1 2 3 4 5 6 7 8 9 10 11 12

Hand auger boring; location not accessible to backhoe

Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Grasses and oak trees, slope 15% to the southeast
+2				
+1				
				Subsurface Conditions
0	TP-55-0.0		ML	Sandy silt, dry to slightly moist, medium, yellow-brown to brown (7.5 YR 4/4) NATIVE SOIL
1	TP-55-1.0			
2			RX	Agrillaceous metasedimentary bedrock, highly weathered, drills as sandy silt with with abundant residual rock texture, moist, medium WEATHERED BEDROCK
3				Hand auger refusal in weathered rock at 2.0 feet
4				
5				
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

EXPLORATORY TRENCH TP-55

ORO DE AMADOR

JACKSON, CALIFORNIA

PROJECT S9959-07-03

Date:	05/23/23
Water Level:	none
Orientation:	not applicable
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	Hand Auger
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact

Scale (feet)

0 1 2 3 4 5 6 7 8 9 10 11 12

Hand auger boring; location not accessible to backhoe

Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Grasses and oak trees, slope 15% to the southeast
+2				
+1				
				Subsurface Conditions
0	TP-56-0.0		ML	Sandy silt, dry to slightly moist, medium, yellow-brown to brown (7.5 YR 4/4) NATIVE SOIL
1				
2	TP-56-1.5 TP-56-2.0		RX	Agrillaceous metasedimentary bedrock, highly weathered, drills as sandy silt with with abundant residual rock texture, moist, medium WEATHERED BEDROCK
3				Hand auger refusal in weathered rock at 2.5 feet
4				
5				
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

EXPLORATORY TRENCH TP-56

ORO DE AMADOR

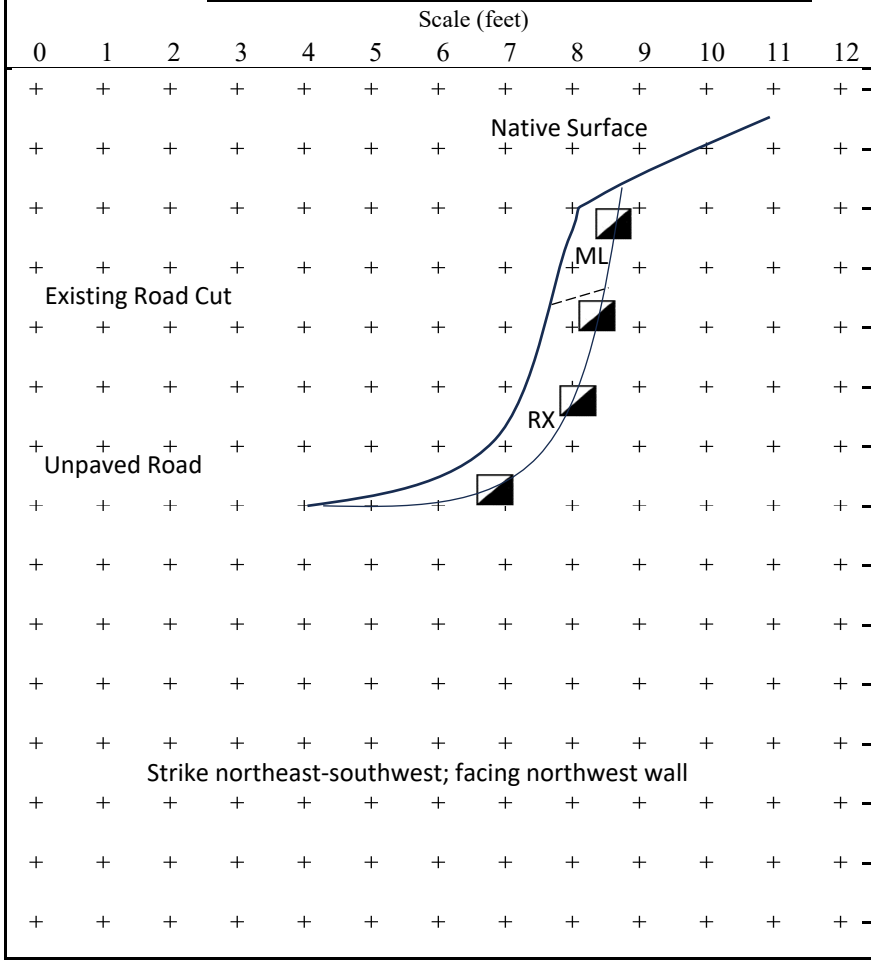
JACKSON, CALIFORNIA

PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	NE-SW
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Sparse grass in road cut, dense on surrounding native surfaces, exploratory trench excacvatd into existing road cut revealing undisturbed native soil; road base is flat, native ground surface above road cut slopes 20% to the northeast
+2				
+1				
				Subsurface Conditions
0	TP-57-0.0		ML	Sandy silt, dry to slightly moist, medium, brown (7.5 YR 4/4) NATIVE SOIL
1	TP-57-1.5			Agrillaceous metasedimentary bedrock, weak, highly weathered, excavates as sandy silt with clay and gravel-size rock fragments, slightly moist, yellowish-red (5 YR 5/8) to red (2.5 YR 2/6) WEATHERED BEDROCK
2			RX	
3	TP-57-3.0			
4				
	TP-57-4.5			
5				Total depth 5.0 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

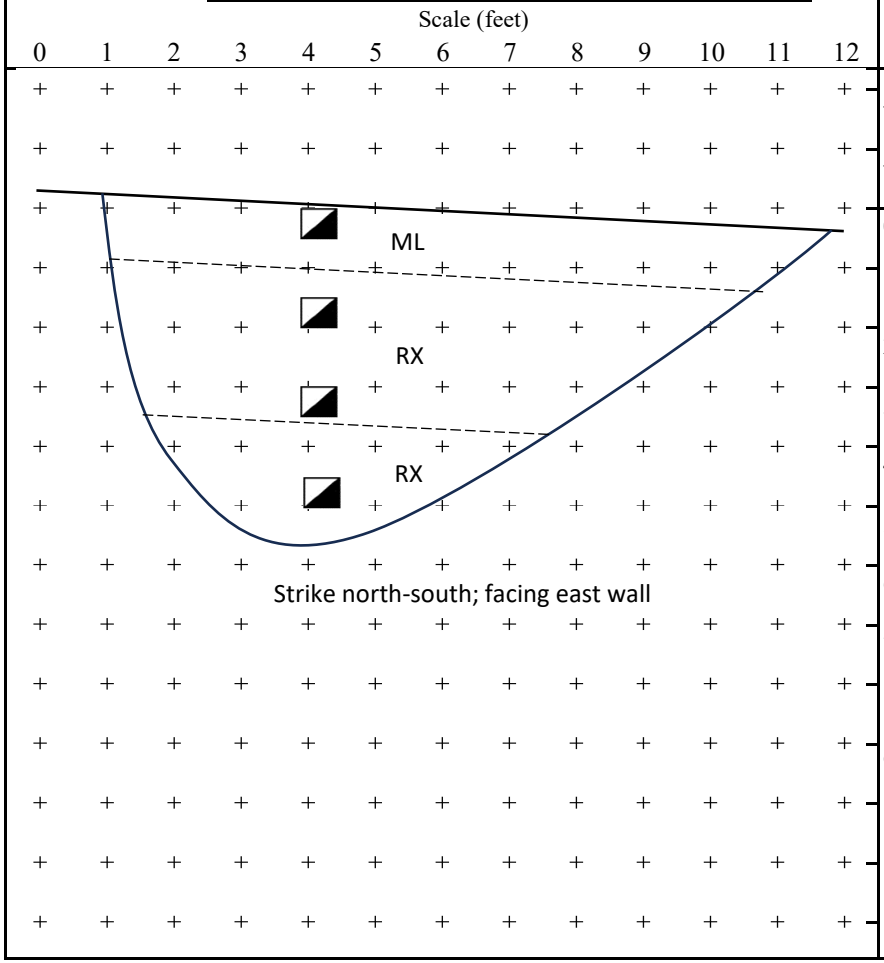
EXPLORATORY TRENCH TP-57

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Dense grasses, south of unpaved road, slope 15% to the south-southeast
+1				
				Subsurface Conditions
0	TP-58-0.0		ML	Sandy silt dry to slightly moist, medium, brown (7.5 YR 4/4), common fine roots NATIVE SOIL
1	TP-58-1.5		RX	Agrillaceous metasedimentary bedrock, highly weathered, excavates as sandy silt with clay gravel-size rock fragments, abundant residual rock structure, moist, weak, yellowish red (5 YR 5/6) to red (2.5 YR 2/6) WEATHERED BEDROCK
2				
3	TP-58-3.0			
4	TP-58-4.5		RX	Rock structure increases with depth, fine leaves, near-vertical dip WEATHERED BEDROCK
5				Total depth 5.5 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

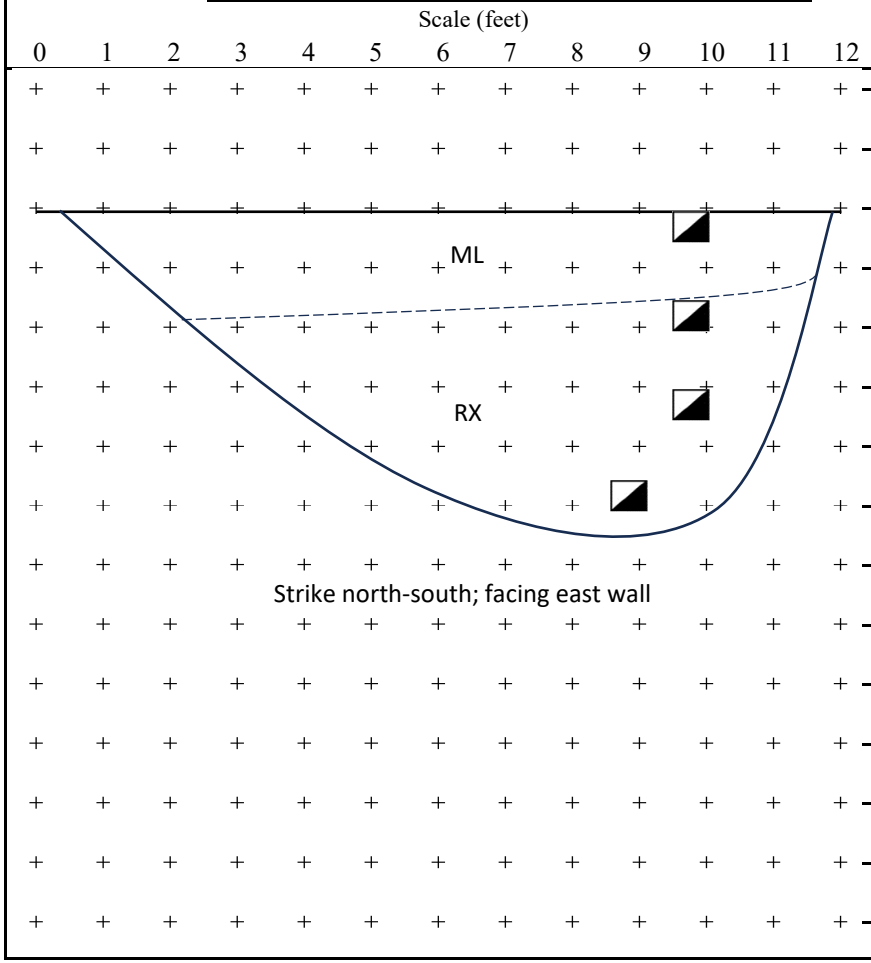
EXPLORATORY TRENCH TP-58

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Grasses and scattered oak trees, slope 10% to the west
+1				
				Subsurface Conditions
0	TP-59-0.0		ML	Sandy silt with minor clay and trace gravel, slightly moist, loose, dark reddish brown (5 YR 3/3), common fine roots NATIVE SOIL
1	TP-59-1.5			
2			RX	Agrillaceous metasedimentary bedrock, highly weathered, excavates as clayey silt with with abundant residual rock structure, moist, weak, yellowish red (5 YR 5/6), trace thin films of soil fines between leaves, breaks with difficulty in hands WEATHERED BEDROCK
3	TP-59-3.0			
4	TP-59-4.5			
5				Total depth 5.5 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

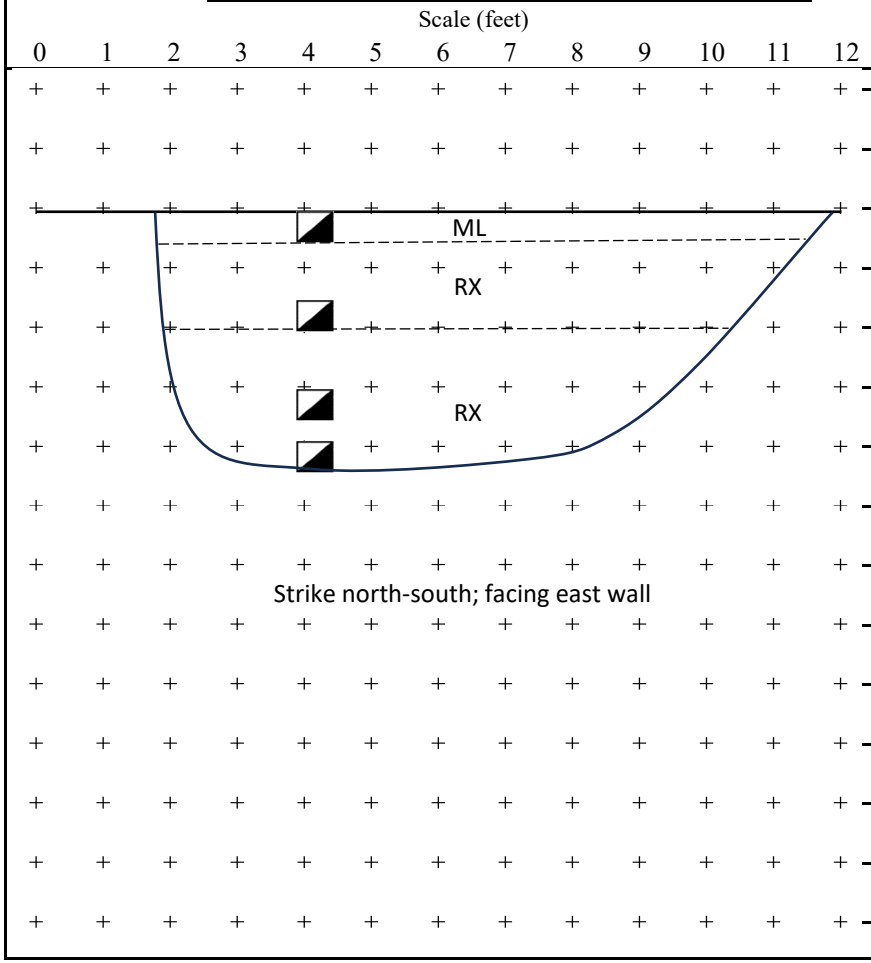
EXPLORATORY TRENCH TP-59

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Grasses and oak trees, slope 2% to the east
+2				
+1				
				Subsurface Conditions
0	TP-60-0.0		ML	Sandy silt with minor clay, slightly moist, loose, dark reddish brown (5 YR 3/3) to yellowish red (5 YR 5/6), common fine roots
1				NATIVE SOIL
	TP-60-1.5		RX	Agrillaceous metasedimentary bedrock, highly weathered, excavates as clayey silt with with abundant residual rock
2				structure, moist, weak, yellowish red (5 YR 5/6), clayey silt
3	TP-60-3.0			inclusions and seams, breaks with difficulty in hands
4	TP-60-4.5		RX	WEATHERED BEDROCK
5				Grades to less weathered bedrock, can still be broken by hand.
6				Refusal in bedrock at 4.5 feet
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

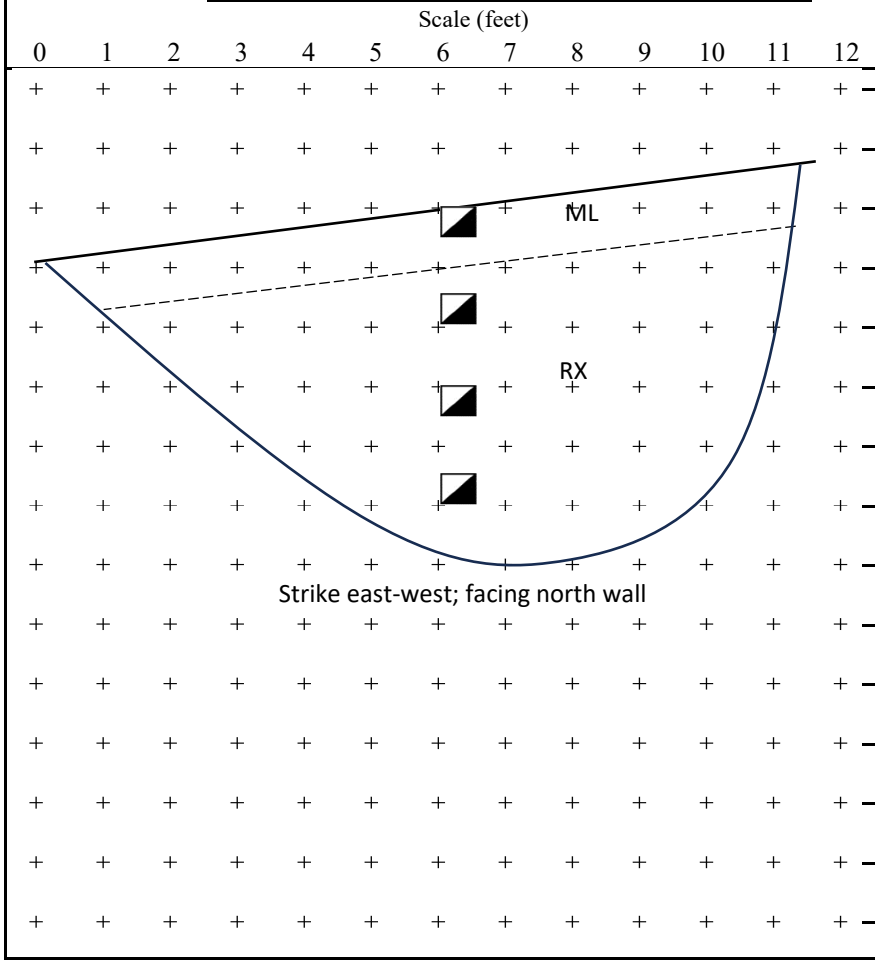
EXPLORATORY TRENCH TP-60

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Dense grasses, slope 20% to the west
+1				
				Subsurface Conditions
0	TP-61-0.0		ML	Silt with abundant gravel-size rock fragments and minor clay and sand, dry, loose, reddish brown (5 YR 5/4) NATIVE SOIL
1	TP-61-1.5			
2			RX	Agrillaceous metasedimentary bedrock, highly to moderately weathered, highly foliated, abundant inclusions and films of yellowish-red to reddish brown (5 YR 4/4) soil fines, manganese oxide staining, difficult to break with hands, near-vertical dip WEATHERED BEDROCK
3	TP-61-3.0			
4	TP-61-4.5			
5				
6				Total depth 6.0 feet
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

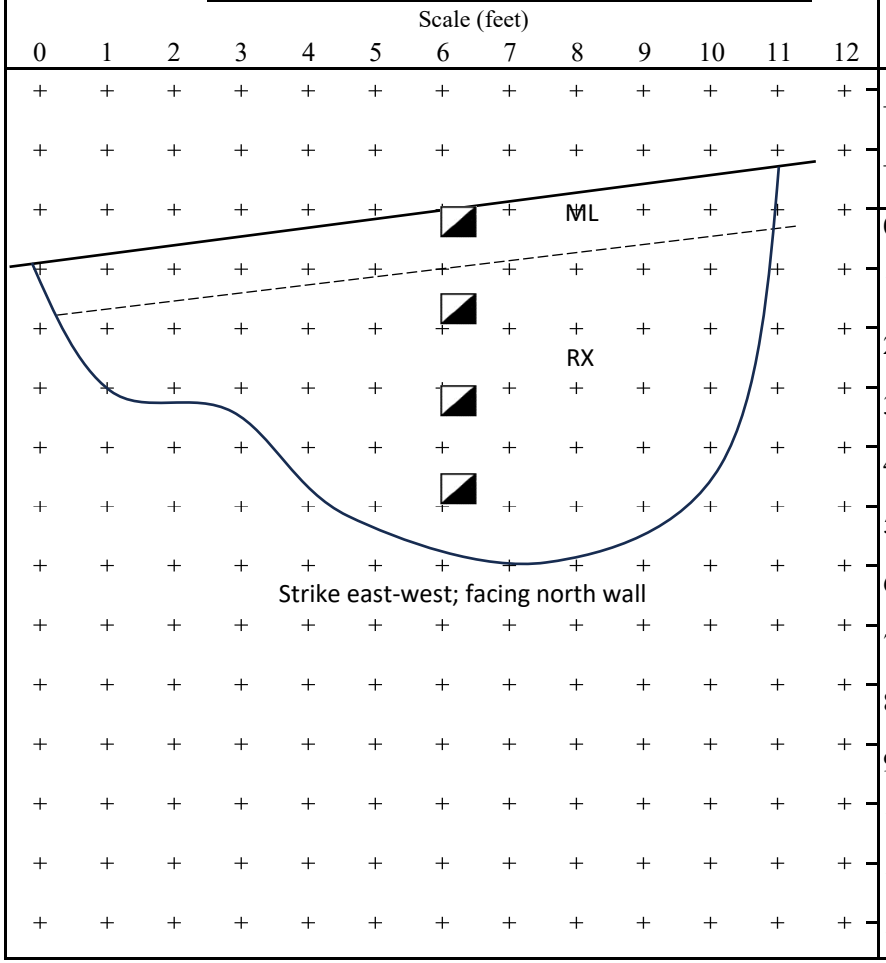
EXPLORATORY TRENCH TP-61

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Dense grasses, slope 20% to the west
+1				
				Subsurface Conditions
0	TP-62-0.0		ML	Silt with abundant gravel-size rock fragments and minor clay and sand, dry, loose, reddish brown (5 YR 5/4) NATIVE SOIL
1	TP-62-1.5			
2			RX	Agrillaceous metasedimentary bedrock, highly to moderately weathered, highly foliated, abundant inclusions and films of yellowish-red to reddish brown (5 YR 4/4) soil fines, manganese oxide staining, difficult to break with hands, near-vertical dip WEATHERED BEDROCK
3	TP-62-3.0			
4	TP-62-4.5			
5				
6				Total depth 6.0 feet
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

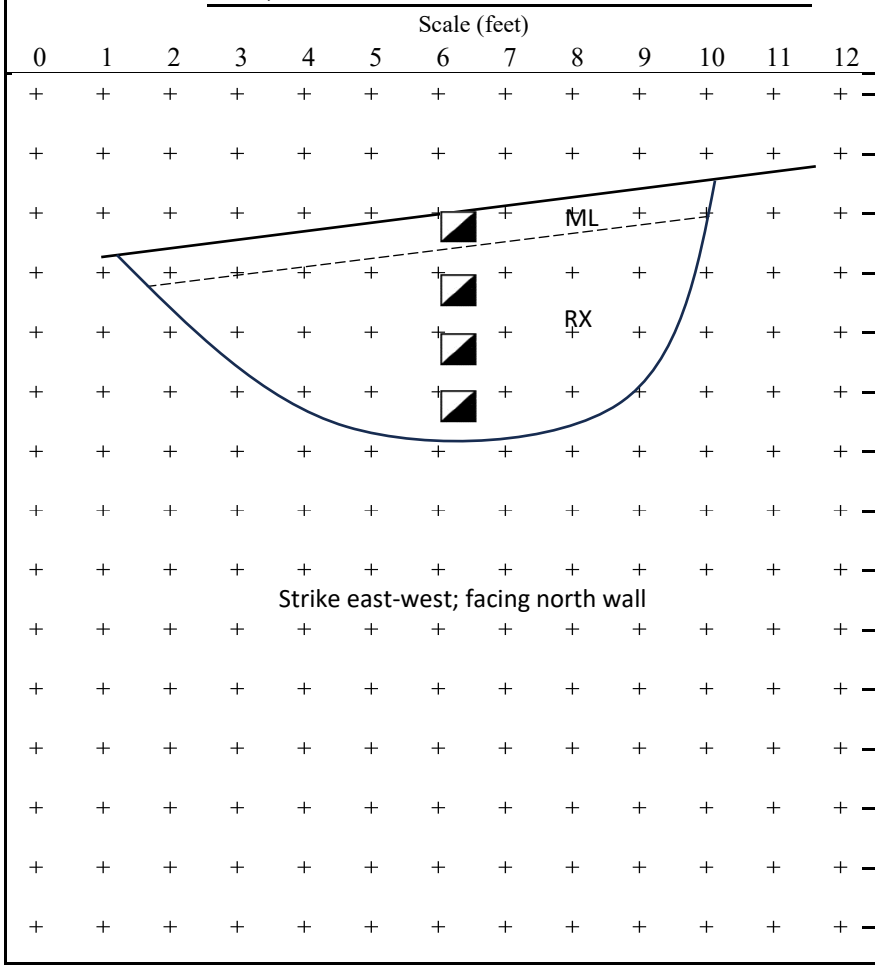
EXPLORATORY TRENCH TP-62

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	E-W
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Dense grasses, slope 20% to the west-southwest
+1				
				Subsurface Conditions
0	TP-63-0.0		ML	Silt with abundant gravel-size rock fragments and minor clay and sand, dry, loose, reddish brown (5 YR 5/4) NATIVE SOIL
1	TP-63-1.0			
2	TP-63-2.0		RX	Agrillaceous metasedimentary bedrock, highly to moderately weathered, abundant inclusions and films of yellowish-red to reddish brown (5 YR 4/4) soil fines, difficult to break with hands, near-vertical dip WEATHERED BEDROCK
3	TP-63-3.0			
4				
5				Refusal in bedrock at 3.5 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

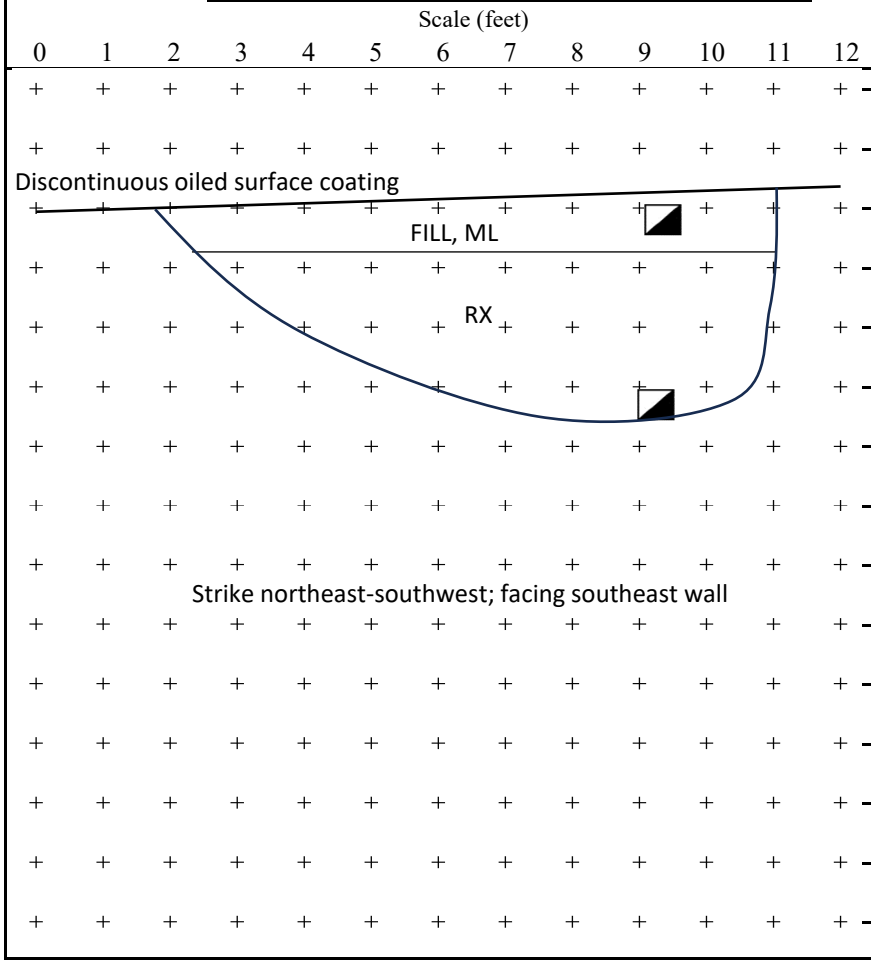
EXPLORATORY TRENCH TP-63

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	NE-SW
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Sparse grass, base of cut slope between cyanide tank pads, native surface profile removed, oiled surface coating, level pad on northwest-facing slope of saddle
+2				
+1				Discontinuous oiled/asphaltic surfacing, depth varies, cemented sand, dry, hard, dark grey to black (2.5 Y 2.5/1) SURFACE COATING
				Subsurface Conditions
0	TP-64-0.0		ML	Dark brown sandy silt, slightly moist, medium, with gravel-size to cobble-size subrounded rock FILL
1				
2				Agrillaceous metasedimentary bedrock, highly weathered, 0.25 to 0.5 mm leaves with thin yellowish red soil fines and black manganese oxide staining, near-vertical dip WEATHERED BEDROCK
3	TP-64-3.0		RX	
4				Refusal in bedrock at 3.5 feet
5				
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

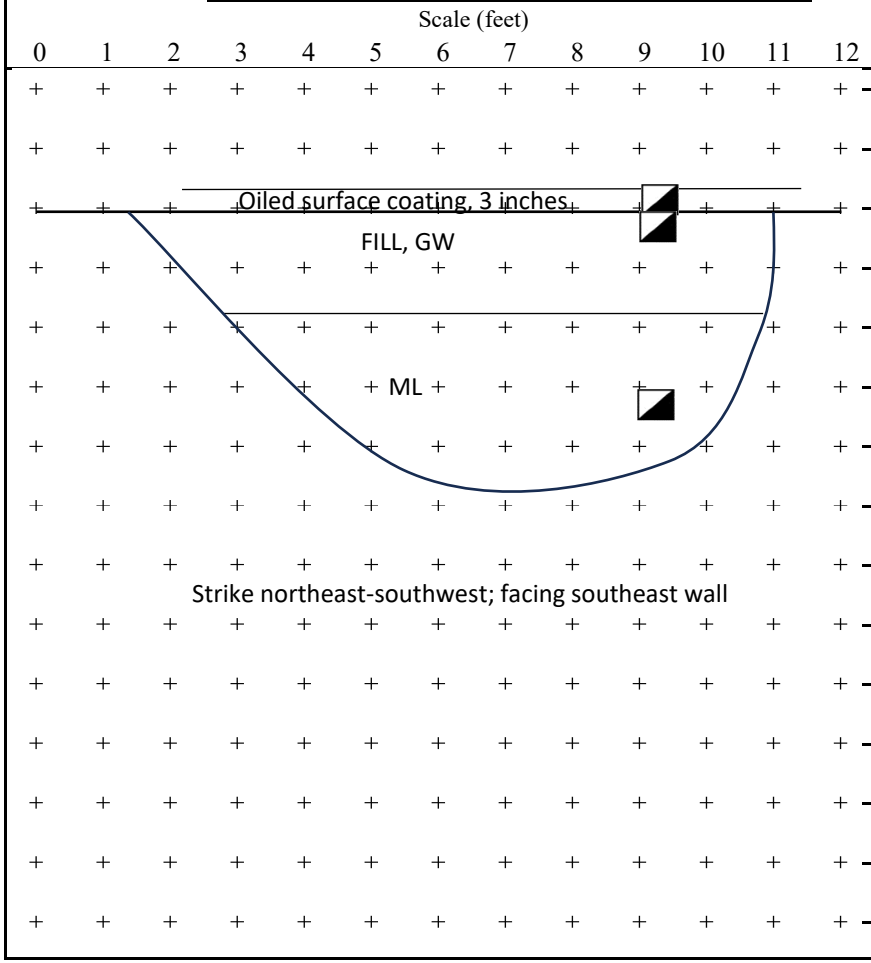
EXPLORATORY TRENCH TP-64

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	NE-SW
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Sparse grass, oiled surface coating, adjacent to concrete-lined process trench, level ground surface
+2				
+1	TP-65-SURF	■		Oiled/asphaltic surfacing, cemented sand, dry, hard, dark grey to black (2.5 Y 2.5/1) 3" SURFACE COATING
				Subsurface Conditions
0	TP-65-0.0	■	GW	Sandy gravel with silt, moist, medium dense, light bluish gray (GLEY 2 8/1), sheared, soapy, apparent mine waste rock, possibly imported from Kennedy Mine FILL
1				
2				Clayey silt, moist, soft, dark reddish brown (5 YR 3/3) NATIVE SOIL
3	TP-65-3.0	■	ML	
4				
5				Total depth 4.5 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

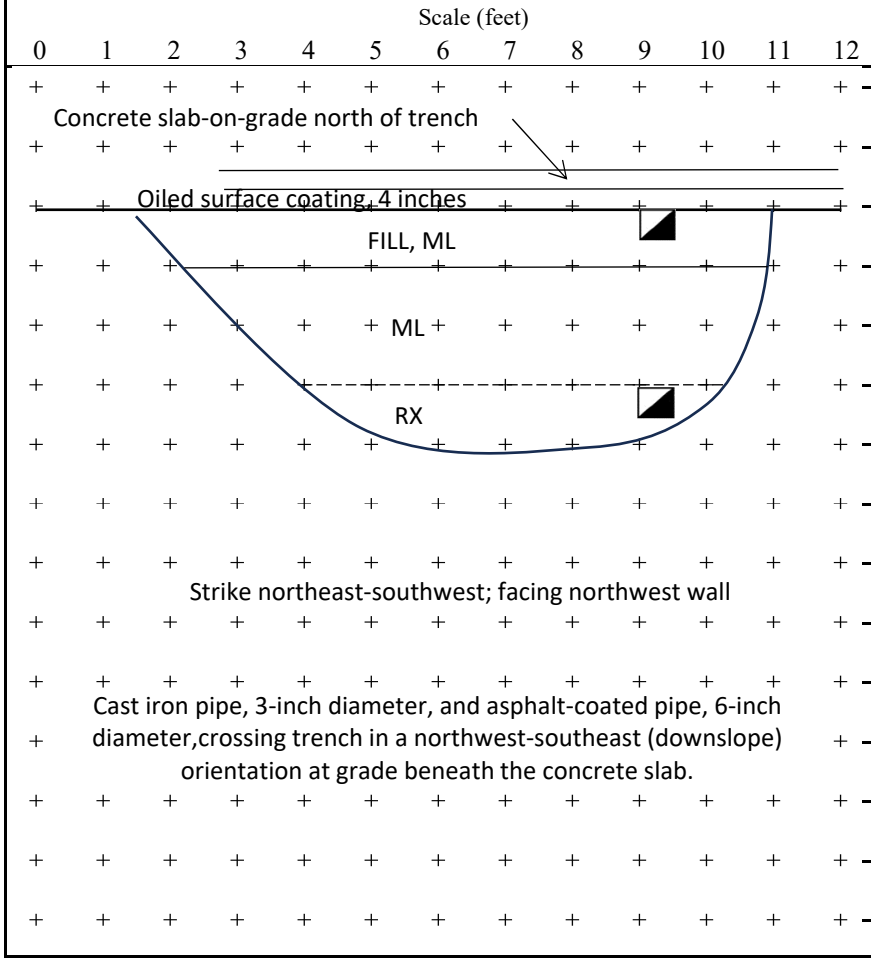
EXPLORATORY TRENCH TP-65

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/22/23
Water Level:	none
Orientation:	NE-SW
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Sparse grass, southeast edge of process area concrete foundations, discontinuous oiled surface coating, immeidately downslope (southeast) of slab-on-grade, slope 2% to the southeast
+2				
+1				Oiled/asphaltic surfacing, cemented sand, dry, hard, dark grey to black (2.5 Y 2.5/1) 4" SURFACE COATING
				Subsurface Conditions
0	TP-66-0.0		ML	Clayey silt with gravel and sand, occassional larger rock, slightly moist, medium, light gray to dark redish brown (5 YR 3/4) to dark brown (7.5 YR 3/4) FILL
1				
2			ML	Silty clay with abundant gravel and trace sand, slightly moist, firm, yellowish red (5 YR 5/6), blocky NATIVE SOIL
3	TP-66-3.0		RX	Agrillaceous metasedimentary bedrock, highly weathered, excavates as clayey silt with with abundant residual rock structure, slightly moist, weak, yellowish red (5 YR 5/6), thin films of soil fines between leaves WEATHERED BEDROCK
4				
5				
6				Total depth 4.0 feet
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

EXPLORATORY TRENCH TP-66

ORO DE AMADOR

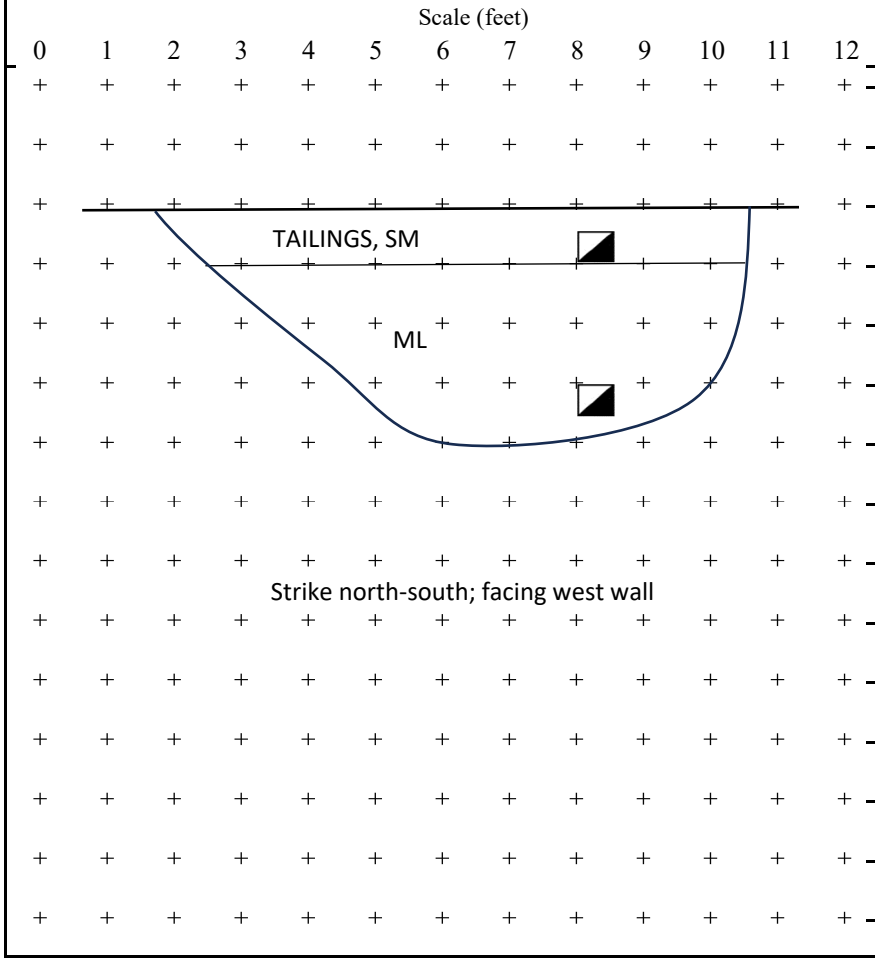
JACKSON, CALIFORNIA

PROJECT S9959-07-03

Date:	05/23/23
Water Level:	none
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Upper (northern) Lakebed Area, dense grasses, slope 10% to the west-southwest
+1				
				Subsurface Conditions
0			SM	Silty fine sand, slighlty moist to moist, loose, bluish black (GLEY 2 4/5B to 2.5/5B), 0.25-0.5 mm angular grains, primarily quartz FILL: TAILINGS
1	TP-67-1.5			
2				Sandy silt with minor gravel-size rock fragments, slight residual rock texture, moist, medium, yellowish red (5 YR 5/6), manganese oxide staining COMPLETELY WEATHERED BEDROCK
3	TP-67-3.0		ML	
4				Total depth 4.0 feet
5				
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

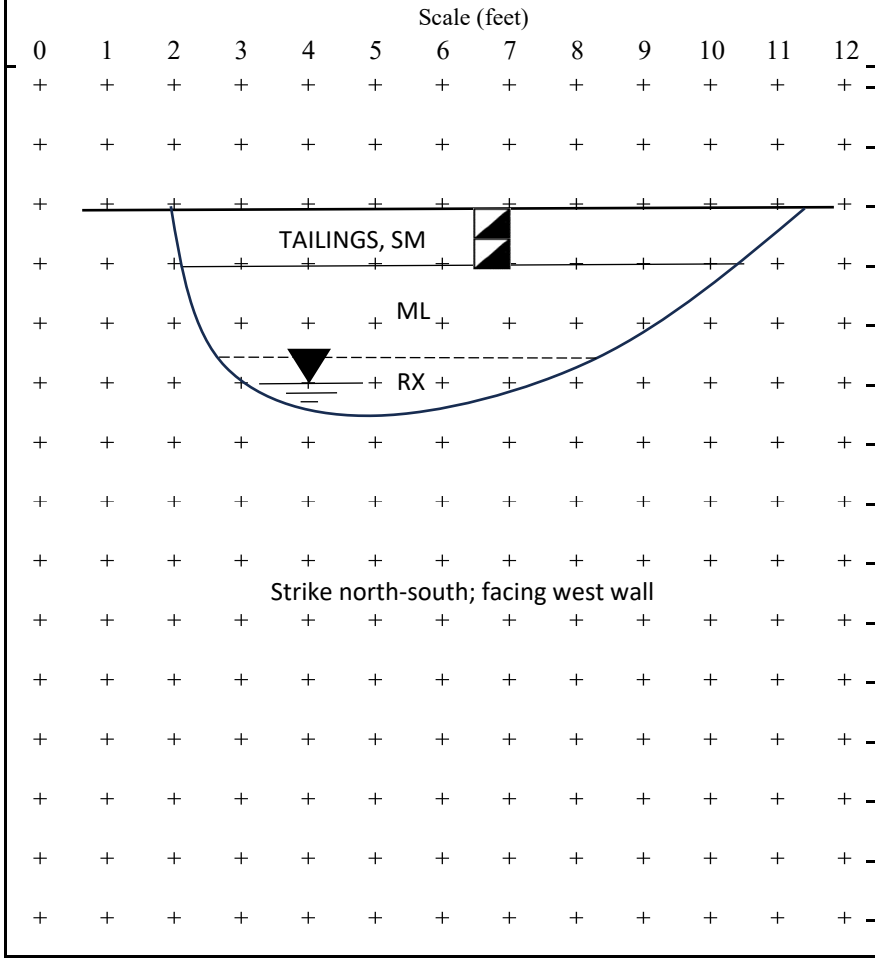
EXPLORATORY TRENCH TP-67

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/23/23
Water Level:	3.0 feet
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
				Lakebed Area, hydrophyllic vegetation, gentle slope to south
+2				
+1				
				Subsurface Conditions
0	TP-68-0.0 TP-68-0.5		SM	Fine sand with minor, thin silt lenses, damp, loose, bluish black (GLEY 2 2.5/5B) to dark gray with minor yellowish red (5 YR 5/8) FILL: TAILINGS
1				
2			ML	Clayey silt, saturated, soft, yellowish red (5 YR 5/6), massive, blocky NATIVE SOIL
3			RX	Agrillaceous metasedimentary bedrock, highly weathered, saturated, weak, thin leaves, near-vertical dip WEATHERED BEDROCK
4				
5				Total depth 3.5 feet
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

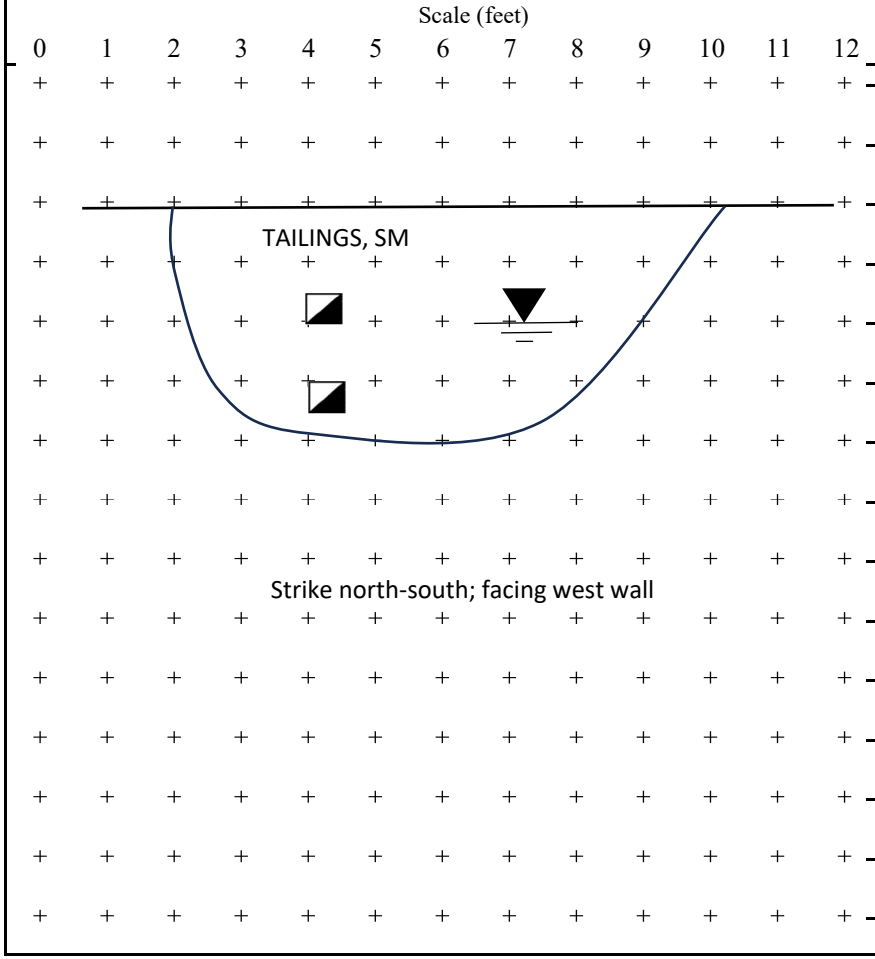
EXPLORATORY TRENCH TP-68

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03

Date:	05/23/23
Water Level:	2.0 feet
Orientation:	N-S
Logged By:	Muir
Checked By:	Ewert
Subcontractor:	none
Equipment:	JD 310L EP with 24-inch bucket
Weather:	Clear, 80° F

LEGEND

- Drive Sample
- Grab sample
- Composite sample
- Abrupt contact
- Gradational contact



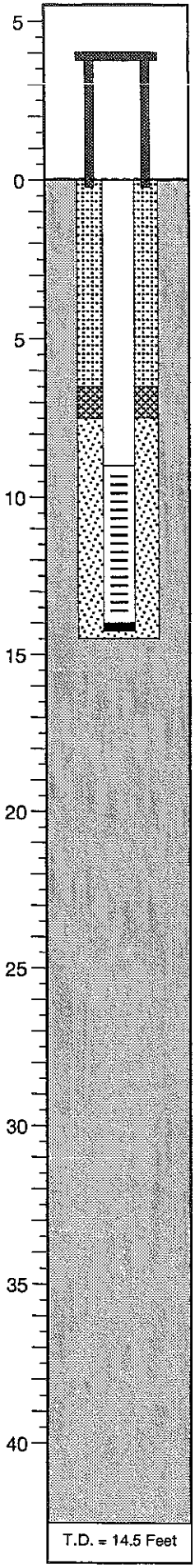
Depth (feet)	Sample Name	Sample Depth Interval	USCS	DESCRIPTION
				USCS Name; Density/Consistency; Moisture; Munsel Color; Origin (Residuum/Fill/Source) Field Estimated Particl Size Composition (%); Plasticity; Structure; Cementation; Organics; Odor; Staining; Other
				Surface Conditions
+2				Lakebed Area, hydrophyllic vegetation, flat
+1				
				Subsurface Conditions
0				Fine sand with minor, thin silt lenses, damp, loose, bluish black (GLEY 2 2.5/5B) to dark gray with minor yellowish red (5 YR 5/8) FILL: TAILINGS
1	TP-69-1.5		SM	
2				Saturated below 2.0 feet; extensive caving to ground surface
3	TP-69-3.0			
4				Total depth 4.0 feet, extensive caving
5				
6				
7				
8				
9				
10				
11				
12				

EXPLORATORY TRENCH CROSS SECTION

GEOCON

EXPLORATORY TRENCH TP-69

ORO DE AMADOR
JACKSON, CALIFORNIA
PROJECT S9959-07-03



Job Name Oro De Amador Well No. MW-1

Job Number 25319-001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates _____ Elevation Ground Level _____

_____ Elevation Top of Casing _____

Drilling Summary

Total Depth Drilled 14.5' bgs.

Borehole Diameter 8"

Driller Hunt Drilling

Jackson, CA.

Rig Ingersoll-Rand A-200 HSA

Bit(s) _____

Drilling Fluid N/A

Total Depth of Well 14.5' bgs.

Casing Stick-up Height 4'

Surface Completion Stand Pipe

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log _____

Casing String(s): CC=Conductor Casing C=Casing
S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
0' — 9'	C	—
9' — 14'	S	—
14' — 14.5'	ST	—
— —	—	—
— —	—	—

Conductor CC1 -

Casing CC2 -

Casing C1 Schedule 40 PVC, 4", blank

C2 -

Screen S1 Schedule 40 PVC, 4", 0.010" slot

S2 -

Sed. Trap ST 6" Flush Threaded End Cap

Grout Seal Neat Cement with 5% Bentonite (0-6.5' bgs.)

Bentonite Seal 1/4" Bentonite Pellets (6.5-7.5' bgs.)

Filter Pack Lonestar #2/12 Sand (7.5-14.5' bgs.)

Centralizers 1 Stainless at 8 ' bgs.

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling: Pilot	-	-	-	-
Ream: Well	-	-	-	-
Geophys.Logging	-	-	-	-
Casing	-	-	-	-
Filter Placement	-	-	-	-
Pre-Development	-	-	-	-
Cementing	-	-	-	-

Well Development	Date	Time	Date	Time
	-	-	-	-

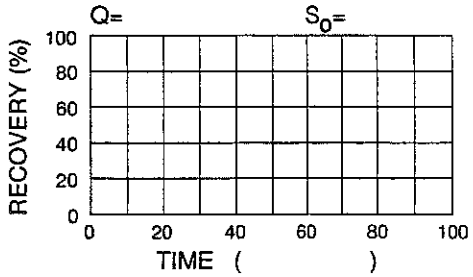
Initial Water Level _____

Final Water Level _____

Stabalization Test Data

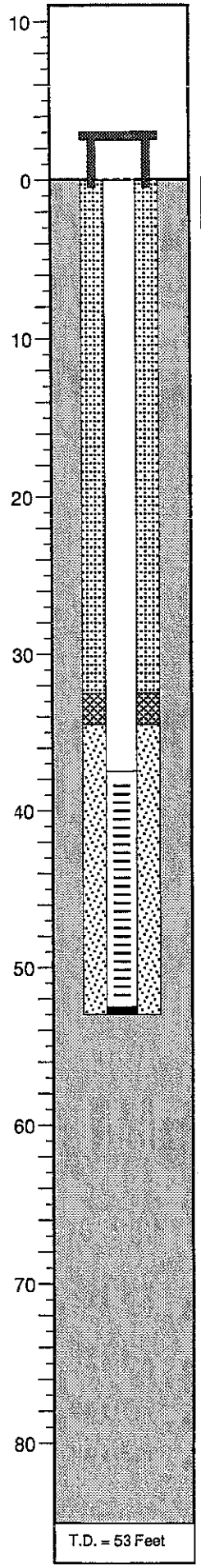
Time	pH	Spec. Cond.	Temp (C)	Turbidity
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Recovery Data



Comments: _____

Observed by: D. Zuber Client: Oro De Amador Location: Kennedy Mine Tailings



Job Name Oro De Amador **Well No.** MW-2

Job Number 25319-001-044 **Boring No. X-Ref**

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates _____ Elevation Ground Level _____

_____ Elevation Top of Casing _____

Drilling Summary

Total Depth Drilled 52.9' bgs.

Borehole Diameter 8"

Driller Hunt Drilling

Jackson, CA.

Rig Ingersoll-Rand A-220 to 46' , TH60 to 52.9'

Bit(s) _____

Drilling Fluid None, Air

Total Depth of Well 53' bgs.

Casing Stick-up Height 3'

Surface Completion Stand Pipe

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log ____

Casing String(s): CC=Conductor Casing C=Casing
S=Screen ST=Sediment Trap

Depth			String(s)	Elevation		
0'	—	37.5'	C	____	—	____
37.5'	—	52.5'	S	____	—	____
52.5'	—	53'	ST	____	—	____
____	—	____	____	____	—	____
____	—	____	____	____	—	____

Conductor CC1 -

Casing CC2 -

Casing C1 Schedule 40 PVC, 4", blank

C2 -

Screen S1 Schedule 40 PVC, 4", 0.010" slot

S2 -

Sed. Trap ST 6" End Cap w/ Drilled Holes

Grout Seal Neat Cement with 5% Bentonite (0-32.5' bgs.)

Bentonite Seal 1/4" Bentonite Pellets (32.5-36.5' bgs.)

Filter Pack Lonestar #2/12 Sand (35.5-53.0' bgs.)

Centralizers Stainless at 20' and 37.5' bgs.

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling: Pilot	-	-	-	-
Ream: Well	-	-	-	-
Geophys.Logging	-	-	-	-
Casing	-	-	-	-
Filter Placement	-	-	-	-
Pre-Development	-	-	-	-
Cementing	-	-	-	-

Well Development	Date	Time	Date	Time
	11/19/92	10:00	11/19/92	12:15

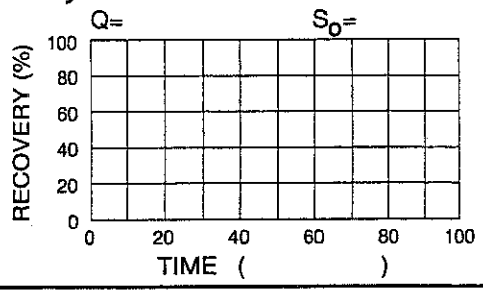
Initial Water Level 40.92' bgs.

Final Water Level _____

Stabalization Test Data

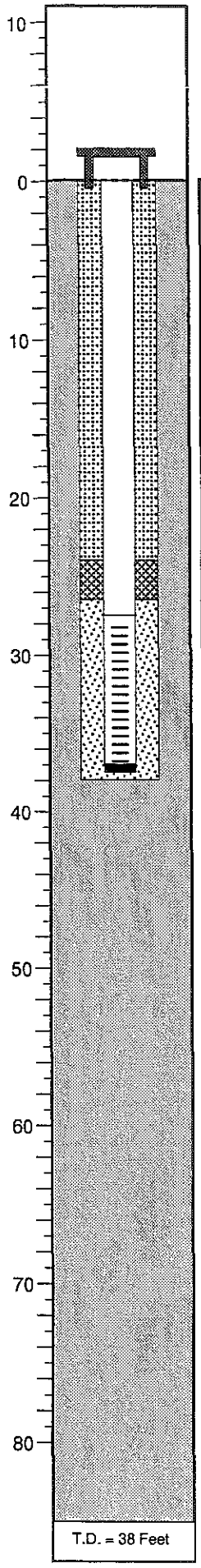
Time	pH	Spec. Cond.	Temp (C)	Turbidity
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Recovery Data



Comments: _____

Observed by: D. Zuber Client: Oro De Amador Location: Kennedy Mine Tailings



Job Name Oro De Amador Well No. MW-3

Job Number 25319-001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates _____ Elevation Ground Level _____

_____ Elevation Top of Casing _____

Drilling Summary

Total Depth Drilled 39' bgs.

Borehole Diameter 9"

Driller Hunt Drilling

Jackson, CA.

Rig Ingersoll-Rand TH60

Bit(s) _____

Drilling Fluid Air

Total Depth of Well 38' bgs.

Casing Stick-up Height 2'

Surface Completion Stand Pipe

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log

Casing String(s): CC=Conductor Casing C=Casing
S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
0' — 27.5'	C	—
27.5' — 37.5'	S	—
37.5' — 38'	ST	—
— —	—	—
— —	—	—

Conductor CC1 -

Casing CC2 -

Casing C1 Schedule 40 PVC, 4", blank

C2 -

Screen S1 Schedule 40 PVC, 4", 0.030" slot

S2 -

Sed. Trap ST 6" Flush Threaded End Cap

Grout Seal Neat Cement with 5% Bentonite (0-24' bgs.)

Bentonite Seal 1/4" Bentonite Pellets (24-26.5' bgs.)

Filter Pack Lonestar #3 Sand (26.5-38' bgs.)

Centralizers Stainless at 27.5' bgs.

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling: Pilot	-	-	-	-
Ream: Well	-	-	-	-
Geophys.Logging	-	-	-	-
Casing	-	-	-	-
Filter Placement	-	-	-	-
Pre-Development	-	-	-	-
Cementing	-	-	-	-

	Date	Time	Date	Time
Well Development	11/19/92	12:30	11/19/92	13:45

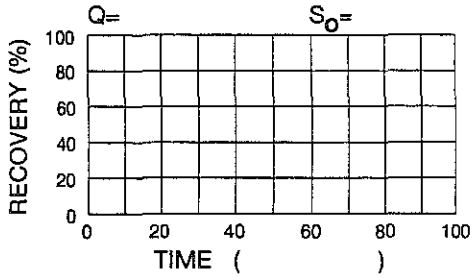
Initial Water Level _____

Final Water Level _____

Stabalization Test Data

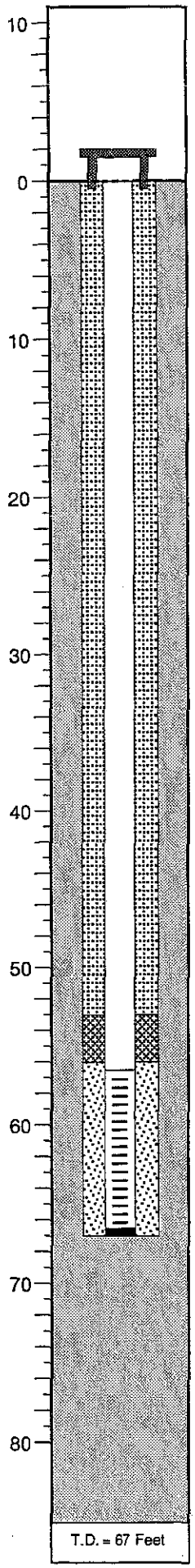
Time	pH	Spec. Cond.	Temp (C)	Turbidity
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Recovery Data



Comments: _____

Observed by: D. Zuber Client: Oro De Amador Location: Kennedy Mine Tailings



Job Name Oro De Amador **Well No.** MW-4

Job Number 25319-001-044 **Boring No. X-Ref**

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates

Elevation Ground Level

Elevation Top of Casing

Drilling Summary

Total Depth Drilled 67' bgs.
Borehole Diameter 8.625 "
Driller Hunt Drilling
Jackson, CA.
Rig Ingersoll-Rand TH60
Bit(s) Air Hammer

Drilling Fluid Air

Total Depth of Well 67' bgs.
Casing Stick-up Height 3'
Surface Completion Stand Pipe

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log

Casing String(s): CC=Conductor Casing C=Casing
S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
0' — 57'	C	—
57' — 67'	S	—
67' — 67.5'	ST	—
—		—
—		—

Conductor CC1 -
Casing CC2 -
Casing C1 Schedule 40 PVC, 4", blank
C2 -
Screen S1 Schedule 40 PVC, 4", 0.030 "slot
S2 -
Sed. Trap ST Slip Cap with Stainless Screws
Grout Seal Neat Cement with 5% Bentonite (0-53' bgs.)
Bentonite Seal 1/4" Bentonite Pellets (53-56' bgs.)
Filter Pack Lonestar #3 Sand (56-67' bgs.)
Centralizers Stainless at 57' bgs.

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling: Pilot	-	-	-	-
Ream: Well	-	-	-	-
Geophys.Logging	-	-	-	-
Casing	-	-	-	-
Filter Placement	-	-	-	-
Pre-Development	-	-	-	-
Cementing	-	-	-	-

	Date	Time	Date	Time
Well Development	11/19/92	13:55	11/19/92	15:30

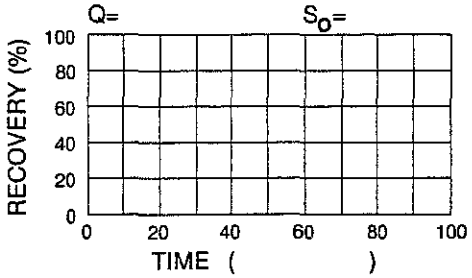
Initial Water Level

Final Water Level

Stabalization Test Data

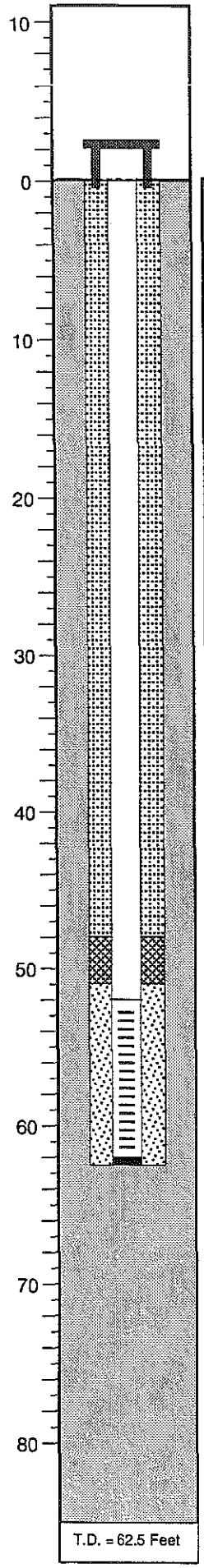
Time	pH	Spec. Cond.	Temp (C)	Turbidity
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Recovery Data



Comments:

Observed by: D. Zuber Client: Oro De Amador Location: Kennedy Mine Tailings



Job Name Oro De Amador **Well No.** MW-5

Job Number 25319-001-044 **Boring No. X-Ref**

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates

Elevation Ground Level

Elevation Top of Casing

Drilling Summary

Total Depth Drilled 62.5' bgs.

Borehole Diameter 8.75"

Driller Hunt Drilling
Jackson, CA.

Rig Ingersoll-Rand TH60

Bit(s)

Drilling Fluid Air

Total Depth of Well 62.25' bgs.

Casing Stick-up Height 2.5'

Surface Completion Stand Pipe

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log

Casing String(s): CC=Conductor Casing C=Casing
S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
0' — 52'	C	—
52' — 62'	S	—
62' — 62.5'	ST	—
— —		—
— —		—

Conductor CC1 -

Casing CC2 -

Casing C1 Schedule 40 PVC, 4", blank

C2 -

Screen S1 Schedule 40 PVC, 4", 0.030" slot

S2 -

Sed. Trap ST 6" Flush Thread End Cap

Grout Seal Neat Cement with 5% Bentonite (0-48' bgs.)

Bentonite Seal 1/4" Bentonite Pellets (48-51' bgs.)

Filter Pack Lonestar #3 Sand (51-62.5 ' bgs.)

Centralizers Stainless at 52' bgs.

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling: Pilot	-	-	-	-
Ream: Well	-	-	-	-
Geophys.Logging	-	-	-	-
Casing	-	-	-	-
Filter Placement	-	-	-	-
Pre-Development	-	-	-	-
Cementing	-	-	-	-

	Date	Time	Date	Time
Well Development	11/19/92	15:50	11/19/92	16:45

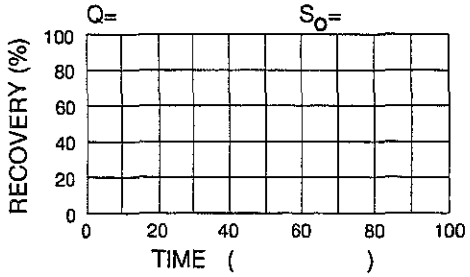
Initial Water Level

Final Water Level

Stabalization Test Data

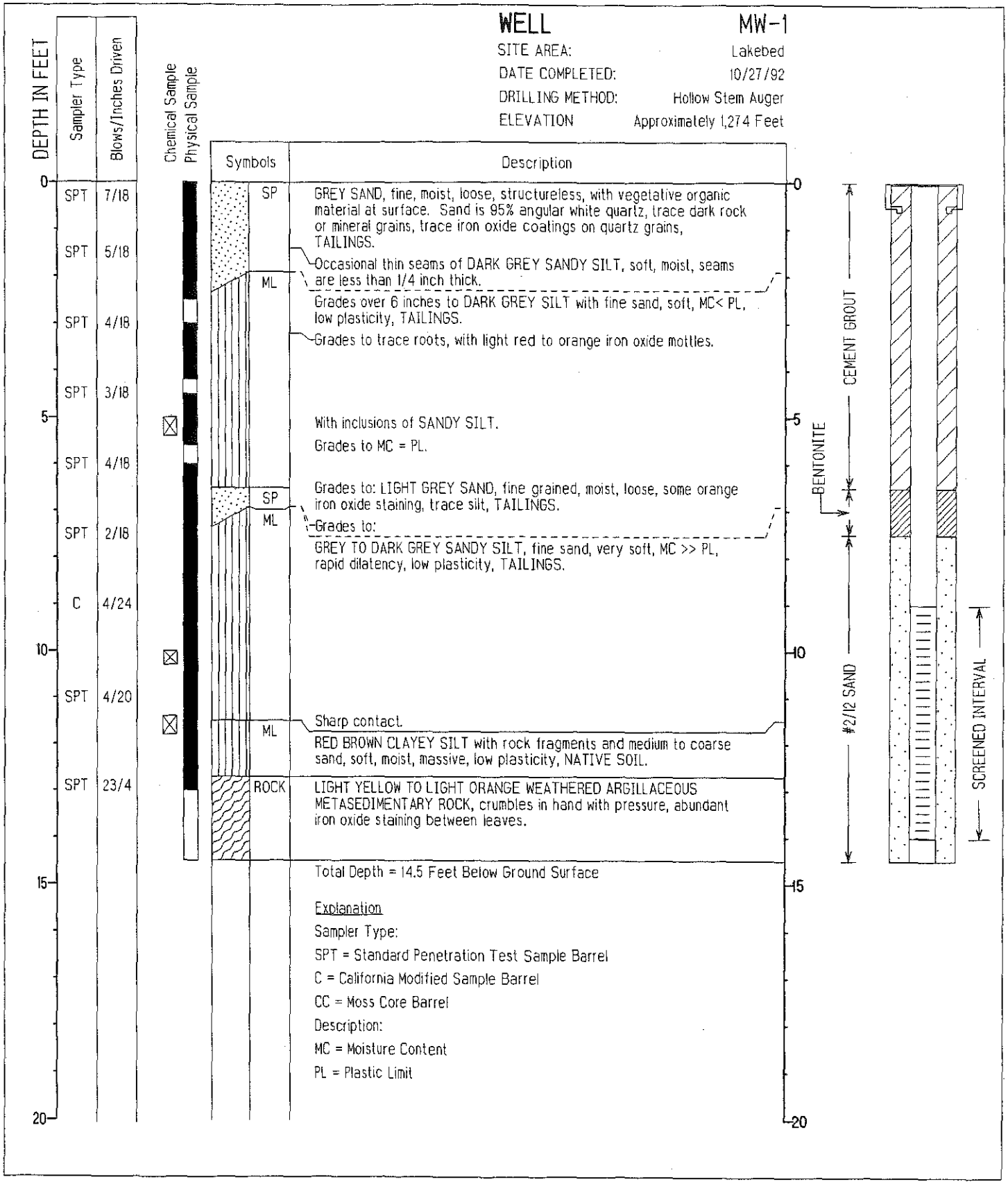
Time	pH	Spec. Cond.	Temp (C)	Turbidity
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Recovery Data



Comments:

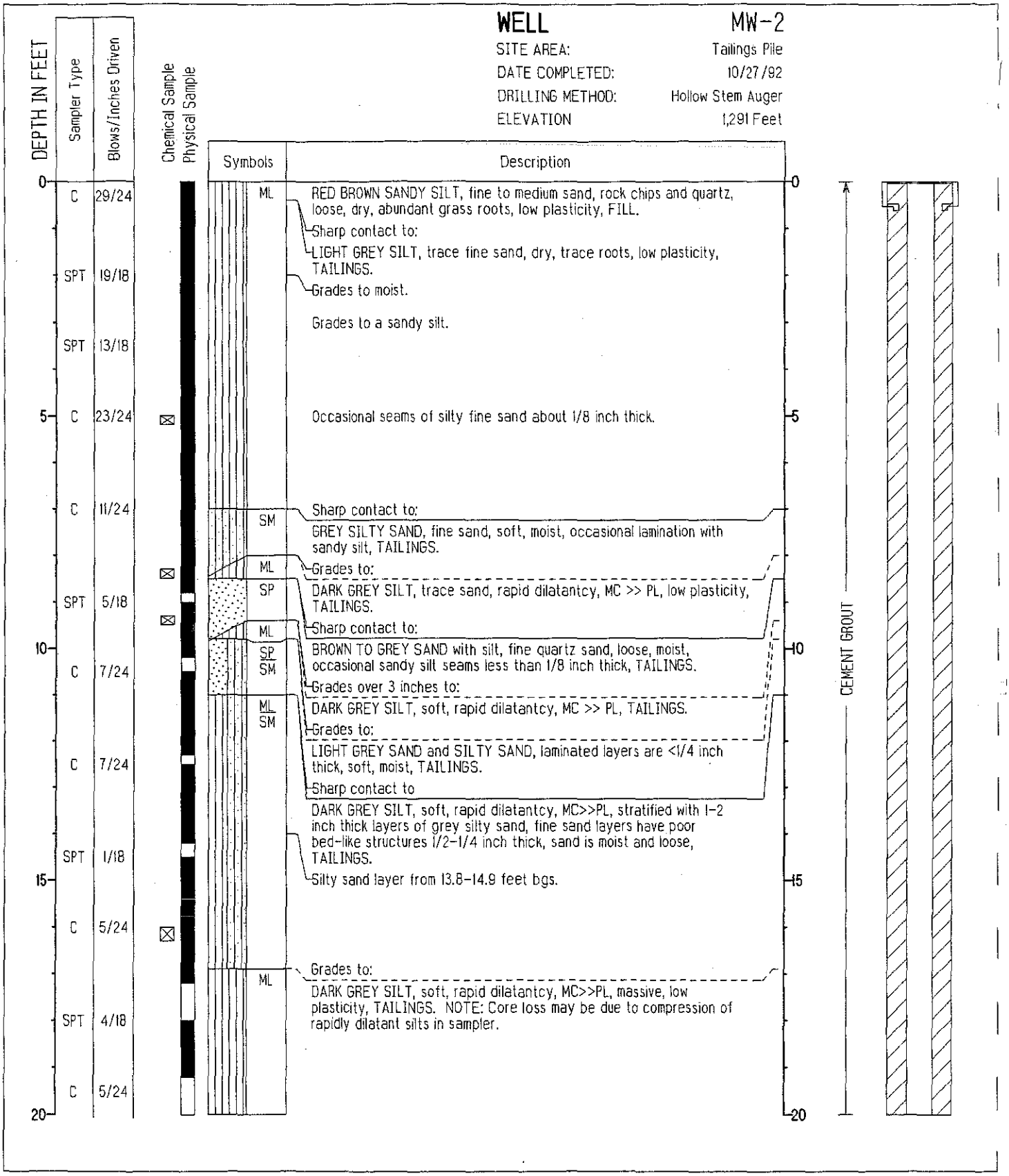
Observed by: D. Zuber Client: Oro De Amador Location: Kennedy Mine Tailings

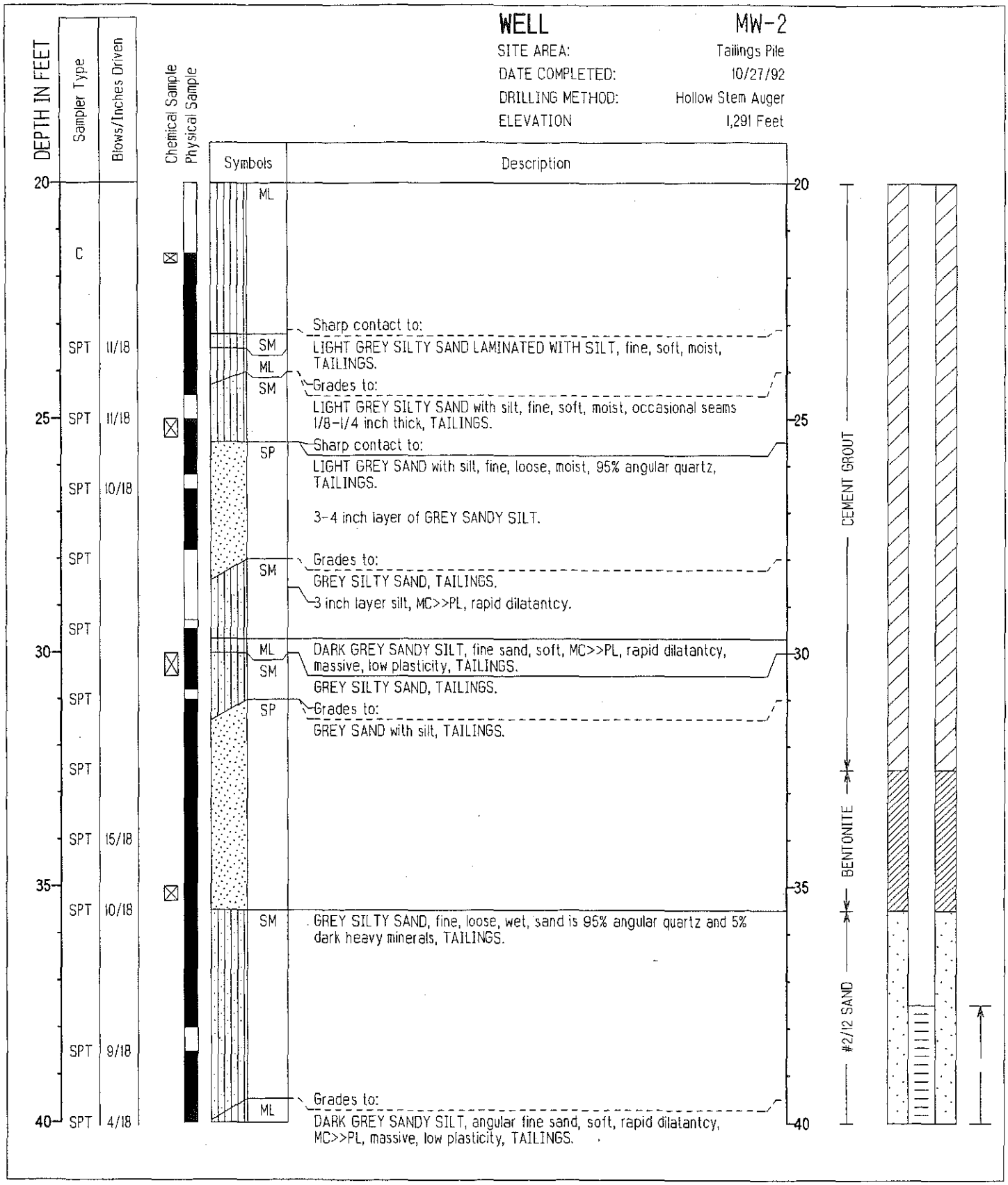


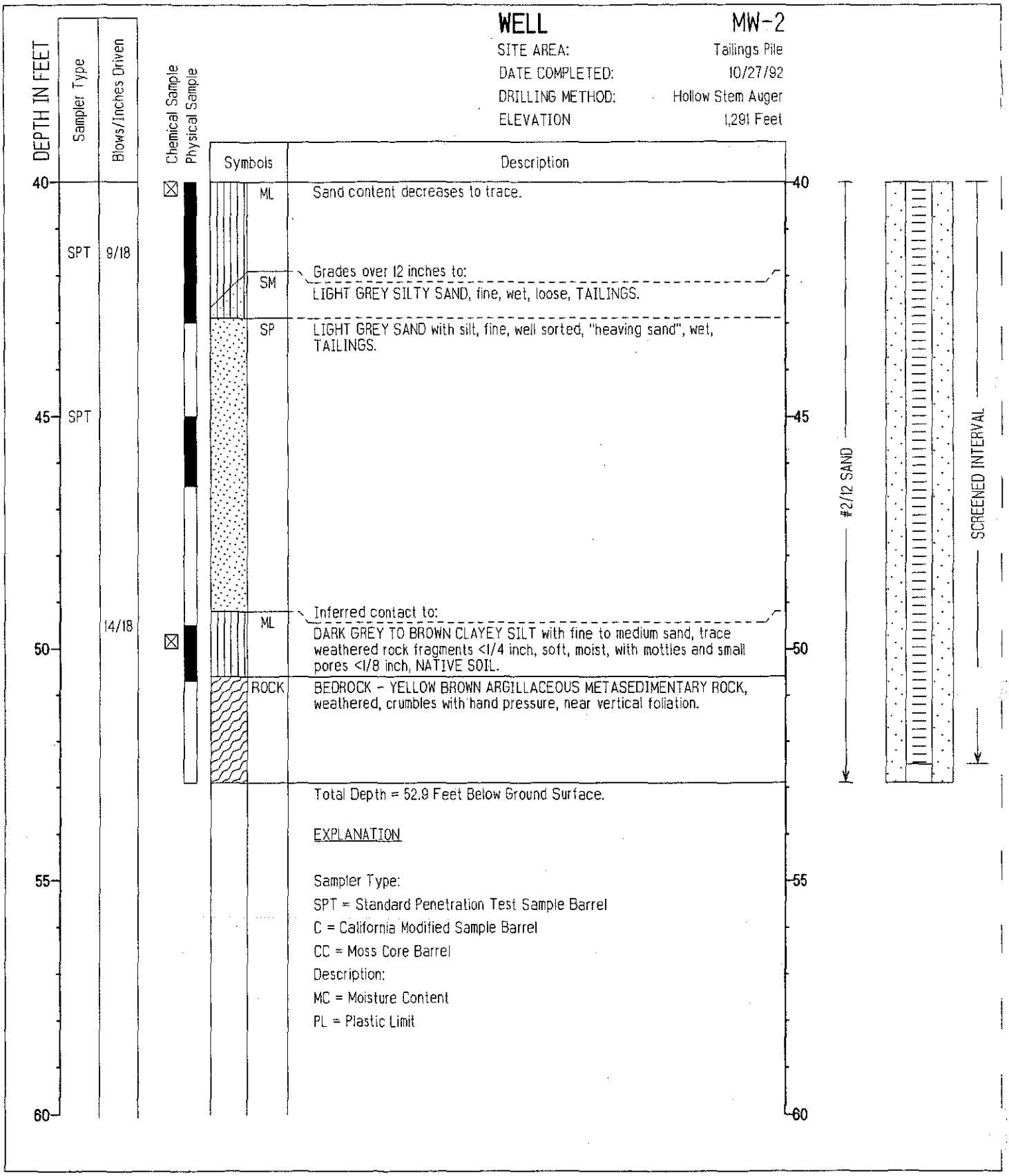
DAMES & MOORE

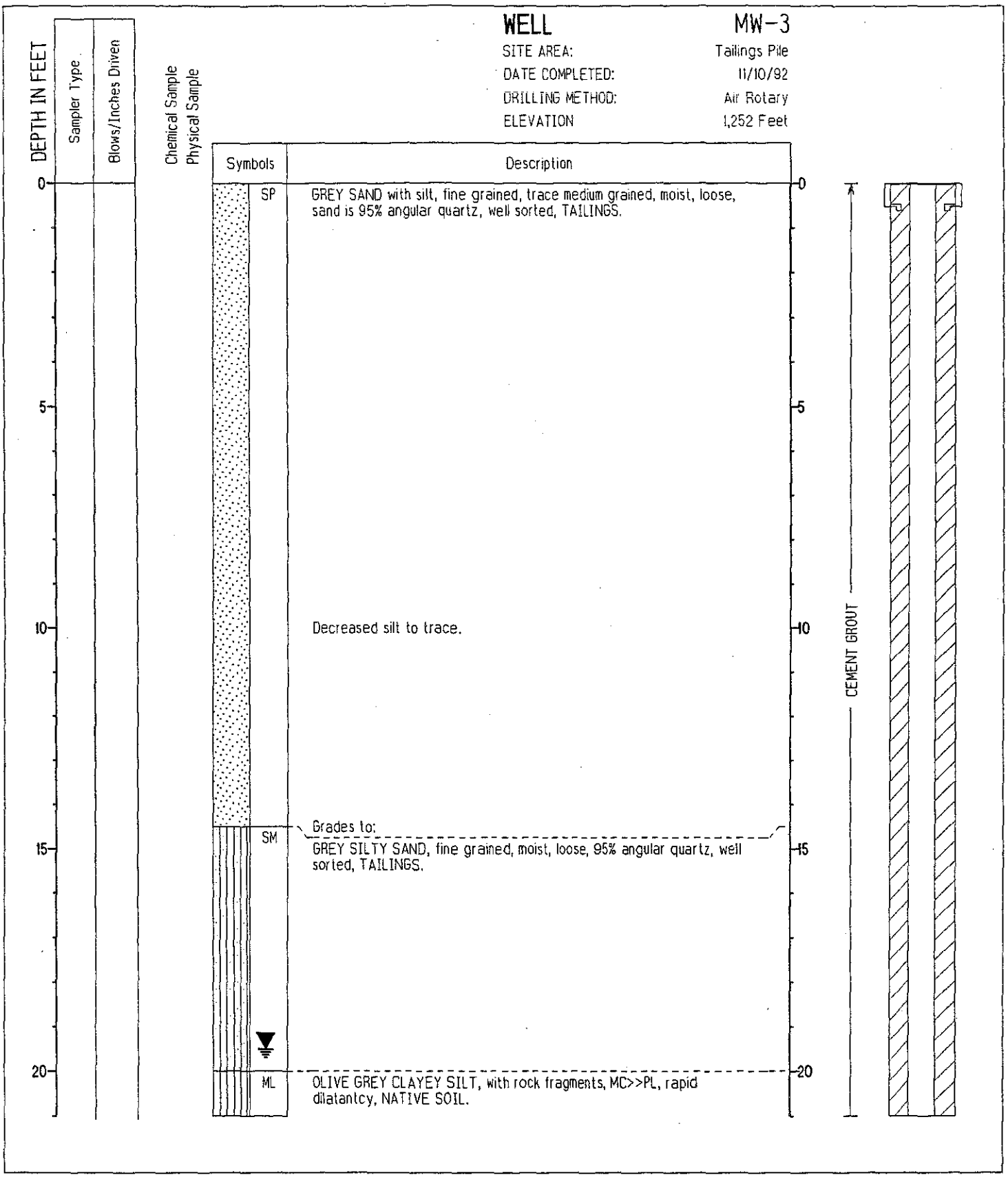
25319-001-044

KENNEDY MINE TAILINGS
Oro de Amador
Jackson, California


WELL MW-2
SITE AREA: Tailings Pile
DATE COMPLETED: 10/27/92
DRILLING METHOD: Hollow Stem Auger
ELEVATION 1,291 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
0
C 29/24
ML
RED BROWN SANDY SILT, fine to medium sand, rock chips and quartz, loose, dry, abundant grass roots, low plasticity, FILL.
Sharp contact to:
LIGHT GREY SILT, trace fine sand, dry, trace roots, low plasticity, TAILINGS.
SPT 19/18
Grades to moist.
Grades to a sandy silt.
SPT 13/18
5
C 23/24
Occasional seams of silty fine sand about 1/8 inch thick.
C 11/24
Sharp contact to:
SM
GREY SILTY SAND, fine sand, soft, moist, occasional lamination with sandy silt, TAILINGS.
ML
Grades to:
SP
SPT 5/18
DARK GREY SILT, trace sand, rapid dilatantcy, MC >> PL, low plasticity, TAILINGS.
ML
Sharp contact to:
10
SP
SM
C 7/24
BROWN TO GREY SAND with silt, fine quartz sand, loose, moist, occasional sandy silt seams less than 1/8 inch thick, TAILINGS.
Grades over 3 inches to:
ML
SM
DARK GREY SILT, soft, rapid dilatantcy, MC >> PL, TAILINGS.
Grades to:
LIGHT GREY SAND and SILTY SAND, laminated layers are <1/4 inch thick, soft, moist, TAILINGS.
C 7/24
Sharp contact to
DARK GREY SILT, soft, rapid dilatantcy, MC>>PL, stratified with 1-2 inch thick layers of grey silty sand, fine sand layers have poor bed-like structures 1/2-1/4 inch thick, sand is moist and loose, TAILINGS.
SPT 1/18
15
Silty sand layer from 13.8-14.9 feet bgs.
C 5/24
Grades to:
ML
DARK GREY SILT, soft, rapid dilatantcy, MC>>PL, massive, low plasticity, TAILINGS. NOTE: Core loss may be due to compression of rapidly dilatant silts in sampler.
SPT 4/18
C 5/24
20
CEMENT GROUT


WELL MW-2
SITE AREA: Tailings Pile
DATE COMPLETED: 10/27/92
DRILLING METHOD: Hollow Stem Auger
ELEVATION 1,291 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
C
SPT 11/18
SPT 11/18
SPT 10/18
SPT 15/18
SPT 10/18
SPT 9/18
SPT 4/18
ML
Sharp contact to:
SM
LIGHT GREY SILTY SAND LAMINATED WITH SILT, fine, soft, moist, TAILINGS.
ML
SM
Grades to:
LIGHT GREY SILTY SAND with silt, fine, soft, moist, occasional seams 1/8-1/4 inch thick, TAILINGS.
SP
Sharp contact to:
LIGHT GREY SAND with silt, fine, loose, moist, 95% angular quartz, TAILINGS.
3-4 inch layer of GREY SANDY SILT.
Grades to:
SM
GREY SILTY SAND, TAILINGS.
3 inch layer silt, MC>>PL, rapid dilatantcy.
ML
DARK GREY SANDY SILT, fine sand, soft, MC>>PL, rapid dilatantcy, massive, low plasticity, TAILINGS.
SM
GREY SILTY SAND, TAILINGS.
SP
Grades to:
GREY SAND with silt, TAILINGS.
SM
GREY SILTY SAND, fine, loose, wet, sand is 95% angular quartz and 5% dark heavy minerals, TAILINGS.
ML
Grades to:
DARK GREY SANDY SILT, angular fine sand, soft, rapid dilatantcy, MC>>PL, massive, low plasticity, TAILINGS.
20
25
30
35
40
CEMENT GROUT
BENTONITE
#2/12 SAND

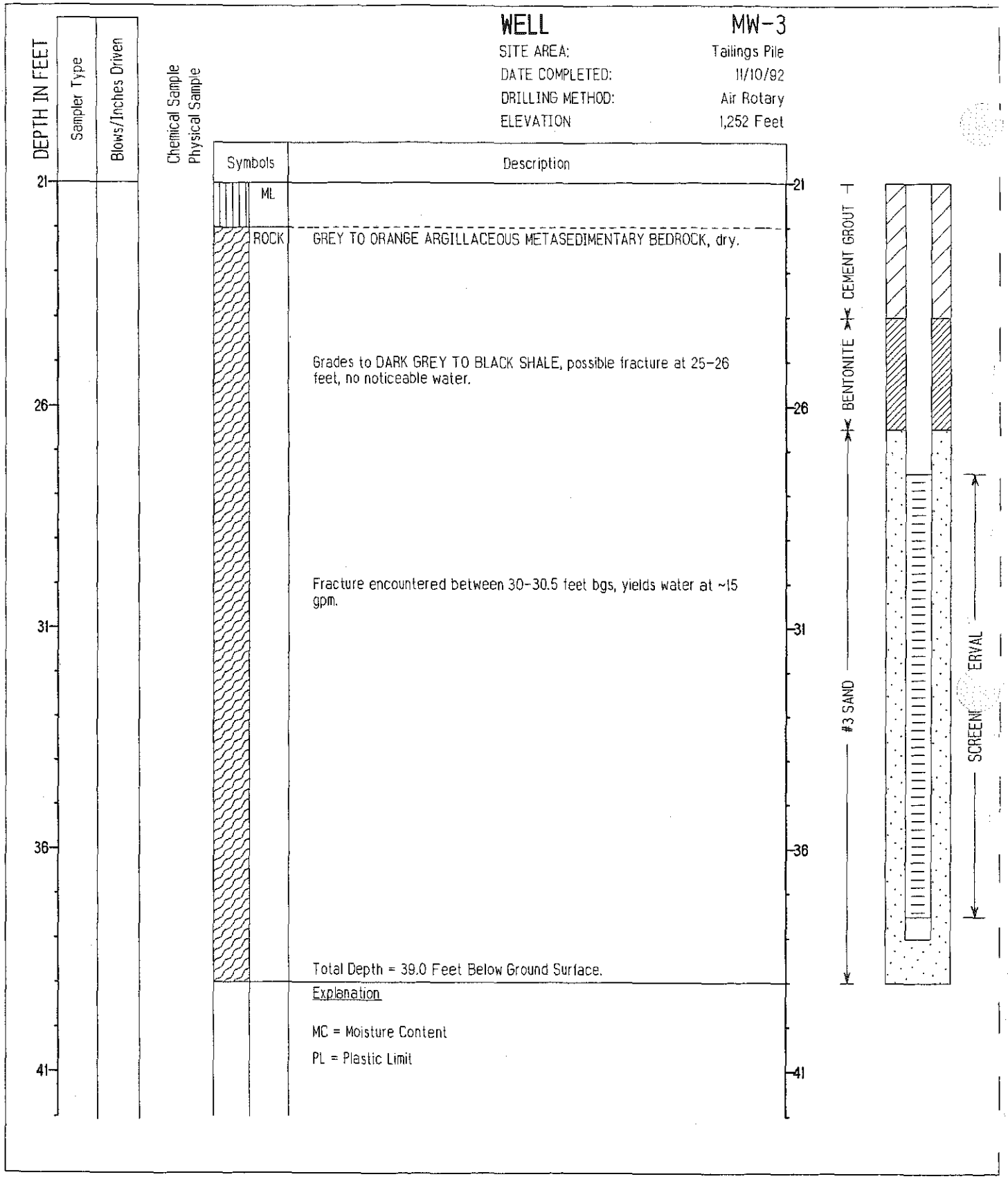

WELL MW-2
SITE AREA: Tailings Pile
DATE COMPLETED: 10/27/92
DRILLING METHOD: Hollow Stem Auger
ELEVATION 1,291 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
40
45
50
55
60
SPT 9/18
SPT
14/18
ML
Sand content decreases to trace.
SM
Grades over 12 inches to:
LIGHT GREY SILTY SAND, fine, wet, loose, TAILINGS.
SP
LIGHT GREY SAND with silt, fine, well sorted, "heaving sand", wet, TAILINGS.
ML
Inferred contact to:
DARK GREY TO BROWN CLAYEY SILT with fine to medium sand, trace weathered rock fragments <1/4 inch, soft, moist, with mottles and small pores <1/8 inch, NATIVE SOIL.
ROCK
BEDROCK - YELLOW BROWN ARGILLACEOUS METASEDIMENTARY ROCK, weathered, crumbles with hand pressure, near vertical foliation.
#2/12 SAND
SCREENED INTERVAL
Total Depth = 52.9 Feet Below Ground Surface.
EXPLANATION
Sampler Type:
SPT = Standard Penetration Test Sample Barrel
C = California Modified Sample Barrel
CC = Moss Core Barrel
Description:
MC = Moisture Content
PL = Plastic Limit

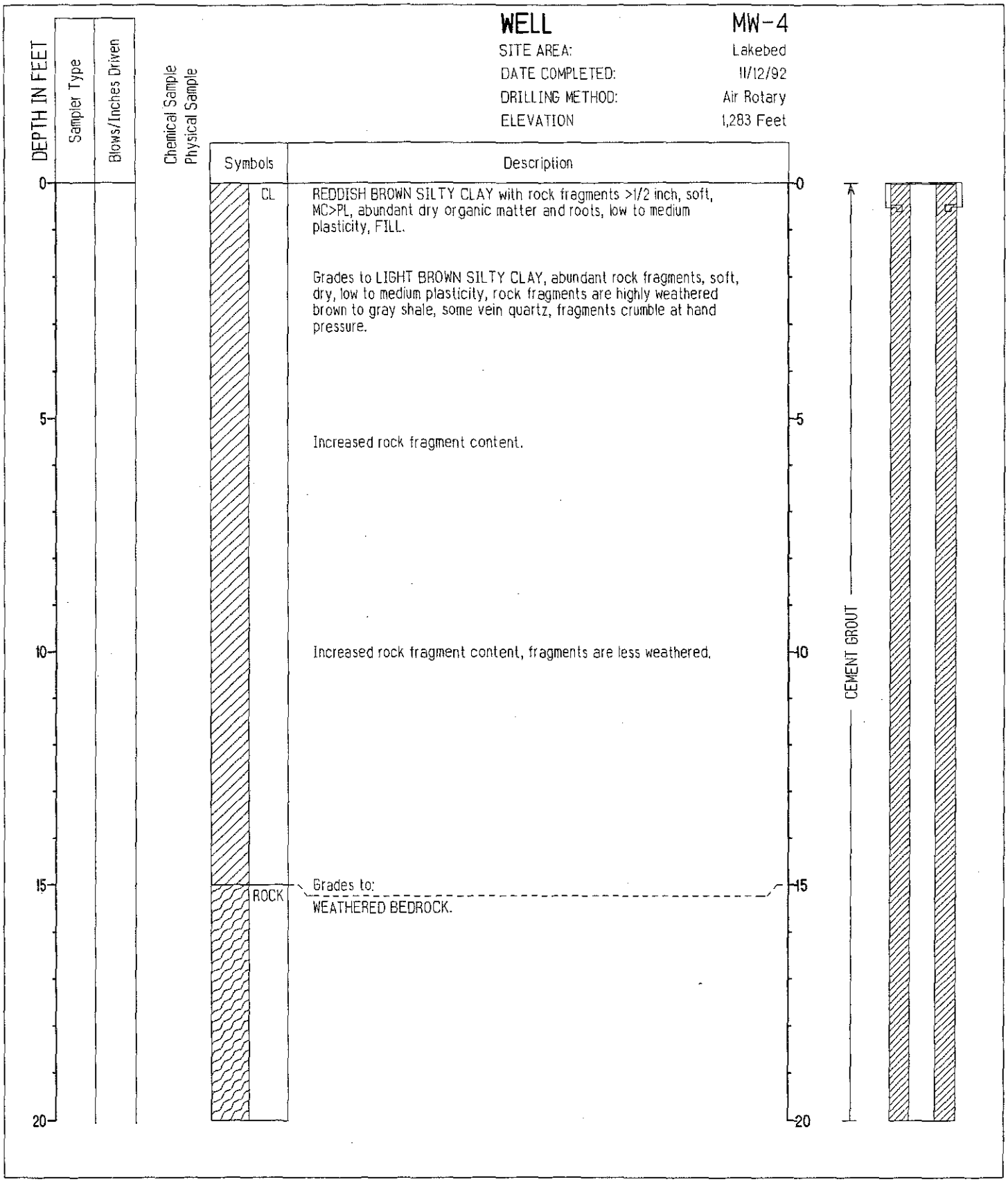


KENNEDY MINE TAILINGS
Oro de Amador
Jackson, California

DAMES & MOORE

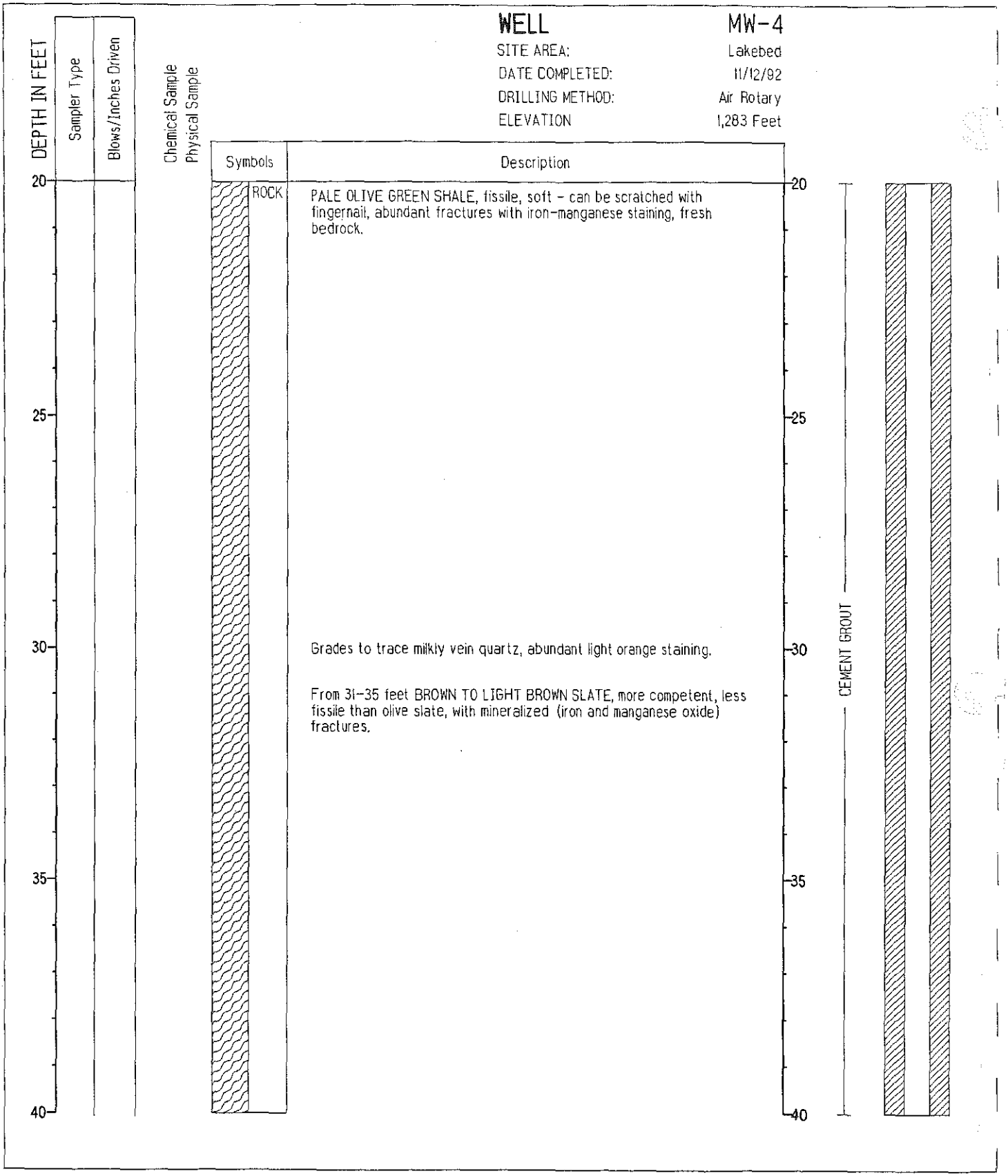
25319-001-044


WELL MW-3
SITE AREA: Tailings Pile
DATE COMPLETED: 11/10/92
DRILLING METHOD: Air Rotary
ELEVATION 1,252 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
21
26
31
36
41
ML
ROCK
GREY TO ORANGE ARGILLACEOUS METASEDIMENTARY BEDROCK, dry.
Grades to DARK GREY TO BLACK SHALE, possible fracture at 25-26 feet, no noticeable water.
Fracture encountered between 30-30.5 feet bgs, yields water at ~15 gpm.
Total Depth = 39.0 Feet Below Ground Surface.
Explanation
MC = Moisture Content
PL = Plastic Limit
BENTONITE
CEMENT GROUT
#3 SAND
SCREENERVAL



KENNEDY MINE TAILINGS
Oro de Amador
Jackson, California

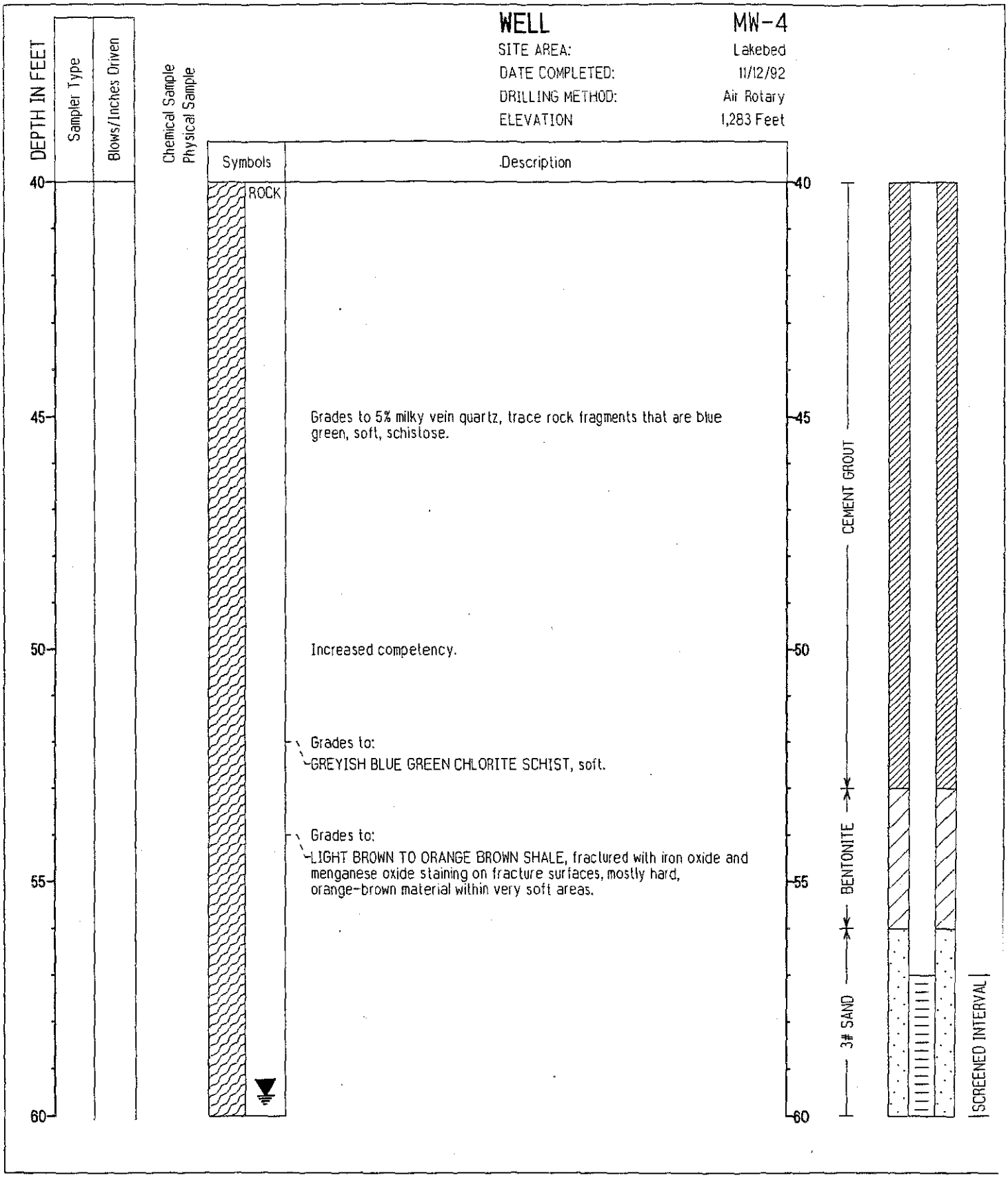
DAMES & MOORE



KENNEDY MINE TAILIN
Oro de Amador
Jackson, California

DAMES & MOORE

25319-001-044

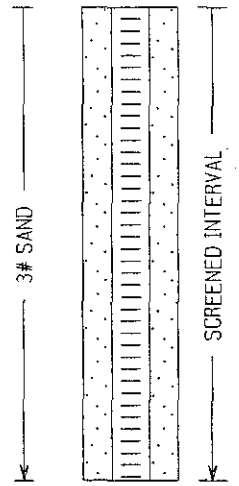

WELL MW-4
SITE AREA: Lakebed
DATE COMPLETED: 11/12/92
DRILLING METHOD: Air Rotary
ELEVATION 1,283 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
ROCK
Grades to 5% milky vein quartz, trace rock fragments that are blue green, soft, schistose.
Increased competency.
Grades to:
GREYISH BLUE GREEN CHLORITE SCHIST, soft.
Grades to:
LIGHT BROWN TO ORANGE BROWN SHALE, fractured with iron oxide and menganese oxide staining on fracture surfaces, mostly hard, orange-brown material within very soft areas.
CEMENT GROUT
BENTONITE
3# SAND
SCREENED INTERVAL
40
45
50
55
60

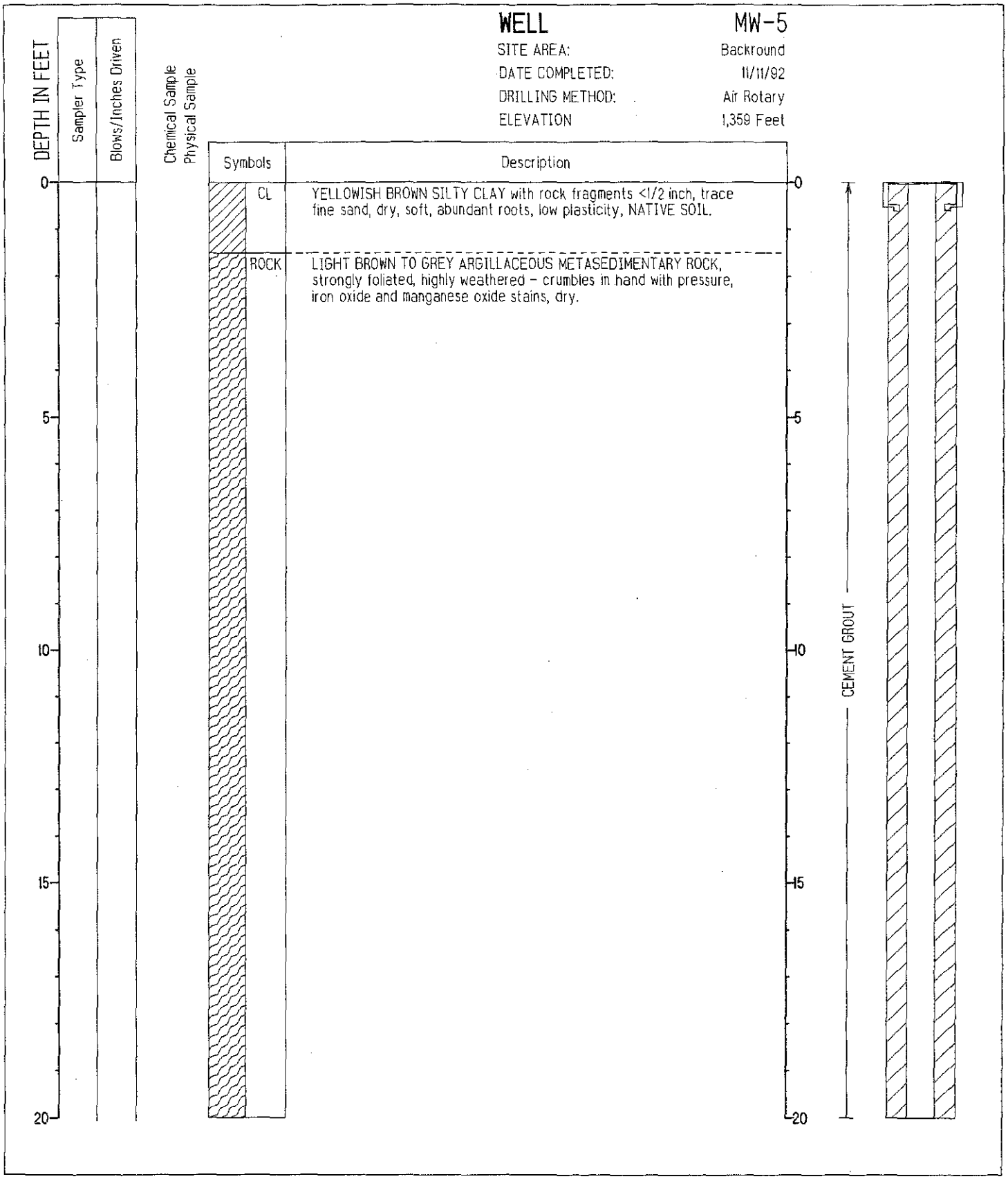
WELL	MW-4
SITE AREA:	Lakebed
DATE COMPLETED:	11/12/92
DRILLING METHOD:	Air Rotary
ELEVATION	1,283 Feet

DEPTH IN FEET | Sampler Type | Blows/Inches Driven | Chemical Sample / Physical Sample

Symbols	Description
ROCK	Water producing fracture at 60 feet bgs. Water level reached 26 feet at 1200.
	Grades to trace vein filling quartz and calcite.
	Total Depth = 67 Feet Below Ground Surface.

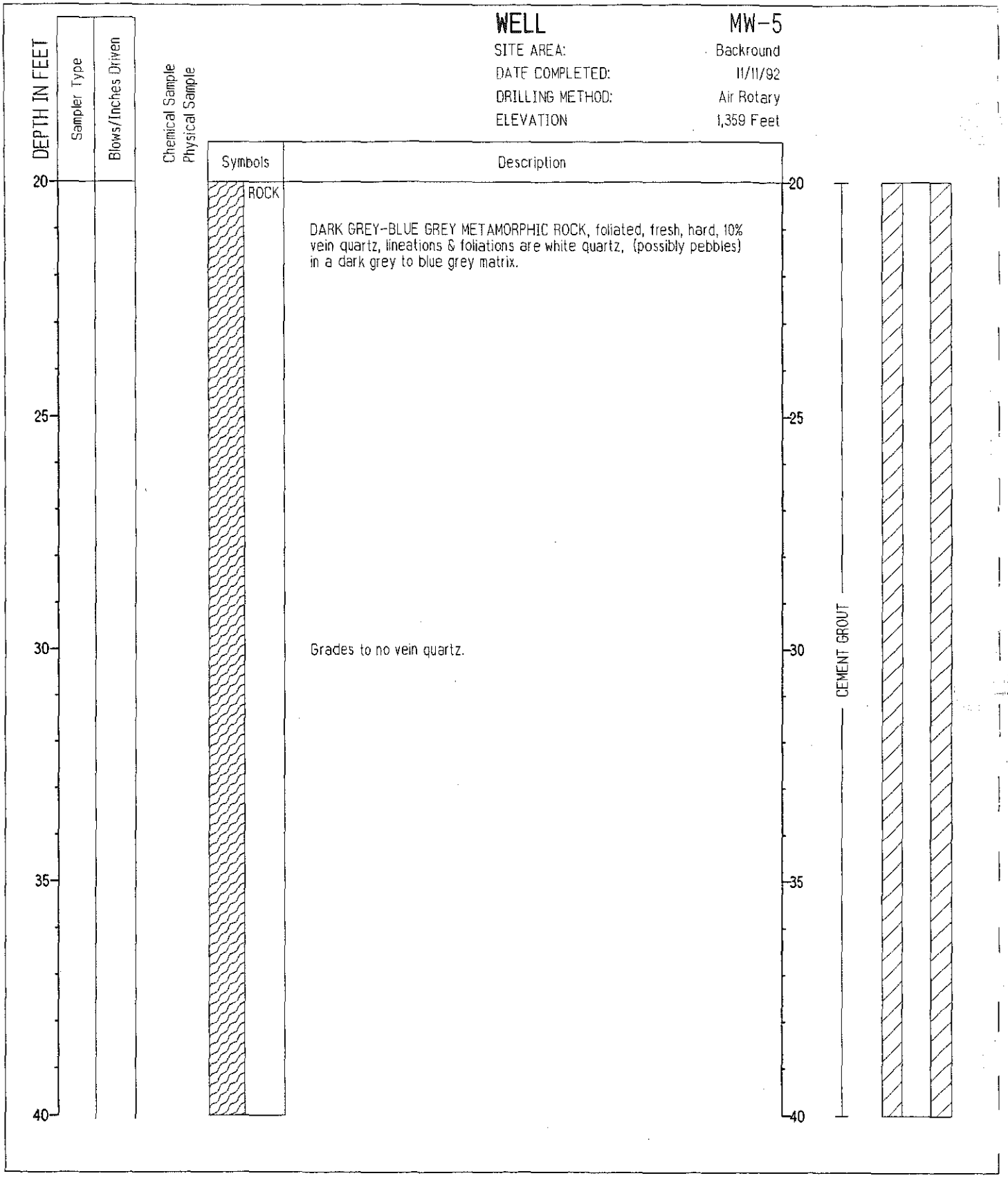
Explanation
MC = Moisture Content
PL = Plastic Limit





KENNEDY MINE TAILINGS
Oro de Amador
Jackson, California

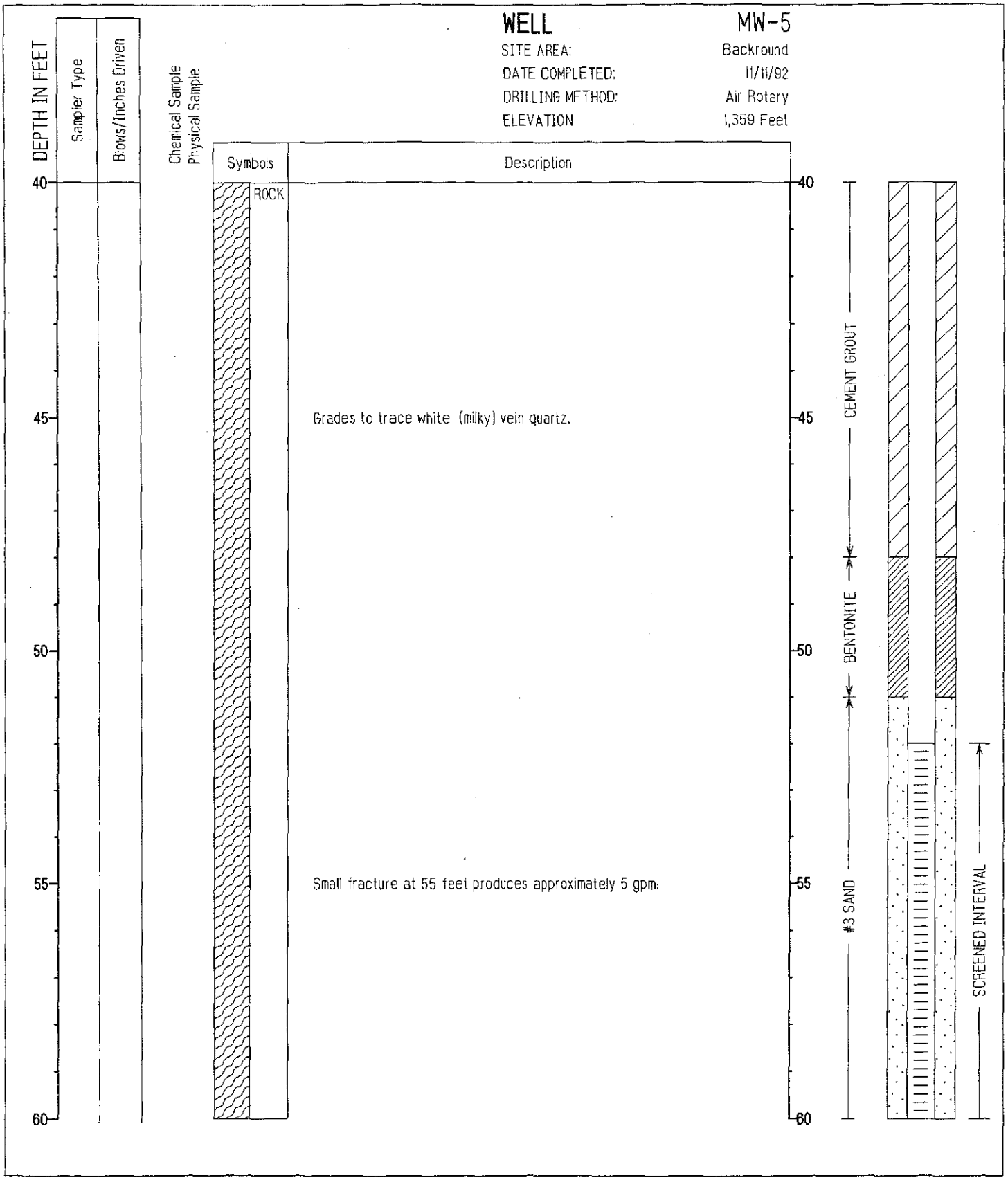
DAMES & MOORE

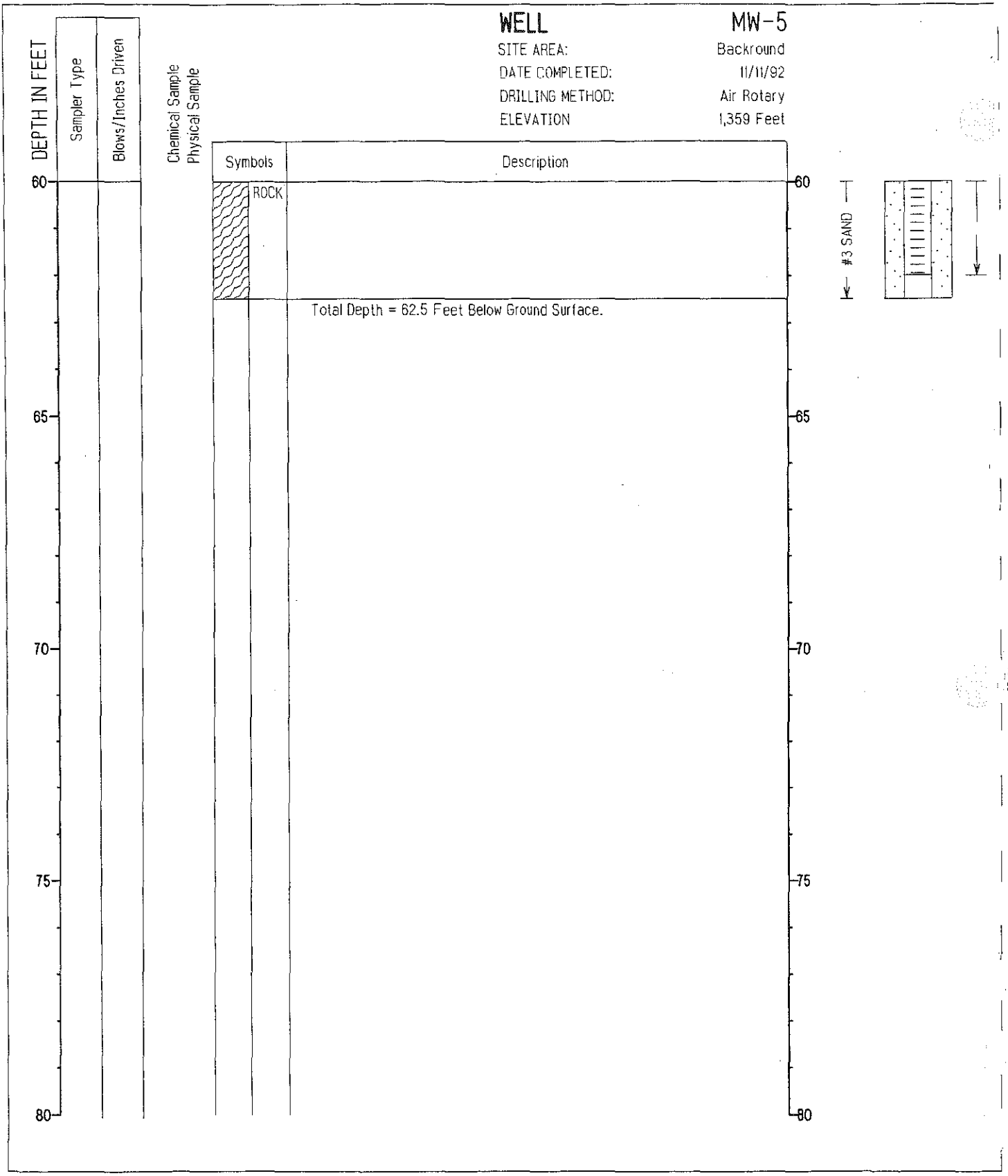


KENNEDY MINE TAILIN
Oro de Amador
Jackson, California

DAMES & MOORE

25319-001-044


WELL MW-5
SITE AREA: Backround
DATE COMPLETED: 11/11/92
DRILLING METHOD: Air Rotary
ELEVATION 1,359 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
ROCK
Grades to trace white (milky) vein quartz.
Small fracture at 55 feet produces approximately 5 gpm.
40
45
50
55
60
CEMENT GROUT
BENTONITE
#3 SAND
SCREENED INTERVAL


WELL
MW-5
SITE AREA:
Backround
DATE COMPLETED:
11/11/92
DRILLING METHOD:
Air Rotary
ELEVATION
1,359 Feet
DEPTH IN FEET
Sampler Type
Blows/Inches Driven
Chemical Sample
Physical Sample
Symbols
Description
ROCK
Total Depth = 62.5 Feet Below Ground Surface.
#3 SAND
60
65
70
75
80

ORO DE AMADOR

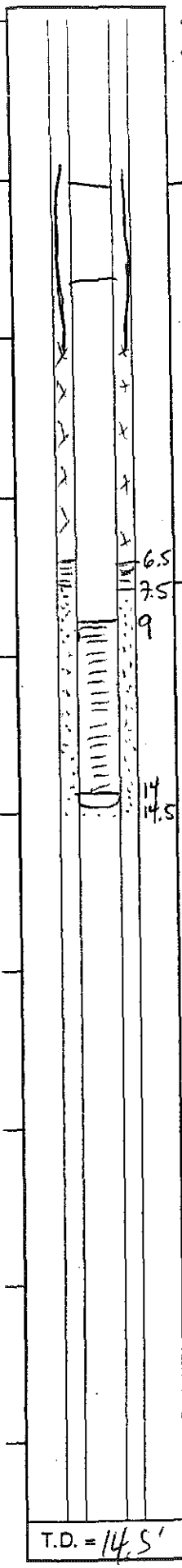
Job Name ~~KENNEDY~~ MINE Well No. MW-1

Job Number 25319-001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates Elevation Ground Level

Elevation Top of Casing



Drilling Summary

Total Depth Drilled 14.5' bgs

Borehole Diameter 8" dia

Driller HUNT Drilling, out of Jackson, CA

Rig INGERSOL-RAND A-200 HSA

Bit(s)

Drilling Fluid N/A

Total Depth of Well 14.5'

Casing Stick-up Height 4"

Surface Completion Standpipe

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys.Logging				
Casing				
Filter Placement				
Pre-Development				
Cementing				

Well Development

Date	Time	Date	Time

Initial Water Level

Final Water Level

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log

Casing String(s): CC=Conductor Casing C=Casing S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
0 – 9	~~Blank~~ C	–
9 – 14	~~Screen~~ S	–
14 – 14.5	~~End Cap~~ ST	–
–		–
–		–

Conductor CC1 ~~0-9' Sch 40 PVC 4"~~

Casing CC2

Casing C1 Schedule 40 PVC 4" blank

C2 Schedule 40 PVC 4" 0.010 Slot

Screen S1 0.010 – 4" diameter

S2

Sed. Trap ST 6" Flush threaded end cap

Grout Seal Neat cement with 5% bentonite (0-6.5' bgs)

Bentonite Seal ~~Hydrated~~ Bentonite pellets (7.5-6.5' bgs)

Filter Pack #2/12 sand (14.5-7.5' bgs)

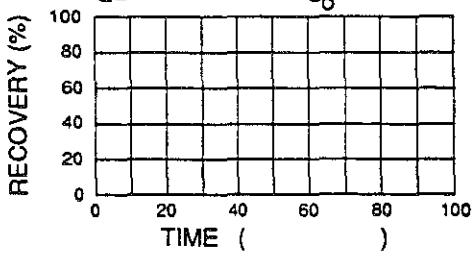
Centralizers One stainless steel ~~above screen~~ at 8' bgs

Stabalization Test Data

Time	pH	Spec. Cond.	Temp (C)	Turbidity

Recovery Data

Q= S_o=



Comments:

Observed by: D Tucker Client: Oro De Amador Location: Kennedy Mine

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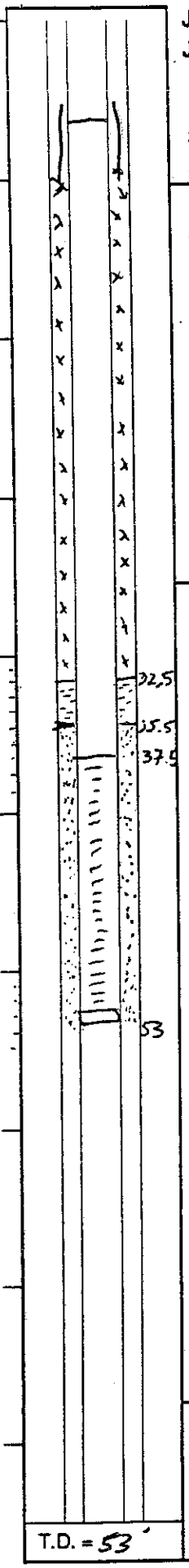
5103

Job Name Kennedy Mine Well No. MW-2
Job Number 25319-001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

40.63

Survey Coordinates Elevation Ground Level
Elevation Top of Casing



Drilling Summary
Total Depth Drilled 52.9'
Borehole Diameter 8"
Driller Hunt Drilling, Jackson, CA
Rig I/R A220 To 46' - T/R TH60 To 52.9
Bit(s)
Drilling Fluid None - Air
Total Depth of Well 53'
Casing Stick-up Height 3'
Surface Completion Standpipe

Well Design & Specifications
Basis: Geologic Log ✓ Geophysical Log
Casing String(s): CC=Conductor Casing C=Casing S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
0 – 37.5	CC1	–
37.5 – 52.5	S1	–
52.5 – 53	ST	–
–		–
–		–

Conductor CC1 37.5' 4" Sch 40 PVC
Casing CC2
Casing C1
C2
Screen S1 15' 0.010 Sch 40 PVC
S2
Sed. Trap ST 6" End Cap - Drilled holes
Grout Seal Neat Cement with 5% bentonite 0 - 32.5' bgs
Bentonite Seal pellets to (32.5' - 35.5' bgs) 1/4" bentonite #2/12 sand
Filter Pack ~~#2/12~~ Lonestar, to (35.5' ~~bgs~~ - 37.5' bgs)
Centralizers ~~top of screen (37.5) and at 20' bgs~~ Stainless at 20' and 37.5' bgs

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys. Logging				
Casing				
Filter Placement				
Pre-Development				
Cementing				

Well Development

Date	Time	Date	Time
11/19/92	1000	11/19/92	1215

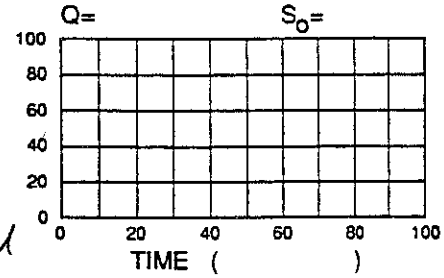
Initial Water Level 40.92
Final Water Level

Stabalization Test Data

Time	pH	Spec. Cond.	Temp (C)	Turbidity

Recovery Data

Q= S_o=



Comments:

Observed by: D. Zubeck Client: Oro de Amador Location: Kennedy Mine

DAMES & MOORE

ORO DE AMADOR

BEDROCK

Job Name Kennedy Mine Well No. MW-3

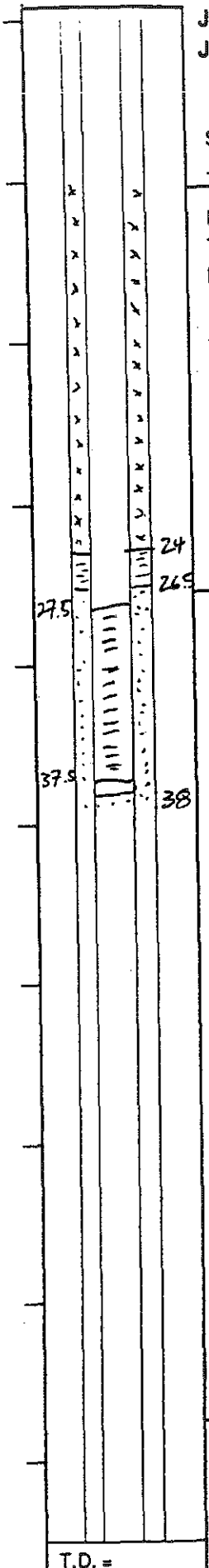
Job Number 25319-001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

10.98

Survey Coordinates Elevation Ground Level

Elevation Top of Casing



Drilling Summary

Total Depth Drilled 39'

Borehole Diameter 9"

Driller HUNT DRILLING, JACKSON CA

Rig TH60

Bit(s) Ingersoll Rand

Drilling Fluid AIR

Total Depth of Well 38'

Casing Stick-up Height 2'

Surface Completion STAND PIPE

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys. Logging				
Casing				
Filter Placement				
Pre-Development				
Cementing				

Well Development

Date	Time	Date	Time
11/19/92	1230	11/19/92	1345

Initial Water Level

Final Water Level

Well Design & Specifications

Basis: Geologic Log ✓ Geophysical Log

Casing String(s): CC=Conductor Casing C=Casing S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
+2.5 – 27.5	C#	–
27.5 – 37.5	S#	–
37.5 – 38	ST#	–
–		–
–		–

Conductor CC1

Casing CC2 Sch 40 PVC 4" Blank

Casing C1 #4 Sch 40 PVC, 4" Blank

C2 Sch 40 PVC, 4", Slot

Screen S1 #4" Sch 40, 0.030 Screen

S2

Sed. Trap ST 6" Flush Threaded end cap

Grout Seal Neat Cement with 5% Bentonite (0-24' bgs)

Bentonite Seal 1/4" Bentonite pellets (24-26.5' bgs)

Filter Pack #3 Sand (26.5-38' bgs) Lonestar

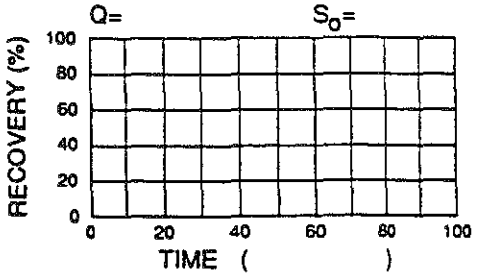
Centralizers Stainless Steel @ at 27.5' bgs

Stabalization Test Data

Time	pH	Spec. Cond.	Temp (C)	Turbidity

Recovery Data

Q= S_o=



Comments:

Observed by: D. Tarter Client: Oro De Amador Location: Kennedy Mine

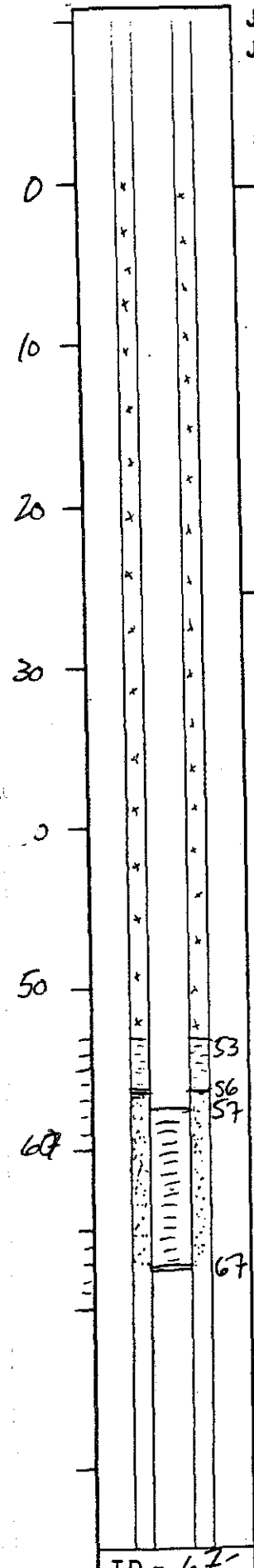
DAMES & MOORE

BEDROCK

Job Name Kennedy Mine Well No. MW-4
Job Number 25319-001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

Survey Coordinates
Elevation Ground Level 11.72
Elevation Top of Casing



Drilling Summary
Total Depth Drilled 67'
Borehole Diameter 9 5/8"
Driller HUNT DRILLING, JACKSON, CA
Rig INGERSOLL RAND TH60
Bit(s) AIR HAMMER
Drilling Fluid AIR
Total Depth of Well 67'
Casing Stick-up Height 3'
Surface Completion STAND PIPE

Well Design & Specifications
Basis: Geologic Log ✓ Geophysical Log
Casing String(s): CC=Conductor Casing C=Casing S=Screen ST=Sediment Trap

Depth	String(s)	Elevation
+3 – 57	C	–
57 – 67	S	–
67 – 67.5	ST	–
–		–
–		–

Conductor CC1
Casing CC2 dual
Casing C1 Sch 40, 4" PVC Blank
C2 PVC, Slot
Screen S1 Sch 40, 4", 0.030 screen
S2 PVC,
Sed. Trap ST Slip Cap @ Stainless screws
Grout Seal Neat cement with 5% bentonite (0 - 53' bgs)
Bentonite Seal 53 - 56' 1/4" bentonite pellets (53 - 56' bgs)
Filter Pack To 56' Lonestar #3 Sand (56-67' bgs)
Centralizers Stainless steel at 57'

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys.Logging				
Casing				
Filter Placement				
Pre-Development				
Cementing				

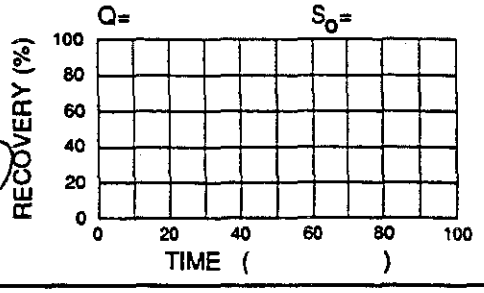
Well Development	Date	Time	Date	Time
	11/19/92	1355	11/19/92	1530

Initial Water Level
Final Water Level

Stabalization Test Data

Time	pH	Spec. Cond.	Temp (C)	Turbidity

Recovery Data



Comments:

Observed by: D. ZUBER Client: Ore de Arnedo Location: Kennedy Mine

DAMES & MOORE

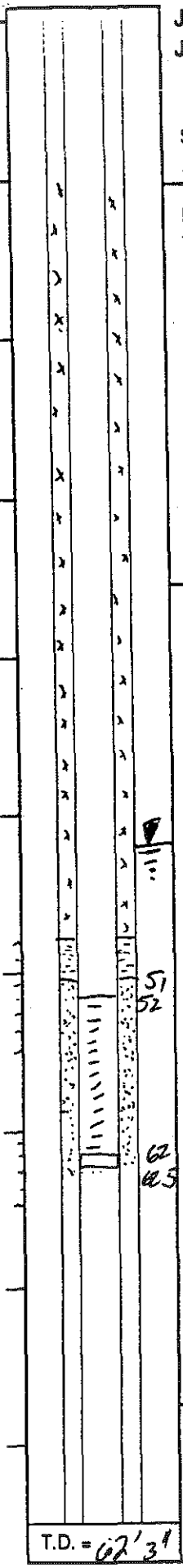
BEDROCK

Job Name Kennedy Mine Well No. MW-5
Job Number 25319.001-044 Boring No. X-Ref

MONITORING WELL CONSTRUCTION SUMMARY

39.25

Survey Coordinates
Elevation Ground Level
Elevation Top of Casing



Drilling Summary
Total Depth Drilled 62.5'
Borehole Diameter 8 3/4"
Driller HUNT DRILLERS
JACKSON, CA
Rig INGERSOLL-RAND TH60
Bit(s)
Drilling Fluid Air
Total Depth of Well 62.3"
Casing Stick-up Height 2 1/2'
Surface Completion STANDPIPE

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys.Logging				
Casing				
Filter Placement				
Pre-Development				
Cementing				

Well Development

Date	Time	Date	Time
11/9/92	1550	11/9/92	1645

Initial Water Level
Final Water Level

Well Design & Specifications
Basis: Geologic Log ✓ Geophysical Log
Casing String(s): CC=Conductor Casing C=Casing
S=Screen ST=Sediment Trap

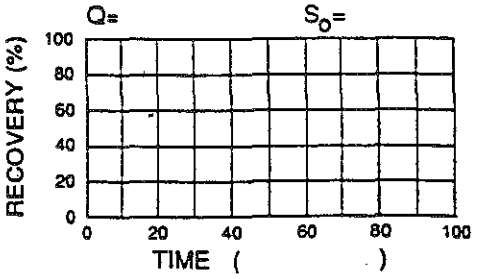
Depth	String(s)	Elevation
+3 – 52'	C1	–
52 – 62	S1	–
62 – 62.5	ST	–
–	–	–
–	–	–

Conductor CC1
Casing CC2 4" Blank
Casing C1 ~~4" Sch 40 PVC~~
C2
Screen S1 4" Sch 40 PVC, 0.030 Slot
S2
Sed. Trap ST 6" Flush Thread End Cap
Grout Seal SURFACE – 48' Neat Cement with 5% bentonite (0-48' bgs)
Bentonite Seal 48 – 51' 1/4" bentonite pellets (48-51' bgs)
Filter Pack #3 SAND (51 – 62.5' bgs)
Lonestar
Centralizers ~~Top of Screen @ 52'~~
Stainless at 52' bgs

Stabalization Test Data

Time	pH	Spec. Cond.	Temp (C)	Turbidity

Recovery Data



Comments:

Observed by: D. ZUBER Client: Oro De Amador Location: Kennedy Mine

DAMES & MOORE

GEOCON CONSULTANTS, INC.
3160 Gold Valley Dr, Ste 800
Rancho Cordova, CA 95742
Ph: 916.852.9118

Date: 5/30/23
Day of Week: (M) T W R F S S
Page: 1 of 1

FIELD PROJECT LOG

Type of Work: ☐ Drilling ☐ Soil Sampling ☒ Groundwater Sampling ☐ Other: _____

PROJECT NAME: Oro De Amador		PROJECT NO 59959-07-03
PROJECT MANAGER Jason Muir	Client	Contractor:
HEALTH & SAFETY MEETING: ☐	WEATHER:	Field Tech/Author: J. Esquivel

0600- Arrived @ Geocon - picked sample containers — Start Mileage:

0630-0730- Mob to site
0730-1430- Arrived on site
set up deon 1wash 2rinse
set up the Horiba to measure - Temp, Cond, Ph, Turb, D.O and ORP.
measured DTW on all well

Purged and sampled - MW-5, MW-4, MW-1, MW-2 and MW-3
duplicate collected on MW-2 labeled MW-6 Time 1300

MW-1 went dry @ Appx 1½ volumes - slow recharge waited Appx. 2 hr before sampling

MW-3 purged orange water from top of water, until water cleared. When sampling well, the water was dark orange.
- Purged water was dispose of, onsite.
locked up wells and gates.

1430- Departed site -

1430-1530- Demob - picked up Ice and dropped off the Horiba @ Envirotech.

1530-1630- Arrived @ Geocon - unloaded equipment, finished paperwork, and stored samples in fridge. Mc Campbell will pick up sample on 5/31/23 AM.

End Mileage:

NAME:	HOURS: 10.5	NAME:	HOURS:	MILEAGE:

MONITORING WELL SAMPLING DATA

Project Name:	Oro de Amador	**Project Number:**	S9959-07-03
Well No.:	MW-5	Date:	5/30/23
Well Diameter (in):	4	Field Personnel:	JAE
Depth to Bottom (ft):	~~62.50~~ 65.60	Screen Length (ft):	52-62
Well Elevation (ft):	ft amsl		

PURGE CHARACTERISTICS	
Water Depth Before Purging: 41.41	2 in. = .1632 Gal/ft. 4 in. = .6528 Gal/ft.
Calculated Water Column Volume: 15.79	Volumes Purged:
Start Purging Time: 0751	End Purging Time:
Total Time:	Flow Gauge:
Total Volume Purged (Gal):	Avg. Flow Rate:
Water Depth After Purging: 42.19 - 0845 - After Sampling	Time:

SAMPLING CHARACTERISTICS

Purging Method: | Sampling Method:

Laboratory Analysis: CAM 17 Metals, Total Cyanide

TIME	TEMPERATURE (°C)	CONDUCTIVITY (umhos/cm)	pH	Gallons Purged		Notes		
				NTU Turb	mg/L DO	ORP		
0803	16.34	483	5.26	1.8	10.22	305	16	16
0816	15.96	416	5.98	0.0	10.09	193	32	32
0829	16.02	411	6.02	0.0	9.76	138	48	48
0840						Sampled		

Comments: Clear; no odor

~~TH~~
~~TH~~

MONITORING WELL SAMPLING DATA

Project Name:	Oro de Amador	**Project Number:**	S9959-07-03
Well No.:	MW-4	Date:	5/30/23
Well Diameter (in):	4	Field Personnel:	JAT
Depth to Bottom (ft):	67.00 69.6	Screen Length (ft):	57-67
Well Elevation (ft):	ft amsl		

PURGE CHARACTERISTICS	
Water Depth Before Purging: 15.51	2 in. = .1632 Gal/ft. 4 in. = .6528 Gal/ft.
Calculated Water Column Volume: 35.31	Volumes Purged:
Start Purging Time: 0947	End Purging Time:
Total Time:	Flow Gauge:
Total Volume Purged (Gal):	Avg. Flow Rate:
Water Depth After Purging:	Time:

SAMPLING CHARACTERISTICS

Purging Method: 2 Pump w/Battery — Sampling Method: disposible bailer

Laboratory Analysis: CAM 17 Metals, Total Cyanide

TIME	TEMPERATURE (°C)	CONDUCTIVITY (umhos/cm)	pH	Gallons Purged: Turb. NTU	Gallons Purged: Mg/L D.O	ORP	Notes
1006	17.64	608	6.18	0.0	5.86	38	35
1029	17.43	627	7.18	0.0	4.97	33	70
1054	17.44	634	6.83	0.0	7.41	72	106
							1
1055							Sampled

Comments: Clear; no odor

~~HH~~ ~~HH~~
~~HH~~ HII
1

MONITORING WELL SAMPLING DATA

Project Name:	Oro de Amador	**Project Number:**	S9959-07-03
Well No.:	MW-1	Date:	
Well Diameter (in):	4	Field Personnel:	
Depth to Bottom (ft):	14.50 - 17.5	Screen Length (ft):	9-14
Well Elevation (ft):	ft amsl		

PURGE CHARACTERISTICS			
Water Depth Before Purging:	4.36	2 in. = .1632 Gal/ft. 4 in. = .6528 Gal/ft.	
Calculated Water Column Volume:	8.58	Volumes Purged:	
Start Purging Time:	0914	End Purging Time:	
Total Time:		Flow Gauge:	
Total Volume Purged (Gal):		Avg. Flow Rate:	
Water Depth After Purging:		Time:	

SAMPLING CHARACTERISTICS

Purging Method: | Sampling Method:

Laboratory Analysis: CAM 17 Metals, Total Cyanide

TIME	TEMPERATURE (°C)	CONDUCTIVITY (umhos/cm)	pH	Gallons Purged	NTU Turb	mg/L DO	ORP	Notes
0919	17.38	1063	5.09	0.3	9.30	-126	9	
0921	16.56	1072	5.13	10.2	10.47	-171	11	
0942	17.54	1068	7.04	6.1	9.97	-180	12	
1140								Sampled

Comments: clear; w/ sulphur odors - Dry @ 11gls-0211 - waited Approx. 20 min. purged 1gl before well went dry - going to let it recharge before sampling - Well slowly recovered - Approx 2ft. enough water to only sample.

MONITORING WELL SAMPLING DATA

Project Name:	Oro de Amador	**Project Number:**	S9959-07-03
Well No.:	MW-2	Date:	5/30/23
Well Diameter (in):	4	Field Personnel:	JAE
Depth to Bottom (ft):	52.90 54.75	Screen Length (ft):	37.5-52.5
Well Elevation (ft):	ft amsl		

PURGE CHARACTERISTICS			
Water Depth Before Purging:	30.04	2 in. = .1632 Gal/ft. 4 in. = .6528 Gal/ft.	
Calculated Water Column Volume:	16.13	Volumes Purged:	
Start Purging Time:	1200	End Purging Time:	
Total Time:		Flow Gauge:	
Total Volume Purged (Gal):		Avg. Flow Rate:	
Water Depth After Purging:	30.25 @ 12:54 After Sampling	Time:	

SAMPLING CHARACTERISTICS							
Purging Method:			Sampling Method:				
Laboratory Analysis: CAM 17 Metals, Total Cyanide							
TIME	TEMPERATURE (°C)	CONDUCTIVITY (umhos/cm)	pH	Gallons Purged	NTU Turb	Mg/L DO	ORP	Notes
1211	20.52	1781	6.39	12.4	7.97	-35	16	
1222	18.94	1820	6.28	0.5	8.74	-50	32	
1231	18.40	1810	6.79	0.0	8.76	-81	48.5	
1245							Sampled	

Comments: Clear, no odor
collected Duplicate labeled MW-6 Time 1300

NH
NH

MONITORING WELL SAMPLING DATA

Project Name:	Oro de Amador	**Project Number:**	S9959-07-03
Well No.:	MW-3	Date:	5/30/17
Well Diameter (in):	4	Field Personnel:	JAE
Depth to Bottom (ft):	39.00 40.0	Screen Length (ft):	27.5-37.5
Well Elevation (ft):	ft amsl		

PURGE CHARACTERISTICS			
Water Depth Before Purging:	7.90	2 in. = .1632 Gal/ft. 4 in. = .6528 Gal/ft.	
Calculated Water Column Volume:	20.95	Volumes Purged:	
Start Purging Time:	1314	End Purging Time:	
Total Time:		Flow Gauge:	
Total Volume Purged (Gal):		Avg. Flow Rate:	
Water Depth After Purging:	9.01	Time:	

SAMPLING CHARACTERISTICS

Purging Method:	Sampling Method:

Laboratory Analysis: CAM 17 Metals, Total Cyanide

TIME	TEMPERATURE (°C)	CONDUCTIVITY (umhos/cm)	pH	Gallons Purged / NTU Turb / mg/L DO	ORP	Notes
1326	20.78	1409	5.39	20.3 / 7.84	-15	21
1336	20.40	1350	5.67	82.2 / 8.51	-17	42
1348	18.78	1347	5.81	13.4 / 3.18	-18	63
1400						Sampled

Comments: No odor; purge water turbid orange - water started to clear after 1½ Volumes - (sample was dark orange - rusty - purged from top of water)

Equipment Blank 2 Poly (250ml) HNO3 Time 1410

TOC III

General COC

MAI Work Order #_____

McCAMPBELL ANALYTICAL, INC.

1534 Willow Pass Rd. Pittsburg, Ca. 94565-1701
Telephone: (877) 252-9262 / Fax: (925) 252-9269
www.mccampbell.com main@mccampbell.com

CHAIN OF CUSTODY RECORD

Turn Around Time:	1 Day Rush		2 Day Rush		3 Day Rush		STD	●	Quote #	233151														
J-Flag / MDL		ESL		Cleanup Approved		Dry Weight		Bottle Order #																
Delivery Format:	PDF	●	GeoTracker EDF		EDD	●	CLIP EDT (DW)		Detect Summary															

Report To: Jason Muir — Bill To: Jason Muir

Company: Geocon Consultants, Inc.

Email: muir@geoconinc.com

Alt Email: — Tele: (916) 852-9118 / (530) 913-5996

Project Name: Oro de Amador - S9959-07-03 — Project #: S9959-07-03

Project Location: Oro de Amador - S9959-07-03 — PO #

Sampler Signature:

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative	Analysis Requested: E200.8 (Ca,Mg,NA,K) (Dissolved)	E200.8 (Metals)	E245.2 (Mercury)	E300.1 (Cl,NO2,NO3,SO4)	SM2320B (Alkalinity)	SM2340B (Hardness)	SM2540C (TDS)	SM2540D (TSS)	Total and Amenable Cyanide
MW-1	5/30/23	1140	8	H_2O	1,4,5	X	X	X	X	X	X	X	X	X
MW-2		1245												
MW-3		1400												
MW-4		1055												
MW-5		0840												
MW-6		1300												
Equipment Blank		1410	2		4		X							

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E200.8.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Comments / Instructions

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
J. Esquivel / Geocon	5/30/23	1630	Geocons' Fridge	5/30/23	1630

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp _____ °C Initials _____

EnviroTech
Quality Environmental Products
4851 Sunrise Dr., Suite 101
Martinez, CA 94553

Certificate of Calibration

Groundwater Sampling Instrumentation

Instrument: Horiba U-52 s/n: DK22

	Span Value	/ Reading
•pH:	4.00	/ 4.01
•mS/cm:	4.49	/ 4.49
•DO:	110%	/ 110.3%
•Turb:	0.0	/ 0.0
•ORP:	—	/ —
•Other:	—	/ —

Notes: _____

Calibrated by: Patrick Nagel (Print Name) (Signature)

Date: 5-26-23

Air Monitoring Instrumentation

Instrument: _____ s/n: _____

	Span Value	/ Reading
•H2S:		/
•CO:		/
•O2:		/
•LEL:		/
•Isobutylene:		/

•Other: _____

Notes: _____

Calibrated by: _____ (Print Name) _____ (Signature)

Date: _____

This instrument has been calibrated by a qualified instrument technician in accordance with the manufacturer's recommended specifications in a temperature controlled laboratory, or clean air, environment. To assure accuracy, it is recommended in most Standard Operating Procedures (SOP) that instruments be recalibrated at the site where it is being used.

Thank you for renting from Enviro Tech, if you have any questions or difficulties please call for technical support.
1-800-468-8921 or (925) 370-1541

CALIFORNIA LABORATORY SERVICES
Committed. Responsive. Flexible.

June 06, 2023

CLS Work Order #: 23E1579
COC #:

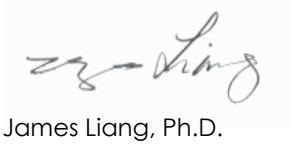
Jason Muir
Geocon Consultants
3160 Gold Valley Dr. Suite #800
Rancho Cordova, CA 95742

Project Name: Oro de Amador

Enclosed are the results of analyses for samples received by the laboratory on 05/26/23 15:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,



James Liang, Ph.D.
Technical Director

CA SWRCB ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579 (1 of 7)

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA 95742
www.californialab.com
☐ OTHER

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID. n/a

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	CAM 17 Metals and Sulfur, EPA 6010B/7471A	Total Arsenic, EPA 6010B
5.22.23	1230	TP-49-0.0		soil	1	glass	3		X
	1235	TP-49-1.5		soil	1	glass	3	X	
	1240	TP-49R-1.5		soil	1	glass	3	X	
	1245	TP-49-3.0		soil	1	glass	3		X
	1250	TP-49-4.5		soil	1	glass	3		X
	1330	TP-50-0.0		soil	1	glass	3		X
	1335	TP-50-~~1.5~~ 0.5		soil	1	glass	3	X	
	1340	TP-50-~~3.0~~ 1.0		soil	1	glass	3		X
	1345	TP-50-~~4.5~~ 1.5		soil	1	glass	3		X
	1130	TP-51-0.0		soil	1	glass	3		X
	1135	TP-51-1.5		soil	1	glass	3	X	
	1140	TP-51-3.0		soil	1	glass	3		X

TURNAROUND TIME IN DAYS: 1 | 2 | 3 | 5 — Standard turnaround time

SPECIAL INSTRUCTIONS

INVOICE TO:
Geocon Consultants, Inc.
3160 Gold Valley Drive #800
Rancho Cordova, CA 95742
PO# S9959-07-03
QUOTE#

SUSPECTED CONSTITUENTS
As, Pb, Hg

SAMPLE RETENTION TIME
Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
[signature]	JASON MUIR, GEOCON	05/26/23 1400 1500	[signature]	

RECEIVED AT LAB BY: [signature] DATE/TIME: 5/26/23 1400 1500 CONDITIONS/COMMENTS: 14.9/25.7

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579 (2 of 7)

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com
☐ OTHER

ANALYSIS REQUESTED

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID. n/a

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼	CAM 17 Metals and Sulfur, EPA 6010B/7471A	Total Arsenic, EPA 6010B
05/22/23	1145	TP-51-4.5		soil	1	glass	3		X
05/22/23	1150	TP-51R-4.5		soil	1	glass	3		X
05/23/23	0930	TP-52-1.5		soil	1	glass	3		X
05/23/23	0920	TP-52-3.0		soil	1	glass	3	X	
05/23/23	0755	TP-53-1.5		soil	1	glass	3		X
05/23/23	0745	TP-53-3.0		soil	1	glass	3	X	
05/23/23	0830	TP-54-1.5		soil	1	glass	3		X
05/23/23	0825	TP-54-3.0		soil	1	glass	3	X	
05/23/23	1400	TP-55-0.0		soil	1	glass	3		X
05/23/23	~~13:55~~	TP-55-~~3.5~~ 1.0	14:15	soil	1	glass	3		X
	~~13:50~~	~~TP-55-3.0~~		~~soil~~	~~1~~	~~glass~~	~~3~~		~~X~~
	~~13:45~~	~~TP-55-4.5~~		~~soil~~	~~1~~	~~glass~~	~~3~~		~~X~~

TURNAROUND TIME IN DAYS: 1 ☐ 2 ☐ 3 ☐ 5 ☒ Standard turnaround time

SPECIAL INSTRUCTIONS

INVOICE TO:
Geocon Consultants, Inc.
3160 Gold Valley Drive #800
Rancho Cordova, CA 95742
PO# S9959-07-03
QUOTE#

SUSPECTED CONSTITUENTS
As, Pb, Hg

SAMPLE RETENTION TIME
Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	JASON MUIR GEOCON	05/26/23 1400 1500		

RECEIVED AT LAB BY: DAS DATE/TIME: 05/26/23 1808 CONDITIONS/COMMENTS: 4.9/25.7

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579 (3 of 7)

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA 95742
www.californialab.com
☐ OTHER

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID. n/a

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	CAM 17 Metals and Sulfur, EPA 6010B/7471A	Total Arsenic, EPA 6010B
05/23/23	1425	TP-56-0.0		soil	1	glass	3		X
05/23/23	1430	TP-56-1.5		soil	1	glass	3	X	
05/23/23	1435	TP-56-3.0 2.0		soil	1	glass	3		X
~~—~~	~~—~~	~~TP-56-4.5~~		~~soil~~	~~1~~	~~glass~~	~~3~~		X
05/23/23	1400	TP-57-0.0		soil	1	glass	3		X
↓	1405	TP-57R-0.0		soil	1	glass	3		X
↓	1355	TP-57-1.5		soil	1	glass	3	X	
↓	1350	TP-57-3.0		soil	1	glass	3		X
↓	1345	TP-57-4.5		soil	1	glass	3		X
5/23/23	1102	TP-58-0.0		soil	1	glass	3		X
↓	1100	TP-58-1.5		soil	1	glass	3		X
↓	1056	TP-58-3.0		soil	1	glass	3		X

TURNAROUND TIME IN DAYS: 1 | 2 | 3 | 5 — Standard turnaround time

SPECIAL INSTRUCTIONS

INVOICE TO:
Geocon Consultants, Inc.
3160 Gold Valley Drive #800
Rancho Cordova, CA 95742
PO# S9959-07-03
QUOTE#

SUSPECTED CONSTITUENTS
As, Pb, Hg

SAMPLE RETENTION TIME
Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
[signature]	Jason Muir, Geocon	05/26/23 1500		

RECEIVED AT LAB BY: [signature] DATE/TIME: 5/26/23 1500

CONDITIONS/COMMENTS: 24.9/26.7

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579 (4 of 7)

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA 95742
www.californialab.com
☐ OTHER

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID n/a

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	CONTAINER MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	ANALYSIS REQUESTED: CAM 17 Metals and Sulfur, EPA 6010B/7471A	ANALYSIS REQUESTED: Total Arsenic, EPA 6010B
5/23/23	1053	TP-58-4.5		soil	1	glass	3		X
5/22/23	0755	TP-59-0.0		soil	1	glass	3		X
	0800	TP-59-1.5		soil	1	glass	3	X	
	0805	TP-59-3.0		soil	1	glass	3		X
	0810	TP-59-4.5		soil	1	glass	3		X
	0830	TP-60-0.0		soil	1	glass	3		X
	0835	TP-60-1.5		soil	1	glass	3		X
	0840	TP-60R-1.5		soil	1	glass	3		X
	0845	TP-60-3.0		soil	1	glass	3		X
	0850	TP-60-4.5		soil	1	glass	3		X
	1525	TP-61-0.0		soil	1	glass	3		X
↓	1530	TP-61-1.5		soil	1	glass	3	X	

TURNAROUND TIME IN DAYS: 1 | 2 | 3 | 5 (Standard turnaround time)

SPECIAL INSTRUCTIONS

INVOICE TO:
Geocon Consultants, Inc.
3160 Gold Valley Drive #800
Rancho Cordova, CA 95742
PO# S9959-07-03
QUOTE#

SUSPECTED CONSTITUENTS
As, Pb, Hg

SAMPLE RETENTION TIME
Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	JASON MUIR, GEOCON	05/26/23 1500		

RECEIVED AT LAB BY: DSR DATE/TIME: 5/26/23 1500 CONDITIONS/COMMENTS: M.9 12.7

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579 (5 of 7)

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA 95742
www.californialab.com
☐ OTHER

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID: n/a
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	CAM 17 Metals and Sulfur, EPA 6010B/7471A	Total Arsenic, EPA 6010B	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
5.22.23	1535	TP-61-3.0		soil	1	glass	3		X				Standard turnaround time	
	1540	TP-61-4.5		soil	1	glass	3		X					
	1545	TP-62-0.0		soil	1	glass	3		X					
	1550	TP-62-1.5		soil	1	glass	3	X						
	1555	TP-62-3.0		soil	1	glass	3		X					
	1600	TP-62-4.5		soil	1	glass	3		X					
	1500	TP-63-0.0		soil	1	glass	3		X					INVOICE TO:
	1505	TP-63-1.0		soil	1	glass	3	X						Geocon Consultants, Inc.
	1510	TP-63-2.0		soil	1	glass	3		X					3160 Gold Valley Drive #800
	1515	TP-63R-2.0		soil	1	glass	3		X					Rancho Cordova, CA 95742
	1520	TP-63-3.0		soil	1	glass	3		X					PO# S9959-07-03
	1045	TP-64-0.0		soil	1	glass	3	X						QUOTE#

SUSPECTED CONSTITUENTS: As, Pb, Hg

SAMPLE RETENTION TIME: Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	JASON MUIR, GEOCON	05/26/23 1400		

RECEIVED AT LAB BY: DEGT. DATE/TIME: 5/26/23 1800 CONDITIONS/COMMENTS: 24-9/2857

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA
95742
www.californialab.com
☐ OTHER

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID. n/a

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	CAM 17 Metals and Sulfur, EPA 6010B/7471A	Total Arsenic, EPA 6010B	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
05/22/23	1050	TP-64R-0.0		soil	1	glass	3	X					Standard turnaround time	
	1055	TP-64-3.0		soil	1	glass	3		X					
	1005	TP-65-0.0		soil	1	glass	3		X					
	1010	TP-65-3.0		soil	1	glass	3	X						
	0920	TP-66-0.0		soil	1	glass	3	X						
	0925	TP-66-3.0		soil	1	glass	3		X					
05/23/23	1300	~~TP-67-1.5~~ TP-67-0.5		soil	1	glass	3		X					INVOICE TO:
	1255	TP-67-3.0		soil	1	glass	3	X						Geocon Consultants, Inc.
	1235	TP-68-~~2~~ 0.5		soil	1	glass	3	X						3160 Gold Valley Drive #800
	1232	TP-68R-~~2~~ 0.5		soil	1	glass	3	X						Rancho Cordova, CA 95742
	1230	~~TP-68-3.0~~ TP-68R-0.5		soil	1	glass	3		X					PO# S9959-07-03
5/23/23	1205	TP-69-1.5		soil	1	glass	3		X					QUOTE#

SUSPECTED CONSTITUENTS: As, Pb, Hg

SAMPLE RETENTION TIME: Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	JASON MUIR, GEOCON	05/23/23 1400 1500		

RECEIVED AT LAB BY: DAT DATE/TIME: 5/26/23 1500 CONDITIONS/COMMENTS: 7.4 9/2507

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. 23E1579 (7 of 7)

Report To:
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742
Project Manager: Jason Muir
Project Name: Oro de Amador
Sampled By: Muir
Job Description: Supplemental Site Investigation
Site Location: Jackson, California

Client Job Number: S9959-07-03

Destination Laboratory
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova, CA 95742
www.californialab.com
☐ OTHER

ANALYSIS REQUESTED

GEOTRACKER n/a
EDF REPORT ☒ YES ☐ NO
GLOBAL ID. n/a

FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	FIELD ID.	CONTAINER MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES ▼	CAM 17 Metals and Sulfur, EPA 6010B/7471A	Total Arsenic, EPA 6010B	TOTAL CAM 17 METALS	TURNAROUND TIME IN DAYS 1	2	3	5	SPECIAL INSTRUCTIONS
05/22/23	2:00	TP-69-3.0		soil	1	glass	3	X						Standard turnaround time	
05/23/23	0840	RB-052323		water	1	poly				X					
05/22/23	10:15	TP-65-SURFACE		soil	1	glass		X							

INVOICE TO:
Geocon Consultants, Inc.
3160 Gold Valley Drive #800
Rancho Cordova, CA 95742
PO# S9959-07-03
QUOTE#

SUSPECTED CONSTITUENTS: As, Pb, Hg

SAMPLE RETENTION TIME: Contact PM to pick up after 30 days

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)= H_2SO_4

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
	JASON MUIR, GEOCON	05/23/23 1400 1500		

RECEIVED AT LAB BY: DON DATE/TIME: 5/26/23 1500 CONDITIONS/COMMENTS: 7.9/207

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER delivered by courier AIR BILL # n/a

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-49-1.5 (23E1579-02) Soil Sampled: 05/22/23 12:35 Received: 05/26/23 15:00									
Antimony	**12**	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	A-COMa
Arsenic	**620**	1.0	"	"	"	"	"	"	
Barium	**22**	1.0	"	"	"	"	"	"	
Beryllium	**1.2**	1.0	"	"	"	"	"	"	
Cadmium	**5.8**	1.0	"	"	"	"	"	"	
Chromium	**180**	1.0	"	"	"	"	"	"	
Cobalt	**140**	1.0	"	"	"	"	"	"	
Copper	**130**	5.0	"	5	"	"	06/01/23	"	
Lead	**18**	2.5	"	1	"	"	05/31/23	"	
Mercury	**0.14**	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**790**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**31**	1.0	"	"	"	"	"	"	
Zinc	**53**	1.0	"	"	"	"	"	"	
TP-49R-1.5 (23E1579-03) Soil Sampled: 05/22/23 12:40 Received: 05/26/23 15:00									
Antimony	**17**	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	A-COMa
Arsenic	**760**	1.0	"	"	"	"	"	"	
Barium	**27**	1.0	"	"	"	"	"	"	
Beryllium	**1.5**	1.0	"	"	"	"	"	"	
Cadmium	**6.2**	1.0	"	"	"	"	"	"	
Chromium	**210**	1.0	"	"	"	"	"	"	
Cobalt	**100**	1.0	"	"	"	"	"	"	
Copper	**140**	5.0	"	5	"	"	06/01/23	"	
Lead	**20**	2.5	"	1	"	"	05/31/23	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**910**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03
Rancho Cordova, CA 95742	Project Manager:	Jason Muir

CLS Work Order #: 23E1579
COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-49R-1.5 (23E1579-03) Soil Sampled: 05/22/23 12:40 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304484	"	05/31/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**34**	1.0	"	"	"	"	"	"	
Zinc	**56**	1.0	"	"	"	"	"	"	
TP-50-0.5 (23E1579-07) Soil Sampled: 05/22/23 13:35 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**5.4**	1.0	"	"	"	"	"	"	
Barium	**54**	1.0	"	"	"	"	"	"	
Beryllium	**1.2**	1.0	"	"	"	"	"	"	
Cadmium	**1.4**	1.0	"	"	"	"	"	"	
Chromium	**10**	1.0	"	"	"	"	"	"	
Cobalt	**9.0**	1.0	"	"	"	"	"	"	
Copper	**74**	1.0	"	"	"	"	"	"	
Lead	**3.6**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**32**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**29**	1.0	"	"	"	"	"	"	
Zinc	**44**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-51-1.5 (23E1579-11) Soil Sampled: 05/22/23 11:35 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**59**	1.0	"	"	"	"	"	"	
Barium	**60**	1.0	"	"	"	"	"	"	
Beryllium	**2.1**	1.0	"	"	"	"	"	"	
Cadmium	**3.1**	1.0	"	"	"	"	"	"	
Chromium	**19**	1.0	"	"	"	"	"	"	
Cobalt	**19**	1.0	"	"	"	"	"	"	
Copper	**72**	1.0	"	"	"	"	"	"	
Lead	ND	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**60**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**91**	1.0	"	"	"	"	"	"	
Zinc	**61**	1.0	"	"	"	"	"	"	
TP-52-3.0 (23E1579-16) Soil Sampled: 05/23/23 09:20 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**120**	1.0	"	"	"	"	"	"	
Barium	**47**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.0**	1.0	"	"	"	"	"	"	
Chromium	**3.6**	1.0	"	"	"	"	"	"	
Cobalt	**4.9**	1.0	"	"	"	"	"	"	
Copper	**22**	1.0	"	"	"	"	"	"	
Lead	**23**	2.5	"	"	"	"	"	"	
Mercury	**2.1**	1.0	"	10	2304493	05/31/23	06/05/23	EPA 7471A	
Molybdenum	**1.0**	1.0	"	1	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**13**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-52-3.0 (23E1579-16) Soil Sampled: 05/23/23 09:20 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304484	"	05/31/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**6.6**	1.0	"	"	"	"	"	"	
Zinc	**46**	1.0	"	"	"	"	"	"	
TP-53-3.0 (23E1579-18) Soil Sampled: 05/23/23 07:45 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**180**	1.0	"	"	"	"	"	"	
Barium	**78**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.2**	1.0	"	"	"	"	"	"	
Chromium	**9.7**	1.0	"	"	"	"	"	"	
Cobalt	**6.2**	1.0	"	"	"	"	"	"	
Copper	**23**	1.0	"	"	"	"	"	"	
Lead	**51**	2.5	"	"	"	"	"	"	
Mercury	**6.6**	2.5	"	25	2304493	05/31/23	06/05/23	EPA 7471A	
Molybdenum	**1.6**	1.0	"	1	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**19**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**15**	1.0	"	"	"	"	"	"	
Zinc	**60**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03
Rancho Cordova, CA 95742	Project Manager:	Jason Muir

CLS Work Order #: 23E1579
COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-54-3.0 (23E1579-20) Soil Sampled: 05/23/23 08:25 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**220**	1.0	"	"	"	"	"	"	
Barium	**65**	1.0	"	"	"	"	06/01/23	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.3**	1.0	"	"	"	"	05/31/23	"	
Chromium	**7.0**	1.0	"	"	"	"	"	"	
Cobalt	**6.9**	1.0	"	"	"	"	"	"	
Copper	**33**	1.0	"	"	"	"	"	"	
Lead	**52**	2.5	"	"	"	"	"	"	
Mercury	**3.3**	1.0	"	10	2304493	05/31/23	06/05/23	EPA 7471A	
Molybdenum	**1.3**	1.0	"	1	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**20**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**12**	1.0	"	"	"	"	"	"	
Zinc	**71**	1.0	"	"	"	"	"	"	
TP-56-1.5 (23E1579-24) Soil Sampled: 05/23/23 14:30 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**7.0**	1.0	"	"	"	"	"	"	
Barium	**140**	1.0	"	"	"	"	06/01/23	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**2.0**	1.0	"	"	"	"	05/31/23	"	
Chromium	**88**	1.0	"	"	"	"	"	"	
Cobalt	**28**	1.0	"	"	"	"	"	"	
Copper	**83**	1.0	"	"	"	"	"	"	
Lead	**8.9**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**53**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-56-1.5 (23E1579-24) Soil Sampled: 05/23/23 14:30 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304484	"	05/31/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**20**	1.0	"	"	"	"	"	"	
Zinc	**130**	1.0	"	"	"	"	"	"	
TP-57-1.5 (23E1579-28) Soil Sampled: 05/23/23 13:55 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**52**	1.0	"	"	"	"	"	"	
Barium	**160**	1.0	"	"	"	"	06/01/23	"	
Beryllium	**1.3**	1.0	"	"	"	"	"	"	
Cadmium	**2.2**	1.0	"	"	"	"	05/31/23	"	
Chromium	**53**	1.0	"	"	"	"	"	"	
Cobalt	**16**	1.0	"	"	"	"	"	"	
Copper	**57**	1.0	"	"	"	"	"	"	
Lead	**26**	2.5	"	"	"	"	"	"	
Mercury	**1.4**	0.50	"	5	2304493	05/31/23	06/05/23	EPA 7471A	
Molybdenum	**2.1**	1.0	"	1	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**60**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**35**	1.0	"	"	"	"	"	"	
Zinc	**77**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-59-1.5 (23E1579-36) Soil Sampled: 05/22/23 08:00 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	ND	1.0	"	"	"	"	"	"	
Barium	**110**	1.0	"	"	"	"	06/01/23	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.5**	1.0	"	"	"	"	05/31/23	"	
Chromium	**14**	1.0	"	"	"	"	"	"	
Cobalt	**3.8**	1.0	"	"	"	"	"	"	
Copper	**62**	1.0	"	"	"	"	"	"	
Lead	**9.6**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	**3.7**	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**19**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**19**	1.0	"	"	"	"	"	"	
Zinc	**57**	1.0	"	"	"	"	"	"	
TP-61-1.5 (23E1579-45) Soil Sampled: 05/22/23 15:30 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**1.2**	1.0	"	"	"	"	"	"	
Barium	**140**	1.0	"	"	"	"	06/01/23	"	
Beryllium	**12**	1.0	"	"	"	"	"	"	
Cadmium	**2.9**	1.0	"	"	"	"	05/31/23	"	
Chromium	**11**	1.0	"	"	"	"	"	"	
Cobalt	**15**	1.0	"	"	"	"	"	"	
Copper	**71**	1.0	"	"	"	"	"	"	
Lead	**5.1**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**9.4**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-61-1.5 (23E1579-45) Soil Sampled: 05/22/23 15:30 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304484	"	05/31/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**99**	1.0	"	"	"	"	"	"	
Zinc	**54**	1.0	"	"	"	"	"	"	
TP-62-1.5 (23E1579-49) Soil Sampled: 05/22/23 15:50 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	ND	1.0	"	"	"	"	"	"	
Barium	**170**	1.0	"	"	"	"	06/01/23	"	
Beryllium	**12**	1.0	"	"	"	"	"	"	
Cadmium	**2.9**	1.0	"	"	"	"	05/31/23	"	
Chromium	**24**	1.0	"	"	"	"	"	"	
Cobalt	**18**	1.0	"	"	"	"	"	"	
Copper	**74**	1.0	"	"	"	"	"	"	
Lead	**4.0**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**15**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**130**	1.0	"	"	"	"	"	"	
Zinc	**56**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-63-1.0 (23E1579-53) Soil Sampled: 05/22/23 15:05 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	ND	1.0	"	"	"	"	"	"	
Barium	**160**	1.0	"	"	"	"	06/01/23	"	
Beryllium	**12**	1.0	"	"	"	"	"	"	
Cadmium	**2.9**	1.0	"	"	"	"	05/31/23	"	
Chromium	**22**	1.0	"	"	"	"	"	"	
Cobalt	**19**	1.0	"	"	"	"	"	"	
Copper	**75**	1.0	"	"	"	"	"	"	
Lead	**3.2**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**13**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	QB-2, A-COMb
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**130**	1.0	"	"	"	"	"	"	
Zinc	**52**	1.0	"	"	"	"	"	"	
TP-64-0.0 (23E1579-57) Soil Sampled: 05/22/23 10:45 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**110**	1.0	"	"	"	"	"	"	
Barium	**63**	1.0	"	"	"	"	06/01/23	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**2.3**	1.0	"	"	"	"	05/31/23	"	
Chromium	**67**	1.0	"	"	"	"	"	"	
Cobalt	**12**	1.0	"	"	"	"	"	"	
Copper	**49**	1.0	"	"	"	"	"	"	
Lead	**18**	2.5	"	"	"	"	"	"	
Mercury	**0.44**	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**75**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-64-0.0 (23E1579-57) Soil Sampled: 05/22/23 10:45 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304484	"	05/31/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**20**	1.0	"	"	"	"	"	"	
Zinc	**71**	1.0	"	"	"	"	"	"	
TP-64R-0.0 (23E1579-58) Soil Sampled: 05/22/23 10:50 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**96**	1.0	"	"	"	"	"	"	
Barium	**52**	1.0	"	"	"	"	06/01/23	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.7**	1.0	"	"	"	"	05/31/23	"	
Chromium	**59**	1.0	"	"	"	"	"	"	
Cobalt	**10**	1.0	"	"	"	"	"	"	
Copper	**44**	1.0	"	"	"	"	"	"	
Lead	**22**	2.5	"	"	"	"	"	"	
Mercury	**0.46**	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**65**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	**1.0**	1.0	"	"	"	"	"	"	A-COMa
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**17**	1.0	"	"	"	"	"	"	
Zinc	**77**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-65-3.0 (23E1579-61) Soil Sampled: 05/22/23 10:10 Received: 05/26/23 15:00									
Antimony	**20**	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	A-COMa
Arsenic	**1300**	1.0	"	"	"	"	"	"	
Barium	**71**	5.0	"	5	"	"	06/01/23	"	
Beryllium	ND	5.0	"	"	"	"	"	"	
Cadmium	**6.6**	1.0	"	1	"	"	05/31/23	"	
Chromium	**450**	1.0	"	"	"	"	"	"	
Cobalt	**110**	1.0	"	"	"	"	"	"	
Copper	**170**	5.0	"	5	"	"	06/01/23	"	
Lead	**360**	2.5	"	1	"	"	05/31/23	"	
Mercury	**0.13**	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	**120**	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**1000**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**53**	1.0	"	"	"	"	"	"	
Zinc	**120**	1.0	"	"	"	"	"	"	
TP-66-0.0 (23E1579-62) Soil Sampled: 05/22/23 09:20 Received: 05/26/23 15:00									
Antimony	**5.8**	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	A-COMa
Arsenic	**450**	1.0	"	"	"	"	"	"	
Barium	**100**	1.0	"	"	"	"	06/01/23	"	
Beryllium	**1.4**	1.0	"	"	"	"	"	"	
Cadmium	**2.7**	1.0	"	"	"	"	05/31/23	"	
Chromium	**150**	1.0	"	"	"	"	"	"	
Cobalt	**24**	1.0	"	"	"	"	"	"	
Copper	**60**	1.0	"	"	"	"	"	"	
Lead	**42**	2.5	"	"	"	"	"	"	
Mercury	**0.24**	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	**2.3**	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**180**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-66-0.0 (23E1579-62) Soil Sampled: 05/22/23 09:20 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304484	"	05/31/23	EPA 6010B	
Silver	**2.1**	1.0	"	"	"	"	"	"	A-COMa
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**39**	1.0	"	"	"	"	"	"	
Zinc	**100**	1.0	"	"	"	"	"	"	
TP-67-3.0 (23E1579-65) Soil Sampled: 05/23/23 12:55 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304484	05/31/23	05/31/23	EPA 6010B	QB-2
Arsenic	**88**	1.0	"	"	"	"	"	"	
Barium	**130**	1.0	"	"	"	"	06/01/23	"	
Beryllium	**1.2**	1.0	"	"	"	"	"	"	
Cadmium	**2.4**	1.0	"	"	"	"	05/31/23	"	
Chromium	**80**	1.0	"	"	"	"	"	"	
Cobalt	**20**	1.0	"	"	"	"	"	"	
Copper	**65**	1.0	"	"	"	"	"	"	
Lead	**5.5**	2.5	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	2304493	05/31/23	06/01/23	EPA 7471A	
Molybdenum	**3.9**	1.0	"	"	2304484	05/31/23	05/31/23	EPA 6010B	
Nickel	**67**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	A-COMb, QB-2
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**41**	1.0	"	"	"	"	"	"	
Zinc	**73**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-68-0.0 (23E1579-66) Soil Sampled: 05/23/23 12:35 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304505	06/01/23	06/02/23	EPA 6010B	QB-2
Arsenic	**81**	1.0	"	"	"	"	"	"	
Barium	**30**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.2**	1.0	"	"	"	"	"	"	
Chromium	**4.5**	1.0	"	"	"	"	"	"	
Cobalt	**2.5**	1.0	"	"	"	"	"	"	
Copper	**22**	1.0	"	"	"	"	"	"	
Lead	**14**	2.5	"	"	"	"	"	"	
Mercury	**0.99**	0.50	"	5	2304493	05/31/23	06/05/23	EPA 7471A	
Molybdenum	ND	1.0	"	1	2304505	06/01/23	06/02/23	EPA 6010B	
Nickel	**12**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**7.8**	1.0	"	"	"	"	"	"	
Zinc	**43**	1.0	"	"	"	"	"	"	
TP-68R-0.5 (23E1579-67) Soil Sampled: 05/23/23 12:32 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304505	06/01/23	06/02/23	EPA 6010B	QB-2
Arsenic	**68**	1.0	"	"	"	"	"	"	
Barium	**33**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.0**	1.0	"	"	"	"	"	"	
Chromium	**8.6**	1.0	"	"	"	"	"	"	
Cobalt	**3.8**	1.0	"	"	"	"	"	"	
Copper	**26**	1.0	"	"	"	"	"	"	
Lead	**12**	2.5	"	"	"	"	"	"	
Mercury	**0.89**	0.50	"	5	2304500	05/31/23	06/02/23	EPA 7471A	
Molybdenum	ND	1.0	"	1	2304505	06/01/23	06/02/23	EPA 6010B	
Nickel	**12**	1.0	"	"	"	"	"	"	

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Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-68R-0.5 (23E1579-67) Soil Sampled: 05/23/23 12:32 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304505	"	06/02/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**7.7**	1.0	"	"	"	"	"	"	
Zinc	**31**	1.0	"	"	"	"	"	"	
TP-69-3.0 (23E1579-70) Soil Sampled: 05/23/23 12:00 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304505	06/01/23	06/02/23	EPA 6010B	QB-2
Arsenic	**110**	1.0	"	"	"	"	"	"	
Barium	**94**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	**1.4**	1.0	"	"	"	"	"	"	
Chromium	**14**	1.0	"	"	"	"	"	"	
Cobalt	**7.0**	1.0	"	"	"	"	"	"	
Copper	**27**	1.0	"	"	"	"	"	"	
Lead	**43**	2.5	"	"	"	"	"	"	
Mercury	**5.4**	2.0	"	20	2304500	05/31/23	06/02/23	EPA 7471A	
Molybdenum	**1.5**	1.0	"	1	2304505	06/01/23	06/02/23	EPA 6010B	
Nickel	**30**	1.0	"	"	"	"	"	"	
Selenium	ND	2.5	"	"	"	"	"	"	
Silver	ND	1.0	"	"	"	"	"	"	
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**19**	1.0	"	"	"	"	"	"	
Zinc	**68**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03
Rancho Cordova, CA 95742	Project Manager:	Jason Muir

CLS Work Order #: 23E1579
COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RB-052323 (23E1579-71) Water Sampled: 05/23/23 08:40 Received: 05/26/23 15:00									
Antimony	ND	0.050	mg/L	1	2304424	05/30/23	05/30/23	EPA 6010B	
Arsenic	ND	0.010	"	"	"	"	"	"	
Barium	ND	0.020	"	"	"	"	"	"	
Beryllium	ND	0.0050	"	"	"	"	"	"	
Cadmium	ND	0.010	"	"	"	"	"	"	
Chromium	ND	0.020	"	"	"	"	"	"	
Cobalt	ND	0.020	"	"	"	"	"	"	
Copper	ND	0.020	"	"	"	"	"	"	
Lead	ND	0.050	"	"	"	"	05/31/23	"	
Mercury	ND	0.00020	"	"	2304447	05/30/23	06/01/23	EPA 7470A	
Molybdenum	ND	0.020	"	"	2304424	05/30/23	05/30/23	EPA 6010B	
Nickel	ND	0.020	"	"	"	"	"	"	
Selenium	ND	0.010	"	"	"	"	"	"	
Silver	**0.026**	0.020	"	"	"	"	"	"	
Thallium	ND	0.020	"	"	"	"	"	"	
Vanadium	ND	0.020	"	"	"	"	"	"	
Zinc	ND	0.020	"	"	"	"	"	"	
TP-65-SURFACE (23E1579-72) Soil Sampled: 05/22/23 10:15 Received: 05/26/23 15:00									
Antimony	ND	2.5	mg/kg	1	2304505	06/01/23	06/02/23	EPA 6010B	QB-2
Arsenic	**18**	1.0	"	"	"	"	"	"	
Barium	**11**	1.0	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	1.0	"	"	"	"	"	"	
Chromium	**12**	1.0	"	"	"	"	"	"	
Cobalt	**1.0**	1.0	"	"	"	"	"	"	
Copper	**7.2**	1.0	"	"	"	"	"	"	
Lead	**7.2**	2.5	"	"	"	"	"	"	
Mercury	**0.20**	0.10	"	"	2304500	05/31/23	06/02/23	EPA 7471A	
Molybdenum	ND	1.0	"	"	2304505	06/01/23	06/02/23	EPA 6010B	
Nickel	**9.1**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-65-SURFACE (23E1579-72) Soil Sampled: 05/22/23 10:15 Received: 05/26/23 15:00									
Selenium	ND	2.5	mg/kg	1	2304505	"	06/02/23	EPA 6010B	
Silver	ND	1.0	"	"	"	"	"	"	
Thallium	ND	4.0	"	"	"	"	"	"	
Vanadium	**3.3**	1.0	"	"	"	"	"	"	
Zinc	**15**	1.0	"	"	"	"	"	"	

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-49-0.0 (23E1579-01) Soil Sampled: 05/22/23 12:30 Received: 05/26/23 15:00									
Arsenic	**950**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-49-1.5 (23E1579-02) Soil Sampled: 05/22/23 12:35 Received: 05/26/23 15:00									
Total Sulfur	**37**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-49R-1.5 (23E1579-03) Soil Sampled: 05/22/23 12:40 Received: 05/26/23 15:00									
Total Sulfur	**50**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-49-3.0 (23E1579-04) Soil Sampled: 05/22/23 12:45 Received: 05/26/23 15:00									
Arsenic	**480**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-49-4.5 (23E1579-05) Soil Sampled: 05/22/23 12:50 Received: 05/26/23 15:00									
Arsenic	**510**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-50-0.0 (23E1579-06) Soil Sampled: 05/22/23 13:30 Received: 05/26/23 15:00									
Arsenic	**58**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-50-0.5 (23E1579-07) Soil Sampled: 05/22/23 13:35 Received: 05/26/23 15:00									
Total Sulfur	**29**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-50-1.0 (23E1579-08) Soil Sampled: 05/22/23 13:40 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-50-1.5 (23E1579-09) Soil Sampled: 05/22/23 13:45 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	

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Rancho Cordova, CA 95742	Project Manager:	Jason Muir

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COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-51-0.0 (23E1579-10) Soil Sampled: 05/22/23 11:30 Received: 05/26/23 15:00									
Arsenic	**280**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-51-1.5 (23E1579-11) Soil Sampled: 05/22/23 11:35 Received: 05/26/23 15:00									
Total Sulfur	**7.8**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-51-3.0 (23E1579-12) Soil Sampled: 05/22/23 11:40 Received: 05/26/23 15:00									
Arsenic	**42**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-51-4.5 (23E1579-13) Soil Sampled: 05/22/23 11:45 Received: 05/26/23 15:00									
Arsenic	**14**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-51R-4.5 (23E1579-14) Soil Sampled: 05/22/23 11:50 Received: 05/26/23 15:00									
Arsenic	**8.3**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-52-1.5 (23E1579-15) Soil Sampled: 05/23/23 09:30 Received: 05/26/23 15:00									
Arsenic	**190**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-52-3.0 (23E1579-16) Soil Sampled: 05/23/23 09:20 Received: 05/26/23 15:00									
Total Sulfur	**950**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-53-1.5 (23E1579-17) Soil Sampled: 05/23/23 07:55 Received: 05/26/23 15:00									
Arsenic	**69**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-53-3.0 (23E1579-18) Soil Sampled: 05/23/23 07:45 Received: 05/26/23 15:00									
Total Sulfur	**4600**	25	mg/kg	5	2304484	05/31/23	06/03/23	EPA 6010B	

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3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-54-1.5 (23E1579-19) Soil Sampled: 05/23/23 08:30 Received: 05/26/23 15:00									
Arsenic	**250**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-54-3.0 (23E1579-20) Soil Sampled: 05/23/23 08:25 Received: 05/26/23 15:00									
Total Sulfur	**890**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-55-0.0 (23E1579-21) Soil Sampled: 05/23/23 14:10 Received: 05/26/23 15:00									
Arsenic	**7.7**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-55-1.0 (23E1579-22) Soil Sampled: 05/23/23 14:15 Received: 05/26/23 15:00									
Arsenic	**4.9**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-56-0.0 (23E1579-23) Soil Sampled: 05/23/23 14:25 Received: 05/26/23 15:00									
Arsenic	**14**	2.0	mg/kg	1	2304505	06/01/23	06/02/23	EPA 6010B	
TP-56-1.5 (23E1579-24) Soil Sampled: 05/23/23 14:30 Received: 05/26/23 15:00									
Total Sulfur	**15**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-56-2.0 (23E1579-25) Soil Sampled: 05/23/23 14:35 Received: 05/26/23 15:00									
Arsenic	**2.2**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-57-0.0 (23E1579-26) Soil Sampled: 05/23/23 14:00 Received: 05/26/23 15:00									
Arsenic	**37**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-57R-0.0 (23E1579-27) Soil Sampled: 05/23/23 14:05 Received: 05/26/23 15:00									
Arsenic	**41**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	

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COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-57-1.5 (23E1579-28) Soil Sampled: 05/23/23 13:55 Received: 05/26/23 15:00									
Total Sulfur	**130**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-57-3.0 (23E1579-29) Soil Sampled: 05/23/23 13:50 Received: 05/26/23 15:00									
Arsenic	**67**	2.0	mg/kg	1	2304489	05/31/23	06/02/23	EPA 6010B	
TP-57-4.5 (23E1579-30) Soil Sampled: 05/23/23 13:45 Received: 05/26/23 15:00									
Arsenic	**58**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-58-0.0 (23E1579-31) Soil Sampled: 05/23/23 11:02 Received: 05/26/23 15:00									
Arsenic	**67**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-58-1.5 (23E1579-32) Soil Sampled: 05/23/23 11:00 Received: 05/26/23 15:00									
Arsenic	**32**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-58-3.0 (23E1579-33) Soil Sampled: 05/23/23 10:56 Received: 05/26/23 15:00									
Arsenic	**79**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-58-4.5 (23E1579-34) Soil Sampled: 05/23/23 10:53 Received: 05/26/23 15:00									
Arsenic	**26**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-59-0.0 (23E1579-35) Soil Sampled: 05/22/23 07:55 Received: 05/26/23 15:00									
Arsenic	**6.0**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-59-1.5 (23E1579-36) Soil Sampled: 05/22/23 08:00 Received: 05/26/23 15:00									
Total Sulfur	**41**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	

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COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-59-3.0 (23E1579-37) Soil Sampled: 05/22/23 08:05 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-59-4.5 (23E1579-38) Soil Sampled: 05/22/23 08:10 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-60-0.0 (23E1579-39) Soil Sampled: 05/22/23 08:30 Received: 05/26/23 15:00									
Arsenic	**3.5**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-60-1.5 (23E1579-40) Soil Sampled: 05/22/23 08:35 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-60R-1.5 (23E1579-41) Soil Sampled: 05/22/23 08:40 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-60-3.0 (23E1579-42) Soil Sampled: 05/22/23 08:45 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-60-4.5 (23E1579-43) Soil Sampled: 05/22/23 08:50 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-61-0.0 (23E1579-44) Soil Sampled: 05/22/23 15:25 Received: 05/26/23 15:00									
Arsenic	**4.9**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-61-1.5 (23E1579-45) Soil Sampled: 05/22/23 15:30 Received: 05/26/23 15:00									
Total Sulfur	**51**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	

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Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-61-3.0 (23E1579-46) Soil Sampled: 05/22/23 15:35 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-61-4.5 (23E1579-47) Soil Sampled: 05/22/23 15:40 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-62-0.0 (23E1579-48) Soil Sampled: 05/22/23 15:45 Received: 05/26/23 15:00									
Arsenic	**2.9**	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-62-1.5 (23E1579-49) Soil Sampled: 05/22/23 15:50 Received: 05/26/23 15:00									
Total Sulfur	**53**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-62-3.0 (23E1579-50) Soil Sampled: 05/22/23 15:55 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304490	05/31/23	06/02/23	EPA 6010B	
TP-62-4.5 (23E1579-51) Soil Sampled: 05/22/23 16:00 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304495	05/31/23	06/02/23	EPA 6010B	
TP-63-0.0 (23E1579-52) Soil Sampled: 05/22/23 15:00 Received: 05/26/23 15:00									
Arsenic	**4.2**	2.0	mg/kg	1	2304495	05/31/23	06/02/23	EPA 6010B	
TP-63-1.0 (23E1579-53) Soil Sampled: 05/22/23 15:05 Received: 05/26/23 15:00									
Total Sulfur	**40**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-63-2.0 (23E1579-54) Soil Sampled: 05/22/23 15:10 Received: 05/26/23 15:00									
Arsenic	ND	2.0	mg/kg	1	2304495	05/31/23	06/02/23	EPA 6010B	

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Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-63R-2.0 (23E1579-55) Soil Sampled: 05/22/23 15:15 Received: 05/26/23 15:00									
Arsenic	**2.2**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-63-3.0 (23E1579-56) Soil Sampled: 05/22/23 15:20 Received: 05/26/23 15:00									
Arsenic	**2.3**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-64-0.0 (23E1579-57) Soil Sampled: 05/22/23 10:45 Received: 05/26/23 15:00									
Total Sulfur	**340**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-64R-0.0 (23E1579-58) Soil Sampled: 05/22/23 10:50 Received: 05/26/23 15:00									
Total Sulfur	**370**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-64-3.0 (23E1579-59) Soil Sampled: 05/22/23 10:55 Received: 05/26/23 15:00									
Arsenic	**100**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-65-0.0 (23E1579-60) Soil Sampled: 05/22/23 10:05 Received: 05/26/23 15:00									
Arsenic	**260**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-65-3.0 (23E1579-61) Soil Sampled: 05/22/23 10:10 Received: 05/26/23 15:00									
Total Sulfur	**290**	10	mg/kg	2	2304484	05/31/23	06/03/23	EPA 6010B	
TP-66-0.0 (23E1579-62) Soil Sampled: 05/22/23 09:20 Received: 05/26/23 15:00									
Total Sulfur	**1200**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-66-3.0 (23E1579-63) Soil Sampled: 05/22/23 09:25 Received: 05/26/23 15:00									
Arsenic	**100**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	

Geocon Consultants	Project: Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number: S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager: Jason Muir	COC #:

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-67-0.5 (23E1579-64) Soil Sampled: 05/23/23 13:00 Received: 05/26/23 15:00									
Arsenic	**130**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-67-3.0 (23E1579-65) Soil Sampled: 05/23/23 12:55 Received: 05/26/23 15:00									
Total Sulfur	**40**	5.0	mg/kg	1	2304484	05/31/23	06/03/23	EPA 6010B	
TP-68-0.0 (23E1579-66) Soil Sampled: 05/23/23 12:35 Received: 05/26/23 15:00									
Total Sulfur	**180**	5.0	mg/kg	1	2304505	06/01/23	06/03/23	EPA 6010B	
TP-68R-0.5 (23E1579-67) Soil Sampled: 05/23/23 12:32 Received: 05/26/23 15:00									
Total Sulfur	**78**	5.0	mg/kg	1	2304505	06/01/23	06/05/23	EPA 6010B	
TP-68R-0.5 (23E1579-68) Soil Sampled: 05/23/23 12:30 Received: 05/26/23 15:00									
Arsenic	**70**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-69-1.5 (23E1579-69) Soil Sampled: 05/23/23 12:05 Received: 05/26/23 15:00									
Arsenic	**120**	2.0	mg/kg	1	2304495	05/31/23	06/06/23	EPA 6010B	
TP-69-3.0 (23E1579-70) Soil Sampled: 05/23/23 12:00 Received: 05/26/23 15:00									
Total Sulfur	**76**	5.0	mg/kg	1	2304505	06/01/23	06/05/23	EPA 6010B	
TP-65-SURFACE (23E1579-72) Soil Sampled: 05/22/23 10:15 Received: 05/26/23 15:00									
Total Sulfur	**930**	5.0	mg/kg	1	2304505	06/01/23	06/03/23	EPA 6010B	

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COC #:

CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304424 - EPA 3010A										
Blank (2304424-BLK1)				Prepared & Analyzed: 05/30/23						
Antimony	ND	0.050	mg/L							
Barium	ND	0.020	"							
Beryllium	ND	0.0050	"							
Cadmium	ND	0.010	"							
Cobalt	ND	0.020	"							
Chromium	ND	0.020	"							
Copper	ND	0.020	"							
Lead	ND	0.050	"							
Molybdenum	ND	0.020	"							
Nickel	ND	0.020	"							
Silver	ND	0.020	"							
Vanadium	ND	0.020	"							
Zinc	ND	0.020	"							
Arsenic	ND	0.010	"							
Selenium	ND	0.010	"							
Thallium	ND	0.020	"							
LCS (2304424-BS1)				Prepared & Analyzed: 05/30/23						
Antimony	0.535	0.050	mg/L	0.500		107	80-120			
Barium	0.500	0.020	"	0.500		100	80-120			
Beryllium	0.524	0.0050	"	0.500		105	80-120			
Cadmium	0.518	0.010	"	0.500		104	80-120			
Cobalt	0.524	0.020	"	0.500		105	80-120			
Chromium	0.522	0.020	"	0.500		104	80-120			
Copper	0.527	0.020	"	0.500		105	80-120			
Lead	0.530	0.050	"	0.500		106	80-120			
Molybdenum	0.535	0.020	"	0.500		107	80-120			
Nickel	0.519	0.020	"	0.500		104	80-120			
Silver	0.645	0.020	"	0.500		129	80-120			QM-1
Vanadium	0.516	0.020	"	0.500		103	80-120			
Zinc	0.499	0.020	"	0.500		100	80-120			
Arsenic	0.517	0.010	"	0.500		103	80-120			

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CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304424 - EPA 3010A										
LCS (2304424-BS1)				Prepared & Analyzed: 05/30/23						
Selenium	0.502	0.010	mg/L	0.500		100	80-120			
Thallium	0.520	0.020	"	0.500		104	80-120			
Matrix Spike (2304424-MS1)	**Source: 23E1577-02**			Prepared & Analyzed: 05/30/23						
Antimony	1.52	0.050	mg/L	0.500	1.04	96	75-125			
Barium	0.580	0.020	"	0.500	0.124	91	75-125			
Beryllium	0.521	0.0050	"	0.500	0.0288	98	75-125			
Cadmium	1.28	0.010	"	0.500	0.844	86	75-125			
Cobalt	0.614	0.020	"	0.500	0.137	95	75-125			
Chromium	0.569	0.020	"	0.500	0.0901	96	75-125			
Copper	0.937	0.020	"	0.500	0.489	90	75-125			
Lead	0.544	0.050	"	0.500	0.0837	92	75-125			
Molybdenum	0.506	0.020	"	0.500	0.00846	99	75-125			
Nickel	0.545	0.020	"	0.500	0.0664	96	75-125			
Silver	0.566	0.020	"	0.500	ND	113	75-125			
Vanadium	0.549	0.020	"	0.500	0.0647	97	75-125			
Zinc	0.793	0.020	"	0.500	0.334	92	75-125			
Arsenic	0.481	0.010	"	0.500	ND	96	75-125			
Selenium	0.495	0.010	"	0.500	ND	99	75-125			
Thallium	0.447	0.020	"	0.500	ND	89	75-125			
Matrix Spike Dup (2304424-MSD1)	**Source: 23E1577-02**			Prepared & Analyzed: 05/30/23						
Antimony	1.53	0.050	mg/L	0.500	1.04	98	75-125	0.6	25	
Barium	0.577	0.020	"	0.500	0.124	91	75-125	0.6	25	
Beryllium	0.526	0.0050	"	0.500	0.0288	99	75-125	1	25	
Cadmium	1.29	0.010	"	0.500	0.844	90	75-125	1	25	
Cobalt	0.624	0.020	"	0.500	0.137	97	75-125	2	25	
Chromium	0.570	0.020	"	0.500	0.0901	96	75-125	0.2	25	
Copper	0.951	0.020	"	0.500	0.489	92	75-125	1	25	
Lead	0.551	0.050	"	0.500	0.0837	94	75-125	1	25	
Molybdenum	0.515	0.020	"	0.500	0.00846	101	75-125	2	25	
Nickel	0.555	0.020	"	0.500	0.0664	98	75-125	2	25	

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CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304424 - EPA 3010A										
Matrix Spike Dup (2304424-MSD1)		**Source: 23E1577-02**		Prepared & Analyzed: 05/30/23						
Silver	0.567	0.020	mg/L	0.500	ND	113	75-125	0.1	25	
Vanadium	0.551	0.020	"	0.500	0.0647	97	75-125	0.4	25	
Zinc	0.804	0.020	"	0.500	0.334	94	75-125	1	25	
Arsenic	0.495	0.010	"	0.500	ND	99	75-125	3	25	
Selenium	0.508	0.010	"	0.500	ND	102	75-125	3	25	
Thallium	0.452	0.020	"	0.500	ND	90	75-125	1	25	
Batch 2304447 - EPA 7470A										
Blank (2304447-BLK1)				Prepared: 05/30/23 Analyzed: 06/01/23						
Mercury	ND	0.00020	mg/L							
LCS (2304447-BS1)				Prepared: 05/30/23 Analyzed: 06/01/23						
Mercury	0.00408	0.00020	mg/L	0.00500		82	80-120			
Matrix Spike (2304447-MS1)		**Source: 23E1454-01**		Prepared: 05/30/23 Analyzed: 06/01/23						
Mercury	0.00415	0.00020	mg/L	0.00500	ND	83	75-125			
Matrix Spike (2304447-MS2)		**Source: 23E1579-71**		Prepared: 05/30/23 Analyzed: 06/01/23						
Mercury	0.00409	0.00020	mg/L	0.00500	ND	82	75-125			
Matrix Spike Dup (2304447-MSD1)		**Source: 23E1454-01**		Prepared: 05/30/23 Analyzed: 06/01/23						
Mercury	0.00412	0.00020	mg/L	0.00500	ND	82	75-125	0.9	25	
Batch 2304484 - EPA 3050B										
Blank (2304484-BLK1)				Prepared & Analyzed: 05/31/23						
Antimony	ND	2.5	mg/kg							
Arsenic	ND	1.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	1.0	"							
Cobalt	ND	1.0	"							
Chromium	ND	1.0	"							
Copper	ND	1.0	"							

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CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304484 - EPA 3050B										
Blank (2304484-BLK1)				Prepared & Analyzed: 05/31/23						
Lead	ND	2.5	mg/kg							
Molybdenum	ND	1.0	"							
Nickel	ND	1.0	"							
Selenium	ND	2.5	"							
Silver	ND	1.0	"							
Thallium	ND	4.0	"							
Vanadium	ND	1.0	"							
Zinc	ND	1.0	"							
LCS (2304484-BS1)				Prepared & Analyzed: 05/31/23						
Antimony	43.7	2.5	mg/kg	50.0		87	75-125			
Arsenic	42.7	1.0	"	50.0		85	75-125			
Barium	45.2	1.0	"	50.0		90	75-125			
Beryllium	45.1	1.0	"	50.0		90	75-125			
Cadmium	43.2	1.0	"	50.0		86	75-125			
Cobalt	44.2	1.0	"	50.0		88	75-125			
Chromium	45.0	1.0	"	50.0		90	75-125			
Copper	43.9	1.0	"	50.0		88	75-125			
Lead	43.1	2.5	"	50.0		86	75-125			
Molybdenum	45.4	1.0	"	50.0		91	75-125			
Nickel	43.2	1.0	"	50.0		86	75-125			
Selenium	40.9	2.5	"	50.0		82	75-125			
Silver	40.8	1.0	"	50.0		82	75-125			
Thallium	44.2	4.0	"	50.0		88	75-125			
Vanadium	45.7	1.0	"	50.0		91	75-125			
Zinc	41.4	1.0	"	50.0		83	75-125			
Matrix Spike (2304484-MS1)	**Source: 23E1579-02**			Prepared & Analyzed: 05/31/23						
Antimony	30.1	2.5	mg/kg	50.0	11.6	37	75-125			QM-5
Arsenic	564	1.0	"	50.0	619	NR	75-125			QM-4X
Barium	63.7	1.0	"	50.0	21.7	84	75-125			
Beryllium	42.4	1.0	"	50.0	1.25	82	75-125			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304484 - EPA 3050B										
Matrix Spike (2304484-MS1)	**Source: 23E1579-02**			Prepared & Analyzed: 05/31/23						
Cadmium	46.1	1.0	mg/kg	50.0	5.81	81	75-125			
Cobalt	139	1.0	"	50.0	142	NR	75-125			QM-5
Chromium	222	1.0	"	50.0	180	83	75-125			
Copper	87.6	1.0	"	50.0	130	NR	75-125			A-COM
Lead	55.4	2.5	"	50.0	17.6	76	75-125			
Molybdenum	42.1	1.0	"	50.0	ND	84	75-125			
Nickel	715	1.0	"	50.0	787	NR	75-125			QM-4X
Selenium	18.7	2.5	"	50.0	ND	37	75-125			QM-5
Silver	38.0	1.0	"	50.0	ND	76	75-125			
Thallium	38.5	4.0	"	50.0	ND	77	75-125			
Vanadium	70.4	1.0	"	50.0	31.1	79	75-125			
Zinc	85.5	1.0	"	50.0	53.4	64	75-125			QM-5
Matrix Spike Dup (2304484-MSD1)	**Source: 23E1579-02**			Prepared & Analyzed: 05/31/23						
Antimony	35.1	2.5	mg/kg	50.0	11.6	47	75-125	15	30	QM-5
Arsenic	757	1.0	"	50.0	619	277	75-125	29	30	QM-4X
Barium	72.6	1.0	"	50.0	21.7	102	75-125	13	30	
Beryllium	42.2	1.0	"	50.0	1.25	82	75-125	0.5	30	
Cadmium	47.0	1.0	"	50.0	5.81	82	75-125	2	30	
Cobalt	149	1.0	"	50.0	142	14	75-125	7	30	QM-5
Chromium	281	1.0	"	50.0	180	201	75-125	23	30	QM-4X
Copper	190	5.0	"	50.0	130	120	75-125	74	30	QM-5
Lead	57.4	2.5	"	50.0	17.6	80	75-125	3	30	
Molybdenum	41.3	1.0	"	50.0	ND	83	75-125	2	30	
Nickel	939	1.0	"	50.0	787	304	75-125	27	30	QM-4X
Selenium	12.5	2.5	"	50.0	ND	25	75-125	40	30	QM-5
Silver	36.2	1.0	"	50.0	ND	72	75-125	5	30	QM-5
Thallium	36.9	4.0	"	50.0	ND	74	75-125	4	30	QM-5
Vanadium	78.1	1.0	"	50.0	31.1	94	75-125	10	30	
Zinc	98.9	1.0	"	50.0	53.4	91	75-125	15	30	

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CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304493 - EPA 7471A										
Blank (2304493-BLK1)				Prepared: 05/31/23 Analyzed: 06/01/23						
Mercury	ND	0.10	mg/kg							
LCS (2304493-BS1)				Prepared: 05/31/23 Analyzed: 06/01/23						
Mercury	0.201	0.10	mg/kg	0.208		97	75-125			
Matrix Spike (2304493-MS1)		**Source: 23E1579-03**		Prepared: 05/31/23 Analyzed: 06/01/23						
Mercury	0.289	0.10	mg/kg	0.208	0.0954	93	75-125			
Matrix Spike Dup (2304493-MSD1)		**Source: 23E1579-03**		Prepared: 05/31/23 Analyzed: 06/01/23						
Mercury	0.295	0.10	mg/kg	0.208	0.0954	96	75-125	2	25	
Batch 2304500 - EPA 7471A										
Blank (2304500-BLK1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Mercury	ND	0.10	mg/kg							
LCS (2304500-BS1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Mercury	0.196	0.10	mg/kg	0.208		94	75-125			
Matrix Spike (2304500-MS1)		**Source: 23E1579-67**		Prepared: 05/31/23 Analyzed: 06/02/23						
Mercury	1.03	0.50	mg/kg	0.208	0.886	70	75-125			QM-4X
Matrix Spike Dup (2304500-MSD1)		**Source: 23E1579-67**		Prepared: 05/31/23 Analyzed: 06/02/23						
Mercury	1.14	0.50	mg/kg	0.208	0.886	120	75-125	10	25	
Batch 2304505 - EPA 3050B										
Blank (2304505-BLK1)				Prepared: 06/01/23 Analyzed: 06/02/23						
Antimony	ND	2.5	mg/kg							
Arsenic	ND	1.0	"							
Barium	ND	1.0	"							
Beryllium	ND	1.0	"							
Cadmium	ND	1.0	"							
Cobalt	ND	1.0	"							
Chromium	ND	1.0	"							
Copper	ND	1.0	"							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304505 - EPA 3050B										
Blank (2304505-BLK1)				Prepared: 06/01/23 Analyzed: 06/02/23						
Lead	ND	2.5	mg/kg							
Molybdenum	ND	1.0	"							
Nickel	ND	1.0	"							
Selenium	ND	2.5	"							
Silver	1.26	1.0	"							A-COMa
Thallium	ND	4.0	"							
Vanadium	ND	1.0	"							
Zinc	ND	1.0	"							
LCS (2304505-BS1)				Prepared: 06/01/23 Analyzed: 06/02/23						
Antimony	51.3	2.5	mg/kg	50.0		103	75-125			
Arsenic	48.7	1.0	"	50.0		97	75-125			
Barium	45.4	1.0	"	50.0		91	75-125			
Beryllium	48.6	1.0	"	50.0		97	75-125			
Cadmium	48.5	1.0	"	50.0		97	75-125			
Cobalt	49.2	1.0	"	50.0		98	75-125			
Chromium	48.6	1.0	"	50.0		97	75-125			
Copper	48.1	1.0	"	50.0		96	75-125			QM-5
Lead	48.8	2.5	"	50.0		98	75-125			
Molybdenum	50.2	1.0	"	50.0		100	75-125			
Nickel	48.6	1.0	"	50.0		97	75-125			
Selenium	45.9	2.5	"	50.0		92	75-125			
Silver	51.2	1.0	"	50.0		102	75-125			
Thallium	47.6	4.0	"	50.0		95	75-125			
Vanadium	47.7	1.0	"	50.0		95	75-125			
Zinc	47.2	1.0	"	50.0		94	75-125			
Matrix Spike (2304505-MS1)	**Source: 23E1579-66**			Prepared: 06/01/23 Analyzed: 06/02/23						
Antimony	33.6	2.5	mg/kg	50.0	ND	67	75-125			QM-5
Arsenic	105	1.0	"	50.0	80.7	48	75-125			QM-5
Barium	69.3	1.0	"	50.0	29.9	79	75-125			
Beryllium	42.5	1.0	"	50.0	0.207	85	75-125			

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CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304505 - EPA 3050B										
Matrix Spike (2304505-MS1)	**Source: 23E1579-66**			Prepared: 06/01/23 Analyzed: 06/02/23						
Cadmium	42.6	1.0	mg/kg	50.0	1.21	83	75-125			
Cobalt	43.9	1.0	"	50.0	2.46	83	75-125			
Chromium	46.9	1.0	"	50.0	4.55	85	75-125			
Copper	58.6	1.0	"	50.0	22.1	73	75-125			QM-5
Lead	53.6	2.5	"	50.0	14.4	78	75-125			
Molybdenum	43.5	1.0	"	50.0	ND	87	75-125			
Nickel	50.5	1.0	"	50.0	12.0	77	75-125			
Selenium	37.4	2.5	"	50.0	ND	75	75-125			
Silver	46.3	1.0	"	50.0	ND	93	75-125			
Thallium	39.1	4.0	"	50.0	ND	78	75-125			
Vanadium	50.1	1.0	"	50.0	7.80	85	75-125			
Zinc	74.4	1.0	"	50.0	42.9	63	75-125			QM-5
Matrix Spike Dup (2304505-MSD1)	**Source: 23E1579-66**			Prepared: 06/01/23 Analyzed: 06/02/23						
Antimony	34.0	2.5	mg/kg	50.0	ND	68	75-125	1	30	QM-5
Arsenic	119	1.0	"	50.0	80.7	76	75-125	12	30	
Barium	74.1	1.0	"	50.0	29.9	88	75-125	7	30	
Beryllium	47.1	1.0	"	50.0	0.207	94	75-125	10	30	
Cadmium	46.2	1.0	"	50.0	1.21	90	75-125	8	30	
Cobalt	47.7	1.0	"	50.0	2.46	91	75-125	8	30	
Chromium	49.5	1.0	"	50.0	4.55	90	75-125	5	30	
Copper	62.1	1.0	"	50.0	22.1	80	75-125	6	30	
Lead	58.4	2.5	"	50.0	14.4	88	75-125	8	30	
Molybdenum	46.7	1.0	"	50.0	ND	93	75-125	7	30	
Nickel	55.7	1.0	"	50.0	12.0	87	75-125	10	30	
Selenium	40.8	2.5	"	50.0	ND	82	75-125	9	30	
Silver	45.4	1.0	"	50.0	ND	91	75-125	2	30	
Thallium	42.6	4.0	"	50.0	ND	85	75-125	9	30	
Vanadium	52.4	1.0	"	50.0	7.80	89	75-125	4	30	
Zinc	81.8	1.0	"	50.0	42.9	78	75-125	10	30	

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304484 - EPA 3050B										
Blank (2304484-BLK1)				Prepared: 05/31/23 Analyzed: 06/03/23						
Total Sulfur	ND	5.0	mg/kg							
LCS (2304484-BS1)				Prepared: 05/31/23 Analyzed: 06/03/23						
Total Sulfur	0.909		mg/L	1.00		91	75-125			
Matrix Spike (2304484-MS1)	**Source: 23E1579-02**			Prepared: 05/31/23 Analyzed: 06/03/23						
Total Sulfur	1.30		mg/L	1.00	0.372	93	75-125			QM-5
Matrix Spike Dup (2304484-MSD1)	**Source: 23E1579-02**			Prepared: 05/31/23 Analyzed: 06/03/23						
Total Sulfur	1.32		mg/L	1.00	0.372	94	75-125		30	QM-5
Batch 2304489 - EPA 3050B										
Blank (2304489-BLK1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	ND	2.0	mg/kg							
LCS (2304489-BS1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	50.1	2.0	mg/kg	50.0		100	75-125			
Matrix Spike (2304489-MS1)	**Source: 23E1579-01**			Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	948	2.0	mg/kg	50.0	954	NR	75-125			QM-4X
Matrix Spike Dup (2304489-MSD1)	**Source: 23E1579-01**			Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	1060	2.0	mg/kg	50.0	954	218	75-125	12	30	QM-4X
Batch 2304490 - EPA 3050B										
Blank (2304490-BLK1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	ND	2.0	mg/kg							

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304490 - EPA 3050B										
LCS (2304490-BS1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	49.7	2.0	mg/kg	50.0		99	75-125			
Matrix Spike (2304490-MS1)		**Source: 23E1579-30**		Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	125	2.0	mg/kg	50.0	57.6	135	75-125			QM-5
Matrix Spike Dup (2304490-MSD1)		**Source: 23E1579-30**		Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	110	2.0	mg/kg	50.0	57.6	104	75-125	13	30	
Batch 2304495 - EPA 3050B										
Blank (2304495-BLK1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	ND	2.0	mg/kg							
LCS (2304495-BS1)				Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	49.8	2.0	mg/kg	50.0		100	75-125			
Matrix Spike (2304495-MS1)		**Source: 23E1579-51**		Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	32.0	2.0	mg/kg	50.0	ND	64	75-125			QM-5
Matrix Spike Dup (2304495-MSD1)		**Source: 23E1579-51**		Prepared: 05/31/23 Analyzed: 06/02/23						
Arsenic	30.9	2.0	mg/kg	50.0	ND	62	75-125	4	30	QM-5
Batch 2304505 - EPA 3050B										
Blank (2304505-BLK1)				Prepared: 06/01/23 Analyzed: 06/02/23						
Arsenic	ND	2.0	mg/kg							
Total Sulfur	ND	5.0	"							

Geocon Consultants	Project:	Oro de Amador
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03
Rancho Cordova, CA 95742	Project Manager:	Jason Muir

CLS Work Order #: 23E1579
COC #:

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2304505 - EPA 3050B										
LCS (2304505-BS1)				Prepared: 06/01/23 Analyzed: 06/02/23						
Arsenic	48.7	2.0	mg/kg	50.0		97	75-125			
Total Sulfur	101	5.0	"				75-125			
Matrix Spike (2304505-MS1)	**Source: 23E1579-66**			Prepared: 06/01/23 Analyzed: 06/02/23						
Arsenic	105	2.0	mg/kg	50.0	ND	210	75-125			QM-5
Total Sulfur	265	5.0	"		181		75-125			
Matrix Spike Dup (2304505-MSD1)	**Source: 23E1579-66**			Prepared: 06/01/23 Analyzed: 06/02/23						
Arsenic	119	2.0	mg/kg	50.0	ND	238	75-125	12	30	QM-5
Total Sulfur	252	5.0	"		181		75-125	5	30	

Geocon Consultants	Project:	Oro de Amador	
3160 Gold Valley Dr. Suite #800	Project Number:	S9959-07-03	**CLS Work Order #: 23E1579**
Rancho Cordova, CA 95742	Project Manager:	Jason Muir	COC #:

Notes and Definitions

QM-5	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
QM-1	The spike recovery was outside acceptance limits for the LCS or LCSD. The batch was accepted based on acceptable MS/MSD recoveries & RPD's.
QB-2	The analyte was detected in the method blank or calibration verfication blank. A re-analysis was not performed since all sample results for the analyte are ND.
A-COMb	The CCV recoveries were 87~89%, slightly below the control limit of 90%.
A-COMa	Low level of detection also in the method blank and/or CCB.
A-COM	
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
*	The laboratory does not hold CA-ELAP accreditation for this analyte or method. Accreditation may not be available from CA-ELAP for this analyte or method.

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Analytical Report

WorkOrder:	2305L84	**Amended:**	07/07/2023
		Revision:	1
Report Created for:	GEOCON Env. Consultants		
	3160 Gold Valley Drive, Suite 800 Rancho Cordova, CA 95742-7306		
Project Contact:	Jason Muir		
Project P.O.:			
Project:	S9959-07-03; Oro de Amador-S9959-07-03		
Project Received:	05/31/2023		

Analytical Report reviewed & approved for release on 06/08/2023 by:

Christine Askari
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in a case narrative.

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CA ELAP 1644 ♦ NELAP 4033 ORELAP

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Revision History

Client: GEOCON Env. Consultants **WorkOrder:** 2305L84

Project: S9959-07-03; Oro de Amador-S9959-07-03

Date	Revision	Reason
07/07/2023	1	Revised to include narrative explaining amenable CN switch to weak acid dissociable CN.

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Glossary of Terms & Qualifier Definitions

Client: GEOCON Env. Consultants **WorkOrder:** 2305L84

Project: S9959-07-03; Oro de Amador-S9959-07-03

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit [1]
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NA	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting limit [2]
RPD	Relative Percent Difference
RRT	Relative Retention Time
RSD	Relative Standard Deviation
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure

[1] MDL is the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results. Definition and Procedure for the Determination of the Method Detection Limit, Revision 2, 40CFR, Part 136, Appendix B, EPA 821-R-16-006, December 2016.

[2] RL is the lowest level that can be reliably determined within specified limits of precision and accuracy during routine laboratory operating conditions. (The RL cannot be lower than the lowest calibration standard used in the initial calibration of the instrument and must be greater than the MDL.)

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Glossary of Terms & Qualifier Definitions

Client: GEOCON Env. Consultants **WorkOrder:** 2305L84

Project: S9959-07-03; Oro de Amador-S9959-07-03

TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

F	Sample was filtered upon arrival to the lab
S	Surrogate recovery outside accepted recovery limits.
a1	Sample diluted due to matrix interference.
a14	Reporting limit raised due to the physical nature of the sample.
c1	Surrogate recovery outside of the control limits due to the dilution of the sample.

Quality Control Qualifiers

F10	MS/MSD outside control limits. Physical or chemical interferences exist due to sample matrix.
F13	Indigenous sample results too high for a representative matrix spike analysis.

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Case Narrative

Client: GEOCON Env. Consultants
Project: S9959-07-03; Oro de Amador-S9959-07-03

Work Order: 2305L84
July 07, 2023

j1:

SM4500-CN¯GE (Cyanide, Total & Amenable)

The initial testing for Amenable Cyanide on samples 2305L84-001H, -002H, 003H, 004H provided an invalid result due to possibly unidentified organic compounds in the samples interfering during the chlorination step. Per Method 4500-CN-G, this is a known interference with the method, and when this is observed Weak Acid Dissociable Cyanide by 4500-CN-I should be performed as an alternative to determining free cyanide. Therefore, MAI is reporting Weak Acid Dissociable Cyanide instead of the Amenable Cyanide requested.

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E300.1
Date Prepared:	05/31/2023-06/01/2023	**Analytical Method:**	E300.1
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Inorganic Anions by IC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001D	Water	05/30/2023 11:40	IC4 06012347.D	270659

Analytes	Result	RL	DF	Date Analyzed
Chloride	**3.9**	0.20	2	05/31/2023 16:16
Nitrate as N	ND	0.20	2	05/31/2023 16:16
Nitrate as $NO3^{-}$	ND	0.88	2	05/31/2023 16:16
Nitrite as N	ND	0.20	2	05/31/2023 16:16
Nitrite as $NO2^{-}$	ND	0.66	2	05/31/2023 16:16
Nitrate & Nitrite as N	ND	0.20	2	05/31/2023 16:16
Sulfate	**590**	20	200	06/01/2023 05:10

Surrogates	REC (%)	Qualifiers	Limits	
Malonate	82	S	90-115	05/31/2023 16:16

Analyst(s): ND Analytical Comments: c1,a14

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002D	Water	05/30/2023 12:45	IC4 06012348.D	270659

Analytes	Result	RL	DF	Date Analyzed
Chloride	**2.4**	0.40	4	05/31/2023 18:41
Nitrate as N	ND	0.40	4	05/31/2023 18:41
Nitrate as $NO3^{-}$	ND	1.8	4	05/31/2023 18:41
Nitrite as N	ND	0.40	4	05/31/2023 18:41
Nitrite as $NO2^{-}$	ND	1.3	4	05/31/2023 18:41
Nitrate & Nitrite as N	ND	0.40	4	05/31/2023 18:41
Sulfate	**230**	20	200	06/01/2023 05:24

Surrogates	REC (%)	Qualifiers	Limits	
Malonate	78	S	90-115	05/31/2023 18:41

Analyst(s): ND Analytical Comments: c1,a1

(Cont.)

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E300.1
Date Prepared:	05/31/2023-06/01/2023	**Analytical Method:**	E300.1
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Inorganic Anions by IC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003D	Water	05/30/2023 14:00	IC4 06012329.D	270659

Analytes	Result	RL	DF	Date Analyzed
Chloride	**5.6**	0.20	2	05/31/2023 16:45
Nitrate as N	ND	0.20	2	05/31/2023 16:45
Nitrate as $NO3^{-}$	ND	0.88	2	05/31/2023 16:45
Nitrite as N	ND	0.20	2	05/31/2023 16:45
Nitrite as $NO2^{-}$	ND	0.66	2	05/31/2023 16:45
Nitrate & Nitrite as N	ND	0.20	2	05/31/2023 16:45
Sulfate	**650**	20	200	06/01/2023 05:39

Surrogates	REC (%)	Limits	
Malonate	98	90-115	05/31/2023 16:45

Analyst(s): ND Analytical Comments: a14

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004D	Water	05/30/2023 10:55	IC4 06012337.D	270659

Analytes	Result	RL	DF	Date Analyzed
Chloride	**4.9**	1.0	10	06/01/2023 00:50
Nitrate as N	**3.8**	0.10	1	05/31/2023 16:59
Nitrate as $NO3^{-}$	**17**	0.44	1	05/31/2023 16:59
Nitrite as N	ND	0.10	1	05/31/2023 16:59
Nitrite as $NO2^{-}$	ND	0.33	1	05/31/2023 16:59
Nitrate & Nitrite as N	**3.8**	0.10	1	05/31/2023 16:59
Sulfate	**91**	10	100	06/01/2023 03:58

Surrogates	REC (%)	Limits	
Malonate	97	90-115	05/31/2023 16:59

Analyst(s): ND

(Cont.)

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E300.1
Date Prepared:	05/31/2023-06/01/2023	**Analytical Method:**	E300.1
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Inorganic Anions by IC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005D	Water	05/30/2023 08:40	IC4 06012331.D	270659

Analytes	Result	RL	DF	Date Analyzed
Chloride	**3.7**	0.10	1	05/31/2023 17:14
Nitrate as N	**0.13**	0.10	1	05/31/2023 17:14
Nitrate as $NO3^{-}$	**0.59**	0.44	1	05/31/2023 17:14
Nitrite as N	ND	0.10	1	05/31/2023 17:14
Nitrite as $NO2^{-}$	ND	0.33	1	05/31/2023 17:14
Nitrate & Nitrite as N	**0.13**	0.10	1	05/31/2023 17:14
Sulfate	**69**	10	100	06/01/2023 04:12

Surrogates	REC (%)	Limits	
Malonate	95	90-115	05/31/2023 17:14

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006D	Water	05/30/2023 13:00	IC4 06012349.D	270659

Analytes	Result	RL	DF	Date Analyzed
Chloride	**2.4**	0.40	4	05/31/2023 18:55
Nitrate as N	ND	0.40	4	05/31/2023 18:55
Nitrate as $NO3^{-}$	ND	1.8	4	05/31/2023 18:55
Nitrite as N	ND	0.40	4	05/31/2023 18:55
Nitrite as $NO2^{-}$	ND	1.3	4	05/31/2023 18:55
Nitrate & Nitrite as N	ND	0.40	4	05/31/2023 18:55
Sulfate	**220**	20	200	06/01/2023 04:55

Surrogates	REC (%)	Qualifiers	Limits	
Malonate	85	S	90-115	05/31/2023 18:55

Analyst(s): ND Analytical Comments: c1,a1

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM2320 B
Date Prepared:	06/07/2023	**Analytical Method:**	SM2320 B
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg $CaCO_3$/L

Total & Speciated Alkalinity as Calcium Carbonate

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001E	Water	05/30/2023 11:40	TITRINO F073898	271127

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	**438**	10.0	1	06/07/2023 10:04
Carbonate	ND	10.0	1	06/07/2023 10:04
Bicarbonate	**438**	10.0	1	06/07/2023 10:04
Hydroxide	ND	10.0	1	06/07/2023 10:04

Analyst(s): HN

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002E	Water	05/30/2023 12:45	TITRINO F073899	271127

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	**734**	10.0	1	06/07/2023 10:22
Carbonate	ND	10.0	1	06/07/2023 10:22
Bicarbonate	**734**	10.0	1	06/07/2023 10:22
Hydroxide	ND	10.0	1	06/07/2023 10:22

Analyst(s): HN

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003E	Water	05/30/2023 14:00	TITRINO F073900	271127

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	**185**	10.0	1	06/07/2023 10:29
Carbonate	ND	10.0	1	06/07/2023 10:29
Bicarbonate	**185**	10.0	1	06/07/2023 10:29
Hydroxide	ND	10.0	1	06/07/2023 10:29

Analyst(s): HN

(Cont.)

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM2320 B
Date Prepared:	06/07/2023	**Analytical Method:**	SM2320 B
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg $CaCO_3$/L

Total & Speciated Alkalinity as Calcium Carbonate

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004E	Water	05/30/2023 10:55	TITRINO F073901	271127

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	**234**	10.0	1	06/07/2023 10:38
Carbonate	ND	10.0	1	06/07/2023 10:38
Bicarbonate	**234**	10.0	1	06/07/2023 10:38
Hydroxide	ND	10.0	1	06/07/2023 10:38

Analyst(s): HN

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005E	Water	05/30/2023 08:40	TITRINO F073902	271127

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	**146**	10.0	1	06/07/2023 10:46
Carbonate	ND	10.0	1	06/07/2023 10:46
Bicarbonate	**146**	10.0	1	06/07/2023 10:46
Hydroxide	ND	10.0	1	06/07/2023 10:46

Analyst(s): HN

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006E	Water	05/30/2023 13:00	TITRINO F073904	271127

Analytes	Result	RL	DF	Date Analyzed
Total Alkalinity	**735**	10.0	1	06/07/2023 11:12
Carbonate	ND	10.0	1	06/07/2023 11:12
Bicarbonate	**735**	10.0	1	06/07/2023 11:12
Hydroxide	ND	10.0	1	06/07/2023 11:12

Analyst(s): HN

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM4500-CN⁻ GE
Date Prepared:	06/07/2023	**Analytical Method:**	SM4500-CN⁻ GE
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Cyanide, Amenable

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005H	Water	05/30/2023 08:40	WC_Skalar3 230607A0_79	271032

Analytes	Result	RL	DF	Date Analyzed
Amenable Cyanide	ND	1.0	1	06/07/2023 15:24

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006H	Water	05/30/2023 13:00	WC_Skalar3 230607A0_80	271032

Analytes	Result	RL	DF	Date Analyzed
Amenable Cyanide	ND	1.0	1	06/07/2023 15:26

Analyst(s): CC

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	Kelada-01
Date Prepared:	06/07/2023	**Analytical Method:**	Kelada-01
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Cyanide, Total

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001H	Water	05/30/2023 11:40	WC_Skalar3 230607A0_52	271032

Analytes	Result	RL	DF	Date Analyzed
Total Cyanide	**1.2**	1.0	1	06/07/2023 14:09

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002H	Water	05/30/2023 12:45	WC_Skalar3 230607A0_53	271032

Analytes	Result	RL	DF	Date Analyzed
Total Cyanide	**16**	1.0	1	06/07/2023 14:12

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003H	Water	05/30/2023 14:00	WC_Skalar3 230607A0_54	271032

Analytes	Result	RL	DF	Date Analyzed
Total Cyanide	ND	1.0	1	06/07/2023 14:15

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004H	Water	05/30/2023 10:55	WC_Skalar3 230607A0_55	271032

Analytes	Result	RL	DF	Date Analyzed
Total Cyanide	**1.5**	1.0	1	06/07/2023 14:17

Analyst(s): CC

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	Kelada-01
Date Prepared:	06/07/2023	**Analytical Method:**	Kelada-01
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Cyanide, Total

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005H	Water	05/30/2023 08:40	WC_Skalar3 230607A0_56	271032

Analytes	Result	RL	DF	Date Analyzed
Total Cyanide	ND	1.0	1	06/07/2023 14:20

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006H	Water	05/30/2023 13:00	WC_Skalar3 230607A0_57	271032

Analytes	Result	RL	DF	Date Analyzed
Total Cyanide	**17**	1.0	1	06/07/2023 14:23

Analyst(s): CC

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM4500-CN⁻ I / Kelada-01
Date Prepared:	06/08/2023	**Analytical Method:**	SM4500-CN⁻ I / Kelada-01
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Weak Acid Dissociable Cyanide

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001H	Water	05/30/2023 11:40	WC_Skalar3 230608a0_40	271223

Analytes	Result	RL	DF	Date Analyzed
Weak Acid Dissociable Cyanide	ND	1.0	1	06/08/2023 11:46

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002H	Water	05/30/2023 12:45	WC_Skalar3 230608a0_41	271223

Analytes	Result	RL	DF	Date Analyzed
Weak Acid Dissociable Cyanide	**1.6**	1.0	1	06/08/2023 11:49

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003H	Water	05/30/2023 14:00	WC_Skalar3 230608a0_42	271223

Analytes	Result	RL	DF	Date Analyzed
Weak Acid Dissociable Cyanide	ND	1.0	1	06/08/2023 11:52

Analyst(s): CC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004H	Water	05/30/2023 10:55	WC_Skalar3 230608a0_43	271223

Analytes	Result	RL	DF	Date Analyzed
Weak Acid Dissociable Cyanide	ND	1.0	1	06/08/2023 11:55

Analyst(s): CC

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	06/01/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg $CaCO_3$/L

Hardness by SM2340B Calculation (>1% Sediment Content)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003B	Water	05/30/2023 14:00	ICP-MS5 105SMPLA.D	270762

Analytes	Result	RL	DF	Date Analyzed
Hardness	**766**	1.65	1	06/02/2023 09:56

Surrogates	REC (%)	Limits	
Terbium	102	70-130	06/02/2023 09:56

Analyst(s): WV

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg $CaCO_3$/L

Hardness by SM2340B Calculation

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	**2305L84-001B**	**Water**	**05/30/2023 11:40**	**ICP-MS4 103SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Hardness	**1140**	4.56	10	06/01/2023 13:32

Surrogates	REC (%)	Limits	
Terbium	107	70-130	06/01/2023 13:32

Analyst(s): WV

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	**2305L84-002B**	**Water**	**05/30/2023 12:45**	**ICP-MS6 151SMPLA.D**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Hardness	**958**	2.28	5	06/02/2023 13:13

Surrogates	REC (%)	Limits	
Terbium	103	70-130	06/02/2023 13:13

Analyst(s): MIG Analytical Comments: a1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	**2305L84-004B**	**Water**	**05/30/2023 10:55**	**ICP-MS6 152SMPLA.D**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Hardness	**280**	2.28	5	06/02/2023 13:17

Surrogates	REC (%)	Limits	
Terbium	95	70-130	06/02/2023 13:17

Analyst(s): MIG Analytical Comments: a1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	**2305L84-005B**	**Water**	**05/30/2023 08:40**	**ICP-MS6 153SMPLA.D**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Hardness	**195**	2.28	5	06/02/2023 13:20

Surrogates	REC (%)	Limits	
Terbium	99	70-130	06/02/2023 13:20

Analyst(s): MIG Analytical Comments: a1

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg $CaCO_3$/L

Hardness by SM2340B Calculation

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006B	Water	05/30/2023 13:00	ICP-MS6 154SMPLA.D	270637

Analytes	Result	RL	DF	Date Analyzed
Hardness	**960**	2.28	5	06/02/2023 13:24

Surrogates	REC (%)	Limits	
Terbium	106	70-130	06/02/2023 13:24

Analyst(s): MIG Analytical Comments: a1

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E245.2
Date Prepared:	05/31/2023	**Analytical Method:**	E245.2
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Mercury by Cold Vapor Atomic Absorption

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001C	Water	05/30/2023 11:40	AA1 _16	270651

Analytes	Result	RL	DF	Date Analyzed
Mercury	ND	0.20	1	06/02/2023 17:07

Analyst(s): DMA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002C	Water	05/30/2023 12:45	AA1 _43	270651

Analytes	Result	RL	DF	Date Analyzed
Mercury	ND	0.20	1	06/02/2023 18:28

Analyst(s): DMA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003C	Water	05/30/2023 14:00	AA1 _44	270651

Analytes	Result	RL	DF	Date Analyzed
Mercury	ND	0.20	1	06/02/2023 18:31

Analyst(s): DMA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004C	Water	05/30/2023 10:55	AA1 _45	270651

Analytes	Result	RL	DF	Date Analyzed
Mercury	ND	0.20	1	06/02/2023 18:34

Analyst(s): DMA

(Cont.)

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E245.2
Date Prepared:	05/31/2023	**Analytical Method:**	E245.2
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Mercury by Cold Vapor Atomic Absorption

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005C	Water	05/30/2023 08:40	AA1 _46	270651

Analytes	Result	RL	DF	Date Analyzed
Mercury	ND	0.20	1	06/02/2023 18:37

Analyst(s): DMA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006C	Water	05/30/2023 13:00	AA1 _47	270651

Analytes	Result	RL	DF	Date Analyzed
Mercury	ND	0.20	1	06/02/2023 18:40

Analyst(s): DMA

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Dissolved Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001A	Water	05/30/2023 11:40	ICP-MS5 196SMPL.d	270663

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Calcium	**230,000**	F	2000	10	06/01/2023 18:15
Magnesium	**120,000**	F	500	10	06/01/2023 18:15
Potassium	**8000**	F	50	1	05/31/2023 21:39
Sodium	**8100**	F	500	1	05/31/2023 21:39

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002A	Water	05/30/2023 12:45	ICP-MS5 197SMPL.d	270663

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Calcium	**100,000**	F	4000	20	06/01/2023 18:18
Magnesium	**180,000**	F	1000	20	06/01/2023 18:18
Potassium	**2600**	F	50	1	05/31/2023 21:55
Sodium	**8800**	F	500	1	05/31/2023 21:55

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003A	Water	05/30/2023 14:00	ICP-MS5 198SMPL.d	270663

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Calcium	**190,000**	F	2000	10	06/01/2023 18:22
Magnesium	**67,000**	F	500	10	06/01/2023 18:22
Potassium	**2100**	F	50	1	05/31/2023 21:59
Sodium	**38,000**	F	500	1	05/31/2023 21:59

Analyst(s): DB

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Dissolved Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004A	Water	05/30/2023 10:55	ICP-MS5 199SMPL.d	270663

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Calcium	**80,000**	F	2000	10	06/01/2023 18:25
Magnesium	**28,000**	F	50	1	05/31/2023 22:03
Potassium	**330**	F	50	1	05/31/2023 22:03
Sodium	**21,000**	F	500	1	05/31/2023 22:03

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005A	Water	05/30/2023 08:40	ICP-MS5 200SMPL.d	270663

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Calcium	**52,000**	F	2000	10	06/01/2023 18:29
Magnesium	**14,000**	F	50	1	05/31/2023 22:07
Potassium	**3000**	F	50	1	05/31/2023 22:07
Sodium	**15,000**	F	500	1	05/31/2023 22:07

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006A	Water	05/30/2023 13:00	ICP-MS5 201SMPL.d	270663

Analytes	Result	Qualifiers	RL	DF	Date Analyzed
Calcium	**100,000**	F	4000	20	06/01/2023 18:32
Magnesium	**180,000**	F	1000	20	06/01/2023 18:32
Potassium	**2500**	F	50	1	05/31/2023 22:19
Sodium	**8900**	F	500	1	05/31/2023 22:19

Analyst(s): DB

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	06/01/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals (>1% Sediment Content)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	**2305L84-003B**	**Water**	**05/30/2023 14:00**	**ICP-MS5 105SMPL.d**	**270762**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	100	1	06/02/2023 09:56
Antimony	ND	2.5	1	06/02/2023 09:56
Arsenic	**6.1**	2.5	1	06/02/2023 09:56
Barium	**37**	25	1	06/02/2023 09:56
Cadmium	ND	2.5	1	06/02/2023 09:56
Chromium	ND	2.5	1	06/02/2023 09:56
Cobalt	**9.3**	2.5	1	06/02/2023 09:56
Copper	**11**	2.5	1	06/02/2023 09:56
Iron	**160,000**	250	1	06/02/2023 09:56
Lead	ND	2.5	1	06/02/2023 09:56
Manganese	**1700**	250	1	06/02/2023 09:56
Nickel	**80**	2.5	1	06/02/2023 09:56
Silver	ND	2.5	1	06/02/2023 09:56
Thallium	ND	2.5	1	06/02/2023 09:56
Vanadium	ND	2.5	1	06/02/2023 09:56
Zinc	**140**	25	1	06/02/2023 09:56

Surrogates	REC (%)	Limits	
Terbium	102	70-130	06/02/2023 09:56

Analyst(s): WV

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	**2305L84-001B**	**Water**	**05/30/2023 11:40**	**ICP-MS4 105SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	**250**	50	1	06/01/2023 13:40
Antimony	**1.2**	0.50	1	06/01/2023 13:40
Arsenic	**54**	0.50	1	06/01/2023 13:40
Barium	**54**	5.0	1	06/01/2023 13:40
Cadmium	ND	0.50	1	06/01/2023 13:40
Chromium	**1.2**	0.50	1	06/01/2023 13:40
Cobalt	**7.9**	0.50	1	06/01/2023 13:40
Copper	**5.4**	1.5	1	06/01/2023 13:40
Iron	**4800**	50	1	06/01/2023 13:40
Lead	**2.0**	0.50	1	06/01/2023 13:40
Manganese	**940**	50	1	06/01/2023 13:40
Nickel	**39**	0.50	1	06/01/2023 13:40
Silver	ND	0.50	1	06/01/2023 13:40
Thallium	ND	0.50	1	06/01/2023 13:40
Vanadium	**5.8**	0.50	1	06/01/2023 13:40
Zinc	ND	20	1	06/01/2023 13:40

Surrogates	REC (%)	Limits	
Terbium	108	70-130	06/01/2023 13:40

Analyst(s): WV

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	**2305L84-002B**	**Water**	**05/30/2023 12:45**	**ICP-MS6 151SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	250	5	06/02/2023 13:13
Antimony	ND	2.5	5	06/02/2023 13:13
Arsenic	**52**	2.5	5	06/02/2023 13:13
Barium	**57**	25	5	06/02/2023 13:13
Cadmium	ND	2.5	5	06/02/2023 13:13
Chromium	ND	2.5	5	06/02/2023 13:13
Cobalt	**2.6**	2.5	5	06/02/2023 13:13
Copper	**7.6**	7.5	5	06/02/2023 13:13
Iron	**850**	250	5	06/02/2023 13:13
Lead	ND	2.5	5	06/02/2023 13:13
Manganese	**310**	250	5	06/02/2023 13:13
Nickel	**6.4**	2.5	5	06/02/2023 13:13
Silver	ND	2.5	5	06/02/2023 13:13
Thallium	ND	2.5	5	06/02/2023 13:13
Vanadium	ND	2.5	5	06/02/2023 13:13
Zinc	ND	100	5	06/02/2023 13:13

Surrogates	REC (%)	Limits	
Terbium	103	70-130	06/02/2023 13:13

Analyst(s): MIG Analytical Comments: a1

(Cont.)

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	**2305L84-004B**	**Water**	**05/30/2023 10:55**	**ICP-MS6 152SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	250	5	06/02/2023 13:17
Antimony	ND	2.5	5	06/02/2023 13:17
Arsenic	ND	2.5	5	06/02/2023 13:17
Barium	ND	25	5	06/02/2023 13:17
Cadmium	ND	2.5	5	06/02/2023 13:17
Chromium	ND	2.5	5	06/02/2023 13:17
Cobalt	ND	2.5	5	06/02/2023 13:17
Copper	ND	7.5	5	06/02/2023 13:17
Iron	ND	250	5	06/02/2023 13:17
Lead	ND	2.5	5	06/02/2023 13:17
Manganese	ND	250	5	06/02/2023 13:17
Nickel	ND	2.5	5	06/02/2023 13:17
Silver	ND	2.5	5	06/02/2023 13:17
Thallium	ND	2.5	5	06/02/2023 13:17
Vanadium	ND	2.5	5	06/02/2023 13:17
Zinc	ND	100	5	06/02/2023 13:17

Surrogates	REC (%)	Limits	
Terbium	95	70-130	06/02/2023 13:17

Analyst(s): MIG Analytical Comments: a1

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	**2305L84-005B**	**Water**	**05/30/2023 08:40**	**ICP-MS6 153SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	250	5	06/02/2023 13:20
Antimony	ND	2.5	5	06/02/2023 13:20
Arsenic	ND	2.5	5	06/02/2023 13:20
Barium	**35**	25	5	06/02/2023 13:20
Cadmium	ND	2.5	5	06/02/2023 13:20
Chromium	ND	2.5	5	06/02/2023 13:20
Cobalt	ND	2.5	5	06/02/2023 13:20
Copper	ND	7.5	5	06/02/2023 13:20
Iron	**930**	250	5	06/02/2023 13:20
Lead	ND	2.5	5	06/02/2023 13:20
Manganese	ND	250	5	06/02/2023 13:20
Nickel	ND	2.5	5	06/02/2023 13:20
Silver	ND	2.5	5	06/02/2023 13:20
Thallium	ND	2.5	5	06/02/2023 13:20
Vanadium	ND	2.5	5	06/02/2023 13:20
Zinc	ND	100	5	06/02/2023 13:20

Surrogates	REC (%)	Limits	
Terbium	99	70-130	06/02/2023 13:20

Analyst(s): MIG Analytical Comments: a1

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	**2305L84-006B**	**Water**	**05/30/2023 13:00**	**ICP-MS6 154SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	250	5	06/02/2023 13:24
Antimony	ND	2.5	5	06/02/2023 13:24
Arsenic	**38**	2.5	5	06/02/2023 13:24
Barium	**56**	25	5	06/02/2023 13:24
Cadmium	ND	2.5	5	06/02/2023 13:24
Chromium	ND	2.5	5	06/02/2023 13:24
Cobalt	**2.7**	2.5	5	06/02/2023 13:24
Copper	**12**	7.5	5	06/02/2023 13:24
Iron	**620**	250	5	06/02/2023 13:24
Lead	ND	2.5	5	06/02/2023 13:24
Manganese	**310**	250	5	06/02/2023 13:24
Nickel	**6.7**	2.5	5	06/02/2023 13:24
Silver	ND	2.5	5	06/02/2023 13:24
Thallium	ND	2.5	5	06/02/2023 13:24
Vanadium	ND	2.5	5	06/02/2023 13:24
Zinc	ND	100	5	06/02/2023 13:24

Surrogates	REC (%)	Limits	
Terbium	106	70-130	06/02/2023 13:24

Analyst(s): MIG Analytical Comments: a1

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	E200.8
Date Prepared:	05/31/2023	**Analytical Method:**	E200.8
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	µg/L

Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Equiment Blank	**2305L84-007A**	**Water**	**05/30/2023 14:10**	**ICP-MS6 260SMPL.d**	**270637**

Analytes	Result	RL	DF	Date Analyzed
Aluminum	ND	50	1	06/01/2023 23:22
Antimony	ND	0.50	1	06/01/2023 23:22
Arsenic	ND	0.50	1	06/01/2023 23:22
Barium	ND	5.0	1	06/01/2023 23:22
Cadmium	ND	0.50	1	06/01/2023 23:22
Chromium	ND	0.50	1	06/01/2023 23:22
Cobalt	ND	0.50	1	06/01/2023 23:22
Copper	ND	1.5	1	06/01/2023 23:22
Iron	ND	50	1	06/01/2023 23:22
Lead	ND	0.50	1	06/01/2023 23:22
Manganese	ND	50	1	06/01/2023 23:22
Nickel	ND	0.50	1	06/01/2023 23:22
Silver	ND	0.50	1	06/01/2023 23:22
Thallium	ND	0.50	1	06/01/2023 23:22
Vanadium	ND	0.50	1	06/01/2023 23:22
Zinc	ND	20	1	06/01/2023 23:22

Surrogates	REC (%)	Limits	
Terbium	110	70-130	06/01/2023 23:22

Analyst(s): AL

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM2540 C-1997
Date Prepared:	06/05/2023	**Analytical Method:**	SM2540 C
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Total Dissolved Solids

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001F	Water	05/30/2023 11:40	WetChem	270954

Analytes	Result	RL	DF	Date Analyzed
Total Dissolved Solids	**1250**	10.0	1	06/06/2023 12:40

Analyst(s): JME

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002F	Water	05/30/2023 12:45	WetChem	270954

Analytes	Result	RL	DF	Date Analyzed
Total Dissolved Solids	**818**	10.0	1	06/06/2023 12:45

Analyst(s): JME

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003F	Water	05/30/2023 14:00	WetChem	270954

Analytes	Result	RL	DF	Date Analyzed
Total Dissolved Solids	**1010**	10.0	1	06/06/2023 12:50

Analyst(s): JME

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004F	Water	05/30/2023 10:55	WetChem	270954

Analytes	Result	RL	DF	Date Analyzed
Total Dissolved Solids	**330**	10.0	1	06/06/2023 12:55

Analyst(s): JME

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM2540 C-1997
Date Prepared:	06/05/2023	**Analytical Method:**	SM2540 C
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Total Dissolved Solids

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005F	Water	05/30/2023 08:40	WetChem	270954

Analytes	Result	RL	DF	Date Analyzed
Total Dissolved Solids	**226**	10.0	1	06/06/2023 13:00

Analyst(s): JME

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006F	Water	05/30/2023 13:00	WetChem	270954

Analytes	Result	RL	DF	Date Analyzed
Total Dissolved Solids	**858**	10.0	1	06/06/2023 13:05

Analyst(s): JME

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM2540 D-1997
Date Prepared:	06/01/2023	**Analytical Method:**	SM2540 D
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Total Suspended Solids

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-1	2305L84-001G	Water	05/30/2023 11:40	WetChem	270725

Analytes	Result	RL	DF	Date Analyzed
Total Suspended Solids	**13.6**	2.00	2	06/01/2023 15:20

Analyst(s): JRA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-2	2305L84-002G	Water	05/30/2023 12:45	WetChem	270725

Analytes	Result	RL	DF	Date Analyzed
Total Suspended Solids	**6.00**	1.00	1	06/01/2023 15:25

Analyst(s): JRA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-3	2305L84-003G	Water	05/30/2023 14:00	WetChem	270725

Analytes	Result	RL	DF	Date Analyzed
Total Suspended Solids	**260**	16.7	16.67	06/01/2023 15:30

Analyst(s): JRA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-4	2305L84-004G	Water	05/30/2023 10:55	WetChem	270725

Analytes	Result	RL	DF	Date Analyzed
Total Suspended Solids	**3.00**	1.00	1	06/01/2023 15:45

Analyst(s): JRA

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Received:	05/31/2023 11:56	**Extraction Method:**	SM2540 D-1997
Date Prepared:	06/01/2023	**Analytical Method:**	SM2540 D
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Unit:**	mg/L

Total Suspended Solids

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-5	2305L84-005G	Water	05/30/2023 08:40	WetChem	270725

Analytes	Result	RL	DF	Date Analyzed
Total Suspended Solids	**21.4**	1.00	1	06/01/2023 15:40

Analyst(s): JRA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW-6	2305L84-006G	Water	05/30/2023 13:00	WetChem	270725

Analytes	Result	RL	DF	Date Analyzed
Total Suspended Solids	**6.40**	1.00	1	06/01/2023 15:50

Analyst(s): JRA

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270659
Date Analyzed:	05/31/2023	**Extraction Method:**	E300.1
Instrument:	IC4	**Analytical Method:**	E300.1
Matrix:	Water	**Unit:**	mg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270659

QC Summary Report for E300.1

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Chloride	ND	0.015	0.10	-	-	-
Nitrate as N	ND	0.018	0.10	-	-	-
Nitrate as $NO3^{-}$	ND	0.059	0.44	-	-	-
Nitrite as N	ND	0.013	0.10	-	-	-
Nitrite as $NO2^{-}$	ND	0.042	0.33	-	-	-
Sulfate	ND	0.058	0.10	-	-	-
Surrogate Recovery						
Malonate	0.10			0.1	104	90-115

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Chloride	1.0	1.0	1	103	103	85-115	0.0630	20
Nitrate as N	1.0	1.0	1	102	102	85-115	0.0225	20
Nitrate as $NO3^{-}$	4.5	4.5	4.4	103	103	85-115	0.0227	20
Nitrite as N	1.0	1.0	1	103	103	85-115	0.0681	20
Nitrite as $NO2^{-}$	3.4	3.4	3.3	102	102	85-115	0.0675	20
Sulfate	1.1	1.0	1	105	105	85-115	0.540	20
Surrogate Recovery								
Malonate	0.10	0.10	0.10	104	104	90-115	0.177	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/07/2023	**BatchID:**	271127
Date Analyzed:	06/07/2023	**Extraction Method:**	SM2320 B
Instrument:	TITRINO	**Analytical Method:**	SM2320 B
Matrix:	Water	**Unit:**	mg $CaCO_3$/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-271127 2305L84-005E

QC Summary Report for Alkalinity

Analyte	MB Result	MDL	RL			
Total Alkalinity	ND	5.70	10.0	-	-	-
Carbonate	ND	9.80	10.0	-	-	-
Bicarbonate	ND	6.20	10.0	-	-	-
Hydroxide	ND	1.40	10.0	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Total Alkalinity	52.6	48.9	50	105	98	80-120	7.33	20

Analyte	SAMP Result	DUP Result	RPD	RPD Limit
Total Alkalinity	146	150	3.08	20
Carbonate	ND	ND	N/A	20
Bicarbonate	146	150	3.08	20
Hydroxide	ND	ND	N/A	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/07/2023	**BatchID:**	271032
Date Analyzed:	06/07/2023	**Extraction Method:**	Kelada-01
Instrument:	WC_Skalar3	**Analytical Method:**	Kelada-01
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-271032

QC Summary Report for Kelada-01

Analyte	MB Result	MDL	RL			
Total Cyanide	ND	0.59	1.0	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Total Cyanide	48	46	50	96	92	90-110	4.24	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/08/2023	**BatchID:**	271223
Date Analyzed:	06/08/2023	**Extraction Method:**	SM4500-CN⁻ I / Kelada-01
Instrument:	WC_Skalar3	**Analytical Method:**	SM4500-CN⁻ I / Kelada-01
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-271223 2305L84-001HMS/MSD

QC Summary Report for SM4500-CN⁻ I / Kelada-01

Analyte	MB Result	MDL	RL			
Weak Acid Dissociable Cyanide	ND	0.60	1.0	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Weak Acid Dissociable Cyanide	53	55	50	107	109	90-110	2.09	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Weak Acid Dissociable Cyanide	1	51	49	50	ND	100	96	80-120	3.11	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/01/2023	**BatchID:**	270762
Date Analyzed:	06/02/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS5	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270762 2305L84-003BMS/MSD

QC Summary Report for Hardness

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Calcium	ND	160	250	-	-	-
Magnesium	ND	88	250	-	-	-
Surrogate Recovery						
Terbium	2600			2500	104	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Calcium	26,000	25,000	25000	103	101	85-115	0	20
Magnesium	26,000	25,000	25000	102	100	85-115	0	20
Surrogate Recovery								
Terbium	2600	2500	2500	104	102	70-130	0	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Calcium	1	220,000	220,000	25000	200,000	82,F13	78,F13	85-115	0.462	20
Magnesium	1	89,000	89,000	25000	66,000	93	93	85-115	0.0863	20
Surrogate Recovery										
Terbium	1	2500	2500	2500		101	102	70-130	0.271	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270637
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270637 2305L84-001BMS/MSD

QC Summary Report for Hardness

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Calcium	ND	36	100	-	-	-
Magnesium	ND	11	50	-	-	-
Surrogate Recovery						
Terbium	520			500	105	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Calcium	5100	5200	5000	102	104	85-115	1.23	20
Magnesium	5300	5400	5000	106	108	85-115	1.88	20
Surrogate Recovery								
Terbium	530	530	500	106	105	70-130	1.30	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Calcium	1	250,000	240,000	5000	240,000	67,F13	F13	85-115	NA	20
Magnesium	1	130,000	120,000	5000	130,000	41,F13	F13	85-115	NA	20
Surrogate Recovery										
Terbium	1	550	540	500		111	108	70-130	2.46	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270651
Date Analyzed:	06/02/2023	**Extraction Method:**	E245.2
Instrument:	AA1	**Analytical Method:**	E245.2
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270651 2305L84-001CMS/MSD

QC Summary Report for Mercury

Analyte	MB Result	MDL	RL			
Mercury	ND	0.13	0.20	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Mercury	1.8	1.8	2	92	90	85-115	2.27	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Mercury	1	1.9	1.9	2	ND	95	93	80-120	1.39	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Mercury	ND<1.0	ND		-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270663
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4, ICP-MS5	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270663 2305L84-001AMS/MSD

QC Summary Report for Dissolved Metals

Analyte	MB Result	MDL	RL			
Calcium	ND	120	200	-	-	-
Magnesium	ND	12	50	-	-	-
Potassium	ND	27	50	-	-	-
Sodium	ND	280	500	-	-	-

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270663
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4, ICP-MS5	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270663 2305L84-001AMS/MSD

QC Summary Report for Dissolved Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Calcium	5100	5000	5000	102	100	85-115	1.72	20
Magnesium	5100	5200	5000	101	104	85-115	2.87	20
Potassium	5000	5000	5000	100	101	85-115	1.13	20
Sodium	5200	5200	5000	103	105	85-115	1.36	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Calcium	1	220,000	230,000	5000	230,000	F13	F13	70-130	NA	20
Magnesium	1	110,000	110,000	5000	120,000	F13	F13	70-130	NA	20
Potassium	1	12,000	12,000	5000	7968	91	89	70-130	0.553	20
Sodium	1	13,000	13,000	5000	8124	96	95	70-130	0.419	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Calcium	230,000	230,000	0.477	20
Magnesium	120,000	120,000	1.76	20
Potassium	8100	8000	1.96	20
Sodium	8300	8100	2.62	-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/01/2023	**BatchID:**	270762
Date Analyzed:	06/02/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS5	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270762 2305L84-003BMS/MSD

QC Report for Metals (>1% Sediment Content)

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aluminum	ND	66	100	-	-	-
Antimony	ND	0.63	2.5	-	-	-
Arsenic	ND	0.53	2.5	-	-	-
Barium	ND	3.0	25	-	-	-
Cadmium	ND	0.36	2.5	-	-	-
Chromium	ND	2.0	2.5	-	-	-
Cobalt	ND	0.28	2.5	-	-	-
Copper	ND	0.99	2.5	-	-	-
Lead	ND	0.42	2.5	-	-	-
Manganese	ND	36	250	-	-	-
Nickel	ND	1.6	2.5	-	-	-
Silver	ND	0.33	2.5	-	-	-
Thallium	ND	0.28	2.5	-	-	-
Vanadium	ND	1.1	2.5	-	-	-
Zinc	ND	11	25	-	-	-
Surrogate Recovery						
Terbium	2600			2500	104	70-130

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/01/2023	**BatchID:**	270762
Date Analyzed:	06/02/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS5	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270762 2305L84-003BMS/MSD

QC Report for Metals (>1% Sediment Content)

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aluminum	2600	2600	2500	105	102	85-115	2.56	20
Antimony	240	230	250	96	93	85-115	3.59	20
Arsenic	260	260	250	105	102	85-115	2.20	20
Barium	2600	2500	2500	104	100	85-115	3.50	20
Cadmium	260	260	250	103	103	85-115	0.413	20
Chromium	260	250	250	103	102	85-115	1.08	20
Cobalt	260	250	250	105	102	85-115	2.93	20
Copper	260	260	250	104	103	85-115	1.50	20
Lead	250	250	250	102	99	85-115	2.99	20
Manganese	26,000	25,000	25000	102	99	85-115	2.96	20
Nickel	260	250	250	104	102	85-115	2.05	20
Silver	250	230	250	102	93	85-115	8.69	20
Thallium	260	250	250	103	101	85-115	2.51	20
Vanadium	260	250	250	102	100	85-115	1.82	20
Zinc	2600	2600	2500	105	103	85-115	2.03	20
Surrogate Recovery								
Terbium	2600	2500	2500	104	102	70-130	2.31	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Aluminum	1	2600	2600	2500	ND	103	102	85-115	1.02	20
Antimony	1	240	240	250	ND	95	95	85-115	0.738	20
Arsenic	1	260	260	250	6.080	103	102	85-115	0.465	20
Barium	1	2600	2600	2500	37.25	102	102	85-115	0.418	20
Cadmium	1	250	250	250	ND	100	100	85-115	0.132	20
Chromium	1	250	250	250	ND	101	101	85-115	0.316	20
Cobalt	1	260	260	250	9.305	101	101	85-115	0.173	20
Copper	1	250	250	250	10.74	97	97	85-115	0.120	20
Lead	1	250	250	250	ND	98	99	85-115	0.956	20
Manganese	1	26,000	27,000	25000	1737	98	99	85-115	1.05	20
Nickel	1	320	330	250	80.40	97	98	85-115	0.684	20
Silver	1	230	230	250	ND	92	92	85-115	0.217	20
Thallium	1	250	250	250	ND	100	101	85-115	1.06	20
Vanadium	1	250	250	250	ND	101	101	85-115	0.250	20
Zinc	1	2600	2600	2500	144.9	99	100	85-115	0.327	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/01/2023	**BatchID:**	270762
Date Analyzed:	06/02/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS5	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270762 2305L84-003BMS/MSD

QC Report for Metals (>1% Sediment Content)

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Surrogate Recovery										
Terbium	1	2500	2500	2500		101	102	70-130	0.271	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Aluminum	ND<500	ND		-
Antimony	ND<12	ND		-
Arsenic	ND<12	6.1	33.8	-
Barium	ND<120	37	32.1	-
Cadmium	ND<12	ND		-
Chromium	ND<12	ND		-
Cobalt	ND<12	9.3	39.8	-
Copper	ND<12	11	42.0	-
Lead	ND<12	ND	100	-
Manganese	ND<1200	1700	42.9	-
Nickel	42	80	47.7	-
Silver	ND<12	ND		-
Thallium	ND<12	ND		-
Vanadium	ND<12	ND		-
Zinc	ND<120	140	45.0	-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270637
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270637 2305L84-001BMS/MSD 2305L84-001BPDS

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aluminum	ND	11	50	-	-	-
Antimony	ND	0.13	0.50	-	-	-
Arsenic	ND	0.074	0.50	-	-	-
Barium	ND	0.53	5.0	-	-	-
Cadmium	ND	0.043	0.50	-	-	-
Chromium	ND	0.28	0.50	-	-	-
Cobalt	ND	0.043	0.50	-	-	-
Copper	ND	0.75	1.5	-	-	-
Iron	ND	26	50	-	-	-
Lead	ND	0.19	0.50	-	-	-
Manganese	ND	4.2	50	-	-	-
Nickel	ND	0.33	0.50	-	-	-
Silver	ND	0.092	0.50	-	-	-
Thallium	ND	0.043	0.50	-	-	-
Vanadium	ND	0.092	0.50	-	-	-
Zinc	ND	14	20	-	-	-
Surrogate Recovery						
Terbium	520			500	105	70-130

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270637
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270637 2305L84-001BMS/MSD 2305L84-001BPDS

QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aluminum	530	540	500	106	108	85-115	2.00	20
Antimony	52	51	50	103	102	85-115	0.983	20
Arsenic	52	52	50	104	104	85-115	0.239	20
Barium	530	530	500	106	106	85-115	0.541	20
Cadmium	53	53	50	106	105	85-115	0.370	20
Chromium	52	52	50	104	105	85-115	0.819	20
Cobalt	51	52	50	102	104	85-115	1.51	20
Copper	54	53	50	109	105	85-115	3.22	20
Iron	5300	5300	5000	106	106	85-115	0.272	20
Lead	50	51	50	100	101	85-115	1.14	20
Manganese	5200	5200	5000	104	105	85-115	1.02	20
Nickel	53	52	50	106	103	85-115	2.80	20
Silver	50	51	50	100	102	85-115	1.89	20
Thallium	49	49	50	98	98	85-115	0.477	20
Vanadium	52	52	50	104	104	85-115	0.468	20
Zinc	540	540	500	107	108	85-115	0.445	20
Surrogate Recovery								
Terbium	530	530	500	106	105	70-130	1.30	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Aluminum	1	790	680	500	252.8	107	85	85-115	14.6	20
Antimony	1	55	54	50	1.206	108	105	85-115	3.10	20
Arsenic	1	100	92	50	53.69	102	78,F10	85-115	12.3	20
Barium	1	590	460	500	54.02	108	82,F10	85-115	24.2,F10	20
Cadmium	1	52	40	50	ND	103	81,F10	85-115	24.2,F10	20
Chromium	1	53	42	50	1.223	103	81,F10	85-115	22.9,F10	20
Cobalt	1	57	46	50	7.859	99	76,F10	85-115	22.6,F10	20
Copper	1	55	44	50	5.394	98	77,F10	85-115	21.5,F10	20
Iron	1	10,000	10,000	5000	4775	106	104	85-115	0.662	20
Lead	1	54	44	50	2.017	105	84,F10	85-115	21.5,F10	20
Manganese	1	6000	6000	5000	940.5	102	102	85-115	0.152	20
Nickel	1	90	77	50	38.99	103	76,F10	85-115	16.0	20
Silver	1	48	38	50	ND	97	77,F10	85-115	22.9,F10	20
Thallium	1	51	41	50	ND	102	82,F10	85-115	22.1,F10	20
Vanadium	1	57	46	50	5.780	102	81,F10	85-115	20.4,F10	20

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270637
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270637 2305L84-001BMS/MSD 2305L84-001BPDS

QC Summary Report for Metals

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Zinc	1	510	400	500	ND	99	77,F10	85-115	23.7,F10	20
Surrogate Recovery										
Terbium	1	550	540	500		111	108	70-130	2.46	20

Analyte	PDS Result	SPK Val	SPKRef Val	PDS %REC	PDS Limits
Barium	560	500	54.02	102	75-125
Cadmium	50	50	ND	100	75-125
Chromium	51	50	1.223	99	75-125
Cobalt	55	50	7.859	94	75-125
Copper	53	50	5.394	94	75-125
Lead	52	50	2.017	101	75-125
Nickel	86	50	38.99	93	75-125
Silver	48	50	ND	96	75-125
Thallium	49	50	ND	97	75-125
Vanadium	56	50	5.780	100	75-125
Zinc	490	500	ND	94	75-125

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Aluminum	260	250	2.61	-
Antimony	ND<2.5	1.2	7.13	-
Arsenic	56	54	4.79	20
Barium	55	54	2.72	-
Cadmium	ND<2.5	ND	100	-
Chromium	ND<2.5	1.2	17.7	-
Cobalt	8.3	7.9	5.04	-
Copper	ND<7.5	5.4	9.84	-
Iron	4900	4800	1.62	20
Lead	ND<2.5	2.0	5.11	-
Manganese	970	940	3.54	-
Nickel	41	39	5.00	20
Silver	ND<2.5	ND		-
Thallium	ND<2.5	ND	100	-
Vanadium	5.7	5.8	1.99	-

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	05/31/2023	**BatchID:**	270637
Date Analyzed:	05/31/2023 - 06/01/2023	**Extraction Method:**	E200.8
Instrument:	ICP-MS4	**Analytical Method:**	E200.8
Matrix:	Water	**Unit:**	µg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270637 2305L84-001BMS/MSD 2305L84-001BPDS

QC Summary Report for Metals

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Zinc	ND<100	ND	100	-

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/05/2023	**BatchID:**	270954
Date Analyzed:	06/06/2023	**Extraction Method:**	SM2540 C-1997
Instrument:	WetChem	**Analytical Method:**	SM2540 C
Matrix:	Water	**Unit:**	mg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270954

QC Summary Report for Total Dissolved Solids

Analyte	MB Result	MDL	RL			
Total Dissolved Solids	ND	10.0	10.0	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Total Dissolved Solids	902	918	1000	90	92	80-120	1.76	10

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2305L84
Date Prepared:	06/01/2023	**BatchID:**	270725
Date Analyzed:	06/01/2023	**Extraction Method:**	SM2540 D-1997
Instrument:	WetChem	**Analytical Method:**	SM2540 D
Matrix:	Water	**Unit:**	mg/L
Project:	S9959-07-03; Oro de Amador-S9959-07-03	**Sample ID:**	MB/LCS/LCSD-270725 2305L84-003G

QC Summary Report for Total Suspended Solids

Analyte	MB Result	MDL	RL			
Total Suspended Solids	ND	1.00	1.00	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Total Suspended Solids	95.0	95.0	100	95	95	80-120	0	10

Analyte	SAMP Result	DUP Result	RPD	RPD Limit
Total Suspended Solids	260	250	3.92	10

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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 2305L84 **ClientCode: GECR** **QuoteID: 233151**

☐ WaterTrax ☐ CLIP ☐ EDF ☑ EQuIS ☑ Dry-Weight ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☑ Detection Summary ☑ Excel []

Report to:
Jason Muir
GEOCON Env. Consultants
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742-7306
(520) 561-3800 FAX: (916) 852-9132

Email: muir@geoconinc.com
cc/3rd Party:
PO:
Project: S9959-07-03; Oro de Amador-S9959-07-03

Bill to:
Accounts Payable
GEOCON Env. Consultants
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742-7306

Requested TAT: 5 days;

Date Received: **05/31/2023**
Date Logged: **05/31/2023**

Lab ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
2305L84-001	MW-1	Water	5/30/2023 11:40	☐	D	E	H	H	B	C	A	B	A	A	F	G
2305L84-002	MW-2	Water	5/30/2023 12:45	☐	D	E	H	H	B	C	A	B	A	A	F	G
2305L84-003	MW-3	Water	5/30/2023 14:00	☐	D	E	H	H	B	C	A	B	A	A	F	G
2305L84-004	MW-4	Water	5/30/2023 10:55	☐	D	E	H	H	B	C	A	B	A	A	F	G
2305L84-005	MW-5	Water	5/30/2023 08:40	☐	D	E	H	H	B	C	A	B	A	A	F	G
2305L84-006	MW-6	Water	5/30/2023 13:00	☐	D	E	H	H	B	C	A	B	A	A	F	G
2305L84-007	Equiment Blank	Water	5/30/2023 14:10	☐								A	A			

Test Legend:

1	300_1_W	2	Alk_W	3	CN_AMEN_W	4	CN_W
5	HARDMS_W	6	HG_W	7	METALSMS_DISS	8	METALSMS_TTLC_W
9	PRDisposal Fee	10	PRDISSOLVED	11	TDS_W	12	TSS_W

Project Manager: Susan Thompson **Prepared by: Yvette Gallegos**

The following SampIDs: 001H, 002H, 003H, 004H, 005H, 006H contain testgroup CN_AMENonly_W.

Comments: 916-799-2172 Julio Rebecca 916-508-1910

NOTE: Soil samples are discarded 60 days after receipt unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: GEOCON ENV. CONSULTANTS
Client Contact: Jason Muir
Contact's Email: muir@geoconinc.com

Project: S9959-07-03; Oro de Amador-S9959-07-03
Comments: 916-799-2172 Julio Rebecca 916-508-1910

Work Order: 2305L84
QC Level: LEVEL 2
Date Logged: 5/31/2023

☐ WaterTrax ☐ CLIP ☐ EDF ☑ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
001A	MW-1	Water	E200.8 (Metals) (Dissolved-Lab Filtered) <Calcium, Magnesium, Potassium, Sodium>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
001B	MW-1	Water	E200.8 (Metals) <Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Silver, Thallium, Vanadium, Zinc>	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
			SM2340B (Hardness)			☐	☐	☐		5 days	6/7/2023	Trace	☐	☐
001C	MW-1	Water	E245.2 (Mercury)	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
001D	MW-1	Water	E300.1 (Inorganic Anions) <Chloride, Nitrate & Nitrite as N, Nitrate as N, Nitrate as NO_3^-, Nitrite as N, Nitrite as NO_2^-, Sulfate>	1	125mL HDPE, unprsv.	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
001E	MW-1	Water	SM2320B (Alkalinity) <Bicarbonate, Carbonate, Hydroxide, Total Alkalinity>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
001F	MW-1	Water	SM2540C (TDS)	1	500mL HDPE, unprsv.	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
001G	MW-1	Water	SM2540D (TSS)	1	1L HDPE, unprsv.	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐

NOTES: * STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

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Contact's Email: muir@geoconinc.com

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Comments: 916-799-2172 Julio Rebecca 916-508-1910

Work Order: 2305L84
QC Level: LEVEL 2
Date Logged: 5/31/2023

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LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
001H	MW-1	Water	Total and Amenable Cyanide	1	250mL aHDPE w/ NaOH	☐	☐	☐	5/30/2023 11:40	5 days	6/7/2023	Trace	☐	☐
002A	MW-2	Water	E200.8 (Metals) (Dissolved-Lab Filtered) <Calcium, Magnesium, Potassium, Sodium>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐
002B	MW-2	Water	E200.8 (Metals) <Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Silver, Thallium, Vanadium, Zinc>	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐
			SM2340B (Hardness)			☐	☐	☐		5 days	6/7/2023	None	☐	☐
002C	MW-2	Water	E245.2 (Mercury)	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐
002D	MW-2	Water	E300.1 (Inorganic Anions) <Chloride, Nitrate & Nitrite as N, Nitrate as N, Nitrate as $NO3^{-}$, Nitrite as N, Nitrite as $NO2^{-}$, Sulfate>	1	125mL HDPE, unprsv.	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐
002E	MW-2	Water	SM2320B (Alkalinity) <Bicarbonate, Carbonate, Hydroxide, Total Alkalinity>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐

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WORK ORDER SUMMARY

Client Name: GEOCON ENV. CONSULTANTS
Client Contact: Jason Muir
Contact's Email: muir@geoconinc.com

Project: S9959-07-03; Oro de Amador-S9959-07-03
Comments: 916-799-2172 Julio Rebecca 916-508-1910

Work Order: 2305L84
QC Level: LEVEL 2
Date Logged: 5/31/2023

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LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
002F	MW-2	Water	SM2540C (TDS)	1	500mL HDPE, unprsv.	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐
002G	MW-2	Water	SM2540D (TSS)	1	1L HDPE, unprsv.	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	None	☐	☐
002H	MW-2	Water	Total and Amenable Cyanide	1	250mL aHDPE w/ NaOH	☐	☐	☐	5/30/2023 12:45	5 days	6/7/2023	Trace	☐	☐
003A	MW-3	Water	E200.8 (Metals) (Dissolved-Lab Filtered) <Calcium, Magnesium, Potassium, Sodium>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 14:00	5 days	6/7/2023	Present	☐	☐
003B	MW-3	Water	E200.8 (Metals) <Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Silver, Thallium, Vanadium, Zinc>	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 14:00	5 days	6/7/2023	Present	☐	☐
			SM2340B (Hardness)			☐	☐	☐		5 days	6/7/2023	Present	☐	☐
003C	MW-3	Water	E245.2 (Mercury)	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 14:00	5 days	6/7/2023	Present	☐	☐
003D	MW-3	Water	E300.1 (Inorganic Anions) <Chloride, Nitrate & Nitrite as N, Nitrate as N, Nitrate as NO_3^-, Nitrite as N, Nitrite as NO_2^-, Sulfate>	1	125mL HDPE, unprsv.	☐	☐	☐	5/30/2023 14:00	5 days	6/7/2023	Present	☐	☐

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Comments: 916-799-2172 Julio Rebecca 916-508-1910

Work Order: 2305L84
QC Level: LEVEL 2
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003H	MW-3	Water	Total and Amenable Cyanide	1	250mL aHDPE w/ NaOH	☐	☐	☐	5/30/2023 14:00	5 days	6/7/2023	Present	☐	☐
004A	MW-4	Water	E200.8 (Metals) (Dissolved-Lab Filtered) <Calcium, Magnesium, Potassium, Sodium>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 10:55	5 days	6/7/2023	None	☐	☐
004B	MW-4	Water	E200.8 (Metals) <Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Silver, Thallium, Vanadium, Zinc>	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 10:55	5 days	6/7/2023	None	☐	☐
			SM2340B (Hardness)			☐	☐	☐		5 days	6/7/2023	None	☐	☐
004C	MW-4	Water	E245.2 (Mercury)	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 10:55	5 days	6/7/2023	None	☐	☐

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WORK ORDER SUMMARY

Client Name: GEOCON ENV. CONSULTANTS
Client Contact: Jason Muir
Contact's Email: muir@geoconinc.com

Project: S9959-07-03; Oro de Amador-S9959-07-03
Comments: 916-799-2172 Julio Rebecca 916-508-1910

Work Order: 2305L84
QC Level: LEVEL 2
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005E	MW-5	Water	SM2320B (Alkalinity) <Bicarbonate, Carbonate, Hydroxide, Total Alkalinity>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 8:40	5 days	6/7/2023	None	☐	☐
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005G	MW-5	Water	SM2540D (TSS)	1	1L HDPE, unprsv.	☐	☐	☐	5/30/2023 8:40	5 days	6/7/2023	None	☐	☐
005H	MW-5	Water	Total and Amenable Cyanide	1	250mL aHDPE w/ NaOH	☐	☐	☐	5/30/2023 8:40	5 days	6/7/2023	Trace	☐	☐
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Client Contact: Jason Muir
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Date Logged: 5/31/2023

☐ WaterTrax ☐ CLIP ☐ EDF ☑ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
006B	MW-6	Water	E200.8 (Metals) <Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Silver, Thallium, Vanadium, Zinc>	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	None	☐	☐
			SM2340B (Hardness)			☐	☐	☐		5 days	6/7/2023	None	☐	☐
006C	MW-6	Water	E245.2 (Mercury)	1	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	None	☐	☐
006D	MW-6	Water	E300.1 (Inorganic Anions) <Chloride, Nitrate & Nitrite as N, Nitrate as N, Nitrate as $NO3^{-}$, Nitrite as N, Nitrite as $NO2^{-}$, Sulfate>	1	125mL HDPE, unprsv.	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	None	☐	☐
006E	MW-6	Water	SM2320B (Alkalinity) <Bicarbonate, Carbonate, Hydroxide, Total Alkalinity>	1	250mL HDPE, unprsv.	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	None	☐	☐
006F	MW-6	Water	SM2540C (TDS)	1	500mL HDPE, unprsv.	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	None	☐	☐
006G	MW-6	Water	SM2540D (TSS)	1	1L HDPE, unprsv.	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	None	☐	☐
006H	MW-6	Water	Total and Amenable Cyanide	1	250mL aHDPE w/ NaOH	☐	☐	☐	5/30/2023 13:00	5 days	6/7/2023	Trace	☐	☐

NOTES: * STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- Organic extracts are held for 40 days before disposal; Inorganic extract are held for 30 days.

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

U = An unpreserved container was received for a method that suggests a preservation in order to extend hold time for analysis.**

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: GEOCON ENV. CONSULTANTS
Client Contact: Jason Muir
Contact's Email: muir@geoconinc.com

Project: S9959-07-03; Oro de Amador-S9959-07-03
Comments: 916-799-2172 Julio Rebecca 916-508-1910

Work Order: 2305L84
QC Level: LEVEL 2
Date Logged: 5/31/2023

☐ WaterTrax ☐ CLIP ☐ EDF ☑ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
007A	Equiment Blank	Water	E200.8 (Metals) <Aluminum, Antimony, Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Nickel, Silver, Thallium, Vanadium, Zinc>	2	250mL HDPE w/ HNO3	☐	☐	☐	5/30/2023 14:10	5 days	6/7/2023	None	☐	☐

NOTES: * STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- Organic extracts are held for 40 days before disposal; Inorganic extract are held for 30 days.

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

U = An unpreserved container was received for a method that suggests a preservation in order to extend hold time for analysis.**

General COC

MAI Work Order # 2305184

McCAMPBELL ANALYTICAL, INC.

1534 Willow Pass Rd. Pittsburg, Ca. 94565-1701
Telephone: (877) 252-9262 / Fax: (925) 252-9269
www.mccampbell.com main@mccampbell.com

CHAIN OF CUSTODY RECORD

Turn Around Time:	1 Day Rush		2 Day Rush		3 Day Rush		STD	●	Quote #	233151									
J-Flag / MDL		ESL		Cleanup Approved		Dry Weight		Bottle Order #											
Delivery Format:	PDF	●	GeoTracker EDF		EDD	●	CLIP EDT (DW)		Detect Summary										

Report To: Jason Muir — Bill To: Jason Muir

Company: Geocon Consultants, Inc.

Email: muir@geoconinc.com

Alt Email: — Tele: (916) 852-9118 / (530) 913-5996

Project Name: Oro de Amador - S9959-07-03 — Project #: S9959-07-03

Project Location: Oro de Amador - S9959-07-03 — PO #

Sampler Signature:

Analysis Requested

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative	E200.8 (Ca,Mg,NA,K) (Dissolved)	E200.8 (Metals)	E245.2 (Mercury)	E300.1 (Cl,NO2,NO3,SO4)	SM2320B (Alkalinity)	SM2340B (Hardness)	SM2540C (TDS)	SM2540D (TSS)	Total and Amenable Cyanide
MW-1	5/30/23	1140	8	H_2O	1,4,5	X	X	X	X	X	X	X	X	X
MW-2		1245												
MW-3		1400												
MW-4		1055												
MW-5		0840												
MW-6		1300												
Equipment Blank		1410	2		4		X							

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E200.8.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Comments / Instructions

Per quote

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
J. Esquivel / Geocon	5/30/23	1630	Geocons' Fridge	5/30/23	1630
Geocon Fridge / PJ	5/31/23	0845	PJ	5/31/23	0845
PJ	5/31/23	1156	Cynthia Gallardo	5/31/23	1156

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp 1.7 °C (wet) Initials YG

Page 1 of 1

McCampbell Analytical, Inc.
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name: GEOCON Env. Consultants
Project: S9959-07-03; Oro de Amador-S9959-07-03

Date and Time Received: 5/31/2023 11:56
Date Logged: 5/31/2023
Received by: Yvette Gallegos
Logged by: Yvette Gallegos

WorkOrder №: 2305L84 Matrix: Water
Carrier: Patrick Johnson (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	
COC agrees with Quote?	Yes ☑	No ☐	NA ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	NA ☐
Samples Received on Ice?	Yes ☑	No ☐	
(Ice Type: WET ICE)			
Sample/Temp Blank temperature	Temp: 1.7°C		NA ☐
ZHS conditional analyses: VOA meets zero headspace requirement (VOCs, TPHg/BTEX, RSK)?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes ☑	No ☐	NA ☐
UCMR Samples:			
pH tested and acceptable upon receipt (200.7: ≤2; 533: 6 - 8; 537.1: 6 - 8)?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L) [not applicable to 200.7]?	Yes ☐	No ☐	NA ☑

Comments:

FINAL RESULTS

July 11, 2023

Jason Muir, PE, GE
GEOCON Consultants
3160 Gold Valley Drive Suite 800
Rancho Cordova, CA 95742

RE: California Arsenic Bioaccessiblity test
Client Job No.: S9959-07-03
Client Project ID: Oro de Amador
PRIMA ID: Geocon-Oro

Dear Mr. Muir:

PRIMA Environmental, Inc. measured arsenic relative bioaccessibility (RBA) for soil samples using the California Arsenic Bioaccessibility (CAB) method. The procedures and results are described in this letter report.

Sample Receipt and Preparation

Twelve soil samples were received on June 15, 2023 (see attached chain of custody). Each sample was air-dried, then sieved (hand shaken) to obtain the -250 µm (-60 mesh) fraction. **Table 1** (attached) lists the amount of material for each size fraction.

Materials

ACS reagent grade sodium chloride (NaCl), reagent grade ascorbic acid, and porcine pepsin obtained from Sigma Aldrich (www.sigmaaldrich.com, catalog number P7000) were used in this study.

Procedures

Gastric phase bioaccessibility tests were performed using the CAB method. Simulated gastric solution was prepared by dissolving reagents (NaCl, ascorbic acid, and pepsin) in deionized water, then adjusting the pH to 1.5±0.01. Each soil sample was extracted by adding 150 ± 1 mL of gastric solution to 1.00±0.05 g soil (-250 µm fraction), then mixing end-over-end in a 37°C water bath for 120 minutes. After 120 minutes, the gastric solution was filtered through 0.45 µm filter and the final pH of each sample was measured. Filtered gastric solution was submitted to a Enthalpy Analytical (Orange, CA) for analysis of arsenic via EPA 6020. QC samples – a reagent blank, a process control, a duplicate and a laboratory control sample (NIST 2711a soil) – were also run. The QC

samples and aliquots of the -250 μm fraction of soil were also submitted for arsenic analysis.

Results

The final pH of all samples was within 0.1 pH units of the initial pH, as required by the method. The concentration of arsenic in gastric solution and in the unextracted (-250 μm fraction) soil, as well as the corresponding bioaccessibility and RBA values, are given in **Table 2** (attached). The CAB is given in terms of percent (**Eqn. 1**), and as the mass of soluble metal per mass of soil (**Eqn. 2**). RBA was calculated from the CAB value (expressed as a percent) according to **Eqn. 3** as specified in DTSC HHRA Note 6 revised September 29, 2017. The QC results are given in **Table 3** (attached). All QC results were within specification.

$$\text{CAB (\%)} = 100 \times \frac{\text{(concentration in extract, mg/L) * (volume extract, L)}}{\text{(concentration in soil, mg/kg) * (mass of soil, kg)}} \quad \text{Eqn. 1}$$

$$\text{CAB (mg As/kg soil)} = \frac{\text{(concentration in extract, mg/L) * (volume extract, L)}}{\text{(mass of soil, kg)}} \quad \text{Eqn. 2}$$

$$\text{RBA (\%)} = 0.81 * \text{CAB (\%)} + 3.2 \quad \text{Eqn. 3}$$

If you have any questions, please give me a call at 916-939-7300. Thank you for the opportunity to be of service.

Sincerely,
PRIMA Environmental, Inc.

Cindy G. Schreier, Ph.D.
President & Chief Scientist

Attachments

Table 1. Approximate Particle Size Distribution.

Sample	Mass, g		Percent	
	Less than 250 µm	Greater than 250 µm	Less than 250 µm	Greater than 250 µm
TP-49-1.5	10	103	9.2	91
TP-49-4.5	9.0	105	7.9	92
TP-51-0.0	41	100	29	71
TP-52-3.0	140	14	91	9.2
TP-53-3.0	32	108	23	77
TP-54-3.0	99	61	62	38
TP-56-1.5	32	145	18	82
TP-58-3.0	9.3	183	4.8	95
TP-61-1.5	25	125	17	83
TP-64-3.0	5.5	145	3.7	96
TP-65-3.0	18	153	10	90
TP-66-0.0	10	255	3.9	96

Note: Results are approximate. Soil was air-dried, then sieved by hand.

Table 2. Results of CAB Tests.

PRIMA ID	Extraction Date	Client ID	Mass Extracted	As Concentration		Bioaccessibility		RBA^
				Soil**	Extraction Fluid			
			g	mg/kg	mg/L	%	mg As/kg soil	%
S9	28-Jun-2023	TP-49-1.5	1.0188	1,500	0.41	4.0	60	6.5
S10	28-Jun-2023	TP-49-4.5	0.9859	1,200	0.39	4.9	59	7.2
S11	28-Jun-2023	TP-51-0.0	0.9970	380	0.47	19	71	18
S12	28-Jun-2023	TP-52-3.0	0.9858	210	0.33	24	50	23
S12-dup	28-Jun-2023	TP-52-3.0	0.9943	210	0.34	24	51	23
S13	28-Jun-2023	TP-53-3.0	1.0009	320	0.33	15	49	16
S14	28-Jun-2023	TP-54-3.0	1.0005	300	0.54	27	81	25
S15	28-Jun-2023	TP-56-1.5	1.0030	15	< 0.011	< 11	< 1.6	< 12
S16	28-Jun-2023	TP-58-3.0	0.9854	150	0.075 J	7.6 J	11 J	9.4 J
S17	28-Jun-2023	TP-6101.5	0.9809	10	0.012 J	19 J	1.8 J	19 J
S18	28-Jun-2023	TP-64-3.0	1.0005	180	0.15	12	22	13
S19	28-Jun-2023	TP-65-3.0	1.0018	2,400	1.9	12	280	13
S20	28-Jun-2023	TP-66-0.0	1.0153	1,000	3.3	49	490	43

* "Dup" indicates a duplicate extraction; the soil was extracted twice, but arsenic in the soil was measured once.

** concentration in <60 mesh (250 micron) fraction.

^ Relative bioavailability = 0.81 * Bioaccessibility (in %) + 3.2, per DTSC HHRA Note 6 Rev Sep 29, 2017.

Table 3. QC Data for IVBA Tests.

PRIMA ID	Date	Sample ID	Conc. mg/L	Spike	% Recovery	CAB* %	RPD	Limits
RB	28-Jun-2023	Reagent Blank	< 0.011	--	--	--	--	< 0.025 mg/L
MB	28-Jun-2023	Process Control	< 0.011	--	--	--	--	< 0.025 mg/L
NIST	28-Jun-2023	LCS (NIST 2711a)	0.46	--	--	64	--	CAB = 54-80%
Spk	28-Jun-2023	Blank - Spike	0.97	1.0	97	--	--	80-120% recovery
S12	28-Jun-2023	TP-52-3.0	--	--	--	24	2.13	--
S12-dup		TP-52-3.0 dup				24		

* Assumes Arsenic concentration in NIST 2711a is 107 mg/kg, per certificate of analysis.

5070 Robert J Mathews Parkway, Suite 300
El Dorado Hills, CA 95762
916-939-7300
www.primaenvironmental.com

Sample Receipt Summary

Date/Time: 6/15/23 1753

Client/Company: Geocon

Project: Oro de Amador

	Yes	No	N/A
Custody seals intact?	☐	☐	☒
Chain of custody Present?	☒	☐	☐
If no, list number of samples and Sample ID			
Ice present?	☐	☐	☒
If no, what is temperature? _____			
Samples in good condition?	☒	☐	☐
If no, explain:			
Do sample IDs on containers match IDs on COC?	☒	☐	☐
If no, explain:			

Other Comments:

PRIMA ENVIRONMENTAL Inc. Questions Answered.
5070 Robert J. Mathews Parkway, Suite 300 • El Dorado Hills, CA 95762
(916) 939-7300 • www.primaenvironmental.com

Project Manager:	Jason Muir	Project Name	Oro de Amador
Company:	Geocon Consultants, Inc.	Project Number	S9959-07-03
Phone:	530 913-5996	TAT	Standard
Email:	muir@geoconinc.com	Sampler Signature	

SAMPLE ID	Date	Time	Matrix	# Containers	Analysis or Proposal Description/Date: CAB (HHRA Note 6)	Comments
TP-49-1.5	05/22/23	12:35	S	1	X	
TP-49-4.5	05/22/23	12:50	S	1	X	
TP-51-0.0	05/22/23	11:30	S	1	X	
TP-52-3.0	05/23/23	9:20	S	1	X	
TP-53-3.0	05/23/23	7:45	S	1	X	
TP-54-3.0	05/23/23	8:25	S	1	X	
TP-56-1.5	05/23/23	14:30	S	1	X	
TP-58-3.0	05/23/23	10:56	S	1	X	
TP-61-1.5	05/22/23	15:30	S	1	X	
TP-64-3.0	05/22/23	10:55	S	1	X	
TP-65-3.0	05/22/23	10:10	S	1	X	
TP-66-0.0	05/22/23	9:20	S	1	X	

Special Instructions	Relinquished by:		Received by:
	Company: California Laboratory Services	Date: 6/15/23	Company: Geocon, Inc.
	Printed Name:	Time: 1659	Printed Name: Austin Perry
	Signature:		Signature:
	Relinquished by:		**Received by:**
	Company: Geocon, Inc.	Date: 6/15/23	Company: Prima Environmental
	Printed Name: Austin Perry	Time: 1753	Printed Name: Indy Schreier
	Signature:		Signature:

Matrix key: S - soil/sediment; W - water; OT - other

Enthalpy Analytical
931 West Barkley Ave
Orange, CA 92868
(714) 771-6900

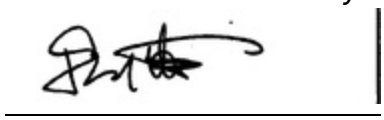
enthalpy.com

Lab Job Number: 487676
Report Level: II
Report Date: 07/10/2023

Analytical Report *prepared for:*

Cindy Schreier
Prima Environmental, Inc.
5070 Robert J. Mathews Pkwy
Suite 300
El Dorado Hills, CA 95762

Authorized for release by:



John Goyette, Service Center Manager
(510) 204-2233 Ext 13112
john.goyette@enthalpy.com

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the above signature which applies to this PDF file as well as any associated electronic data deliverable files. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

CA ELAP# 1338, NELAP# 4038, SCAQMD LAP# 18LA0518, LACSD ID# 10105

ENTHALPY ANALYTICAL

Sample Summary

Cindy Schreier
Prima Environmental, Inc.
5070 Robert J. Mathews Pkwy
Suite 300
El Dorado Hills, CA 95762

Lab Job #: 487676
Date Received: 06/29/23

Sample ID	Lab ID	Collected	Matrix
RB-2	487676-001	06/28/23 12:15	Water
MB-2	487676-002	06/28/23 14:02	Water
S9	487676-003	06/28/23 14:03	Water
S10	487676-004	06/28/23 14:05	Water
S11	487676-005	06/28/23 14:06	Water
S12	487676-006	06/28/23 14:07	Water
S13	487676-007	06/28/23 14:08	Water
S14	487676-008	06/28/23 14:09	Water
S15	487676-009	06/28/23 14:10	Water
S16	487676-010	06/28/23 14:11	Water
S17	487676-011	06/28/23 14:11	Water
S18	487676-012	06/28/23 14:12	Water
S19	487676-013	06/28/23 14:13	Water
S20	487676-014	06/28/23 14:14	Water
S12-DUP	487676-015	06/28/23 14:15	Water
NIST2711A-2	487676-016	06/28/23 14:17	Water
SPK-2	487676-017	06/28/23 14:18	Water
TP-49-1.5 60M	487676-018	06/27/23 18:20	Soil
TP-49-4.5 60M	487676-019	06/27/23 18:20	Soil
TP-51-0.0 60M	487676-020	06/27/23 18:20	Soil
TP-52-3.0 60M	487676-021	06/27/23 18:20	Soil
TP-53-3.0 60M	487676-022	06/27/23 18:20	Soil
TP-54-3.0 60M	487676-023	06/27/23 18:20	Soil
TP-56-1.5 60M	487676-024	06/27/23 18:20	Soil
TP-58-3.0 60M	487676-025	06/27/23 18:20	Soil
TP-61-1.5 60M	487676-026	06/27/23 18:20	Soil

ENTHALPY ANALYTICAL

Sample Summary

Cindy Schreier
Prima Environmental, Inc.
5070 Robert J. Mathews Pkwy
Suite 300
El Dorado Hills, CA 95762

Lab Job #: 487676
Date Received: 06/29/23

Sample ID	Lab ID	Collected	Matrix
TP-64-3.0 60M	487676-027	06/27/23 18:20	Soil
TP-65-3.0 60M	487676-028	06/27/23 18:20	Soil
TP-66-0.0 60M	487676-029	06/27/23 18:20	Soil

ENTHALPY ANALYTICAL

Case Narrative

Prima Environmental, Inc.
5070 Robert J. Mathews Pkwy
Suite 300
El Dorado Hills, CA 95762
Cindy Schreier

Lab Job Number: 487676
Date Received: 06/29/23

This data package contains sample and QC results for seventeen water samples and twelve soil samples, requested for the above referenced project on 06/29/23. The samples were received intact.

Metals (EPA 6020) Water:
No analytical problems were encountered.

Metals (EPA 6020) Soil:
No analytical problems were encountered.

487676

Enthalpy Analytical LLC
931 West Barkley Ave
Orange, CA 92868
(714) 771-6900 Phone

CHAIN OF CUSTODY

Page 1 of 3
Chain of Custody # : _____

C&T LOGIN # _____

Project No:
Project Name: Geo-Oro
EDD Format: _____ Rpt Level: ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: Cindy Schreier
Report To: Cindy Schreier
Company : PRIMA Environmental, Inc.
Telephone: 916-939-7300
Email: data@primaenvironmental.com

Lab No.	Sample ID.	Sampling		Matrix				# of Containers	Chemical Preservative					Analytical Request	
		Date	Time	Water	Soil				HCl	H_2SO_4	HNO_3	None	NaOH	Arsenic - 6020	Arsenic - 6010 or 6020
1	RB-2	06/28/23	12:15	x				1			x			x	
2	MB-2	06/28/23	14:02	x				1			x			x	
3	S9	06/28/23	14:03	x				1			x			x	
4	S10	06/28/23	14:05	x				1			x			x	
5	S11	06/28/23	14:06	x				1			x			x	
6	S12	06/28/23	14:07	x				1			x			x	
7	S13	06/28/23	14:08	x				1			x			x	
8	S14	06/28/23	14:09	x				1			x			x	
9	S15	06/28/23	14:10	x				1			x			x	
10	S16	06/28/23	14:11	x				1			x			x	
11	S17	06/28/23	14:11	x				1			x			x	
12	S18	06/28/23	14:12	x				1			x			x	
13	S19	06/28/23	14:13	x				1			x			x	

Notes:
-- Water is 10 g/L pepsin + 0.1M NaCl adjusted to pH 1.5 with HCl; chloride is approx 5 g/L.
-- Dilute water 50X to address potential matrix issues. Higher dilution if needed due to high target analyte
-- Report to the MDL.

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient

RELINQUISHED BY:

C Brooks 6/29/23 752Am DATE/TIME
Stephen Cole 6/29/23 13:00 DATE/TIME
DATE/TIME

RECEIVED BY:

Stephen Cole 6/29/23 7:52 DATE/TIME
6/30/23 1200 DATE/TIME
DATE/TIME

487676

Enthalpy Analytical LLC
931 West Barkley Ave
Orange, CA 92868
(714) 771-6900 Phone

CHAIN OF CUSTODY

Chain of Custody # : _____

C&T LOGIN # _____

Project No:
Project Name: Geo-Oro
EDD Format: _____ Rpt Level: ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: Cindy Schreier
Report To: Cindy Schreier
Company : PRIMA Environmental, Inc.
Telephone: 916-939-7300
Email: data@primaenvironmental.com

Lab No.	Sample ID.	Sampling		Matrix				# of Containers	Chemical Preservative					Analytical Request	
		Date	Time	Water	Soil				HCl	H_2SO_4	HNO_3	None	NaOH	Arsenic - 6020	Arsenic - 6010 or 6020
14	S20	06/28/23	14:14	x				1			x			x	
15	S12-dup	06/28/23	14:15	x				1			x			x	
16	NIST2711a-2	06/28/23	14:17	x				1			x			x	
17	SPK-2	06/28/23	14:18	x				1			x			x	
	TP-49-1.5 60m	06/27/23	18:20		x			1				x			x
	TP-49-4.5 60m	06/27/23	18:20		x			1				x			x
	TP-51-0.0 60m	06/27/23	18:20		x			1				x			x
	TP-52-3.0 60m	06/27/23	18:20		x			1				x			x
	TP-53-3.0 60m	06/27/23	18:20		x			1				x			x
	TP-54-3.0 60m	06/27/23	18:20		x			1				x			x
	TP-56-1.5 60m	06/27/23	18:20		x			1				x			x
	TP-58-3.0 60m	06/27/23	18:20		x			1				x			x
	TP-61-1.5 60m	06/27/23	18:20		x			1				x			x

Notes:
-- Water is 10 g/L pepsin + 0.1M NaCl adjusted to pH 1.5 with HCl; chloride is approx 5 g/L.
-- Dilute water 50X to address potential matrix issues. Higher dilution if needed due to high target analyte
-- Report to the MDL.

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient

RELINQUISHED BY:		RECEIVED BY:	
[signature]	6/29/23 7:52AM DATE/TIME	[signature]	6/29/23 7:52 DATE/TIME
[signature]	6/29/23 13:00 DATE/TIME	[signature]	6/30/23 12:00 DATE/TIME
	DATE/TIME		DATE/TIME

487676

CHAIN OF CUSTODY

Enthalpy Analytical LLC
931 West Barkley Ave
Orange, CA 92868
(714) 771-6900 Phone

Chain of Custody # : _____

C&T LOGIN # _____

Project No:
Project Name: Geo-Oro
EDD Format: _____ Rpt Level: ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: Cindy Schreier
Report To: Cindy Schreier
Company : PRIMA Environmental, Inc.
Telephone: 916-939-7300
Email: data@primaenvironmental.com

Lab No.	Sample ID.	Sampling		Matrix				# of Containers	Chemical Preservative					Analytical Request	
		Date	Time	Water	Soil				HCl	H_2SO_4	HNO_3	None	NaOH	Arsenic - 6020	Arsenic - 6010 or 6020
	TP-64-3.0 60m	06/27/23	18:20		x			1				x			x
	TP-65-3.0 60m	06/27/23	18:20		x			1				x			x
	TP-66-0.0 60m	06/27/23	18:20		x			1				x			x

Notes:
-- Water is 10 g/L pepsin + 0.1M NaCl adjusted to pH 1.5 with HCl; chloride is approx 5 g/L.
-- Dilute water 50X to address potential matrix issues. Higher dilution if needed due to high target analyte
-- Report to the MDL.

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient

RELINQUISHED BY:	RECEIVED BY:
6/29/23 752AM DATE/TIME	6/29/23 7:52 DATE/TIME
6/29/23 13:06 DATE/TIME	6/30/23 1200 DATE/TIME
DATE/TIME	DATE/TIME

ENTHALPY ANALYTICAL

SAMPLE ACCEPTANCE CHECKLIST

Section 1

Client: Prima Environmental Project: Geo-Oro

Date Received: 6130123 Sampler's Name Present: [X] Yes [ ] No

Section 2

AS 6130123

Sample(s) received in a cooler? [X] Yes, How many? _____ [X] No (skip section 2) Sample Temp (°C) (No Cooler): Amb

Sample Temp (°C), One from each cooler: #1: _____ #2: _____ #3: _____ #4: _____

(Acceptance range is < 6°C but not frozen (for Microbiology samples, acceptance range is < 10°C but not frozen). It is acceptable for samples collected the same day as sample receipt to have a higher temperature as long as there is evidence that cooling has begun.)

Shipping Information: _____

Section 3

Was the cooler packed with: [ ] Ice [ ] Ice Packs [ ] Bubble Wrap [ ] Styrofoam [ ] Paper [ ] None [ ] Other _____

Cooler Temp (°C): #1: GIS #2: _____ #3: _____ #4: _____

Section 4	YES	NO	N/A
Was a COC received?	X		
Are sample IDs present?	X		
Are sampling dates & times present?	X		
Is a relinquished signature present?	X		
Are the tests required clearly indicated on the COC?	X		
Are custody seals present?		X	
If custody seals are present, were they intact?			X
Are all samples sealed in plastic bags? (Recommended for Microbiology samples)			X
Did all samples arrive intact? If no, indicate in Section 4 below.	X		
Did all bottle labels agree with COC? (ID, dates and times)	X		
Were the samples collected in the correct containers for the required tests?	X		
Are the containers labeled with the correct preservatives?	X		
Is there headspace in the VOA vials greater than 5-6 mm in diameter?			X
Was a sufficient amount of sample submitted for the requested tests?	X		

Section 5 Explanations/Comments

Section 6

For discrepancies, how was the Project Manager notified? [ ] Verbal PM Initials: _____ Date/Time _____

[ ] Email (email sent to/on): _____ / _____

Project Manager's response:

Completed By: _____ Date: 6130123

ENTHALPY ANALYTICAL

Analysis Results for 487676

Cindy Schreier
Prima Environmental, Inc.
5070 Robert J. Mathews Pkwy
Suite 300
El Dorado Hills, CA 95762

Lab Job #: 487676
Date Received: 06/29/23

Sample ID: RB-2 **Lab ID: 487676-001** **Collected: 06/28/23 12:15**
Matrix: Water

487676-001 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	ND		ug/L	100	11	50	317361	06/30/23	07/05/23	JCP

Sample ID: MB-2 **Lab ID: 487676-002** **Collected: 06/28/23 14:02**
Matrix: Water

487676-002 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	ND		ug/L	100	11	50	317361	06/30/23	07/05/23	JCP

Sample ID: S9 **Lab ID: 487676-003** **Collected: 06/28/23 14:03**
Matrix: Water

487676-003 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**410**		ug/L	100	11	50	317361	06/30/23	07/05/23	JCP

Sample ID: S10 **Lab ID: 487676-004** **Collected: 06/28/23 14:05**
Matrix: Water

487676-004 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**390**		ug/L	100	11	50	317361	06/30/23	07/05/23	JCP

Sample ID: S11 **Lab ID: 487676-005** **Collected: 06/28/23 14:06**
Matrix: Water

487676-005 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**470**		ug/L	100	11	50	317361	06/30/23	07/05/23	JCP

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 487676

Sample ID: S12 **Lab ID: 487676-006** **Collected: 06/28/23 14:07**
Matrix: Water

487676-006 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**330**		ug/L	100	11	50	317361	06/30/23	07/05/23	JCP

Sample ID: S13 **Lab ID: 487676-007** **Collected: 06/28/23 14:08**
Matrix: Water

487676-007 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**330**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S14 **Lab ID: 487676-008** **Collected: 06/28/23 14:09**
Matrix: Water

487676-008 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**540**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S15 **Lab ID: 487676-009** **Collected: 06/28/23 14:10**
Matrix: Water

487676-009 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	ND		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S16 **Lab ID: 487676-010** **Collected: 06/28/23 14:11**
Matrix: Water

487676-010 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**75**	J	ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 487676

Sample ID: S17 **Lab ID: 487676-011** **Collected: 06/28/23 14:11**
Matrix: Water

487676-011 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**12**	J	ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S18 **Lab ID: 487676-012** **Collected: 06/28/23 14:12**
Matrix: Water

487676-012 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**150**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S19 **Lab ID: 487676-013** **Collected: 06/28/23 14:13**
Matrix: Water

487676-013 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**1,900**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S20 **Lab ID: 487676-014** **Collected: 06/28/23 14:14**
Matrix: Water

487676-014 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**3,300**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: S12-DUP **Lab ID: 487676-015** **Collected: 06/28/23 14:15**
Matrix: Water

487676-015 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**340**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 487676

Sample ID: NIST2711A-2 **Lab ID: 487676-016** **Collected: 06/28/23 14:17**
Matrix: Water

487676-016 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**460**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: SPK-2 **Lab ID: 487676-017** **Collected: 06/28/23 14:18**
Matrix: Water

487676-017 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 200.8										
Arsenic	**970**		ug/L	100	11	50	317361	06/30/23	07/06/23	JCP

Sample ID: TP-49-1.5 60M **Lab ID: 487676-018** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-018 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**1,500**		mg/Kg	19	4.0	19	317355	06/30/23	07/05/23	JCP

Sample ID: TP-49-4.5 60M **Lab ID: 487676-019** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-019 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**1,200**		mg/Kg	20	4.1	20	317355	06/30/23	07/05/23	JCP

Sample ID: TP-51-0.0 60M **Lab ID: 487676-020** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-020 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**380**		mg/Kg	0.96	0.20	0.96	317355	06/30/23	07/05/23	JCP

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Analysis Results for 487676

Sample ID: TP-52-3.0 60M **Lab ID: 487676-021** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-021 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**210**		mg/Kg	0.97	0.20	0.97	317355	06/30/23	07/05/23	JCP

Sample ID: TP-53-3.0 60M **Lab ID: 487676-022** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-022 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**320**		mg/Kg	0.96	0.20	0.96	317355	06/30/23	07/05/23	JCP

Sample ID: TP-54-3.0 60M **Lab ID: 487676-023** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-023 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**300**		mg/Kg	0.95	0.20	0.95	317355	06/30/23	07/05/23	JCP

Sample ID: TP-56-1.5 60M **Lab ID: 487676-024** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-024 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**15**		mg/Kg	0.96	0.20	0.96	317355	06/30/23	07/05/23	JCP

Sample ID: TP-58-3.0 60M **Lab ID: 487676-025** **Collected: 06/27/23 18:20**
Matrix: Soil

487676-025 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**150**		mg/Kg	0.96	0.20	0.96	317355	06/30/23	07/05/23	JCP

Results for any subcontracted analyses are not included in this section.

Analysis Results for 487676

Sample ID: TP-61-1.5 60M	Lab ID: 487676-026	Collected: 06/27/23 18:20
	Matrix: Soil	

487676-026 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**9.6**		mg/Kg	0.98	0.20	0.98	317355	06/30/23	07/05/23	JCP

Sample ID: TP-64-3.0 60M	Lab ID: 487676-027	Collected: 06/27/23 18:20
	Matrix: Soil	

487676-027 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**180**		mg/Kg	0.96	0.20	0.96	317355	06/30/23	07/05/23	JCP

Sample ID: TP-65-3.0 60M	Lab ID: 487676-028	Collected: 06/27/23 18:20
	Matrix: Soil	

487676-028 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**2,400**		mg/Kg	19	3.9	19	317355	06/30/23	07/05/23	JCP

Sample ID: TP-66-0.0 60M	Lab ID: 487676-029	Collected: 06/27/23 18:20
	Matrix: Soil	

487676-029 Analyte	Result	Qual	Units	RL	MDL	DF	Batch	Prepared	Analyzed	Chemist
Method: EPA 6020 Prep Method: EPA 3050B										
Arsenic	**1,000**		mg/Kg	4.7	0.98	4.7	317355	06/30/23	07/06/23	JCP

J Estimated value
ND Not Detected

Results for any subcontracted analyses are not included in this section.

ENTHALPY ANALYTICAL

Batch QC

Type: Blank	**Lab ID:** QC1077250	**Batch:** 317361
Matrix: Water	**Method:** EPA 6020	**Prep Method:** EPA 200.8

QC1077250 Analyte	Result	Qual	Units	RL	MDL	Prepared	Analyzed
Arsenic	ND		ug/L	2.0	0.22	06/30/23	07/05/23

Type: Lab Control Sample	**Lab ID:** QC1077277	**Batch:** 317361
Matrix: Water	**Method:** EPA 6020	**Prep Method:** EPA 200.8

QC1077277 Analyte	Result	Spiked	Units	Recovery	Qual	Limits
Arsenic	100.6	100.0	ug/L	101%		80-120

Type: Lab Control Sample Duplicate	**Lab ID:** QC1077278	**Batch:** 317361
Matrix: Water	**Method:** EPA 6020	**Prep Method:** EPA 200.8

QC1077278 Analyte	Result	Spiked	Units	Recovery	Qual	Limits	RPD	RPD Lim
Arsenic	100.9	100.0	ug/L	101%		80-120	0	20

Type: Blank	**Lab ID:** QC1077225	**Batch:** 317355
Matrix: Soil	**Method:** EPA 6020	**Prep Method:** EPA 3050B

QC1077225 Analyte	Result	Qual	Units	RL	MDL	Prepared	Analyzed
Arsenic	ND		mg/Kg	1.0	0.21	06/30/23	07/05/23

Type: Lab Control Sample	**Lab ID:** QC1077226	**Batch:** 317355
Matrix: Soil	**Method:** EPA 6020	**Prep Method:** EPA 3050B

QC1077226 Analyte	Result	Spiked	Units	Recovery	Qual	Limits
Arsenic	108.8	100.0	mg/Kg	109%		80-120

Type: Matrix Spike	**Lab ID:** QC1077227	**Batch:** 317355
Matrix (Source ID): Soil (487599-014)	**Method:** EPA 6020	**Prep Method:** EPA 3050B

QC1077227 Analyte	Result	Source Sample Result	Spiked	Units	Recovery	Qual	Limits	DF
Arsenic	120.5	18.89	98.04	mg/Kg	104%		75-125	0.98

ENTHALPY ANALYTICAL

Batch QC

Type:	**Matrix Spike Duplicate**	**Lab ID:**	**QC1077228**	**Batch:**	**317355**
Matrix (Source ID):	**Soil (487599-014)**	**Method:**	**EPA 6020**	**Prep Method:**	**EPA 3050B**

QC1077228 Analyte	Result	Source Sample Result	Spiked	Units	Recovery	Qual	Limits	RPD	RPD Lim	DF
Arsenic	118.0	18.89	98.04	mg/Kg	101%		75-125	2	20	0.98

Type:	**Post Digest Spike**	**Lab ID:**	**QC1077229**	**Batch:**	**317355**
Matrix (Source ID):	**Soil (487599-014)**	**Method:**	**EPA 6020**	**Prep Method:**	**EPA 3050B**

QC1077229 Analyte	Result	Source Sample Result	Spiked	Units	Recovery	Qual	Limits	DF
Arsenic	124.9	18.89	98.04	mg/Kg	108%		75-125	0.98

ND Not Detected

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 2307364

Report Created for: GEOCON Env. Consultants

3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742-7306

Project Contact: Jason Muir
Project P.O.:
Project: S9959-07-03; Oro de Amador

Project Received: 07/07/2023

Analytical Report reviewed & approved for release on 07/14/2023 by:

Susan Thompson
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in a case narrative.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: GEOCON Env. Consultants **WorkOrder:** 2307364

Project: S9959-07-03; Oro de Amador

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit [1]
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NA	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit [2]
RPD	Relative Percent Difference
RRT	Relative Retention Time
RSD	Relative Standard Deviation
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents

[1] MDL is the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results. Definition and Procedure for the Determination of the Method Detection Limit, Revision 2, 40CFR, Part 136, Appendix B, EPA 821-R-16-006, December 2016.

[2] RL is the lowest level that can be reliably determined within specified limits of precision and accuracy during routine laboratory operating conditions. (The RL cannot be lower than the lowest calibration standard used in the initial calibration of the instrument and must be greater than the MDL.)

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
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Glossary of Terms & Qualifier Definitions

Client: GEOCON Env. Consultants **WorkOrder:** 2307364

Project: S9959-07-03; Oro de Amador

TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

Analytical Qualifiers

H	Sample was analyzed out of hold time
J	Result is less than the RL/ML but greater than the MDL. The reported concentration is an estimated value.

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Analytical Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2307364
Date Received:	07/07/2023 12:22	**Extraction Method:**	SW1312m
Date Prepared:	07/12/2023	**Analytical Method:**	SW6020
Project:	S9959-07-03; Oro de Amador	**Unit:**	mg/L

Metals (SPLP)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-52-3.0	2307364-001A	Soil	05/23/2023 09:20	ICP-MS6 214SMPL.d	273525

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Arsenic	**0.0026**		0.00081	0.0025	1	07/13/2023 22:33
Lead	ND		0.00030	0.0025	1	07/13/2023 22:33
Mercury	ND	H	0.00010	0.00025	1	07/13/2023 22:33

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-53-3.0	2307364-002A	Soil	05/23/2023 07:45	ICP-MS6 219SMPL.d	273525

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Arsenic	**0.0049**		0.00081	0.0025	1	07/13/2023 22:50
Lead	ND		0.00030	0.0025	1	07/13/2023 22:50
Mercury	ND	H	0.00010	0.00025	1	07/13/2023 22:50

Analyst(s): DB

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
TP-54-3.0	2307364-003A	Soil	05/23/2023 08:25	ICP-MS6 220SMPL.d	273525

Analytes	Result	Qualifiers	MDL	RL	DF	Date Analyzed
Arsenic	**0.0019**	J	0.00081	0.0025	1	07/13/2023 22:53
Lead	ND		0.00030	0.0025	1	07/13/2023 22:53
Mercury	ND	H	0.00010	0.00025	1	07/13/2023 22:53

Analyst(s): DB

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Quality Control Report

Client:	GEOCON Env. Consultants	**WorkOrder:**	2307364
Date Prepared:	07/12/2023	**BatchID:**	273525
Date Analyzed:	07/13/2023	**Extraction Method:**	SW1312m
Instrument:	ICP-MS6	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/L
Project:	S9959-07-03; Oro de Amador	**Sample ID:**	MB/LCS/LCSD-273525

QC Summary Report for Metals (Leachate)

Analyte	MB Result	MDL	RL			
Arsenic	ND	0.00081	0.0025	-	-	-
Lead	ND	0.00030	0.0025	-	-	-
Mercury	ND	0.00010	0.00025	-	-	-

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Arsenic	0.25	0.25	0.25	99	101	75-125	1.67	20
Lead	0.25	0.25	0.25	100	101	75-125	1.86	20
Mercury	0.0061	0.0063	0.0062	98	101	75-125	2.65	20

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 2307364 **ClientCode: GECR** **QuoteID: 233149**

☐ WaterTrax ☐ CLIP ☐ EDF ☒ EQuIS ☒ Dry-Weight ☑ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag
☒ Detection Summary ☐ Excel

Report to:
Jason Muir
GEOCON Env. Consultants
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742-7306
(805) 801-4998 FAX: (916) 852-9132

Email: muir@geoconinc.com
cc/3rd Party:
PO:
Project: S9959-07-03; Oro de Amador

Bill to:
Accounts Payable
GEOCON Env. Consultants
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742-7306

Requested TAT: 5 days;

Date Received: **07/07/2023**
Date Logged: **07/10/2023**

Lab ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
2307364-001	TP-52-3.0	Soil	5/23/2023 09:20	☐	A	A										
2307364-002	TP-53-3.0	Soil	5/23/2023 07:45	☐	A	A										
2307364-003	TP-54-3.0	Soil	5/23/2023 08:25	☐	A	A										

Test Legend:

1	METALSMS_SPLP_S	2	PRDisposal Fee	3		4	
5		6		7		8	
9		10		11		12	

Project Manager: Susan Thompson

Prepared by: Natalie Zaragoza

Comments:

NOTE: Soil samples are discarded 60 days after receipt unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: GEOCON ENV. CONSULTANTS
Client Contact: Jason Muir
Contact's Email: muir@geoconinc.com

Project: S9959-07-03; Oro de Amador
Comments

Work Order: 2307364
QC Level: LEVEL 2
Date Logged: 7/10/2023

☐ WaterTrax ☐ CLIP ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag

LabID	ClientSampID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	U**	Head Space	Dry-Weight	Collection Date & Time	TAT	Test Due Date	Sediment Content	Hold	Sub Out
001A	TP-52-3.0	Soil	SW6020 (Metals) (SPLP) <Arsenic, Lead, Mercury>	1	4OZ GJ, Unpres	☐	☐	☐	5/23/2023 9:20	5 days	7/18/2023		☐	☐
002A	TP-53-3.0	Soil	SW6020 (Metals) (SPLP) <Arsenic, Lead, Mercury>	1	4OZ GJ, Unpres	☐	☐	☐	5/23/2023 7:45	5 days	7/18/2023		☐	☐
003A	TP-54-3.0	Soil	SW6020 (Metals) (SPLP) <Arsenic, Lead, Mercury>	1	4OZ GJ, Unpres	☐	☐	☐	5/23/2023 8:25	5 days	7/18/2023		☐	☐

NOTES: * STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- Organic extracts are held for 40 days before disposal; Inorganic extract are held for 30 days.

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

U = An unpreserved container was received for a method that suggests a preservation in order to extend hold time for analysis.**

General COC

MAI Work Order # 1307364

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CHAIN OF CUSTODY RECORD

Turn Around Time:	1 Day Rush		2 Day Rush		3 Day Rush		STD	●	Quote #	233149									
J-Flag / MDL	●	ESL		Cleanup Approved		Dry Weight		Bottle Order #											
Delivery Format:	PDF	●	GeoTracker EDF		EDD		Write On (DW)		Detect Summary										

Report To: Jason Muir Bill To: Geocon Consultants, Inc.

Company: Geocon Consultants, Inc.

Email: muir@geoconinc.com

Alt Email: Tele: (530) 913-5996

Project Name: Oro de Amador Project #: S9959-07-03

Project Location: Jackson, California PO #

Sampler Signature:

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative	SPLP As, Pb, Hg EPA 1312
TP-52-3.0	05/23/23	09:20	1	S	1	●
TP-53-3.0	05/23/23	07:45	1	S	1	●
TP-54-3.0	05/23/23	08:25	1	S	1	●

Analysis Requested

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E200.8.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
Jason Muir / Geocon Consultants, Inc.	05/07/23			7723	1004
RA	7723	1222	Natalie Tolentino	7/7/23	1222

Comments / Instructions

Please hold samples and return remainder to Geocon after analysis.

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp 2.0 °C Initials

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Sample Receipt Checklist

Client Name:	GEOCON Env. Consultants	Date and Time Received:	7/7/2023 12:22
Project:	S9959-07-03; Oro de Amador	Date Logged:	7/10/2023
		Received by:	Natalie Zaragoza
WorkOrder №:	2307364 Matrix: Soil	Logged by:	Natalie Zaragoza
Carrier:	Patrick Johnson (MAI Courier)		

Chain of Custody (COC) Information

Chain of custody present?	Yes	☑	No	☐	
Chain of custody signed when relinquished and received?	Yes	☑	No	☐	
Chain of custody agrees with sample labels?	Yes	☑	No	☐	
Sample IDs noted by Client on COC?	Yes	☑	No	☐	
Date and Time of collection noted by Client on COC?	Yes	☑	No	☐	
Sampler's name noted on COC?	Yes	☑	No	☐	
COC agrees with Quote?	Yes	☑	No	☐	NA ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes	☐	No	☐	NA ☑
Custody seals intact on sample bottles?	Yes	☐	No	☐	NA ☑
Shipping container/cooler in good condition?	Yes	☑	No	☐	
Samples in proper containers/bottles?	Yes	☑	No	☐	
Sample containers intact?	Yes	☑	No	☐	
Sufficient sample volume for indicated test?	Yes	☑	No	☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes	☑	No	☐	NA ☐
Samples Received on Ice?	Yes	☑	No	☐	
(Ice Type: WET ICE)					
Sample/Temp Blank temperature	Temp: 2°C				NA ☐
ZHS conditional analyses: VOA meets zero headspace requirement (VOCs, TPHg/BTEX, RSK)?	Yes	☐	No	☐	NA ☑
Sample labels checked for correct preservation?	Yes	☑	No	☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes	☐	No	☐	NA ☑
UCMR Samples:					
pH tested and acceptable upon receipt (200.7: ≤2; 533: 6 - 8; 537.1: 6 - 8)?	Yes	☐	No	☐	NA ☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L) [not applicable to 200.7]?	Yes	☐	No	☐	NA ☑

Comments:

APPENDIX G

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	9.9	0	3	1	27.1	1	0.36	1	2.5	0	43.7	1	5	0	112	1	7.5	0	0.2	0	9.9	0	12.0	1	0.40	1	2.5	0			21.0	1	14.0	1					5.0	0			50	0		
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	65.9	1	0.25	0	2.5	0	23.0	1	5	0	36.6	1	7.5	0	0.029	1	9.9	0	15.0	1	1	0	2.5	0			17.0	1	28.0	1			5.0	0								
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	75.2	1	0.25	0	2.5	0	28.2	1	5	0	36.3	1	7.5	0	0.044	1	9.9	0	18.0	1	1	0	2.5	0			17.0	1	32.0	1			5.0	0								
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	1	0	244	1	0.28	1	2.5	0	22.0	1	9.3	1	48.6	1	15.0	1	0.2	0	9.8	0	27	1	0.3	0	2.5	0			25.2	1	58.5	1					5.0	0						
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	5	1	156	1	0.27	1	2.5	0	44.9	1	9.3	1	54.8	1	19.0	1	0.2	0	9.8	0	33	1	0.30	1	2.5	0			25.5	1	69.8	1					5.0	0						
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	7	1	154	1	0.62	1	2.5	0	45.3	1	11.0	1	69.5	1	8.9	1	0.2	0	9.9	0	36	1	0.3	0	2.5	0			30.4	1	71.8	1					5.0	0						
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	6	1	265	1	0.25	0	2.5	0	25.5	1	9.8	1	56.3	1	21.0	1	0.2	0	10	0	31	1	0.30	1	2.5	0			20.0	1	85.7	1					5.0	0						
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	3	1	227	1	0.36	1	2.5	0	25.7	1	12.0	1	35.4	1	25.0	1	0.2	0	10	0	23	1	0.3	0	2.5	0			25.6	1	56.8	1					5.0	0			50	0		
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	10	0	5	1	155	1	0.5	1	2.5	0	32.3	1	13.0	1	58.5	1	12.0	1	0.2	0	9.8	0	29	1	0.3	0	2.5	0			36.3	1	61.1	1					5.0	0			50	0		
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	9.9	0	1	0	135	1	0.31	1	2.5	0	24.0	1	8.4	1	58.3	1	7.7	1	0.2	0	9.9	0	50.9	1	0.30	1	2.5	0			18	1	129	1					5.0	0						
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	7	1	154	1	0.25	0	2.5	0	17.0	1	5.8	1	48.0	1	22.0	1	0.2	1	9.9	0	21	1	0.3	0	2.5	0			17	1	61.6	1					5.0	0						
BKRD-06C-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,C	0.0	9.9	0	7.5	1	151	1	0.25	0	2.5	0	19.0	1	6.6	1	61.3	1	25.0	1	0.2	0	9.9	0	25	1	0.4	1	2.5	0			21	1	71.4	1					5.0	0						
BKRD-06F-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,F	0.0	10	0	6.8	1	204	1	0.26	1	2.5	0	18.0	1	5.7	1	177	1	26.0	1	0.2	0	10	0	24	1	0.3	0	2.5	0			18	1	86.9	1					5.0	0						
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	7	1	195	1	0.39	1	2.5	0	22.0	1	11.0	1	58.1	1	11.0	1	0.2	0	9.9	0	25	1	0.50	1	2.5	0			25	1	51.1	1					5.0	0						
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	12	1	219	1	0.52	1	2.5	0	37.4	1	4.9	0	77.3	1	12.0	1	0.2	0	9.9	0	42	1	0.50	1	2.5	0			31	1	68.9	1					5.0	0						
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	9.8	0	5	1	152	1	0.40	1	2.5	0	23.0	1	7.4	1	73.6	1	10.0	1	0.035	1	9.8	0	37	1	1	0	2.5	0			27	1	68.0	1			5.0	0								
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	4	1	277	1	0.29	1	2.5	0	24.0	1	10.0	1	63.1	1	12.0	1	0.2	0	9.9	0	24	1	0.50	1	2.5	0			24.9	1	69.1	1					5.0	0						
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.8	0	3	1	123	1	0.27	1	2.5	0	24.0	1	7.0	1	116	1	10.0	1	0.03	1	9.8	0	31	1	1	0	2.5	0			28.4	1	81.5	1			5.0	0								
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	3	1	143	1	0.31	1	2.5	0	22.0	1	4.9	0	118	1	11.0	1	0.026	1	9.9	0	23	1	1	0	2.5	0			29.4	1	61.6	1			5.0	0								
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	12	1	189	1	0.38	1	2.5	0	37.2	1	15.0	1	52.3	1	19.0	1	0.2	0	9.9	0	39	1	0.30	1	2.5	0			32.6	1	67.9	1					5.0	0						
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	13	1	197	1	0.5	1	2.5	0	55.0	1	16.0	1	54.7	1	15.0	1	0.2	0	9.9	0	61.6	1	0.30	1	2.5	0			39.3	1	82.7	1					5.0	0						
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	5	1	186	1	0.46	1	2.5	0	26.7	1	13.0	1	65.9	1	18.0	1	0.2	0	9.9	0	34	1	0.70	1	2.5	0			30.4	1	87.4	1					5.0	0						
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.8	0	2	1	107	1	0.29	1	2.5	1	22.0	1	6.9	1	55.4	1	15.0	1	0.033	1	9.8	0	31	1	1	0	2.5	0			20.0	1	71.6	1			5.0	0	5.0	0						
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.9	0	2	1	105	1	0.25	0	2.5	0	21.0	1	6.8	1	58.6	1	11.0	1	0.032	1	9.9	0	29	1	1	0	2.5	0			20.0	1	72.9	1			5.0	0								
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	10	0	2	1	134	1	0.37	1	2.5	0	22.0	1	9.9	1	62.2	1	18.0	1	0.2	0	10	0	22	1	0.30	1	2.5	0			23.0	1	68.9	1					5.0	0						
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	6	1	225	1	0.55	1	2.5	0	34.7	1	11.0	1	64	1	15.0	1	0.2	0	9.9	0	33	1	0.50	1	2.5	0			34.4	1	69.6	1					5.0	0						
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.8	0	2	1	278	1	0.25	0	2.5	0	16	1	101.0	1	178	1	23.0	1	0.065	1	9.8	0	111	1	1	0	2.5	0			14.0	1	86.3	1			5.0	0			50	0		
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.9	0	1	0	190	1	0.25	0	2.5	0	16	1	49.0	1	172	1	17.0	1	0.039	1	9.9	0	74.2	1	1	0	2.5	0			13.0	1	87.3	1			5.0	0			50	0		
MW-01-10.0	10/27/92	D&M 1995	LKBD	SUB	KEN	T	10.0			184	1							3.4	1					52.0	1	6.4	1			22	1															5.0	0						
MW-01-11.5	10/27/92	D&M 1995	LKBD	SUB	CAL*	S	11.5	9.9	0	25	1	115	1	1.1	1	2.5	1	71.5	1	32.0	1	58.4	1	7.4	0	0.2	0	9.9	0	45	1	3	0	2.5	0			86.4	1	40.1	1					5.0	0						
MW-02-25.0	10/28/92	D&M 1995	TAIL	SUB	KEN	T	25.0			8	1							2.5	0					19.0	1	2.0	1			7.8	1																			50	0		
MW-02-50.0	10/28/92	D&M 1995	TAIL	SUB	CAL*	S	50.0			18	1							39.2	1					9.5	1	8.0	1			36.0	1																			50	0		
SB-01-8.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	8.0	25	0	153	1	28.2	1	0.5	0	0.92	1	4.0	1	5.8	1	28.3	1	38.1	1	3.3	1	1.4	1	23	1	3	0	0.5	0			6.8	1	70.3	1			0.5	0								
SB-01-10.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	10.0	24	0	178	1	6.2	1	0.48	1	0.89	1	6.1	1	6.7	1	27.8	1	55.1	1	5.2	1	3.6	1	26.7	1	3	0	0.48	0			7.1	1	84.5	1			0.5	0								
SB-01-25.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	25.0	24	0	143	1	54.9	1	0.48	0	0.40	1	4.6	1	5.5	1	26.8	1	400.0	1	4.0	1	2.8	1	23	1	3	0	0.48	0			5.8	1	68.2	1			0.5	0								
SB-01-33.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	33.0	24	0	187	1	40.0	1	0.48	0	0.57	1	3.0	1	2.9	1	18.9	1	32.3	1	5.0	1	1.5	1	19	1	3	0	0.48	0			4.6	1	43.5	1			0.5	0								
SB-01-41.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	41.5	25	0	60	1	67.0	1	0.53	1	1.00	1	26.2	1	12.2	1	32.3	1	14.0	1	0.1	0	0.99	0	19	1	3	0	0.60	1			60	1	57.4	1			21.9	1								
SB-02-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	24	0	184	1	52.3	1	0.48	0	0.24	0	2.9	1	7.4	1	29.3	1	46.5	1	0.6	1	2.3	1	24	1	3	0	0.48	0			60	1	54.7	1			0.5	0								
SB-02-12.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	12.0	25	0	177	1	55.0	1	0.49	0	0.43	1	2.7	1	6.9	1	30	1	49.7	1	3.0	1	3.0	1	26.4	1	3	0	0.63	1			6.5	1	72.2	1			0.5	0								
SB-02-17.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.0	25	0	137	1	50.7	1	0.5	0	0.25	0	2.7	1	6.1	1	22	1	58.5	1	6.3	1	3.4	1	30.8	1	3	0	0.5	0			5.2	1	72.7	1			12.7	1								
SB-03-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	24	0	212	1	56	1	0.48	0	0.34	1	6.7	1	6.8	1	26	1	15.1	1	0.4	1	4.1	1	27.9	1	3	0	0.68	1			7.8	1	68.3	1												
SB-03-20.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	20.0	25	0	125	1	33.6	1	0.49	0	0.25	0	2.5	1	2.2	1	18.1	1	23.0	1	0.4	1	1.3	1	22	1	3	0	1.2	1			4.8	1	109	1			0.75	1								
SB-03-30.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	30.0	25	0	93	1	33.9	1	0.5	0	0.25	0	2.1	1	1.0	1	6.33	1	11.0	1	1.2	1	3.5	1	12	1	3	0	0.64	1			1.9	1	33.1	1			0.5	0								
SB-03-31.5	08/23/90	D&M 1995	TAIL	SUB	KEN	S	31.5	25	0	19	1	99.2	1	0.5	0	0.79	1	26.5	1	10.0	1	34.8	1	13.0	1	0.1	0	1.1	1	27.2	1	3	0	0.5	0			52.1	1	64.6	1			0.5	0								
SB-04-17.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.5	24	0	144	1	75.9	1	0.48	0	0.24	0	8.4	1	5.8	1	22.5	1	85.6	1	10	1	2.7	1	29.3	1	3	0	0.67	1			8.9	1	78.5	1			0.5	0								
SB-04-36.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	36.5	24	0	78	1	42.9	1	0.48	0	0.24	0	1.5	1	2.6	1	14.1	1	24.4	1	0.3	1	3.4	1	14	1	3	0	0.48	0			2.7	1	52.4	1			0.9	1								
SB-04-40.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	40.0	25	0	117	1	57.3	1	0.49	0	0.24	0	4	1	4.8	1	23.0	1	42.2	1	7.3	1	3.7	1	20	1	3	0	0.85	1			8.2	1	54.3	1			1.1	1								
SB-04-45.0	08/23/90	D&M 1995	TAIL	SUB	MAR*	S	45.0	25	0	32	1	23.1	1	0.49	0	0.25	0	0.98	0	0.98	0	3.5	1	7.7	1	0.6	1	1.9	1	7.8	1	3	0	0.70	1			1.7	1	15.3	1			0.5	0								
SB-05A-23.0	11/02/92	D&M 1995	TAIL	SUB	KEN	T	23.0			219	1							4.7	1					46.0	1	3.5	1			24	1																			25	0		
SB-05-24.5	11/02/92	D&M 1995	TAIL	SUB	MAR*	S	24.5			4.7	1							19	1					7.5	0	0.2	0			15	1																			25	0		
SURF-01-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			76	1							6.8	1					63.0	1	9.7	1			20	1															5.0	0			25	0		
SURF-03-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			113	1							12	1					47.0	1	5.0	1			29	1															5.0	0			50	0		
SURF-04-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			106	1							4.4	1					49.0	1	7.0	1			20	1															5.0	0			50	0		
SURF-05-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			160	1							4.3	1					20.0	1	1.0	1			16	1															5.0	0			50	0		
SURF-06C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,C	0.0			81	1							2.4	0					14.0	1	0.88	1			9.4	1													5.0	0								
SURF-06F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,F	0.0			151	1							5.5	1					24.0	1	1.2	1			17	1													5.0	0								
SURF-07C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			102	1							3.5	1					26.0	1	2.1	1			12	1															5.0	0			50	0		
SURF-07F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			262	1							7.0	1					57.0	1	2.3	1			27	1															5.0	0			50	0		
SURF-08-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			158	1							3.4	1					35.0	1	2.0	1			16	1															5.0	0			50	0		
SURF-09C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			66	1							3.1	1					10.0	1	0.6	1			8.5	1															5.0	0			50	0		
SURF-09F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			110	1							4.5	1					28.0	1	1.4	1			16	1															5.0	0			50	0		
SURF-14-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	9.8	0	215	1	38.3	1	0.24	0	2.4	0	4	1	4.9	0	11	1	22.0	1	0.59	1	9.8	0	16	1	1	0	2.4	0			6.8	1	52.8	1												

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SURF-14R-0.0 (dup)	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	10	0	150	1	54.3	1	0.25	0	2.5	0	5.2	1	6.8	1	30	1	14.0	1	0.23	1	10	0	13	1	1	0	2.5	0			20	1	52.2	1												
SURF-15C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,C	0.0	9.8	0	161	1	70	1	0.24	0	2.4	0	8.3	1	4.9	0	26	1	33.0	1	3.3	1	9.8	0	21	1	0.3	0	2.4	0			11	1	57	1												
SURF-15F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,F	0.0	9.9	0	333	1	65	1	0.25	0	2.5	0	8.7	1	5.5	1	37	1	33.0	1	3.3	1	9.9	0	27	1	0.3	0	2.5	0			12	1	81	1												
SURF-16-0.0	01/11/93	D&M 1995	PROC	SURF	MEL	MR	0.0			69	1							1690	1					7.4	0	0.21	1			1340	1													5.0	0										
SURF-16R-0.0 (dup)	01/11/93	D&M 1995	PROC	SURF	MEL	MR	0.0			12	1							431	1					7.3	0	0.26	1			567	1													5.0	0										
SURF-17-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			220	1							4	1					35.0	1	2.6	1			22	1													5.0	0			50	0						
SURF-17R-0.0 (dup)	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			230	1							6.3	1					55.0	1	1.7	1			26	1													5.0	0			50	0						
SURF-18-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			186	1							7.5	1					64.0	1	3.87	1			27	1																								
SURF-19-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			141	1							16	1					41.0	1	2.65	1			28	1																								
SURF-20-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			214	1							3.9	1					23.0	1	0.72	1			16	1																								
TP-01-2.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	2.0	25	0	11	1	69.1	1	0.49	0	0.42	1	12.6	1	8.1	1	33.3	1	10.0	1	0.1	0	1.4	1	19.0	1	3	0	0.49	0			31.1	1	56.8	1			0.5	0								
TP-02-0.5	08/23/90	D&M 1995	TAIL	SURF	KEN	T	0.5	24	0	35	1	90.7	1	0.48	0	0.95	1	14.2	1	7.8	1	46.3	1	23.0	1	1.2	1	1.3	1	24.0	1	3	0	0.48	0			39	1	76.5	1			0.5	0								
TP-03-4.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	4.0	24	0	38	1	21.4	1	0.49	0	0.24	0	0.98	0	0.98	0	7.21	1	7.2	1	0.1	0	0.98	0	7.3	1	3	0	0.49	0			2.4	1	53	1			0.5	0								
TP-05-3.0	08/23/90	D&M 1995	PROC	SUB	MEL	S	3.0	24	0	14	1	36.8	1	0.9	1	1.5	1	12.4	1	3.7	1	92.9	1	2.4	0	0.1	0	0.96	0	13.0	1	3	0	1.0	1			86.6	1	111	1			5.0	0								
TP-06-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	24	0	63	1	158	1	0.56	1	1.8	1	88.3	1	21.3	1	66.8	1	14.0	1	0.1	0	0.97	0	89.2	1	3	0	0.48	0			52.6	1	59.3	1			5.0	0								
TP-07-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	25	0	52	1	73.6	1	0.74	1	1.1	1	228	1	30.7	1	86.7	1	17.0	1	0.1	0	5.9	1	221	1	3	0	0.99	1			74.8	1	62.0	1			5.0	0								
TP-08-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	24	0	159	1	67.9	1	0.61	1	2.1	1	575	1	85.8	1	61.9	1	71.4	1	0.1	0	13.1	1	930	1	3	0	1.7	1			60.8	1	84.6	1			5.0	0								
TP-09-5.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	5.0	24	0	150	1	39.7	1	0.49	0	0.81	1	0.98	0	6.0	1	31.9	1	39.1	1	3.0	1	2.2	1	24.6	1	4.00	1	0.86	1			7.2	1	56.8	1			5.0	0								
TP-09-8.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	8.0	25	0	4	1	88.0	1	0.5	0	0.50	1	4.0	1	4.1	1	41.4	1	4.9	1	0.20	1	2.7	1	26.4	1	3	0	0.59	1			5.7	1	45.5	1			5.0	0								
TP-10-4.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	4.0	25	0	305	1	58.9	1	0.5	0	0.81	1	4.2	1	8.1	1	38.5	1	25.0	1	3.0	1	1	0	26.2	1	3	0	0.5	0			9.1	1	65.3	1			0.5	0								
TP-10-11.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	11.0	25	0	4	1	81.0	1	0.49	0	1.6	1	42.8	1	13.0	1	53.9	1	6.5	1	1.1	1	2.8	1	28.5	1	3	0	0.71	1			44.2	1	40.2	1			5.0	0								
TP-11-6.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	6.0	24	0	78	1	23.9	1	0.49	0	0.87	1	5	1	4.2	1	13.8	1	21.0	1	3.0	1	2.5	1	21.0	1	3	0	0.49	0			4.2	1	49	1			5.0	0								
TP-11-12.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	12.0	24	0	195	1	42.3	1	0.49	0	0.98	1	2.4	1	6.1	1	26.2	1	35.9	1	4.0	1	0.98	0	23.0	1	3	0	0.49	0			6.5	1	54.3	1			0.5	0								
TP-12-2.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T/S	2.0	25	0	52	1	38.3	1	0.49	0	0.24	0	0.98	0	2.4	1	11.7	1	18.0	1	0.5	1	0.98	0	13.0	1	3	0	0.49	0			4.7	1	56.2	1			0.5	0								
TP-12-4.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	4.5	24	0	30	1	75.3	1	0.48	0	0.72	1	19.6	1	20.2	1	65	1	16.0	1	0.1	0	5.5	1	126.0	1	3	0	0.48	0			40.9	1	156	1			1.3	1								
TP-13-0.1	10/21/92	D&M 1995	PROC	SURF	KEN	T	0.1			80	1							10	1					8.9	1	1.0	1			21.0	1																	5.0	0			50	0		
TP-13C-2.0	10/21/92	D&M 1995	PROC	SUB	KEN	T,C	2.0			44	1							3.1	1					31.0	1	0.9	1			11.0	1																								
TP-13F-2.0	10/21/92	D&M 1995	PROC	SUB	KEN	T,F	2.0			98	1							5.4	1					61.0	1	2.0	1			10.0	1																								
TP-13-2.5	10/21/92	D&M 1995	PROC	SUB	KEN	T	2.5			87	1							14	1					72.0	1	20	1			33.0	1																	5.0	0			50	0		
TP-14-1.5	10/21/92	D&M 1995	LKBD	SUB	KEN	T	1.5			61	1							9.5	1					26.0	1	5.0	1			37.0	1													5.0	0					50	0		
TP-14C-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,C	3.0			27	1							2.5	0					11.0	1	0.5	1			9.3	1													5.0	0								
TP-14F-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,F	3.0			2.5	1							5.2	1					13.0	1	0.7	1			15.0	1													5.0	0								
TP-14-12.0	10/21/92	D&M 1995	LKBD	SUB	CAL	R	12.0	9.9	0	11	1	108	1	0.28	1	2.5	0	28.5	1	11.0	1	47.3	1	7.9	1	0.2	0	9.9	0	32.0	1	0.3	0	2.5	0			21.0	1	52.1	1			5.0	0					25	0		
TP-15-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T	3.0			283	1							4.9	1					12.0	1	1.0	1			15.0	1													5.0	0					50	0		
TP-16-1.0	10/21/92	D&M 1995	LKBD	SURF	KEN	T/S	1.0			14	1							26	1					7.9	1	0.2	0			15.0	1													5.0	0					50	0		
TP-16-3.5	10/21/92	D&M 1995	LKBD	SUB	CAL*	R	3.5	9.8	0	81.2	1	98.6	1	0.25	0	2.5	0	19	1	4.9	0	40.2	1	49.0	1	3.8	1	9.8	0	22.0	1	0.8	1	2.5	0			18.0	1	51.1	1			5.0	0					25	0		
TP-17C-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5			110	1							24.9	1					11.0	1	0.7	1			17.0	1															5.0	0			50	0		
TP-17F-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5			189	1							34.4	1					32.0	1	2.0	1			28.0	1															5.0	0			50	0		
TP-17-1.1	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.1	9.9	0	15	1	94.2	1	1.3	1	2.6		92.4	1	34.0	1	90.9	1	7.5	0	0.2	0	9.9	0	34.0	1	0.3	0	2.5	0			121	1	46.6	1					5.0	0			50	0		
TP-18-0.7	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.7			271	1							6.1	1					62.0	1	0.2	0			26.0	1															5.0	0			50	0		
TP-18-1.5	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.5	9.9	0	14	1	130	1	0.63	1	2.5	0	58.2	1	20.0	1	62.6	1	11.0	1	0.2	0	9.9	0	43.0	1	0.3	0	2.5	0			51.5	1	307	1					5.0	0			50	0		
TP-20-1.5	10/22/92	D&M 1995	PROC	SUB	MEL	MS	1.5			153	1							241	1					9.3	1	0.2	0			214	1															5.0	0			50	0		
TP-21-0.0	10/22/92	D&M 1995	PROC	SURF	KEN	T	0.0			71	1							50.5	1					44.0	1	0.50	1			82.5	1															5.0	0			50	0		
TP-21-0.3	10/22/92	D&M 1995	PROC	SURF	MEL	MR	0.3			257	1							259	1					7.9	1	0.30	1			149	1															5.0	0			50	0		
TP-22-0.0	01/11/93	D&M 1995	BELL	SURF	MEL	WR	0.0	10	0	9	1	72.5	1	0.25	0	2.5	0	12	1	16.0	1	34.1	1	17.0	1	0.320	1	10	0	24.0	1	1	0	2.5	0			24.0	1	60.7	1			5.0	0			50	0				
TP-22-2.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	9.9	0	7	1	126	1	0.25	0	2.5	0	26.3	1	18.0	1	22.0	1	12.0	1	0.018	1	9.9	0	24.0	1	1	0	2.5	0			40.6	1	47.6	1			5.0	0			50	0				
TP-22R-2.5 (dup)	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	9.8	0	5	1	131	1	0.25	0	2.5	0	29.6	1	13.0	1	19.0	1	11.0	1	0.020	1	9.8	0	23.0	1	1	0	2.5	0			32.8	1	40.9	1			5.0	0			50	0				
TP-22-3.0	10/23/92	D&M 1995	BELL	SUB	MEL	S	3.0	9.8	0	12	1	110	1	0.46	1	2.4	0	30.0	1	9.6	1	21.0	1	13.0	1	0.2	0	9.8	0	27.0	1	0.3	0	2.5	0			34.1	1	44.5	1					5.0	0			50	0		
TP-23-0.5	10/26/92	D&M 1995	BELL	SURF	MEL	WR	0.5	9.8	0	51	1	111	1	0.56	1	2.7	1	193	1	25.0	1	105	1	9.1	1	0.2	0	9.8	0	174	1	0.3	0	2.5	0			49.0	1	52.2	1					5.0	0			50	0		
TP-23-2.0	10/26/92	D&M 1995	BELL	SUB	MEL	MR	2.0	9.9	0	31	1	79.1	1	0.79	1	3.3	1	943	1	129	1	164	1	7.5	0	0.2	0	9.9	0	473	1	0.3	0	2.5	0			53.9	1	51.3	1					5.0	0			50	0		
TP-24C-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,C	1.5	9.8	0	139	1	67.0	1	0.82	1	5.0	1	69.0	1	39.0	1	120	1	11.0	1	0.24	1	9.8	0	86.0	1	0.3	0	2.5	0			74.0	1	90.0	1			5.0	0								
TP-24F-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,F	1.5	9.9	0	115	1	84.0	1	0.86	1	4.1	1	66.0	1	43.0	1	140	1	21.0	1	0.27	1	9.9	0	100	1	0.3	0	2.5	0			81.0	1	98.0	1			5.0	0								
TP-24-3.0	10/26/92	D&M 1995	BELL	SUB	MEL	S	3.0	9.9	0	40	1	97.2	1	1.6	1	5.4	1	136	1	29.0	1	115	1	7.4	0	0.2	0	9.9	0	79.1	1	0.3	0	2.5	0			61.3	1	61.3	1					5.0	0			50	0		
TP-25-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.2			28	1							16.0	1					70.0	1	15.0	1			23.0	1															5.0	0								
TP-25-1.0	10/23/92	D&M 1995	TAIL	SURF	MAR*	S	1.0	10	0	3	1	178	1	0.79	1	4.4	1	21.0	1	10.0	1	96.1	1	7.5	0	0.2	0	10	0	15.0	1	0.3	0	2.5	0			133	1	72.0	1					5.0	0						
TP-26-2.0	10/23/92	D&M 1995	TAIL	SUB	MAR*	S	2.0	10	0	9	1	226	1	0.93	1	3.2	1	44.9	1	23.0	1	80.1	1	10.0	1	0.9	1	10	0	33.0	1	0.3	0	2.5	0			114	1	86.1	1					5.0	0						
TP-27-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	9.8	0	5	1	176	1	0.68	1	3.6	1	17.0	1	15.0	1	63.3	1	10.0	1	0.2	0	9.8	0	11.0	1	0.3	0	2.5	0			84.3	1	62.8	1					5.0	0			25	0		
TP-28C-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5			6	1							27.0	1					12.0	1	0.3	1			25.0	1															5.0	0								
TP-28F-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5			6	1							30.8	1					10.0	1	0.2	0			27.0	1															5.0	0								
TP-29-0.3	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.3	9.8	0	21	1	219	1	0.49	1	3.5	1	18.0	1	22.0	1	89.8	1	7.4	0	0.6	1	9.8	0	21.0	1	0.3	0	2.5	0			121	1	77.4	1					5.0	0						
TP-30-0.2	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.2	9.8	0	42	1	199	1	0.88	1	3.2	1	54.0	1	29.0	1	97.3	1	7.4	0	0.2	0	9.8	0	43.0	1	0.3	0	2.5	0			116	1	72.4	1					5.0	0						
TP-31-0.3	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.3	9.9	0	263	1	113	1	0.25	0	2.5	0	14.0	1	8.6	1	31.3	1	44.0	1	5	1	9.9	0	25.0	1	0.50	1	2.5	0			22	1	73.7	1					5.0	0						

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-33-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	WR	0.2	10	0	88	1	207	1	1.4	1	4.3	1	29.5	1	26.0	1	91.5	1	12.0	1	0.3	1	10	0	23.0	1	0.3	0	2.5	0			148	1	85.2	1					5.0	0			25	0		
TP-34-1.0	10/29/92	D&M 1995	TAIL	SURF	KEN	T	1.0			5	1							2.4	0					11.0	1	0.5	1			7.0	1																			50	0		
TP-35-0.0	10/29/92	D&M 1995	PROC	SURF	KEN	T	0.0			4	1							38.2	1					25.0	1	0.5	1			38.0	1																			50	0		
TP-35-0.75	10/29/92	D&M 1995	PROC	SURF	KEN	MS	0.75			12	1							235	1					7.5	0	0.2	0			158	1																			25	0		
TP-40-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0											14.0	1																							1	0										
TP-41-1.0	06/06/95	D&M 1995	LKBD	SURF	KEN	T/S	1.0											12.0	1																							1	0										
TP-42-1.0	06/06/95	D&M 1995	PROC	SURF	MEL	S	1.0											180	1																							1	0										
TP-43-1.0	06/06/95	D&M 1995	BELL	SURF	MEL	S	1.0											620	1																							1	0										
TP-44-1.0	06/06/95	D&M 1995	BELL	SURF	MEL	S	1.0											140	1																							1	0										
TP-45-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0											7.9	1																							1	0										
TP-46-1.0	06/06/95	D&M 1995	PROC	SURF	KEN	S	1.0											320	1																							1	0										
TP-47-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5											11.0	1																							1	0										
TP-48-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5											11.0	1																							1	0										
MR-01-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5																																														
MR-02-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5																																														
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	12.4	1	171	1	0.35	1	0.5	1	60.3	1	12.4	1	72.2	1	20.7	1	0.17	1			48.6	1	1.0	1	0.75	1	1.6	1	30.6	1	73.0	1			2.6	0								
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.7	1	94.4	1	0.16	1	0.19	1	35.9	1	5.9	1	58.9	1	16.4	1	0.04	0			20.8	1	0.66	1	0.45	1	1.2	1	19.1	1	58.1	1			2.7	0								
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	9.9	1	191	1	0.39	1	0.40	1	61.0	1	12.4	1	55.4	1	10.8	1	0.05	0			43.9	1	1.3	1	0.70	1	1.5	1	30.7	1	57.8	1			2.6	0								
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	10.4	1	173	1	0.42	1	0.32	1	70.1	1	14.7	1	66.1	1	10.5	1	0.02	0			47.1	1	1.2	1	0.70	1	1.9	1	36.8	1	64.2	1			2.7	0								
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	11.8	1	209	1	0.44	1	0.51	1	73.0	1	16.8	1	61.9	1	14.4	1	0.06	0			54.9	1	1.2	1	0.99	1	1.6	1	42.7	1	86.4	1			2.7	0								
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.7	0	14.8	1	177	1	0.44	1	0.56	1	99.7	1	20.1	1	72.9	1	10.9	1	0.11	0			64.6	1	1.4	1	1.1	1	1.8	1	52.5	1	90.1	1			2.8	0								
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	12	1	154	1	0.31	1	0.34	1	19.6	1	12.3	1	44.6	1	14.1	1	0.09	0			22.6	1	0.74	1	0.64	1	1.1	1	20.1	1	55.0	1			3.1	0								
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.4	0	11.5	1	177	1	0.46	1	0.38	1	26.5	1	9.8	1	60.9	1	9.9	1	0.1	0			25.2	1	0.96	1	0.79	1	1.6	1	24.3	1	56.6	1			3.1	0								
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10.1	1	211	1	0.33	1	0.48	1	31.9	1	15.5	1	54.4	1	17.7	1	0.03	0			38.7	1	1.4	1	0.42	1	1.5	1	23.7	1	74.6	1			2.6	0								
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.1	1	172	1	0.42	1	0.45	1	66.7	1	12.4	1	84.0	1	12.3	1	0.04	0			59.7	1	1.6	1	0.63	1	1.7	1	32.8	1	70.9	1			2.7	0								
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	6.6	1	222	1	0.31	1	0.62	1	30.6	1	20.8	1	82.4	1	16.1	1	0.06	0			50.1	1	1.6	1	0.77	1	1.7	1	22.9	1	83.3	1			2.6	0								
SOIL06-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	8.5	1	240	1	0.31	1	0.63	1	28.4	1	18.1	1	73.0	1	38.0	1	0.09	0			44.4	1	1.4	1	0.66	1	1.5	1	22.8	1	85.1	1			2.7	0								
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	18.7	1	203	1	0.42	1	0.41	1	34.0	1	14.4	1	64.6	1	22.4	1	0.09	0			33.3	1	1.2	1	0.58	1	1.6	1	25.0	1	66.9	1			2.7	0								
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	12.2	1	182	1	0.38	1	0.29	1	26.0	1	12.9	1	52.2	1	15.7	1	0.05	0			27.0	1	1.0	1	0.46	1	1.3	1	22.5	1	52.1	1			2.7	0								
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.8	0	9.1	1	128	1	0.25	1	0.30	1	22.7	1	5.0	1	63.4	1	18.7	1	0.09	0			21.2	1	1.4	1	0.36	1	1.2	1	18.7	1	61.7	1			2.9	0								
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.3	1	91.3	1	0.24	1	0.39	1	21.4	1	7.3	1	100.0	1	8.2	1	0.03	0			61.7	1	1.5	1	0.69	1	1.7	1	15.5	1	175	1			2.7	0								
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.1	0	10.5	1	196	1	0.32	1	0.45	1	34.8	1	14.6	1	53.6	1	17.3	1	0.06	0			37.3	1	1.5	1	0.60	1	1.5	1	23.6	1	72.7	1			2.6	0								
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	7.7	1	162	1	0.3	1	0.33	1	29.9	1	12.1	1	52.2	1	12.0	1	0.04	0			33.2	1	1.2	1	0.53	1	1.5	1	22.1	1	59.4	1			2.6	0								
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.4	1	208	1	0.35	1	0.32	1	28.3	1	10.1	1	55.2	1	19.0	1	0.07	0			27.3	1	1.3	1	0.64	1	1.4	1	22.4	1	57.5	1			2.7	0								
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.9	1	181	1	0.41	1	0.29	1	30.0	1	14.6	1	75.5	1	16.5	1	0.02	0			31.1	1	1.2	1	0.74	1	1.8	1	26.5	1	26.5	1			2.7	0								
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.7	0	9.8	1	259	1	0.34	1	0.34	0	25.9	1	10.4	1	61.6	1	23.5	1	0.086	1			34.7	1	1.3	1	0.8	1	0.96	1	23.5	1	23.5	1			2.8	0								
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6	0	6.2	1	204	1	0.32	1	0.15	0	20.9	1	8.8	1	58.3	1	10.3	1	0.019	1			28.8	1	1.2	1	0.76	1	1.1	1	20.9	1	20.9	1			2.5	0								
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	14.6	1	205	1	0.28	1	0.23	0	28.5	1	11	1	77.9	1	20.0	1	0.09	0			32.5	1	1.1	1	0.89	1	1.1	1	25.1	1	25.1	1			2.7	0								
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	14.4	1	203	1	0.31	1	0.22	0	33.4	1	11.3	1	77.4	1	23.7	1	0.11	1			38.9	1	1.3	1	0.81	1	1.2	1	23.3	1	23.3	1			2.6	0								
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	4.3	1	140	1	0.26	1	0.10	0	27	1	12.9	1	99.8	1	9.4	1	0.045	1			43.7	1	1	1	0.71	1	1.3	1	19.8	1	69.4	1			2.6	0								
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	13.9	1	187	1	0.32	1	0.33	0	52	1	15.4	1	58.9	1	18.1	1	0.066	1			58.3	1	1.1	1	0.95	1	1.3	1	30.3	1	93.5	1			2.6	0								
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.3	0	14.4	1	204	1	0.40	1	0.38	0	65.1	1	18.6	1	76.4	1	15.8	1	0.028	1			70.6	1	1.3	1	1	1	1.6	1	37.5	1	106	1			3.0	0								
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7	0	9.8	1	174	1	0.30	1	0.16	0	22.8	1	6.6	1	62.8	1	16.9	1	0.071	1			20.5	1	1.6	1	0.62	1	1.2	1	20.5	1	58.8	1			2.9	0								
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.3	1	107	1	0.26	1	0.07	0	15.8	1	5.1	1	62.9	1	9.4	1	0.039	1			17	1	1.8	1	0.47	1	1.0	1	15.7	1	42.9	1			2.7	0								
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	112	1	0.3	1	0.05	0	17.4	1	5.7	1	71.6	1	10.2	1	0.038	1			19.8	1	2	1	0.61	1	1.1	1	17.8	1	48.6	1			2.7	0								
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	8.3	1	178	1	0.29	1	0.15	0	20.6	1	7.9	1	81.2	1	17.0	1	0.08	1			21.5	1	1.2	1	0.77	1	1.0	1	20.3	1	50.1	1			2.6	0								
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	2.8	1	106	1	0.25	1	0.05	0	17.1	1	4.1	0	65.4	1	13.9	1	0.052	1			17	1	0.94	1	0.42	1	1.0	1	15.9	1	42.3	1			2.6	0								
SOIL16-1	05/13/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	7.6	0	502	1	78	1	0.12	1	0.42	0	7.9	1	10.6	1	81.3	1	386	1	28	1			37.9	1	4.8	1	5.6	1	1.4	1	6	0	118	1			3.2	0								
SOIL16-3	05/13/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	19.2	1	178	1	0.29	1	0.13	0	32.8	1	9	1	75.1	1	13.5	1	0.45	1			34.9	1	1.3	1	0.91	1	1.6	1	24.5	1	66.4	1			2.7	0								
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	11.2	1	186	1	0.29	1	0.19	0	45.8	1	14.2	1	58.6	1	11.0	1	0.031	1			48.5	1	1.1	1	0.81	1	1.3	1	25.8	1	74.4	1			2.6	0								
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.2	0	5.5	1	107	1	0.18	1	0.1	0	40.6	1	7.7	1	62.4	1	6.3	1	0.12	0			32.9	1	1.0	1	0.69	1	1.0	1	17.6	1	62.2	1			3.0	0								
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.2	0	13.1	1	307	1	0.39	1	0.52	0	59.0	1	29.9	1	90.7	1	26.3	1	0.12	1			77.7	1	1.4	1	1.3	1	1.5	1	35.4	1	160	1			3.4	0								
SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	8.9	0	10.6	1	258	1	0.33	1	0.48	0	47.0	1	28.9	1	90.4	1	24.7	1	0.078	1			70	1	1.3	1	1.1	1	1.6	1	30.9	1	149	1			3.7	0								
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	10.1	1	231	1	0.55	1	0.24	0	38.4	1	19.4	1	66.6	1	18.0	1	0.054	1			39.3	1	1.2	1	1.1	1	1.5	1	38.6	1	97.5	1			3.1	0								
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.4	1	186	1	0.44	1	0.19	0	28.2	1	14.9	1	52.5	1	14.7	1	0.048	1			31.4	1	1.1	1	0.81	1	1.4	1	30.9	1	78.6	1			2.6	0								
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	6.2	1	182	1	0.50	1	0.40	0	26.6	1	18.5	1	65.9	1	14.1	1	0.02	0			35.8	1	0.66	1	0.13	1	0.94	1	37.3	1	85.1	1			2.7	0								
SOIL20-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	37.6	1	178	1	0.40	1	0.50	0	58.2	1	19.5	1	63.4	1	17.8	1	0.26	1			55.7	1	1.1	1	0.1	1	0.75	1	35.5	1	75.6	1			2.6	0								
SOIL20-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	23.9	1	163	1	0.38	1	0.39	1	45.8	1	17.9	1	63.4	1	12.6	1	0.07	0			51.6	1	0.66	1	1	0	0.81	1	34.6	1	66.3	1			2.6	0								
SOIL21-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	14.1	1	198	1	0.33	1	0.37	1	22.7	1	7.2	1	91.2	1	15.8	1	0.34	1			26.9	1	0.54	1	0.14	1	0.82	1	28.3	1	75.2	1			2.7	0								
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.3	1	193	1	0.36	1	0.38	1	25.1	1	7.2	1	87.2	1	11.3	1	0.05	0			26.3	1	0.94	1	1.1	0	0.94	1	30.2	1	71.8	1			2.7	0								
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	11.3	1	191	1	0.34	1	0.71	1	25.4	1	20.1	1	73.4	1	12.6	1	0.021	1			35	1	1.2	1	1.1	0	1.0	0	24.7	1	87.7	1			2.7	0								
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	10.4	1	161	1	0.37	1	0.65	1	26.7	1	18.3	1	80.3	1	15.4	1	0.023	1			27.8	1	1.3	1	1.1	0	0.97	0	24.6	1	69.9	1			2.7	0								

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	9.3	1	208	1	0.39	1	0.60	1	24.8	1	9.2	1	54.1	1	16.2	1	0.039	1			21.4	1	1.5	1	1.1	0	0.84	0	27.2	1	59.6	1			2.6	0								
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.8	1	203	1	0.41	1	0.62	1	32.6	1	10.2	1	70.7	1	14.3	1	0.031	1			21.9	1	1.7	1	1.1	0	0.97	0	32.6	1	60.5	1			2.7	0								
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	7.5	1	192	1	0.37	1	0.55	1	23.1	1	10.2	1	60.4	1	14.1	1	0.022	1			21.7	1	1.5	1	1.1	0	1	0	28.7	1	61.7	1			2.7	0								
SOIL24-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.8	0	238	1	36.9	1	0.011	1	0.56	0	4.2	1	4.6	1	20.5	1	15.6	1	1.2	1			19.2	1	1.2	1	0.19	1	0.65	0	4.7	1	59.4	1			2.8	0								
SOIL24-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	160	1	38.7	1	0.07	1	0.53	0	3.1	1	4.5	1	14.7	1	7.3	1	0.92	1			17.2	1	0.82	1	0.17	1	0.51	0	3.2	1	59.9	1			2.8	0								
SOIL25-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	160	1	143	1	0.24	1	0.62	1	38.8	1	13.4	1	58.8	1	102	1	5.9	1			44.1	1	2.1	1	1.0	1	0.93	0	27.1	1	66.4	1			2.6	0								
SOIL25-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	48.5	1	140	1	0.31	1	0.56	1	36.5	1	10.3	1	59.8	1	33	1	1.6	1			37.2	1	1.4	1	0.23	1	0.84	0	24.3	1	53.7	1			2.6	0								
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	16.3	1	185	1	0.32	1	0.73	1	45.3	1	13.2	1	58.1	1	14.8	1	0.068	1			46.3	1	1.5	1	1	0	1.1	0	32.2	1	73.7	1			2.6	0								
SOIL26-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	24.4	1	136	1	0.29	1	0.82	1	167	1	16.2	1	68.5	1	11.6	1	0.1	0			93.6	1	1.3	1	1	0	1.1	0	56.7	1	97.5	1			2.6	0								
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.7	1	207	1	0.39	1	0.60	1	26.3	1	9.5	1	64.6	1	15.4	1	0.048	1			24.7	1	1.5	1	0.52	1	0.95	0	27.4	1	61.5	1			2.7	0								
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	12.2	1	195	1	0.38	1	0.54	0	23.9	1	10.3	1	67.1	1	11.9	1	0.017	1			23.5	1	1.2	1	1.1	0	1.1	0	29.4	1	61.5	1			2.7	0								
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.3	1	198	1	0.34	1	0.51	0	24.2	1	10.4	1	61.3	1	11.9	1	0.01	0			21.6	1	1.4	1	0.15	1	0.98	0	26	1	57.1	1			2.7	0								
SOIL28-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	83.4	1	100	1	0.28	1	0.57	1	40.2	1	8.8	1	70.6	1	95.9	1	0.072	1			44.6	1	1.2	1	1	0	0.88	0	32.0	1	73.3	1			2.6	0								
SOIL28-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	38.5	1	82.9	1	0.25	1	0.49	0	31.9	1	6.8	1	77.6	1	13.6	1	0.042	1			42.8	1	1.6	1	1.1	0	0.08	0	22.3	1	74.5	1			2.6	0								
SOIL29-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.6	0	181	1	32.7	1	0.07	1	0.52	0	3.3	1	3.8	0	17.0	1	11.8	1	0.42	1			15.1	1	1.2	1	0.21	1	0.53	0	3.5	1	58.5	1			2.7	0								
SOIL29-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	165	1	34.2	1	0.05	1	0.48	0	1.8	1	5.1	0	12.5	1	6.5	1	0.24	1			17.6	1	0.8	1	0.11	1	0.48	0	2.3	1	59.3	1			2.7	0								
SOIL30-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	43.6	1	152	1	0.3	1	0.57	1	32.3	1	12.6	1	56.7	1	31.4	1	1.9	1			40.4	1	0.99	1	0.21	1	0.89	0	22.3	1	66.6	1			2.6	0								
SOIL30-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.7	0	8.7	1	143	1	0.31	1	0.49	0	43.4	1	13.8	1	64.8	1	9.0	1	0.023	1			40.1	1	1.1	1	1.1	0	1	0	27	1	61.0	1			2.8	0								
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.1	1	154	1	0.21	1	0.44	0	16.6	1	9.9	1	54.5	1	30.2	1	0.11	1			17.0	1	0.51	1	0.27	1	0.66	0	13	1	83.0	1			2.6	0								
SOIL31-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	3.9	1	86.3	1	0.22	0	0.27	0	17.0	1	6.0	1	58.9	1	15.3	1	0.04	0			12.2	1	3.7	0	0.14	1	0.68	0	13.3	1	62.1	1			2.6	0								
SOIL32-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.3	0	32.1	1	112	1	0.36	0	0.53	1	52.5	1	29.4	1	83.7	1	8.9	1	0.26	1			20.4	1	0.89	1	0.34	1	1.1	0	96.1	1	62.2	1			2.6	0								
SOIL32-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.5	0	6.2	1	78	1	0.22	0	0.39	0	57.0	1	31.3	1	69.1	1	2.7	1	0.04	0			17.1	1	0.79	1	0.37	1	0.99	0	84.6	1	54.2	1			2.7	0								
SOIL33-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.3	0	29.6	1	174	1	0.44	0	0.45	0	49.9	1	23.9	1	62.2	1	8.4	1	0.04	0			30.5	1	0.57	1	0.41	1	0.94	0	65.2	1	57.8	1			2.6	0								
SOIL33-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	9	0	46.9	1	228	1	0.55	0	0.57	0	68.0	1	29.9	1	82.2	1	9.8	1	0.05	0			41.0	1	1.0	1	0.56	1	1.4	0	88.2	1	78.2	1			3.9	0								
SOIL34-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	7.3	0	39.1	1	104	1	0.27	0	0.32	0	82.6	1	11.7	1	54.5	1	25.4	1	0.17	1			47.5	1	0.78	1	0.18	1	0.79	0	33.5	1	65.2	1			3.0	0								
SOIL34-1 (dup)	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.8	0	36.1	1	102	1	0.26	0	0.30	0	67.5	1	9.6	1	50.3	1	20.8	1	0.11	1			40.9	1	0.97	1	0.09	1	0.71	0	29.6	1	57.4	1			2.9	0								
SOIL34-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.5	0	12.9	1	96.6	1	0.21	0	0.24	0	54.2	1	9.6	1	58.5	1	7.9	1	0.07	0			25.3	1	1.0	1	0.22	1	0.83	0	48.3	1	44.7	1			2.7	0								
SOIL35-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	80.9	1	104	1	0.2	0	0.40	0	19.6	1	6.7	1	39.2	1	51.4	1	4.1	1			20.9	1	1.2	1	0.69	1	0.7	0	13.8	1	54.9	1			2.6	0								
SOIL35-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	15.1	1	143	1	0.26	0	0.33	0	59.4	1	10.4	1	67.7	1	14.2	1	0.77	1			41.7	1	0.70	1	0.21	1	1	0	24.7	1	84.8	1			2.6	0								
SOIL36-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	72.7	1	114	1	0.27	0	0.35	0	28.6	1	11	1	44.7	1	13.0	1	0.3	1			34.1	1	0.82	1	0.23	1	0.85	0	21.6	1	51.3	1			2.6	0								
SOIL36-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.2	0	36.3	1	86.2	1	0.22	0	0.26	0	21.5	1	7.1	1	56.9	1	6.8	1	0.04	0			27.1	1	0.73	1	0.17	1	0.71	0	18.2	1	49.8	1			2.6	0								
SOIL37-1	05/14/08	USEPA 2008	LKBD	SURF	CAL*	S	0.0-0.5	6.2	0	56.6	1	230	1	0.38	0	0.43	0	49.7	1	23.1	1	60.5	1	18.4	1	0.23	1			48.5	1	0.82	1	0.71	1	0.84	0	32.5	1	60.2	1			2.6	0								
SOIL37-3	05/14/08	USEPA 2008	LKBD	SUB	CAL	S	2.5-3.0	6.6	0	32	1	180	1	0.38	0	0.37	1	271	1	11.6	1	84.8	1	8.3	1	0.04	0			115	1	0.66	1	1.1	0	0.96	1	51.4	1	105	1			2.7	0								
SOIL38-1	05/14/08	USEPA 2008	LKBD	SURF	CAL*	S	0.0-0.5	6.2	0	23.5	1	143	1	0.3	0	0.3	0	63.3	1	14.2	1	47.9	1	12.7	1	0.05	0			41.7	1	0.54	1	0.19	1	0.8	0	35.4	1	58.0	1			2.6	0								
SOIL38-3	05/14/08	USEPA 2008	LKBD	SUB	CAL	S	2.5-3.0	7	0	16.8	1	159	1	0.29	0	0.3	0	62.4	1	18.6	1	47.3	1	10.9	1	0.04	0			46.8	1	0.79	1	0.23	1	0.9	0	34.4	1	66.6	1			2.9	0								
SOIL39-1	05/14/08	USEPA 2008	LKBD	SURF	CAL*	S	0.0-0.5	6.4	0	45.5	1	185	1	0.22	0	0.55	1	41.1	1	18.6	1	47.4	1	16.8	1	0.22	1			45	1	0.61	1	0.55	1	0.69	0	21.6	1	87.3	1			2.7	0								
SOIL39-1 (dup)	05/14/08	USEPA 2008	LKBD	SURF	CAL*	S	0.0-0.5	6.4	0	43.6	1	194	1	0.21	0	0.52	1	43.4	1	18.9	1	48.5	1	16.6	1	0.21	1			44.8	1	1.2	1	0.61	1	0.66	0	22.6	1	89.0	1			2.7	0								
SOIL39-3	05/14/08	USEPA 2008	LKBD	SUB	CAL	S	2.5-3.0	6.5	0	25.2	1	208	1	0.2	0	0.3	0	31.9	1	35.9	1	62.5	1	14.7	1	0.09	0			58.5	1	0.71	1	0.68	1	0.56	0	10.9	1	68.4	1			2.7	0								
SOIL40-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	6.2	0	81.2	1	126	1	0.44	1	0.38	1	29.4	1	12.9	1	64.4	1	42.1	1	2.8	1			22.8	1	1.3	1	0.35	1	0.82	1	41.1	1	57.7	1			2.6	0								
SOIL40-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	4.3	1	228	1	0.38	1	0.47	1	7.5	1	22.3	1	59.1	1	2.7	1	0.042	1			11.6	1	0.59	1	1.1	0	1.2	1	127	1	73.3	1			2.7	0								
SOIL40-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.7	0	5.1	1	200	1	0.45	1	0.50	1	10	1	28.5	1	86.9	1	3.2	1	0.055	1			11.5	1	1.1	1	1.1	0	0.95	1	119	1	82.4	1			2.8	0								
SOIL41-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	6.6	0	76.1	1	113	1	0.38	1	0.38	1	48	1	16.6	1	59.8	1	31.7	1	1.8	1			46	1	0.87	1	0.23	1	0.76	1	53.1	1	62.6	1			2.8	0								
SOIL41-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.8	0	18	1	132	1	0.44	1	0.33	1	82.1	1	20.2	1	68.0	1	6.7	1	0.02	0			65.2	1	0.65	1	1.1	0	0.91	1	74	1	50.8	1			2.8	0								
SOIL41-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.9	0	20.8	1	131	1	0.4	1	0.50	1	42.5	1	28.1	1	121	1	9.8	1	0.46	1			38.3	1	0.98	1	1.2	0	1.2	1	110	1	70.1	1			2.9	0								
SOIL42-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	6.2	0	80.4	1	115	1	0.35	1	0.46	1	71.3	1	12	1	66.7	1	27.8	1	1.10	1			63.6	1	1.7	1	0.1	1	0.75	1	30.2	1	67.2	1			2.6	0								
SOIL42-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.4	0	59.2	1	104	1	0.4	1	0.38	1	74.9	1	10.2	1	69.6	1	12.0	1	0.42	1			55.4	1	0.77	1	1.1	0	0.92	1	33.2	1	58.2	1			2.7	0								
SOIL42-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.4	0	41.5	1	83.5	1	0.32	1	0.29	1	45.7	1	5.6	1	68.4	1	11.6	1	0.33	1			32.4	1	2.2	1	1.1	0	0.88	1	24.8	1	39.6	1			2.7	0								
SOIL43-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	1.1	1	55.4	1	141	1	0.4	1	0.53	1	181	1	19.4	1	81.7	1	20.4	1	0.74	1			133	1	1.2	1	0.05	1	0.97	1	41.2	1	92.2	1			2.6	0								
SOIL43-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	10.2	1	73.6	1	0.19	1	0.21	1	39.2	1	3.50	1	50.8	1	8.5	1	0.071	1			33.9	1	1.1	1	1.1	0	0.86	1	15.0	1	34.4	1			2.7	0								
SOIL43-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.7	0	12.2	1	66.0	1	0.23	1	0.39	1	46.5	1	4.70	1	92.0	1	15.0	1	0.086	1			40.2	1	1.7	1	1.1	0	0.97	1	23.2	1	44.5	1			2.8	0								
SOIL44-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.9	0	13.5	1	124	1	0.21	1	0.41	1	15	1	14.2	1	38.9	1	12.6	1	0.15	1			21.6	1	1.1	1	1.3	0	3.3	0	17.0	1	59.5	1			3.3	0								
SOIL44-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9.9	0	12.9	1	149	1	0.47	1	0.39	1	28.7	1	12.3	1	63.9	1	16.5	1	0.23	1			28.1	1	1.0	1	1.7	0	0.81	1	33.1	1	61.6	1			4.1	0								
SOIL44-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	8.2	0	9.6	1	768	1	0.47	1	0.50	1	29.1	1	17.0	1	62.5	1	16.3	1	0.03	1			34.5	1	0.88	1	0.34	1	0.82	1	37.3	1	62.9	1			3.4	0								
SOIL45-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	8.1	0	57.3	1	170	1	0.36	1	0.55	1	78.6	1	16.2	1	64.7	1	24.1	1	0.49	1			56.7	1	4.7	0	1.3	0	0.62	1	35.2	1	73.6	1			3.4	0								
SOIL45-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	19.8	1	138	1	0.30	1	0.36	1	66	1	14.8	1	56.3	1	11.3	1	0.066	1			46.0	1	0.85	1	1.1	0	0.58	1	31	1	57.1	1			2.8	0								
SOIL45-3 (dup)	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.4	0	19.3	1	135	1	0.31	1	0.35	1	58.3	1	15.6	1	53.1	1	11.1	1	0.074	1			46.5	1	0.63	1	1.1	0	0.5	1	29.1	1	55.8	1			2.7	0								
SOIL45-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.4	0	10.5	1	98.6	1	0.22	1	0.22	1	42	1	8.2	1	45.5	1	10.7	1	0.049	1			26.7	1	0.74	1	1.1	0	0.56	1	22.7	1	41.1	1			2.7	0								
SOIL46-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10	1	127	1	0.25	1	0.34	1	14.7	1	9.5	1	34.9	1	21.4	1	0.15	1			15.3	1	0.83	1	1.1	0	0.26	1	19.8	1	52.8	1			2.7	0								
SOIL46-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	113	1	0.34	1	0.36	1	23.7	1	10.2	1	41.8	1	14.6	1	0.22	1			21.2	1	0.76	1	1.1	0	0.39	1	26.8	1	47.9	1			2.7	0								
SOIL46-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	6.7	0	10.1	1	121	1	0.35	1	0.45	1	27.9	1	18.1	1	54.3	1	7.7	1	0.11	1			31.5	1	0.65	1	1.1	0	0.70	1	30.5	1	56.3	1			2.8	0								
SOIL47-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	20.7	1	108	1	0.20	1	0.36	1	66.4	1	28.8	1	67.7	1	13.2	1	0.10	1			59.7	1	0.99	1	1.1	0	0.28	1	32.9	1	75.5	1			2.7	0								
SOIL47-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	31.7	1	98.7	1	0.21	1	0.36	1	61.8	1	17.8	1	63.5	1	13.7	1	0.25	1			62.5	1	3.9	0	1.1	0	0.48	1	29.0	1	73.1	1			2.8	0								

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SOIL47-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	6.8	0	29.5	1	90.5	1	0.20	1	0.28	1	10	1	16.9	1	63.6	1	11.6	1	0.25	1			70.7	1	0.97	1	1.1	0	0.84	1	30.0	1	73.0	1			2.8	0								
HA-1-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			8.2	1																																											
HA-2-0.5	02/09/09	Arcadis 2009	--	SURF	MAR*	S	0.5			59	1																																											
HA-3-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			19	1																																											
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			19	1																																											
HA-4-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			11	1																																											
HA-5-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			13	1																																											
HA-6-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			11	1																																											
HA-7-0.5	02/09/09	Arcadis 2009	--	SURF	MAR*	S	0.5			46	1																																											
HA-8-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			28	1																																											
HA-9-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			11	1																																											
HA-10-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			6.7	1																																											
HA-11-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			7.5	1																																											
HA-11-0.5 (dup)	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			7	1																																											
HA-12-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			7.7	1																																											
HA-13-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			10	1																																											
HA-14-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			15	1																																											
HA-15-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			6.2	1																																											
HA-16-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			6.7	1																																											
HA-17-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			11	1																																											
HA-18-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			7.7	1																																											
HA-19-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			8.8	1																																											
HA-20-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			9.3	1																																											
HA-21-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			11	1																																											
HA-22-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			15	1																																											
HA-23-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			6.1	1																																											
HA-24-0.5	02/09/09	Arcadis 2009	--	SURF	MAR	S	0.5			8.7	1																																											
HA-25-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	S	0.5	0.99	1	98	1	55	1	0.16	1	0.39	1	5.4	1	4.0	1	23	1	40	1	7.5	1	0.25	0	15	1	0.5	0	0.40	1	0.5	0	8.4	1	39	1										
HA-25-2.0	02/09/09	Arcadis 2009	TAIL	SUB	MAR	S	2.0			3.6	1																																											
HA-26-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	0.50	0	110	1	72	1	0.29	1	0.54	1	7.1	1	8.5	1	36	1	21	1	1.4	1	0.27	1	14	1	0.5	0	0.25	0	0.5	0	30	1	53	1										
HA-26-0.5 (dup)	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	0.50	0	93	1	52	1	0.25	1	0.44	1	5.8	1	6.5	1	30	1	17	1	1.1	1	0.25	0	12	1	0.5	0	0.25	0	0.5	0	22	1	44	1										
HA-26-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			230	1																																										
HA-27-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	9.9	1	85	1	0.5	1	0.37	1	17	1	7.7	1	51	1	9.5	1	0.13	1	0.25	0	9.6	1	0.5	0	0.25	0	0.5	0	55	1	30	1										
HA-27-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			200	1																																									
HA-28-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	27	1	83	1	0.23	1	0.25	0	19	1	6.0	1	24	1	9.4	1	0.20	1	0.82	1	14	1	0.5	0	0.25	0	0.5	0	28	1	42	1										
HA-28-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			110	1																																									
HA-29-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	13	1	94	1	0.35	1	0.46	1	15	1	13	1	32	1	9.9	1	0.099	1	0.54	1	13	1	0.5	0	0.25	0	0.5	0	48	1	53	1										
HA-29-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			85	1																																									
HA-30-0.5	02/10/09	Arcadis 2009	BELL	SURF	MAR	S	0.5			11	1																																										
HA-31-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			160	1																																										
HA-32-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			150	1																																										
HA-33-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			54	1																																										
HA-34-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			210	1																																										
HA-35-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			15	1																																										
HA-36-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			77	1																																										
HA-37-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			29	1																																										
HA-37-0.5 (dup)	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			27	1																																										
HA-38-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			18	1																																										
HA-39-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			360	1																																										
HA-40-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			37	1																																										
HA-41-0.5	02/10/09	Arcadis 2009	BELL	SURF	MEL	S	0.5			550	1																																										
HA-42-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			350	1																																										
HA-42-0.5 (dup)	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			330	1																																										
HA-43-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			18	1																																										
HA-44-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			140	1																																										
HA-45-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			220	1																																										
HA-46-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			87	1																																										
HA-47-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			81	1																																										
HA-48-0.5	02/10/09	Arcadis 2009	--	SURF	MEL*	S	0.5			27	1																																										
HA-49-0.5	02/10/09	Arcadis 2009	--	SURF	MEL*	S	0.5			120	1																																										
HA-50-0.5	02/10/09	Arcadis 2009	--	SURF	MEL*	S	0.5			70	1																																										
HA-51-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			130	1																																										

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
HA-52-0.5	02/10/09	Arcadis 2009	--	SURF	MEL	S	0.5			26	1																																											
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			33	1																																										
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			34	1																																										
HA-54-0.5	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			49	1																																										
HA-55-0.5	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			43	1																																										
HA-56-0.5	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			27	1																																										
HA-57-0.5	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			67	1																																										
HA-58-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			110	1																																										
HA-58-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			41	1																																										
HA-59-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			290	1																																										
HA-59-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			270	1																																										
HA-60-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			58	1																																										
HA-60-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			7.5	1																																										
HA-61-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			180	1																																										
HA-61-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			34	1																																										
HA-61-2.0 (dup)	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			31	1																																										
HA-62-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			410	1																																										
HA-62-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL*	S	2.0			260	1																																										
HA-63-0.5	02/10/09	Arcadis 2009	--	SURF	MEL*	S	0.5			63	1																																										
HA-64-0.5	02/10/09	Arcadis 2009	LKBD	SURF	MEL*	S	0.5			23	1																																										
HA-65-0.5	02/10/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			94	1																																										
HA-66-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			35	1																																										
HA-67-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			50	1																																										
HA-68-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			92	1																																										
HA-69-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			20	1																																										
HA-69-0.5 (dup)	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			23	1																																										
HA-70-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			41	1																																										
HA-71-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			47	1																																										
HA-72-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			130	1																																										
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			17	1																																										
HA-74-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			230	1																																										
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.7	1																																										
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.5	1																																										
HA-77-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.8	1																																										
HA-77-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.3	1																																										
HA-78-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.3	1																																										
HA-79-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.6	1																																										
HA-80-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.6	1																																										
HA-81-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			240	1																																										
HA-81-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			320	1																																										
HA-82-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			130	1																																										
HA-82-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			280	1																																										
HA-83-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			39	1																																										
HA-84-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			43	1																																										
HA-85-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			160	1																																										
HA-85-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			100	1																																										
HA-86-0.5	02/13/09	Arcadis 2009	--	SURF	MEL*	S	0.5			39	1																																										
HA-86-0.5 (dup)	02/13/09	Arcadis 2009	--	SURF	MEL*	S	0.5			50	1																																										
HA-87-0.5	02/13/09	Arcadis 2009	--	SURF	MEL*	S	0.5			77	1																																										
HA-88-0.5	02/13/09	Arcadis 2009	--	SURF	MEL*	S	0.5			23	1																																										
HA-89-0.5	02/13/09	Arcadis 2009	--	SURF	MEL*	S	0.5			120	1																																										
HA-90-0.5	02/13/09	Arcadis 2009	--	SURF	CAL*	S	0.5			68	1																																										
HA-91-0.5	02/13/09	Arcadis 2009	--	SURF	MEL*	S	0.5			33	1																																										
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.8	1																																										
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																										
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			5.1	1																																										
HA-95-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.2	1																																										
HA-96-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			10	1																																										
HA-96-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.5	1																																										
21S003	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			230	1									26	1																	57	1	2.9	1												
21S006	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			24	1									58	1																	28	1	0.22	1												
21S007	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			21	1									83	1																	13	1	0.1	0												

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
21S008	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			65	1							36	1					9.8	1	0.1	0																												
22S002	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			51	1							43	1					30	1	1.4	1																												
22S004	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			140	1							48	1					52	1	3.3	1																												
22S006	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			240	1							70	1					68	1	4.4	1																												
22T001	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			20	1							21	1					19	1	0.2	1																												
TP-49-0.0	05/22/23	Geocon 2023	BELL	SURF	MEL	MS	0.0-0.5			950	1																																											
TP-49-1.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	1.5-2.0	12	1	620	1	22	1	1.2	1	5.8	1	180	1	140	1	130	1	18	1	0.14	1	1	0	790	1	2.5	0	1	0	4	0	31	1	53	1									37	1
TP-49R-1.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	1.5-2.0	17	1	760	1	27	1	1.5	1	6.2	1	210	1	100	1	140	1	20	1	0.1	0	1	0	910	1	2.5	0	1	0	4	0	34	1	56	1									50	1
TP-49-3.0	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	3.0-3.5			480	1																																										
TP-49-4.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	4.5-5.0			510	1																																										
TP-50-0.0	05/22/23	Geocon 2023	BELL	SURF	MEL	MS	0.0-0.5			58	1																																										
TP-50-0.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	0.5-1.0	2.5	0	5.4	1	54	1	1.2	1	1.4	1	10	1	9.0	1	74	1	3.6	1	0.1	0	1	0	32	1	2.5	0	1	0	4	0	29	1	44	1									29	1
TP-50-1.0	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	1.0-1.5			2	0																																										
TP-50-1.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	1.5-2.0			2	0																																										
TP-51-0.0	05/22/23	Geocon 2023	BELL	SURF	MEL	MS	0.0-0.5			280	1																																										
TP-51-1.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	1.5-2.0	2.5	0	59	1	60	1	2.1	1	3.1	1	19	1	19	1	72	1	2.5	0	0.1	0	1	0	60	1	2.5	0	1	0	4	0	91	1	61	1									7.8	1
TP-51-3.0	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	3.0-3.5			42	1																																										
TP-51-4.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	4.5-5.0			14	1																																										
TP-51R-4.5	05/22/23	Geocon 2023	BELL	SUB	MEL	MR	4.5-5.0			8.3	1																																										
TP-52-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			190	1																																										
TP-52-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	120	1	47	1	1	0	1	1	3.6	1	4.9	1	22	1	23	1	2.1	1	1.0	1	13	1	2.5	0	1	0	4	0	6.6	1	46	1									950	1
TP-53-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			69	1																																										
TP-53-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	180	1	78	1	1	0	1.2	1	9.7	1	6.2	1	23	1	51	1	6.6	1	1.6	1	19	1	2.5	0	1	0	4	0	15	1	60	1									4600	1
TP-54-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			250	1																																										
TP-54-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	220	1	65	1	1	0	1.3	1	7.0	1	6.9	1	33	1	52	1	3.3	1	1.3	1	20	1	2.5	0	1	0	4	0	12	1	71	1									890	1
TP-55-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			7.7	1																																										
TP-55-1.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.0-1.5			4.9	1																																										
TP-56-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			14	1																																										
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	7	1	140	1	1	0	2	1	88	1	28	1	83	1	8.9	1	0.1	0	1	0	53	1	2.5	0	1	0	4	0	20	1	130	1									15	1
TP-56-2.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	2.0-2.5			2.2	1																																										
TP-57-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			37	1																																										
TP-57R-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	MS	0.0-0.5			41	1																																										
TP-57-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	MS	1.5-2.0	2.5	0	52	1	160	1	1.3	1	2.2	1	53	1	16	1	57	1	26	1	1.4	1	2.1	1	60	1	2.5	0	1	0	4	0	35	1	77	1									130	1
TP-57-3.0	05/23/23	Geocon 2023	BKG	SUB	CAL	MR	3.0-3.5			67	1																																										
TP-57-4.5	05/23/23	Geocon 2023	BKG	SUB	CAL	MR	4.5-5.0			58	1																																										
TP-58-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	MS	0.0-0.5			67	1																																										
TP-58-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	MR	1.5-2.0			32	1																																										
TP-58-3.0	05/23/23	Geocon 2023	BKG	SUB	CAL	MR	3.0-3.5			79	1																																										
TP-58-4.5	05/23/23	Geocon 2023	BKG	SUB	CAL	MR	4.5-5.0			26	1																																										
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			6	1																																										
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	1	0	110	1	1	0	1.5	1	14	1	3.8	1	62	1	9.6	1	0.1	0	3.7	1	19	1	2.5	0	1	0	4	0	19	1	57	1									41	1
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																										
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																										
TP-60-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			3.5	1																																										
TP-60-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																										
TP-60R-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																										
TP-60-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																										
TP-60-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																										
TP-61-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.9	1																																										
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1.2	1	140	1	12	1	2.9	1	11	1	15	1	71	1	5.1	1	0.1	0	1	0	9.4	1	2.5	0	1	0	4	0	99	1	54	1									51	1
TP-61-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																										
TP-61-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																										
TP-62-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			2.9	1																																										
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1	0	170	1	12	1	2.9	1	24	1	18	1	74	1	4.0	1	0.1	0	1	0	15	1	2.5	0	1	0	4	0	130	1	56	1									53	1
TP-62-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																										
TP-62-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																										
TP-63-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.2	1																																										
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	2.5	0	1	0	160	1	12	1	2.9	1	22	1	19	1	75	1	3.2	1	0.1	0	1	0	13	1	2.5	0	1	0	4	0	130	1	52	1									40	1
TP-63-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2	0																																										
TP-63R-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2.2	1																																										
TP-63-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2.3	1																																										
TP-64-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	2.5	0	110	1	63	1	1	0	2.3	1	67	1	12	1	49	1	18	1	0.44	1	1	0	75	1	2.5	0	1	0	4	0	20	1	71	1									340	1
TP-64R-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	2.5	0	96	1	52	1	1	0	1.7	1	59	1	10	1	44	1	22	1	0.46	1	1	0	65	1	2.5	0	1.0	1	4	0	17	1	77	1									370	1
TP-64-3.0	05/22/23	Geocon 2023	PROC	SUB	MEL	MR	3.0-3.5			100	1																																										
TP-65-SURFACE	05/22/23	Geocon 2023	PROC	SURF	N/A	ASPH	0.0-0.5	2.5	0	18	1	11	1	1	0	1	0	12	1	1.0	1	7.2	1	7.2	1	0.2	1	1	0	9.1	1	2.5	0	1	0	4	0	3.3	1	15	1									930	1
TP-65-0.0	05/22/23	Geocon 2023	PROC	SURF	KEN	S-FILL	0.0-0.5			260	1																																										
TP-65-3.0	05/22/23	Geocon 2023	PROC	SUB	MEL*	MS	3.0-3.5	20	1	1300	1	71	1	5	0	6.6	1	450	1	110	1	170	1	360	1	0.13	1	120	1	1000	1	2.5	0	1	0	4	0	53	1	120	1									290	1
TP-66-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL*	S-FILL	0.0-0.5	5.8	1	450	1	100	1	1.4	1	2.7	1	150	1	24	1	60	1	42	1	0.24	1	2.3	1	180	1	2.5	0	2.1	1	4	0	39	1	100	1									1200	1
TP-66-3.0	05/22/23	Geocon 2023	PROC	SUB	MEL*	MR	3.0-3.5			100	1																																										
TP-67-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0			130	1																																										
TP-67-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	2.5	0	88	1	130	1	1.2	1	2.4	1	80	1	20	1	65	1	5.5	1	0.1	0	3.9	1	67	1	2.5	0	1	0	4	0	41	1	73	1									40	1
TP-68-0.0	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.0-0.5	2.5	0	81	1	30	1	1	0	1.2	1	4.5	1	2.5	1	22	1	14	1	0.99	1	1	0	12	1	2.5	0	1	0	4	0	7.8	1	43	1									180	1

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-68-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	2.5	0	68	1	33	1	1	0	1.0	1	8.6	1	3.8	1	26	1	12	1	0.89	1	1	0	12	1	2.5	0	1	0	4	0	7.7	1	31	1											78	1
TP-68R-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0			70	1																																											
TP-69-1.5	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	1.5-2.0			120	1																																										
TP-69-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	2.5	0	110	1	94	1	1	0	1.4	1	14	1	7.0	1	27	1	43	1	5.4	1	1.5	1	30	1	2.5	0	1	0	4	0	19	1	68	1											76	1

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
21S003	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			230	1							26	1					57	1	2.9	1																												
21S006	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			24	1							58	1					28	1	0.22	1																												
21S007	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			21	1							83	1					13	1	0.1	0																												
21S008	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			65	1							36	1					9.8	1	0.1	0																												
22S002	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			51	1							43	1					30	1	1.4	1																												
22S004	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			140	1							48	1					52	1	3.3	1																												
22S006	Nov-09	DTSC 2011	--	SURF	CAL*	S	Surfac			240	1							70	1					68	1	4.4	1																												
22T001	Nov-09	DTSC 2011	--	SURF	CAL	S	Surfac			20	1							21	1					19	1	0.2	1																												
SOIL40-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	6.2	0	81.2	1	126	1	0.44	1	0.38	1	29.4	1	12.9	1	64.4	1	42.1	1	2.8	1			22.8	1	1.3	1	0.35	1	0.82	1	41.1	1	57.7	1			2.6	0								
SOIL40-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	4.3	1	228	1	0.38	1	0.47	1	7.5	1	22.3	1	59.1	1	2.7	1	0.042	1			11.6	1	0.59	1	1.1	0	1.2	1	127	1	73.3	1			2.7	0								
SOIL40-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.7	0	5.1	1	200	1	0.45	1	0.50	1	10	1	28.5	1	86.9	1	3.2	1	0.055	1			11.5	1	1.1	1	1.1	0	0.95	1	119	1	82.4	1			2.8	0								
SOIL41-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	6.6	0	76.1	1	113	1	0.38	1	0.38	1	48	1	16.6	1	59.8	1	31.7	1	1.8	1			46	1	0.87	1	0.23	1	0.76	1	53.1	1	62.6	1			2.8	0								
SOIL41-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.8	0	18	1	132	1	0.44	1	0.33	1	82.1	1	20.2	1	68.0	1	6.7	1	0.02	0			65.2	1	0.65	1	1.1	0	0.91	1	74	1	50.8	1			2.8	0								
SOIL41-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.9	0	20.8	1	131	1	0.4	1	0.50	1	42.5	1	28.1	1	121	1	9.8	1	0.46	1			38.3	1	0.98	1	1.2	0	1.2	1	110	1	70.1	1			2.9	0								
SOIL42-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	6.2	0	80.4	1	115	1	0.35	1	0.46	1	71.3	1	12	1	66.7	1	27.8	1	1.10	1			63.6	1	1.7	1	0.1	1	0.75	1	30.2	1	67.2	1			2.6	0								
SOIL42-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.4	0	59.2	1	104	1	0.4	1	0.38	1	74.9	1	10.2	1	69.6	1	12.0	1	0.42	1			55.4	1	0.77	1	1.1	0	0.92	1	33.2	1	58.2	1			2.7	0								
SOIL42-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.4	0	41.5	1	83.5	1	0.32	1	0.29	1	45.7	1	5.6	1	68.4	1	11.6	1	0.33	1			32.4	1	2.2	1	1.1	0	0.88	1	24.8	1	39.6	1			2.7	0								
SOIL43-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	1.1	1	55.4	1	141	1	0.4	1	0.53	1	181	1	19.4	1	81.7	1	20.4	1	0.74	1			133	1	1.2	1	0.05	1	0.97	1	41.2	1	92.2	1			2.6	0								
SOIL43-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	10.2	1	73.6	1	0.19	1	0.21	1	39.2	1	3.50	1	50.8	1	8.5	1	0.071	1			33.9	1	1.1	1	1.1	0	0.86	1	15.0	1	34.4	1			2.7	0								
SOIL43-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.7	0	12.2	1	66.0	1	0.23	1	0.39	1	46.5	1	4.70	1	92.0	1	15.0	1	0.086	1			40.2	1	1.7	1	1.1	0	0.97	1	23.2	1	44.5	1			2.8	0								
SOIL45-1	05/15/08	USEPA 2008	--	SURF	CAL*	S	0.0-0.5	8.1	0	57.3	1	170	1	0.36	1	0.55	1	78.6	1	16.2	1	64.7	1	24.1	1	0.49	1			56.7	1	4.7	0	1.3	0	0.62	1	35.2	1	73.6	1			3.4	0								
SOIL45-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	19.8	1	138	1	0.30	1	0.36	1	66	1	14.8	1	56.3	1	11.3	1	0.066	1			46.0	1	0.85	1	1.1	0	0.58	1	31	1	57.1	1			2.8	0								
SOIL45-3 (dup)	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.4	0	19.3	1	135	1	0.31	1	0.35	1	58.3	1	15.6	1	53.1	1	11.1	1	0.074	1			46.5	1	0.63	1	1.1	0	0.5	1	29.1	1	55.8	1			2.7	0								
SOIL45-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.4	0	10.5	1	98.6	1	0.22	1	0.22	1	42	1	8.2	1	45.5	1	10.7	1	0.049	1			26.7	1	0.74	1	1.1	0	0.56	1	22.7	1	41.1	1			2.7	0								
SOIL47-3	05/15/08	USEPA 2008	--	SUB	CAL	S	2.5-3.0	6.6	0	31.7	1	98.7	1	0.21	1	0.36	1	61.8	1	17.8	1	63.5	1	13.7	1	0.25	1			62.5	1	3.9	0	1.1	0	0.48	1	29.0	1	73.1	1			2.8	0								
SOIL47-5	05/15/08	USEPA 2008	--	SUB	CAL	S	4.5-6.0	6.8	0	29.5	1	90.5	1	0.20	1	0.28	1	10	1	16.9	1	63.6	1	11.6	1	0.25	1			70.7	1	0.97	1	1.1	0	0.84	1	30.0	1	73.0	1			2.8	0								
TP-57-0.0	05/23/23	Geocon 2023	--	SURF	CAL*	MS	0.0-0.5			37	1																																											
TP-57-1.5	05/23/23	Geocon 2023	--	SUB	CAL*	MS	1.5-2.0	2.5	0	52	1	160	1	1.3	1	2.2	1	53	1	16	1	57	1	26	1	1.4	1	2.1	1	60	1	2.5	0	1	0	4	0	35	1	77	1									130	1
TP-57-3.0	05/23/23	Geocon 2023	--	SUB	CAL	MR	3.0-3.5			67	1																																										
TP-57-4.5	05/23/23	Geocon 2023	--	SUB	CAL	MR	4.5-5.0			58	1																																										
TP-57R-0.0	05/23/23	Geocon 2023	--	SURF	CAL*	MS	0.0-0.5			41	1																																										
TP-22-0.0	01/11/93	D&M 1995	BELL	SURF	MEL	WR	0.0	10	0	9	1	72.5	1	0.25	0	2.5	0	12	1	16.0	1	34.1	1	17.0	1	0.320	1	10	0	24.0	1	1	0	2.5	0			24.0	1	60.7	1			5.0	0			50	0				
TP-22-2.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	9.9	0	7	1	126	1	0.25	0	2.5	0	26.3	1	18.0	1	22.0	1	12.0	1	0.018	1	9.9	0	24.0	1	1	0	2.5	0			40.6	1	47.6	1			5.0	0			50	0				
TP-22-3.0	10/23/92	D&M 1995	BELL	SUB	MEL	S	3.0	9.8	0	12	1	110	1	0.46	1	2.4	0	30.0	1	9.6	1	21.0	1	13.0	1	0.2	0	9.8	0	27.0	1	0.3	0	2.5	0			34.1	1	44.5	1					5.0	0			50	0
TP-22R-2.5 (dup)	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	9.8	0	5	1	131	1	0.25	0	2.5	0	29.6	1	13.0	1	19.0	1	11.0	1	0.020	1	9.8	0	23.0	1	1	0	2.5	0			32.8	1	40.9	1			5.0	0			50	0				
TP-23-0.5	10/26/92	D&M 1995	BELL	SURF	MEL	WR	0.5	9.8	0	51	1	111	1	0.56	1	2.7	1	193	1	25.0	1	105	1	9.1	1	0.2	0	9.8	0	174	1	0.3	0	2.5	0			49.0	1	52.2	1					5.0	0			50	0
TP-24C-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,C	1.5	9.8	0	139	1	67.0	1	0.82	1	5.0	1	69.0	1	39.0	1	120	1	11.0	1	0.24	1	9.8	0	86.0	1	0.3	0	2.5	0			74.0	1	90.0	1			5.0	0								
TP-24F-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,F	1.5	9.9	0	115	1	84.0	1	0.86	1	4.1	1	66.0	1	43.0	1	140	1	21.0	1	0.27	1	9.9	0	100	1	0.3	0	2.5	0			81.0	1	98.0	1			5.0	0								
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	9.9	0	3	1	27.1	1	0.36	1	2.5	0	43.7	1	5	0	112	1	7.5	0	0.2	0	9.9	0	12.0	1	0.40	1	2.5	0			21.0	1	14.0	1					5.0	0			50	0
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	65.9	1	0.25	0	2.5	0	23.0	1	5	0	36.6	1	7.5	0	0.029	1	9.9	0	15.0	1	1	0	2.5	0			17.0	1	28.0	1			5.0	0								
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	75.2	1	0.25	0	2.5	0	28.2	1	5	0	36.3	1	7.5	0	0.044	1	9.9	0	18.0	1	1	0	2.5	0			17.0	1	32.0	1			5.0	0								
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	1	0	244	1	0.28	1	2.5	0	22.0	1	9.3	1	48.6	1	15.0	1	0.2	0	9.8	0	27	1	0.3	0	2.5	0			25.2	1	58.5	1					5.0	0						
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	5	1	156	1	0.27	1	2.5	0	44.9	1	9.3	1	54.8	1	19.0	1	0.2	0	9.8	0	33	1	0.30	1	2.5	0			25.5	1	69.8	1					5.0	0						
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	7	1	154	1	0.62	1	2.5	0	45.3	1	11.0	1	69.5	1	8.9	1	0.2	0	9.9	0	36	1	0.3	0	2.5	0			30.4	1	71.8	1					5.0	0						
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	6	1	265	1	0.25	0	2.5	0	25.5	1	9.8	1	56.3	1	21.0	1	0.2	0	10	0	31	1	0.30	1	2.5	0			20.0	1	85.7	1					5.0	0						
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	3	1	227	1	0.36	1	2.5	0	25.7	1	12.0	1	35.4	1	25.0	1	0.2	0	10	0	23	1	0.3	0	2.5	0			25.6	1	56.8	1					5.0	0			50	0
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	10	0	5	1	155	1	0.5	1	2.5	0	32.3	1	13.0	1	58.5	1	12.0	1	0.2	0	9.8	0	29	1	0.3	0	2.5	0			36.3	1	61.1	1					5.0	0			50	0
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	9.9	0	1	0	135	1	0.31	1	2.5	0	24.0	1	8.4	1	58.3	1	7.7	1	0.2	0	9.9	0	50.9	1	0.30	1	2.5	0			18	1	129	1					5.0	0						
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	7	1	154	1	0.25	0	2.5	0	17.0	1	5.8	1	48.0	1	22.0	1	0.2	1	9.9	0	21	1	0.3	0	2.5	0			17	1	61.6	1					5.0	0						
BKRD-06C-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,C	0.0	9.9	0	7.5	1	151	1	0.25	0	2.5	0	19.0	1	6.6	1	61.3	1	25.0	1	0.2	0	9.9	0	25	1	0.4	1	2.5	0			21	1	71.4	1					5.0	0						
BKRD-06F-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,F	0.0	10	0	6.8	1	204	1	0.26	1	2.5	0	18.0	1	5.7	1	177	1	26.0	1	0.2	0	10	0	24	1	0.3	0	2.5	0			18	1	86.9	1					5.0	0						
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	7	1	195	1	0.39	1	2.5	0	22.0	1	11.0	1	58.1	1	11.0	1	0.2	0	9.9	0	25	1	0.50	1	2.5	0			25	1	51.1	1					5.0	0						
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	12	1	219	1	0.52	1	2.5	0	37.4	1	4.9	0	77.3	1	12.0	1	0.2	0	9.9	0	42	1	0.50	1	2.5	0			31	1	68.9	1					5.0	0						
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	9.8	0	5	1	152	1	0.40	1	2.5	0	23.0	1	7.4	1	73.6	1	10.0	1	0.035	1	9.8	0	37	1	1	0	2.5	0			27	1	68.0	1			5.0	0								
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	4	1	277	1	0.29	1	2.5	0	24.0	1	10.0	1	63.1	1	12.0	1	0.2	0	9.9	0	24	1	0.50	1	2.5	0			24.9	1	69.1	1					5.0	0						
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.8	0	3	1	123	1	0.27	1	2.5	0	24.0	1	7.0	1	116	1	10.0	1	0.03	1	9.8	0	31	1	1	0	2.5	0			28.4	1	81.5	1			5.0	0								
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	3	1	143	1	0.31	1	2.5	0	22.0	1	4.9	0	118	1	11.0	1	0.026	1	9.9	0	23	1	1	0	2.5	0			29.4	1	61.6	1			5.0	0								
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	12	1	189	1	0.38	1	2.5	0	37.2	1	15.0	1	52.3	1	19.0	1	0.2	0	9.9	0	39	1	0.30	1	2.5	0			32.6	1	67.9	1					5.0	0						
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	13	1	197	1	0.5	1	2.5	0	55.0	1	16.0	1	54.7	1	15.0	1	0.2	0	9.9	0	61.6	1	0.30	1	2.5	0			39.3	1	82.7	1					5.0	0						
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	5	1	186	1	0.46	1	2.5	0	26.7	1	13.0	1	65.9	1	18.0	1	0.2	0	9.9	0	34	1	0.70	1	2.5	0			30.4	1	87.4	1					5.0	0						
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.8	0	2	1	107	1	0.29	1	2.5	1	22.0	1	6.9	1	55.4	1	15.0	1	0.033	1	9.8	0	31	1	1	0	2.5	0			20.0	1	71.6	1			5.0	0	5.0	0						
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	10	0	2	1	134	1	0.37	1	2.5	0	22.0	1	9.9	1	62.2	1	18.0	1	0.2	0	10	0	22	1	0.30	1	2.5	0			23.0	1	68.9	1					5.0	0						

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.9	0	2	1	105	1	0.25	0	2.5	0	21.0	1	6.8	1	58.6	1	11.0	1	0.032	1	9.9	0	29	1	1	0	2.5	0			20.0	1	72.9	1			5.0	0								
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	6	1	225	1	0.55	1	2.5	0	34.7	1	11.0	1	64	1	15.0	1	0.2	0	9.9	0	33	1	0.50	1	2.5	0			34.4	1	69.6	1					5.0	0						
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.8	0	2	1	278	1	0.25	0	2.5	0	16	1	101.0	1	178	1	23.0	1	0.065	1	9.8	0	111	1	1	0	2.5	0			14.0	1	86.3	1			5.0	0			50	0				
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.9	0	1	0	190	1	0.25	0	2.5	0	16	1	49.0	1	172	1	17.0	1	0.039	1	9.9	0	74.2	1	1	0	2.5	0			13.0	1	87.3	1			5.0	0			50	0				
HA-1-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.2	1																																											
HA-10-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.7	1																																												
HA-11-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.5	1																																												
HA-11-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7	1																																												
HA-12-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.7	1																																												
HA-13-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			10	1																																												
HA-14-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			15	1																																												
HA-15-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.2	1																																												
HA-16-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.7	1																																												
HA-17-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-18-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.7	1																																												
HA-19-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.8	1																																												
HA-20-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			9.3	1																																												
HA-21-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-22-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			15	1																																												
HA-23-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.1	1																																												
HA-24-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.7	1																																												
HA-3-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			19	1																																												
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			19	1																																												
HA-30-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-43-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			18	1																																												
HA-48-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			27	1																																												
HA-5-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			13	1																																												
HA-52-0.5	02/10/09	Arcadis 2009	BKG	SURF	MEL	S	0.5			26	1																																												
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			33	1																																												
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			34	1																																												
HA-6-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-64-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																												
HA-66-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			35	1																																												
HA-69-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			20	1																																												
HA-69-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																												
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			17	1																																												
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.7	1																																												
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.5	1																																												
HA-77-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.8	1																																												
HA-77-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.3	1																																												
HA-78-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.3	1																																												
HA-79-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.6	1																																												
HA-80-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.6	1																																												
HA-9-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.8	1																																												
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																												
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			5.1	1																																												
HA-95-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.2	1																																												
HA-96-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			10	1																																												
HA-96-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.5	1																																												
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	12.4	1	171	1	0.35	1	0.5	1	60.3	1	12.4	1	72.2	1	20.7	1	0.17	1			48.6	1	1.0	1	0.75	1	1.6	1	30.6	1	73.0	1			2.6	0								
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.7	1	94.4	1	0.16	1	0.19	1	35.9	1	5.9	1	58.9	1	16.4	1	0.04	0			20.8	1	0.66	1	0.45	1	1.2	1	19.1	1	58.1	1			2.7	0								
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	9.9	1	191	1	0.39	1	0.40	1	61.0	1	12.4	1	55.4	1	10.8	1	0.05	0			43.9	1	1.3	1	0.70	1	1.5	1	30.7	1	57.8	1			2.6	0								
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	10.4	1	173	1	0.42	1	0.32	1	70.1	1	14.7	1	66.1	1	10.5	1	0.02	0			47.1	1	1.2	1	0.70	1	1.9	1	36.8	1	64.2	1			2.7	0								
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	11.8	1	209	1	0.44	1	0.51	1	73.0	1	16.8	1	61.9	1	14.4	1	0.06	0			54.9	1	1.2	1	0.99	1	1.6	1	42.7	1	86.4	1			2.7	0								
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.7	0	14.8	1	177	1	0.44	1	0.56	1	99.7	1	20.1	1	72.9	1	10.9	1	0.11	0			64.6	1	1.4	1	1.1	1	1.8	1	52.5	1	90.1	1			2.8	0								
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	12	1	154	1	0.31	1	0.34	1	19.6	1	12.3	1	44.6	1	14.1	1	0.09	0			22.6	1	0.74	1	0.64	1	1.1	1	20.1	1	55.0	1			3.1	0								
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.4	0	11.5	1	177	1	0.46	1	0.38	1	26.5	1	9.8	1	60.9	1	9.9	1	0.1	0			25.2	1	0.96	1	0.79	1	1.6	1	24.3	1	56.6	1			3.1	0								
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10.1	1	211	1	0.33	1	0.48	1	31.9	1	15.5	1	54.4	1	17.7	1	0.03	0			38.7	1	1.4	1	0.42	1	1.5	1	23.7	1	74.6	1			2.6	0								
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.1	1	172	1	0.42	1	0.45	1	66.7	1	12.4	1	84.0	1	12.3	1	0.04	0			59.7	1	1.6	1	0.63	1	1.7	1	32.8	1	70.9	1			2.7	0								
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	6.6	1	222	1	0.31	1	0.62	1	30.6	1	20.8	1	82.4	1	16.1	1	0.06	0			50.1	1	1.6	1	0.77	1	1.7	1	22.9	1	83.3	1			2.6	0								
SOIL06-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	8.5	1	240	1	0.31	1	0.63	1	28.4	1	18.1	1	73.0	1	38.0	1	0.09	0			44.4	1	1.4	1	0.66	1	1.5	1	22.8	1	85.1	1			2.7	0								

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	18.7	1	203	1	0.42	1	0.41	1	34.0	1	14.4	1	64.6	1	22.4	1	0.09	0			33.3	1	1.2	1	0.58	1	1.6	1	25.0	1	66.9	1			2.7	0								
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	12.2	1	182	1	0.38	1	0.29	1	26.0	1	12.9	1	52.2	1	15.7	1	0.05	0			27.0	1	1.0	1	0.46	1	1.3	1	22.5	1	52.1	1			2.7	0								
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.8	0	9.1	1	128	1	0.25	1	0.30	1	22.7	1	5.0	1	63.4	1	18.7	1	0.09	0			21.2	1	1.4	1	0.36	1	1.2	1	18.7	1	61.7	1			2.9	0								
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.3	1	91.3	1	0.24	1	0.39	1	21.4	1	7.3	1	100.0	1	8.2	1	0.03	0			61.7	1	1.5	1	0.69	1	1.7	1	15.5	1	175	1			2.7	0								
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.1	0	10.5	1	196	1	0.32	1	0.45	1	34.8	1	14.6	1	53.6	1	17.3	1	0.06	0			37.3	1	1.5	1	0.60	1	1.5	1	23.6	1	72.7	1			2.6	0								
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	7.7	1	162	1	0.3	1	0.33	1	29.9	1	12.1	1	52.2	1	12.0	1	0.04	0			33.2	1	1.2	1	0.53	1	1.5	1	22.1	1	59.4	1			2.6	0								
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.4	1	208	1	0.35	1	0.32	1	28.3	1	10.1	1	55.2	1	19.0	1	0.07	0			27.3	1	1.3	1	0.64	1	1.4	1	22.4	1	57.5	1			2.7	0								
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.9	1	181	1	0.41	1	0.29	1	30.0	1	14.6	1	75.5	1	16.5	1	0.02	0			31.1	1	1.2	1	0.74	1	1.8	1	26.5	1	26.5	1			2.7	0								
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.7	0	9.8	1	259	1	0.34	1	0.34	0	25.9	1	10.4	1	61.6	1	23.5	1	0.086	1			34.7	1	1.3	1	0.8	1	0.96	1	23.5	1	23.5	1			2.8	0								
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6	0	6.2	1	204	1	0.32	1	0.15	0	20.9	1	8.8	1	58.3	1	10.3	1	0.019	1			28.8	1	1.2	1	0.76	1	1.1	1	20.9	1	20.9	1			2.5	0								
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	14.6	1	205	1	0.28	1	0.23	0	28.5	1	11	1	77.9	1	20.0	1	0.09	0			32.5	1	1.1	1	0.89	1	1.1	1	25.1	1	25.1	1			2.7	0								
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	14.4	1	203	1	0.31	1	0.22	0	33.4	1	11.3	1	77.4	1	23.7	1	0.11	1			38.9	1	1.3	1	0.81	1	1.2	1	23.3	1	23.3	1			2.6	0								
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	4.3	1	140	1	0.26	1	0.10	0	27	1	12.9	1	99.8	1	9.4	1	0.045	1			43.7	1	1	1	0.71	1	1.3	1	19.8	1	69.4	1			2.6	0								
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	13.9	1	187	1	0.32	1	0.33	0	52	1	15.4	1	58.9	1	18.1	1	0.066	1			58.3	1	1.1	1	0.95	1	1.3	1	30.3	1	93.5	1			2.6	0								
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.3	0	14.4	1	204	1	0.40	1	0.38	0	65.1	1	18.6	1	76.4	1	15.8	1	0.028	1			70.6	1	1.3	1	1	1	1.6	1	37.5	1	106	1			3.0	0								
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7	0	9.8	1	174	1	0.30	1	0.16	0	22.8	1	6.6	1	62.8	1	16.9	1	0.071	1			20.5	1	1.6	1	0.62	1	1.2	1	20.5	1	58.8	1			2.9	0								
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.3	1	107	1	0.26	1	0.07	0	15.8	1	5.1	1	62.9	1	9.4	1	0.039	1			17	1	1.8	1	0.47	1	1.0	1	15.7	1	42.9	1			2.7	0								
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	112	1	0.3	1	0.05	0	17.4	1	5.7	1	71.6	1	10.2	1	0.038	1			19.8	1	2	1	0.61	1	1.1	1	17.8	1	48.6	1			2.7	0								
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	8.3	1	178	1	0.29	1	0.15	0	20.6	1	7.9	1	81.2	1	17.0	1	0.08	1			21.5	1	1.2	1	0.77	1	1.0	1	20.3	1	50.1	1			2.6	0								
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	2.8	1	106	1	0.25	1	0.05	0	17.1	1	4.1	0	65.4	1	13.9	1	0.052	1			17	1	0.94	1	0.42	1	1.0	1	15.9	1	42.3	1			2.6	0								
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	11.2	1	186	1	0.29	1	0.19	0	45.8	1	14.2	1	58.6	1	11.0	1	0.031	1			48.5	1	1.1	1	0.81	1	1.3	1	25.8	1	74.4	1			2.6	0								
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.2	0	5.5	1	107	1	0.18	1	0.1	0	40.6	1	7.7	1	62.4	1	6.3	1	0.12	0			32.9	1	1.0	1	0.69	1	1.0	1	17.6	1	62.2	1			3.0	0								
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.2	0	13.1	1	307	1	0.39	1	0.52	0	59.0	1	29.9	1	90.7	1	26.3	1	0.12	1			77.7	1	1.4	1	1.3	1	1.5	1	35.4	1	160	1			3.4	0								
SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	8.9	0	10.6	1	258	1	0.33	1	0.48	0	47.0	1	28.9	1	90.4	1	24.7	1	0.078	1			70	1	1.3	1	1.1	1	1.6	1	30.9	1	149	1			3.7	0								
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	10.1	1	231	1	0.55	1	0.24	0	38.4	1	19.4	1	66.6	1	18.0	1	0.054	1			39.3	1	1.2	1	1.1	1	1.5	1	38.6	1	97.5	1			3.1	0								
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.4	1	186	1	0.44	1	0.19	0	28.2	1	14.9	1	52.5	1	14.7	1	0.048	1			31.4	1	1.1	1	0.81	1	1.4	1	30.9	1	78.6	1			2.6	0								
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	6.2	1	182	1	0.50	1	0.40	0	26.6	1	18.5	1	65.9	1	14.1	1	0.02	0			35.8	1	0.66	1	0.13	1	0.94	1	37.3	1	85.1	1			2.7	0								
SOIL21-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	14.1	1	198	1	0.33	1	0.37	1	22.7	1	7.2	1	91.2	1	15.8	1	0.34	1			26.9	1	0.54	1	0.14	1	0.82	1	28.3	1	75.2	1			2.7	0								
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.3	1	193	1	0.36	1	0.38	1	25.1	1	7.2	1	87.2	1	11.3	1	0.05	0			26.3	1	0.94	1	1.1	0	0.94	1	30.2	1	71.8	1			2.7	0								
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	11.3	1	191	1	0.34	1	0.71	1	25.4	1	20.1	1	73.4	1	12.6	1	0.021	1			35	1	1.2	1	1.1	0	1.0	0	24.7	1	87.7	1			2.7	0								
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	10.4	1	161	1	0.37	1	0.65	1	26.7	1	18.3	1	80.3	1	15.4	1	0.023	1			27.8	1	1.3	1	1.1	0	0.97	0	24.6	1	69.9	1			2.7	0								
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	9.3	1	208	1	0.39	1	0.60	1	24.8	1	9.2	1	54.1	1	16.2	1	0.039	1			21.4	1	1.5	1	1.1	0	0.84	0	27.2	1	59.6	1			2.6	0								
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.8	1	203	1	0.41	1	0.62	1	32.6	1	10.2	1	70.7	1	14.3	1	0.031	1			21.9	1	1.7	1	1.1	0	0.97	0	32.6	1	60.5	1			2.7	0								
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	7.5	1	192	1	0.37	1	0.55	1	23.1	1	10.2	1	60.4	1	14.1	1	0.022	1			21.7	1	1.5	1	1.1	0	1	0	28.7	1	61.7	1			2.7	0								
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	16.3	1	185	1	0.32	1	0.73	1	45.3	1	13.2	1	58.1	1	14.8	1	0.068	1			46.3	1	1.5	1	1	0	1.1	0	32.2	1	73.7	1			2.6	0								
SOIL26-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	24.4	1	136	1	0.29	1	0.82	1	167	1	16.2	1	68.5	1	11.6	1	0.1	0			93.6	1	1.3	1	1	0	1.1	0	56.7	1	97.5	1			2.6	0								
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.7	1	207	1	0.39	1	0.60	1	26.3	1	9.5	1	64.6	1	15.4	1	0.048	1			24.7	1	1.5	1	0.52	1	0.95	0	27.4	1	61.5	1			2.7	0								
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	12.2	1	195	1	0.38	1	0.54	0	23.9	1	10.3	1	67.1	1	11.9	1	0.017	1			23.5	1	1.2	1	1.1	0	1.1	0	29.4	1	61.5	1			2.7	0								
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.3	1	198	1	0.34	1	0.51	0	24.2	1	10.4	1	61.3	1	11.9	1	0.01	0			21.6	1	1.4	1	0.15	1	0.98	0	26	1	57.1	1			2.7	0								
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.1	1	154	1	0.21	1	0.44	0	16.6	1	9.9	1	54.5	1	30.2	1	0.11	1			17.0	1	0.51	1	0.27	1	0.66	0	13	1	83.0	1			2.6	0								
SOIL31-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	3.9	1	86.3	1	0.22	0	0.27	0	17.0	1	6.0	1	58.9	1	15.3	1	0.04	0			12.2	1	3.7	0	0.14	1	0.68	0	13.3	1	62.1	1			2.6	0								
SOIL32-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	32.1	1	112	1	0.36	0	0.53	1	52.5	1	29.4	1	83.7	1	8.9	1	0.26	1			20.4	1	0.89	1	0.34	1	1.1	0	96.1	1	62.2	1			2.6	0								
SOIL32-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	6.2	1	78	1	0.22	0	0.39	0	57.0	1	31.3	1	69.1	1	2.7	1	0.04	0			17.1	1	0.79	1	0.37	1	0.99	0	84.6	1	54.2	1			2.7	0								
SOIL33-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	29.6	1	174	1	0.44	0	0.45	0	49.9	1	23.9	1	62.2	1	8.4	1	0.04	0			30.5	1	0.57	1	0.41	1	0.94	0	65.2	1	57.8	1			2.6	0								
SOIL33-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9	0	46.9	1	228	1	0.55	0	0.57	0	68.0	1	29.9	1	82.2	1	9.8	1	0.05	0			41.0	1	1.0	1	0.56	1	1.4	0	88.2	1	78.2	1			3.9	0								
SOIL44-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.9	0	13.5	1	124	1	0.21	1	0.41	1	15	1	14.2	1	38.9	1	12.6	1	0.15	1			21.6	1	1.1	1	1.3	0	3.3	0	17.0	1	59.5	1			3.3	0								
SOIL44-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9.9	0	12.9	1	149	1	0.47	1	0.39	1	28.7	1	12.3	1	63.9	1	16.5	1	0.23	1			28.1	1	1.0	1	1.7	0	0.81	1	33.1	1	61.6	1			4.1	0								
SOIL44-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	8.2	0	9.6	1	768	1	0.47	1	0.50	1	29.1	1	17.0	1	62.5	1	16.3	1	0.03	1			34.5	1	0.88	1	0.34	1	0.82	1	37.3	1	62.9	1			3.4	0								
SOIL46-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10	1	127	1	0.25	1	0.34	1	14.7	1	9.5	1	34.9	1	21.4	1	0.15	1			15.3	1	0.83	1	1.1	0	0.26	1	19.8	1	52.8	1			2.7	0								
SOIL46-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	113	1	0.34	1	0.36	1	23.7	1	10.2	1	41.8	1	14.6	1	0.22	1			21.2	1	0.76	1	1.1	0	0.39	1	26.8	1	47.9	1			2.7	0								
SOIL46-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	6.7	0	10.1	1	121	1	0.35	1	0.45	1	27.9	1	18.1	1	54.3	1	7.7	1	0.11	1			31.5	1	0.65	1	1.1	0	0.70	1	30.5	1	56.3	1			2.8	0								
SOIL47-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	20.7	1	108	1	0.20	1	0.36	1	66.4	1	28.8	1	67.7	1	13.2	1	0.10	1			59.7	1	0.99	1	1.1	0	0.28	1	32.9	1	75.5	1			2.7	0								
TP-55-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			7.7	1																																											
TP-55-1.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.0-1.5			4.9	1																																											
TP-56-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			14	1																																											
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	7	1	140	1	1	0	2	1	88	1	28	1	83	1	8.9	1	0.1	0	1	0	53	1	2.5	0	1	0	4	0	20	1	130	1							15	1				
TP-56-2.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	2.0-2.5			2.2	1																																											
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			6	1																																											
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	1	0	110	1	1	0	1.5	1	14	1	3.8	1	62	1	9.6	1	0.1	0	3.7	1	19	1	2.5	0	1	0	4	0	19	1	57	1							41	1				
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																											
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																											
TP-60-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			3.5	1																																											

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-60-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																											
TP-60-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																										
TP-60-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																										
TP-60R-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																										
TP-61-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.9	1																																										
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1.2	1	140	1	12	1	2.9	1	11	1	15	1	71	1	5.1	1	0.1	0	1	0	9.4	1	2.5	0	1	0	4	0	99	1	54	1									51	1
TP-61-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																										
TP-61-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																										
TP-62-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			2.9	1																																										
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1	0	170	1	12	1	2.9	1	24	1	18	1	74	1	4.0	1	0.1	0	1	0	15	1	2.5	0	1	0	4	0	130	1	56	1									53	1
TP-62-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																										
TP-62-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																										
TP-63-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.2	1																																										
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	2.5	0	1	0	160	1	12	1	2.9	1	22	1	19	1	75	1	3.2	1	0.1	0	1	0	13	1	2.5	0	1	0	4	0	130	1	52	1									40	1
TP-63-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2	0																																										
TP-63-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2.3	1																																										
TP-63R-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2.2	1																																										
HA-65-0.5	02/10/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			94	1																																										
HA-67-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			50	1																																										
HA-68-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			92	1																																										
HA-70-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			41	1																																										
HA-71-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			47	1																																										
HA-72-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			130	1																																										
HA-74-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			230	1																																										
HA-81-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			240	1																																										
HA-81-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			320	1																																										
HA-82-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			130	1																																										
HA-82-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			280	1																																										
HA-83-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			39	1																																										
HA-84-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			43	1																																										
HA-85-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			160	1																																										
HA-85-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			100	1																																										
HA-89-0.5	02/13/09	Arcadis 2009	LKBD	SURF	KEN	S	0.5			120	1																																										
MW-01-10.0	10/27/92	D&M 1995	LKBD	SUB	KEN	T	10.0			184	1							3.4	1					52.0	1	6.4	1			22	1																			5.0	0				
MW-01-11.5	10/27/92	D&M 1995	LKBD	SUB	CAL*	S	11.5	9.9	0	25	1	115	1	1.1	1	2.5	1	71.5	1	32.0	1	58.4	1	7.4	0	0.2	0	9.9	0	45	1	3	0	2.5	0			86.4	1	40.1	1									5.0	0		
SOIL16-1	05/13/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	7.6	0	502	1	78	1	0.12	1	0.42	0	7.9	1	10.6	1	81.3	1	386	1	28	1			37.9	1	4.8	1	5.6	1	1.4	1	6	0	118	1			3.2	0								
SOIL16-3	05/13/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	19.2	1	178	1	0.29	1	0.13	0	32.8	1	9	1	75.1	1	13.5	1	0.45	1			34.9	1	1.3	1	0.91	1	1.6	1	24.5	1	66.4	1			2.7	0								
SOIL20-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	37.6	1	178	1	0.40	1	0.50	0	58.2	1	19.5	1	63.4	1	17.8	1	0.26	1			55.7	1	1.1	1	0.1	1	0.75	1	35.5	1	75.6	1			2.6	0								
SOIL20-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	23.9	1	163	1	0.38	1	0.39	1	45.8	1	17.9	1	63.4	1	12.6	1	0.07	0			51.6	1	0.66	1	1	0	0.81	1	34.6	1	66.3	1			2.6	0								
SOIL24-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.8	0	238	1	36.9	1	0.011	1	0.56	0	4.2	1	4.6	1	20.5	1	15.6	1	1.2	1			19.2	1	1.2	1	0.19	1	0.65	0	4.7	1	59.4	1			2.8	0								
SOIL24-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	160	1	38.7	1	0.07	1	0.53	0	3.1	1	4.5	1	14.7	1	7.3	1	0.92	1			17.2	1	0.82	1	0.17	1	0.51	0	3.2	1	59.9	1			2.8	0								
SOIL25-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	160	1	143	1	0.24	1	0.62	1	38.8	1	13.4	1	58.8	1	102	1	5.9	1			44.1	1	2.1	1	1.0	1	0.93	0	27.1	1	66.4	1			2.6	0								
SOIL25-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	48.5	1	140	1	0.31	1	0.56	1	36.5	1	10.3	1	59.8	1	33	1	1.6	1			37.2	1	1.4	1	0.23	1	0.84	0	24.3	1	53.7	1			2.6	0								
SOIL28-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	83.4	1	100	1	0.28	1	0.57	1	40.2	1	8.8	1	70.6	1	95.9	1	0.072	1			44.6	1	1.2	1	1	0	0.88	0	32.0	1	73.3	1			2.6	0								
SOIL28-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	38.5	1	82.9	1	0.25	1	0.49	0	31.9	1	6.8	1	77.6	1	13.6	1	0.042	1			42.8	1	1.6	1	1.1	0	0.08	0	22.3	1	74.5	1			2.6	0								
SOIL29-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.6	0	181	1	32.7	1	0.07	1	0.52	0	3.3	1	3.8	0	17.0	1	11.8	1	0.42	1			15.1	1	1.2	1	0.21	1	0.53	0	3.5	1	58.5	1			2.7	0								
SOIL29-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	165	1	34.2	1	0.05	1	0.48	0	1.8	1	5.1	0	12.5	1	6.5	1	0.24	1			17.6	1	0.8	1	0.11	1	0.48	0	2.3	1	59.3	1			2.7	0								
SOIL30-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	43.6	1	152	1	0.3	1	0.57	1	32.3	1	12.6	1	56.7	1	31.4	1	1.9	1			40.4	1	0.99	1	0.21	1	0.89	0	22.3	1	66.6	1			2.6	0								
SOIL30-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.7	0	8.7	1	143	1	0.31	1	0.49	0	43.4	1	13.8	1	64.8	1	9.0	1	0.023	1			40.1	1	1.1	1	1.1	0	1	0	27	1	61.0	1			2.8	0								
SOIL34-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	7.3	0	39.1	1	104	1	0.27	0	0.32	0	82.6	1	11.7	1	54.5	1	25.4	1	0.17	1			47.5	1	0.78	1	0.18	1	0.79	0	33.5	1	65.2	1			3.0	0								
SOIL34-1 (dup)	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.8	0	36.1	1	102	1	0.26	0	0.30	0	67.5	1	9.6	1	50.3	1	20.8	1	0.11	1			40.9	1	0.97	1	0.09	1	0.71	0	29.6	1	57.4	1			2.9	0								
SOIL34-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.5	0	12.9	1	96.6	1	0.21	0	0.24	0	54.2	1	9.6	1	58.5	1	7.9	1	0.07	0			25.3	1	1.0	1	0.22	1	0.83	0	48.3	1	44.7	1			2.7	0								
SOIL35-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	80.9	1	104	1	0.2	0	0.40	0	19.6	1	6.7	1	39.2	1	51.4	1	4.1	1			20.9	1	1.2	1	0.69	1	0.7	0	13.8	1	54.9	1			2.6	0								
SOIL35-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	15.1	1	143	1	0.26	0	0.33	0	59.4	1	10.4	1	67.7	1	14.2	1	0.77	1			41.7	1	0.70	1	0.21	1	1	0	24.7	1	84.8	1			2.6	0								
SURF-01-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			76	1							6.8	1					63.0	1	9.7	1			20	1															5.0	0			25	0
SURF-03-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			113	1							12	1					47.0	1	5.0	1			29	1															5.0	0			50	0
SURF-04-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			106	1							4.4	1					49.0	1	7.0	1			20	1															5.0	0			50	0
SURF-05-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			160	1							4.3	1					20.0	1	1.0	1			16	1															5.0	0			50	0
SURF-06C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,C	0.0			81	1							2.4	0					14.0	1	0.88	1			9.4	1															5.0	0				
SURF-06F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,F	0.0			151	1							5.5	1					24.0	1	1.2	1			17	1															5.0	0				
SURF-14-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	9.8	0	215	1	38.3	1	0.24	0	2.4	0	4	1	4.9	0	11	1	22.0	1	0.59	1	9.8	0	16	1	1	0	2.4	0			6.8	1	52.8	1										
SURF-14R-0.0 (dup)	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	10	0	150	1	54.3	1	0.25	0	2.5	0	5.2	1	6.8	1	30	1	14.0	1	0.23	1	10	0	13	1	1	0	2.5	0			20	1	52.2	1										

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SURF-15C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,C	0.0	9.8	0	161	1	70	1	0.24	0	2.4	0	8.3	1	4.9	0	26	1	33.0	1	3.3	1	9.8	0	21	1	0.3	0	2.4	0			11	1	57	1												
SURF-15F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,F	0.0	9.9	0	333	1	65	1	0.25	0	2.5	0	8.7	1	5.5	1	37	1	33.0	1	3.3	1	9.9	0	27	1	0.3	0	2.5	0			12	1	81	1												
TP-09-5.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	5.0	24	0	150	1	39.7	1	0.49	0	0.81	1	0.98	0	6.0	1	31.9	1	39.1	1	3.0	1	2.2	1	24.6	1	4.00	1	0.86	1			7.2	1	56.8	1			5.0	0								
TP-09-8.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	8.0	25	0	4	1	88.0	1	0.5	0	0.50	1	4.0	1	4.1	1	41.4	1	4.9	1	0.20	1	2.7	1	26.4	1	3	0	0.59	1			5.7	1	45.5	1			5.0	0								
TP-10-11.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	11.0	25	0	4	1	81.0	1	0.49	0	1.6	1	42.8	1	13.0	1	53.9	1	6.5	1	1.1	1	2.8	1	28.5	1	3	0	0.71	1			44.2	1	40.2	1			5.0	0								
TP-10-4.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	4.0	25	0	305	1	58.9	1	0.5	0	0.81	1	4.2	1	8.1	1	38.5	1	25.0	1	3.0	1	1	0	26.2	1	3	0	0.5	0			9.1	1	65.3	1			0.5	0								
TP-11-12.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	12.0	24	0	195	1	42.3	1	0.49	0	0.98	1	2.4	1	6.1	1	26.2	1	35.9	1	4.0	1	0.98	0	23.0	1	3	0	0.49	0			6.5	1	54.3	1			0.5	0								
TP-11-6.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	6.0	24	0	78	1	23.9	1	0.49	0	0.87	1	5	1	4.2	1	13.8	1	21.0	1	3.0	1	2.5	1	21.0	1	3	0	0.49	0			4.2	1	49	1			5.0	0								
TP-14-1.5	10/21/92	D&M 1995	LKBD	SUB	KEN	T	1.5			61	1							9.5	1					26.0	1	5.0	1			37.0	1													5.0	0					50	0		
TP-14-12.0	10/21/92	D&M 1995	LKBD	SUB	CAL	R	12.0	9.9	0	11	1	108	1	0.28	1	2.5	0	28.5	1	11.0	1	47.3	1	7.9	1	0.2	0	9.9	0	32.0	1	0.3	0	2.5	0			21.0	1	52.1	1			5.0	0					25	0		
TP-14C-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,C	3.0			27	1							2.5	0					11.0	1	0.5	1			9.3	1													5.0	0								
TP-14F-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,F	3.0			2.5	1							5.2	1					13.0	1	0.7	1			15.0	1													5.0	0								
TP-15-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T	3.0			283	1							4.9	1					12.0	1	1.0	1			15.0	1													5.0	0					50	0		
TP-16-1.0	10/21/92	D&M 1995	LKBD	SURF	KEN	T/S	1.0			14	1							26	1					7.9	1	0.2	0			15.0	1													5.0	0					50	0		
TP-16-3.5	10/21/92	D&M 1995	LKBD	SUB	CAL	R	3.5	9.8	0	81.2	1	98.6	1	0.25	0	2.5	0	19	1	4.9	0	40.2	1	49.0	1	3.8	1	9.8	0	22.0	1	0.8	1	2.5	0			18.0	1	51.1	1			5.0	0					25	0		
TP-17-1.1	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.1	9.9	0	15	1	94.2	1	1.3	1	2.6		92.4	1	34.0	1	90.9	1	7.5	0	0.2	0	9.9	0	34.0	1	0.3	0	2.5	0			121	1	46.6	1					5.0	0			50	0		
TP-17C-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5			110	1							24.9	1					11.0	1	0.7	1			17.0	1															5.0	0			50	0		
TP-17F-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5			189	1							34.4	1					32.0	1	2.0	1			28.0	1															5.0	0			50	0		
TP-18-0.7	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.7			271	1							6.1	1					62.0	1	0.2	0			26.0	1															5.0	0			50	0		
TP-18-1.5	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.5	9.9	0	14	1	130	1	0.63	1	2.5	0	58.2	1	20.0	1	62.6	1	11.0	1	0.2	0	9.9	0	43.0	1	0.3	0	2.5	0			51.5	1	307	1					5.0	0			50	0		
TP-40-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0											14.0	1																									1	0								
TP-41-1.0	06/06/95	D&M 1995	LKBD	SURF	KEN	T/S	1.0											12.0	1																									1	0								
TP-45-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0											7.9	1																									1	0								
TP-67-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0			130	1																																											
TP-67-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	2.5	0	88	1	130	1	1.2	1	2.4	1	80	1	20	1	65	1	5.5	1	0.1	0	3.9	1	67	1	2.5	0	1	0	4	0	41	1	73	1									40	1
TP-68-0.0	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.0-0.5	2.5	0	81	1	30	1	1	0	1.2	1	4.5	1	2.5	1	22	1	14	1	0.99	1	1	0	12	1	2.5	0	1	0	4	0	7.8	1	43	1									180	1
TP-68-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	2.5	0	68	1	33	1	1	0	1.0	1	8.6	1	3.8	1	26	1	12	1	0.89	1	1	0	12	1	2.5	0	1	0	4	0	7.7	1	31	1									78	1
TP-68R-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0			70	1																																										
TP-69-1.5	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	1.5-2.0			120	1																																										
TP-69-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	2.5	0	110	1	94	1	1	0	1.4	1	14	1	7.0	1	27	1	43	1	5.4	1	1.5	1	30	1	2.5	0	1	0	4	0	19	1	68	1									76	1
HA-31-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			160	1																																										
HA-32-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			150	1																																										
HA-33-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			54	1																																										
HA-34-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			210	1																																										
HA-35-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			15	1																																										
HA-36-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			77	1																																										
HA-37-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			29	1																																										
HA-37-0.5 (dup)	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			27	1																																										
HA-38-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			18	1																																										
HA-39-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			360	1																																										
HA-40-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			37	1																																										
HA-41-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			550	1																																										
HA-42-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			350	1																																										
HA-42-0.5 (dup)	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			330	1																																										
HA-44-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			140	1																																										
HA-45-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			220	1																																										
HA-46-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			87	1																																										
HA-47-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			81	1																																										
HA-49-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			120	1																																										
HA-50-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			70	1																																										
HA-51-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			130	1																																										
HA-54-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			49	1																																										
HA-55-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			43	1																																										
HA-56-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			27	1																																										
HA-57-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			67	1																																										
HA-63-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			63	1																																										
HA-86-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			39	1																																										
HA-86-0.5 (dup)	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			50	1																																										
HA-87-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			77	1																																										
HA-88-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			23	1																																										
HA-90-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			68	1																																										
HA-91-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			33	1																																										

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SOIL36-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.2	0	72.7	1	114	1	0.27	0	0.35	0	28.6	1	11	1	44.7	1	13.0	1	0.3	1			34.1	1	0.82	1	0.23	1	0.85	0	21.6	1	51.3	1			2.6	0								
SOIL36-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	6.2	0	36.3	1	86.2	1	0.22	0	0.26	0	21.5	1	7.1	1	56.9	1	6.8	1	0.04	0			27.1	1	0.73	1	0.17	1	0.71	0	18.2	1	49.8	1			2.6	0								
SOIL37-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.2	0	56.6	1	230	1	0.38	0	0.43	0	49.7	1	23.1	1	60.5	1	18.4	1	0.23	1			48.5	1	0.82	1	0.71	1	0.84	0	32.5	1	60.2	1			2.6	0								
SOIL37-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	6.6	0	32	1	180	1	0.38	0	0.37	1	271	1	11.6	1	84.8	1	8.3	1	0.04	0			115	1	0.66	1	1.1	0	0.96	1	51.4	1	105	1			2.7	0								
SOIL38-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.2	0	23.5	1	143	1	0.3	0	0.3	0	63.3	1	14.2	1	47.9	1	12.7	1	0.05	0			41.7	1	0.54	1	0.19	1	0.8	0	35.4	1	58.0	1			2.6	0								
SOIL38-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	7	0	16.8	1	159	1	0.29	0	0.3	0	62.4	1	18.6	1	47.3	1	10.9	1	0.04	0			46.8	1	0.79	1	0.23	1	0.9	0	34.4	1	66.6	1			2.9	0								
SOIL39-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.4	0	45.5	1	185	1	0.22	0	0.55	1	41.1	1	18.6	1	47.4	1	16.8	1	0.22	1			45	1	0.61	1	0.55	1	0.69	0	21.6	1	87.3	1			2.7	0								
SOIL39-1 (dup)	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.4	0	43.6	1	194	1	0.21	0	0.52	1	43.4	1	18.9	1	48.5	1	16.6	1	0.21	1			44.8	1	1.2	1	0.61	1	0.66	0	22.6	1	89.0	1			2.7	0								
SOIL39-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	6.5	0	25.2	1	208	1	0.2	0	0.3	0	31.9	1	35.9	1	62.5	1	14.7	1	0.09	0			58.5	1	0.71	1	0.68	1	0.56	0	10.9	1	68.4	1			2.7	0								
TP-20-1.5	10/22/92	D&M 1995	MBK	SUB	MEL	MS	1.5			153	1							241	1					9.3	1	0.2	0			214	1															5.0	0			50	0		
TP-23-2.0	10/26/92	D&M 1995	MBK	SUB	MEL	MR	2.0	9.9	0	31	1	79.1	1	0.79	1	3.3	1	943	1	129	1	164	1	7.5	0	0.2	0	9.9	0	473	1	0.3	0	2.5	0			53.9	1	51.3	1					5.0	0			50	0		
TP-24-3.0	10/26/92	D&M 1995	MBK	SUB	MEL	S	3.0	9.9	0	40	1	97.2	1	1.6	1	5.4	1	136	1	29.0	1	115	1	7.4	0	0.2	0	9.9	0	79.1	1	0.3	0	2.5	0			61.3	1	61.3	1					5.0	0			50	0		
TP-43-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0											620	1																							1	0										
TP-44-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0											140	1																							1	0										
TP-49-0.0	05/22/23	Geocon 2023	MBK	SURF	MEL	MS	0.0-0.5			950	1																																										
TP-49-1.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0	12	1	620	1	22	1	1.2	1	5.8	1	180	1	140	1	130	1	18	1	0.14	1	1	0	790	1	2.5	0	1	0	4	0	31	1	53	1									37	1
TP-49-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			480	1																																									
TP-49-4.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	4.5-5.0			510	1																																									
TP-49R-1.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0	17	1	760	1	27	1	1.5	1	6.2	1	210	1	100	1	140	1	20	1	0.1	0	1	0	910	1	2.5	0	1	0	4	0	34	1	56	1									50	1
TP-50-0.0	05/22/23	Geocon 2023	MBK	SURF	MEL	MS	0.0-0.5			58	1																																									
TP-50-0.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	0.5-1.0	2.5	0	5.4	1	54	1	1.2	1	1.4	1	10	1	9.0	1	74	1	3.6	1	0.1	0	1	0	32	1	2.5	0	1	0	4	0	29	1	44	1									29	1
TP-50-1.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.0-1.5			2	0																																									
TP-50-1.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0			2	0																																									
TP-51-0.0	05/22/23	Geocon 2023	MBK	SURF	MEL	MS	0.0-0.5			280	1																																									
TP-51-1.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0	2.5	0	59	1	60	1	2.1	1	3.1	1	19	1	19	1	72	1	2.5	0	0.1	0	1	0	60	1	2.5	0	1	0	4	0	91	1	61	1									7.8	1
TP-51-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			42	1																																									
TP-51-4.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	4.5-5.0			14	1																																									
TP-51R-4.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	4.5-5.0			8.3	1																																									
TP-58-0.0	05/23/23	Geocon 2023	MBK	SURF	CAL	MS	0.0-0.5			67	1																																									
TP-58-1.5	05/23/23	Geocon 2023	MBK	SUB	CAL	MR	1.5-2.0			32	1																																									
TP-58-3.0	05/23/23	Geocon 2023	MBK	SUB	CAL	MR	3.0-3.5			79	1																																									
TP-58-4.5	05/23/23	Geocon 2023	MBK	SUB	CAL	MR	4.5-5.0			26	1																																									
TP-64-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			100	1																																									
TP-65-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MS	3.0-3.5	20	1	1300	1	71	1	5	0	6.6	1	450	1	110	1	170	1	360	1	0.13	1	120	1	1000	1	2.5	0	1	0	4	0	53	1	120	1									290	1
TP-66-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			100	1																																									
MR-01-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5																																													
MR-02-0.5	06/06/95	D&M 1995	OFF	SURF	MEL	MS	0.5																																													
HA-58-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			110	1																																									
HA-58-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			41	1																																									
HA-59-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			290	1																																									
HA-59-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			270	1																																									
HA-60-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			58	1																																									
HA-60-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			7.5	1																																									
HA-61-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			180	1																																									
HA-61-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			34	1																																									
HA-61-2.0 (dup)	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			31	1																																									
HA-62-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			410	1																																									
HA-62-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL*	S	2.0			260	1																																									
SURF-16-0.0	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0			69	1							1690	1					7.4	0	0.21	1			1340	1													5.0	0										
SURF-16R-0.0 (dup)	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0			12	1							431	1					7.3	0	0.26	1			567	1													5.0	0										
TP-05-3.0	08/23/90	D&M 1995	PROC	SUB	MEL	S	3.0	24	0	14	1	36.8	1	0.9	1	1.5	1	12.4	1	3.7	1	92.9	1	2.4	0	0.1	0	0.96	0	13.0	1	3	0	1.0	1			86.6	1	111	1			5.0	0								
TP-06-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	24	0	63	1	158	1	0.56	1	1.8	1	88.3	1	21.3	1	66.8	1	14.0	1	0.1	0	0.97	0	89.2	1	3	0	0.48	0			52.6	1	59.3	1			5.0	0								
TP-07-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	25	0	52	1	73.6	1	0.74	1	1.1	1	228	1	30.7	1	86.7	1	17.0	1	0.1	0	5.9	1	221	1	3	0	0.99	1			74.8	1	62.0	1			5.0	0								
TP-08-1.0	08/23/90	D&M 1995	PROC	SURF	MEL*	MR	1.0	24	0	159	1	67.9	1	0.61	1	2.1	1	575	1	85.8	1	61.9	1	71.4	1	0.1	0	13.1	1	930	1	3	0	1.7	1			60.8	1	84.6	1			5.0	0								
TP-13-0.1	10/21/92	D&M 1995	PROC	SURF	KEN	T	0.1			80	1							10	1					8.9	1	1.0	1			21.0	1															5.0	0			50	0		
TP-13-2.5	10/21/92	D&M 1995	PROC	SUB	KEN	T	2.5			87	1							14	1					72.0	1	20	1			33.0	1															5.0	0			50	0		
TP-13C-2.0	10/21/92	D&M 1995	PROC	SUB	KEN	T,C	2.0			44	1							3.1	1					31.0	1	0.9	1			11.0	1																						
TP-13F-2.0	10/21/92	D&M 1995	PROC	SUB	KEN	T,F	2.0			98	1							5.4	1					61.0	1	2.0	1			10.0	1																						
TP-21-0.0	10/22/92	D&M 1995	PROC	SURF	KEN	T	0.0			71	1							50.5	1					44.0	1	0.50	1			82.5	1															5.0	0			50	0		
TP-21-0.3	10/22/92	D&M 1995	PROC	SURF	MEL	MR	0.3			257	1							259	1					7.9	1	0.30	1			149	1															5.0	0			50	0		
TP-35-0.0	10/29/92	D&M 1995	PROC	SURF	KEN	T	0.0			4	1							38.2	1					25.0	1	0.5	1			38.0	1															5.0	0			50	0		
TP-35-0.75	10/29/92	D&M 1995	PROC	SURF	MEL*	MS	0.75			12	1							235	1					7.5	0	0.2	0			158	1															5.0	0			25	0		

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-42-1.0	06/06/95	D&M 1995	PROC	SURF	MEL	S	1.0											180	1																							1	0										
TP-46-1.0	06/06/95	D&M 1995	PROC	SURF	KEN	S	1.0											320	1																							1	0										
TP-64-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	2.5	0	110	1	63	1	1	0	2.3	1	67	1	12	1	49	1	18	1	0.44	1	1	0	75	1	2.5	0	1	0	4	0	20	1	71	1									340	1
TP-64R-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	2.5	0	96	1	52	1	1	0	1.7	1	59	1	10	1	44	1	22	1	0.46	1	1	0	65	1	2.5	0	1.0	1	4	0	17	1	77	1									370	1
TP-65-0.0	05/22/23	Geocon 2023	PROC	SURF	KEN	S-FILL	0.0-0.5			260	1																																								
TP-65-SURFACE	05/22/23	Geocon 2023	PROC	SURF	N/A	ASPH	0.0-0.5	2.5	0	18	1	11	1	1	0	1	0	12	1	1.0	1	7.2	1	7.2	1	0.2	1	1	0	9.1	1	2.5	0	1	0	4	0	3.3	1	15	1									930	1
TP-66-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL*	S-FILL	0.0-0.5	5.8	1	450	1	100	1	1.4	1	2.7	1	150	1	24	1	60	1	42	1	0.24	1	2.3	1	180	1	2.5	0	2.1	1	4	0	39	1	100	1									1200	1
HA-2-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR*	S	0.5			59	1																																								
HA-25-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	S	0.5	0.99	1	98	1	55	1	0.16	1	0.39	1	5.4	1	4.0	1	23	1	40	1	7.5	1	0.25	0	15	1	0.5	0	0.40	1	0.5	0	8.4	1	39	1										
HA-25-2.0	02/09/09	Arcadis 2009	TAIL	SUB	MAR	S	2.0			3.6	1																																								
HA-26-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	0.50	0	110	1	72	1	0.29	1	0.54	1	7.1	1	8.5	1	36	1	21	1	1.4	1	0.27	1	14	1	0.5	0	0.25	0	0.5	0	30	1	53	1										
HA-26-0.5 (dup)	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	0.50	0	93	1	52	1	0.25	1	0.44	1	5.8	1	6.5	1	30	1	17	1	1.1	1	0.25	0	12	1	0.5	0	0.25	0	0.5	0	22	1	44	1										
HA-26-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			230	1																																								
HA-27-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	9.9	1	85	1	0.5	1	0.37	1	17	1	7.7	1	51	1	9.5	1	0.13	1	0.25	0	9.6	1	0.5	0	0.25	0	0.5	0	55	1	30	1										
HA-27-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			200	1																																								
HA-28-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	27	1	83	1	0.23	1	0.25	0	19	1	6.0	1	24	1	9.4	1	0.20	1	0.82	1	14	1	0.5	0	0.25	0	0.5	0	28	1	42	1										
HA-28-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			110	1																																								
HA-29-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	13	1	94	1	0.35	1	0.46	1	15	1	13	1	32	1	9.9	1	0.099	1	0.54	1	13	1	0.5	0	0.25	0	0.5	0	48	1	53	1										
HA-29-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			85	1																																								
HA-4-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR	S	0.5			11	1																																								
HA-7-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR*	S	0.5			46	1																																								
HA-8-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR	S	0.5			28	1																																								
MW-02-25.0	10/28/92	D&M 1995	TAIL	SUB	KEN	T	25.0			8	1							2.5	0					19.0	1	2.0	1			7.8	1																			50	0		
MW-02-50.0	10/28/92	D&M 1995	TAIL	SUB	CAL*	S	50.0			18	1							39.2	1					9.5	1	8.0	1			36.0	1																			50	0		
SB-01-10.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	10.0	24	0	178	1	6.2	1	0.48	1	0.89	1	6.1	1	6.7	1	27.8	1	55.1	1	5.2	1	3.6	1	26.7	1	3	0	0.48	0			7.1	1	84.5	1			0.5	0								
SB-01-25.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	25.0	24	0	143	1	54.9	1	0.48	0	0.40	1	4.6	1	5.5	1	26.8	1	400.0	1	4.0	1	2.8	1	23	1	3	0	0.48	0			5.8	1	68.2	1			0.5	0								
SB-01-33.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	33.0	24	0	187	1	40.0	1	0.48	0	0.57	1	3.0	1	2.9	1	18.9	1	32.3	1	5.0	1	1.5	1	19	1	3	0	0.48	0			4.6	1	43.5	1			0.5	0								
SB-01-41.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	41.5	25	0	60	1	67.0	1	0.53	1	1.00	1	26.2	1	12.2	1	32.3	1	14.0	1	0.1	0	0.99	0	19	1	3	0	0.60	1			60	1	57.4	1			21.9	1								
SB-01-8.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	8.0	25	0	153	1	28.2	1	0.5	0	0.92	1	4.0	1	5.8	1	28.3	1	38.1	1	3.3	1	1.4	1	23	1	3	0	0.5	0			6.8	1	70.3	1			0.5	0								
SB-02-12.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	12.0	25	0	177	1	55.0	1	0.49	0	0.43	1	2.7	1	6.9	1	30	1	49.7	1	3.0	1	3.0	1	26.4	1	3	0	0.63	1			6.5	1	72.2	1			0.5	0								
SB-02-17.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.0	25	0	137	1	50.7	1	0.5	0	0.25	0	2.7	1	6.1	1	22	1	58.5	1	6.3	1	3.4	1	30.8	1	3	0	0.5	0			5.2	1	72.7	1			12.7	1								
SB-02-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	24	0	184	1	52.3	1	0.48	0	0.24	0	2.9	1	7.4	1	29.3	1	46.5	1	0.6	1	2.3	1	24	1	3	0	0.48	0			60	1	54.7	1			0.5	0								
SB-03-20.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	20.0	25	0	125	1	33.6	1	0.49	0	0.25	0	2.5	1	2.2	1	18.1	1	23.0	1	0.4	1	1.3	1	22	1	3	0	1.2	1			4.8	1	109	1			0.75	1								
SB-03-30.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	30.0	25	0	93	1	33.9	1	0.5	0	0.25	0	2.1	1	1.0	1	6.33	1	11.0	1	1.2	1	3.5	1	12	1	3	0	0.64	1			1.9	1	33.1	1			0.5	0								
SB-03-31.5	08/23/90	D&M 1995	TAIL	SUB	KEN	S	31.5	25	0	19	1	99.2	1	0.5	0	0.79	1	26.5	1	10.0	1	34.8	1	13.0	1	0.1	0	1.1	1	27.2	1	3	0	0.5	0			52.1	1	64.6	1			0.5	0								
SB-03-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	24	0	212	1	56	1	0.48	0	0.34	1	6.7	1	6.8	1	26	1	15.1	1	0.4	1	4.1	1	27.9	1	3	0	0.68	1			7.8	1	68.3	1												
SB-04-17.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.5	24	0	144	1	75.9	1	0.48	0	0.24	0	8.4	1	5.8	1	22.5	1	85.6	1	10	1	2.7	1	29.3	1	3	0	0.67	1			8.9	1	78.5	1			0.5	0								
SB-04-36.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	36.5	24	0	78	1	42.9	1	0.48	0	0.24	0	1.5	1	2.6	1	14.1	1	24.4	1	0.3	1	3.4	1	14	1	3	0	0.48	0			2.7	1	52.4	1			0.9	1								
SB-04-40.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	40.0	25	0	117	1	57.3	1	0.49	0	0.24	0	4	1	4.8	1	23.0	1	42.2	1	7.3	1	3.7	1	20	1	3	0	0.85	1			8.2	1	54.3	1			1.1	1								
SB-04-45.0	08/23/90	D&M 1995	TAIL	SUB	MAR*	S	45.0	25	0	32	1	23.1	1	0.49	0	0.25	0	0.98	0	0.98	0	3.5	1	7.7	1	0.6	1	1.9	1	7.8	1	3	0	0.70	1			1.7	1	15.3	1			0.5	0								
SB-05-24.5	11/02/92	D&M 1995	TAIL	SUB	MAR*	S	24.5			4.7	1							19	1					7.5	0	0.2	0			15	1																			25	0		
SB-05A-23.0	11/02/92	D&M 1995	TAIL	SUB	KEN	T	23.0			219	1							4.7	1					46.0	1	3.5	1			24	1																			25	0		
SURF-07C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			102	1							3.5	1					26.0	1	2.1	1			12	1																			50	0		
SURF-07F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			262	1							7.0	1					57.0	1	2.3	1			27	1																			50	0		
SURF-08-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			158	1							3.4	1					35.0	1	2.0	1			16	1																			50	0		
SURF-09C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			66	1							3.1	1					10.0	1	0.6	1			8.5	1																			50	0		
SURF-09F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			110	1							4.5	1					28.0	1	1.4	1			16	1																			50	0		
SURF-17-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			220	1							4	1					35.0	1	2.6	1			22	1													5.0	0			50	0				
SURF-17R-0.0 (dup)	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			230	1							6.3	1					55.0	1	1.7	1			26	1													5.0	0			50	0				
SURF-18-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			186	1							7.5	1					64.0	1	3.87	1			27	1																						
SURF-19-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			141	1							16	1					41.0	1	2.65	1			28	1																						
SURF-20-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			214	1							3.9	1					23.0	1	0.72	1			16	1																						
TP-01-2.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	2.0	25	0	11	1	69.1	1	0.49	0	0.42	1	12.6	1	8.1	1	33.3	1	10.0	1	0.1	0	1.4	1	19.0	1	3	0	0.49	0			31.1	1	56.8	1			0.5	0								
TP-02-0.5	08/23/90	D&M 1995	TAIL	SURF	KEN	T	0.5	24	0	35	1	90.7	1	0.48	0	0.95	1	14.2	1	7.8	1	46.3	1	23.0	1	1.2	1	1.3	1	24.0	1	3	0	0.48	0			39	1	76.5	1			0.5	0								
TP-03-4.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	4.0	24	0	38	1	21.4	1	0.49	0	0.24	0	0.98	0	0.98	0	7.21	1	7.2	1	0.1	0	0.98	0	7.3	1	3	0	0.49	0			2.4	1	53	1			0.5	0								
TP-12-2.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T/S	2.0	25	0	52	1	38.3	1	0.49	0	0.24	0	0.98	0	2.4	1	11.7	1	18.0	1	0.5	1	0.98	0	13.0	1	3	0	0.49	0			4.7	1	56.2	1			0.5	0								
TP-12-4.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	4.5	24	0	30	1	75.3	1	0.48	0	0.72	1	19.6	1	20.2	1	65	1	16.0	1	0.1	0	5.5	1	126.0	1	3	0	0.48	0			40.9	1	156	1			1.3	1								
TP-25-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.2			28	1							16.0	1					70.0	1	15.0	1			23.0	1																						
TP-25-1.0	10/23/92	D&M 1995	TAIL	SURF	MAR*	S	1.0	10	0	3	1	178	1	0.79	1	4.4	1	21.0	1	10.0	1	96.1	1	7.5	0	0.2	0	10	0	15.0	1	0.3	0	2.5	0			133	1	72.0	1												
TP-26-2.0	10/23/92	D&M 1995	TAIL	SUB	MAR*	S	2.0	10	0	9	1	226	1	0.93	1	3.2	1	44.9	1	23.0	1	80.1	1	10.0	1	0.9	1	10	0	33.0	1	0.3	0	2.5	0			114	1	86.1	1												
TP-27-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	9.8	0	5	1	176	1	0.68	1	3.6	1	17.0	1	15.0	1	63.3	1	10.0	1	0.2	0	9.8	0	11.0	1	0.3	0	2.5	0			84.3	1	62.8	1											25	0
TP-28C-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5			6	1							27.0	1					12.0	1	0.3	1			25.0	1																						
TP-28F-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5			6	1							30.8	1					10.0	1	0.2	0			27.0	1																						
TP-29-0.3	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.3	9.8	0	21	1	219	1	0.49	1	3.5	1	18.0	1	22.0	1	89.8	1	7.4	0	0.6	1	9.8	0	21.0	1	0.3	0	2.5	0			121	1	77.4	1												
TP-30-0.2	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.2	9.8	0	42	1	199	1	0.88	1	3.2	1	54.0	1	29.0	1	97.3	1	7.4	0	0.2	0	9.8	0	43.0	1	0.3	0	2.5	0			116	1	72.4	1												
TP-31-0.3	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.3	9.9	0	263	1	113	1	0.25	0	2.5	0	14.0	1	8.6	1	31.3	1	44.0	1	5	1	9.9	0	25.0	1	0.50	1	2.5	0			22	1	73.7	1												
TP-33-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	WR	0.2	10	0	88	1	207	1	1.4	1	4.3	1	29.5	1	26.0	1	91.5	1	12.0	1	0.3	1	10	0	23.0	1	0.3	0	2.5	0			148	1	85.2	1											25	0
TP-34-1.0	10/29/92	D&M 1995	TAIL	SURF	KEN	T	1.0			5	1							2.4	0					11.0	1	0.5	1			7.0	1																			50	0		
TP-47-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5											11.0	1																							1	0								
TP-48-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5											11.0	1																							1	0								
TP-52-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			190	1																																								
TP-52-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	120	1	47	1	1	0	1	1	3.6	1	4.9	1	22	1	23	1	2.1	1	1.0	1	13	1	2.5	0	1	0	4	0	6.6	1	46	1									950	1

ProUCL Input: Soil, Tailings and Weathered Rock, Entire Site

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-53-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			69	1																																											
TP-53-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	180	1	78	1	1	0	1.2	1	9.7	1	6.2	1	23	1	51	1	6.6	1	1.6	1	19	1	2.5	0	1	0	4	0	15	1	60	1									4600	1
TP-54-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			250	1																																										
TP-54-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	220	1	65	1	1	0	1.3	1	7.0	1	6.9	1	33	1	52	1	3.3	1	1.3	1	20	1	2.5	0	1	0	4	0	12	1	71	1									890	1

Thallium, All Data
Including D

Tl	D_Tl
8.0	1
8.0	1
6.0	1
49	0
9.0	1
9.0	1
10.0	1
9.0	1
9.0	1
9.0	1
7.0	1
7.0	1
7.0	1
8.0	1
13.0	1
8.0	1
9.0	1
7.0	1
8.0	1
8.0	1
11.0	1
10.0	1
8.0	1
7.0	1
10.0	1
9.0	1
5.0	1
6.0	1
14	1
9.9	0
9.6	0
9.7	0
9.6	0
9.9	0
9.5	0
9.8	0
9.9	0
9.7	0
9.9	0
9.9	0
10.0	0
9.5	0
9.5	0
9.8	0
9.8	0
7.0	1
7.0	1
9.0	1
12	1

Thallium, All Data
Including D

9.8	0
9.5	0
9.8	0
9.6	0
11.0	0
9.8	0
9.8	0
9.8	0
9.9	0
10.0	0
9.8	0
9.8	0
9.8	0
9.8	0
9.7	0
5.0	1
5.0	1
15	1
14	1
10	1
7.0	1
6.0	1
8.0	1
14	1
36	1
23	1
16	1
21	1
18	1
17	1
13	1
18	1
20	1
9.0	1
19.0	1
0.5	0
0.5	0

Thallium, All Data
Including D

1.6	1
1.2	1
1.5	1
1.9	1
1.6	1
1.8	1
1.1	1
1.6	1
1.5	1
1.7	1
1.7	1
1.5	1
1.6	1
1.3	1
1.2	1
1.7	1
1.5	1
1.5	1
1.4	1
1.8	1
0.96	1
1.1	1
1.1	1
1.2	1
1.3	1
1.3	1
1.6	1
1.2	1
1.0	1
1.1	1
1.0	1
1.0	1
1.4	1
1.6	1
1.3	1
1.0	1
1.5	1
1.6	1
1.5	1
1.4	1
0.94	1
0.75	1
0.81	1
0.82	1
0.94	1
1.0	0
0.97	0
0.84	0
0.97	0
1	0
0.65	0
0.51	0
0.93	0
0.84	0
1.1	0
1.1	0
0.95	0
1.1	0
0.98	0
0.88	0
0.87	0
0.53	0
0.48	0
0.89	0
1	0
0.66	0
0.68	0
1.1	0
0.99	0
0.94	0

Thallium, All Data
Including D

1.4	0
0.79	0
0.71	0
0.83	0
0.7	0
1	0
0.85	0
0.71	0
0.84	0
0.96	0
0.8	0
0.9	0
0.69	0
0.66	0
0.56	0
0.82	1
1.2	1
0.95	1
0.76	1
0.91	1
1.2	1
0.75	1
0.92	1
0.88	1
0.97	1
0.86	1
0.97	1
3.3	0
0.81	1
0.82	1
0.62	1
0.58	1
0.5	1
0.56	1
0.26	1
0.39	1
0.70	1
0.28	1
0.48	1
0.84	1

0.5	0
0.5	0
0.5	0

0.5	0
0.5	0
0.5	0

Thallium, All Data
Including D

4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0

Thallium, All Data
Including D

4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0
4	0

Lakebed Area

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-09-8.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	8.0	25	0	4	1	88.0	1	0.5	0	0.50	1	4.0	1	4.1	1	41.4	1	4.9	1	0.20	1	2.7	1	26.4	1	3	0	0.59	1			5.7	1	45.5	1			5.0	0								
TP-10-11.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	11.0	25	0	4	1	81.0	1	0.49	0	1.6	1	42.8	1	13.0	1	53.9	1	6.5	1	1.1	1	2.8	1	28.5	1	3	0	0.71	1			44.2	1	40.2	1			5.0	0								
SOIL30-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.7	0	8.7	1	143	1	0.31	1	0.49	0	43.4	1	13.8	1	64.8	1	9.0	1	0.023	1			40.1	1	1.1	1	1.1	0	1	0	27	1	61.0	1			2.8	0								
TP-14-12.0	10/21/92	D&M 1995	LKBD	SUB	CAL	R	12.0	9.9	0	11	1	108	1	0.28	1	2.5	0	28.5	1	11.0	1	47.3	1	7.9	1	0.2	0	9.9	0	32.0	1	0.3	0	2.5	0			21.0	1	52.1	1			5.0	0					25	0		
SOIL34-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.5	0	12.9	1	96.6	1	0.21	0	0.24	0	54.2	1	9.6	1	58.5	1	7.9	1	0.07	0			25.3	1	1.0	1	0.22	1	0.83	0	48.3	1	44.7	1			2.7	0								
TP-16-1.0	10/21/92	D&M 1995	LKBD	SURF	KEN	T/S	1.0			14	1							26	1					7.9	1	0.2	0			15.0	1													5.0	0					50	0		
TP-18-1.5	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.5	9.9	0	14	1	130	1	0.63	1	2.5	0	58.2	1	20.0	1	62.6	1	11.0	1	0.2	0	9.9	0	43.0	1	0.3	0	2.5	0			51.5	1	307	1					5.0	0			50	0		
TP-17-1.1	10/22/92	D&M 1995	LKBD	SUB	CAL*	S	1.1	9.9	0	15	1	94.2	1	1.3	1	2.6		92.4	1	34.0	1	90.9	1	7.5	0	0.2	0	9.9	0	34.0	1	0.3	0	2.5	0			121	1	46.6	1					5.0	0			50	0		
SOIL35-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	15.1	1	143	1	0.26	0	0.33	0	59.4	1	10.4	1	67.7	1	14.2	1	0.77	1			41.7	1	0.70	1	0.21	1	1	0	24.7	1	84.8	1			2.6	0								
SOIL16-3	05/13/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	19.2	1	178	1	0.29	1	0.13	0	32.8	1	9	1	75.1	1	13.5	1	0.45	1			34.9	1	1.3	1	0.91	1	1.6	1	24.5	1	66.4	1			2.7	0								
SOIL20-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	23.9	1	163	1	0.38	1	0.39	1	45.8	1	17.9	1	63.4	1	12.6	1	0.07	0			51.6	1	0.66	1	1	0	0.81	1	34.6	1	66.3	1			2.6	0								
MW-01-11.5	10/27/92	D&M 1995	LKBD	SUB	CAL*	S	11.5	9.9	0	25	1	115	1	1.1	1	2.5	1	71.5	1	32.0	1	58.4	1	7.4	0	0.2	0	9.9	0	45	1	3	0	2.5	0			86.4	1	40.1	1					5.0	0						
SOIL34-1 (dup)	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.8	0	36.1	1	102	1	0.26	0	0.30	0	67.5	1	9.6	1	50.3	1	20.8	1	0.11	1			40.9	1	0.97	1	0.09	1	0.71	0	29.6	1	57.4	1			2.9	0								
SOIL20-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	37.6	1	178	1	0.40	1	0.50	0	58.2	1	19.5	1	63.4	1	17.8	1	0.26	1			55.7	1	1.1	1	0.1	1	0.75	1	35.5	1	75.6	1			2.6	0								
SOIL28-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	38.5	1	82.9	1	0.25	1	0.49	0	31.9	1	6.8	1	77.6	1	13.6	1	0.042	1			42.8	1	1.6	1	1.1	0	0.08	0	22.3	1	74.5	1			2.6	0								
HA-83-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			39	1																																											
SOIL34-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	7.3	0	39.1	1	104	1	0.27	0	0.32	0	82.6	1	11.7	1	54.5	1	25.4	1	0.17	1			47.5	1	0.78	1	0.18	1	0.79	0	33.5	1	65.2	1			3.0	0								
HA-70-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			41	1																																											
HA-84-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			43	1																																											
SOIL30-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	43.6	1	152	1	0.3	1	0.57	1	32.3	1	12.6	1	56.7	1	31.4	1	1.9	1			40.4	1	0.99	1	0.21	1	0.89	0	22.3	1	66.6	1			2.6	0								
HA-71-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			47	1																																											
SOIL25-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.3	0	48.5	1	140	1	0.31	1	0.56	1	36.5	1	10.3	1	59.8	1	33	1	1.6	1			37.2	1	1.4	1	0.23	1	0.84	0	24.3	1	53.7	1			2.6	0								
HA-67-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			50	1																																											
TP-14-1.5	10/21/92	D&M 1995	LKBD	SUB	KEN	T	1.5			61	1							9.5	1					26.0	1	5.0	1			37.0	1													5.0	0					50	0		
TP-68-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0	2.5	0	68	1	33	1	1	0	1.0	1	8.6	1	3.8	1	26	1	12	1	0.89	1	1	0	12	1	2.5	0	1	0	4	0	7.7	1	31	1											78	1
TP-68R-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0			70	1																																											
SURF-01-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			76	1							6.8	1					63.0	1	9.7	1			20	1													5.0	0					25	0		
TP-11-6.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	6.0	24	0	78	1	23.9	1	0.49	0	0.87	1	5	1	4.2	1	13.8	1	21.0	1	3.0	1	2.5	1	21.0	1	3	0	0.49	0			4.2	1	49	1			5.0	0								
SOIL35-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	80.9	1	104	1	0.2	0	0.40	0	19.6	1	6.7	1	39.2	1	51.4	1	4.1	1			20.9	1	1.2	1	0.69	1	0.7	0	13.8	1	54.9	1			2.6	0								
TP-68-0.0	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.0-0.5	2.5	0	81	1	30	1	1	0	1.2	1	4.5	1	2.5	1	22	1	14	1	0.99	1	1	0	12	1	2.5	0	1	0	4	0	7.8	1	43	1											180	1
TP-16-3.5	10/21/92	D&M 1995	LKBD	SUB	CAL	R	3.5	9.8	0	81.2	1	98.6	1	0.25	0	2.5	0	19	1	4.9	0	40.2	1	49.0	1	3.8	1	9.8	0	22.0	1	0.8	1	2.5	0			18.0	1	51.1	1			5.0	0					25	0		
SOIL28-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	83.4	1	100	1	0.28	1	0.57	1	40.2	1	8.8	1	70.6	1	95.9	1	0.072	1			44.6	1	1.2	1	1	0	0.88	0	32.0	1	73.3	1			2.6	0								
TP-67-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	2.5	0	88	1	130	1	1.2	1	2.4	1	80	1	20	1	65	1	5.5	1	0.1	0	3.9	1	67	1	2.5	0	1	0	4	0	41	1	73	1											40	1
HA-68-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			92	1																																											
HA-65-0.5	02/10/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			94	1																																											
HA-85-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			100	1																																											
SURF-04-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			106	1							4.4	1					49.0	1	7.0	1			20	1															5.0	0			50	0		
TP-17C-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5			110	1							24.9	1					11.0	1	0.7	1			17.0	1															5.0	0			50	0		
TP-69-3.0	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	3.0-3.5	2.5	0	110	1	94	1	1	0	1.4	1	14	1	7.0	1	27	1	43	1	5.4	1	1.5	1	30	1	2.5	0	1	0	4	0	19	1	68	1											76	1
SURF-03-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			113	1							12	1					47.0	1	5.0	1			29	1													5.0	0			50	0		
HA-89-0.5	02/13/09	Arcadis 2009	LKBD	SURF	KEN	S	0.5			120	1																																											
TP-69-1.5	05/23/23	Geocon 2023	LKBD	SUB	CAL*	S	1.5-2.0			120	1																																											
HA-72-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			130	1																																											
HA-82-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			130	1																																											
TP-67-0.5	05/23/23	Geocon 2023	LKBD	SUB	KEN	T	0.5-1.0			130	1																																											
SURF-14R-0.0 (dup)	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	10	0	150	1	54.3	1	0.25	0	2.5	0	5.2	1	6.8	1	30	1	14.0	1	0.23	1	10	0	13	1	1	0	2.5	0			20	1	52.2	1												
TP-09-5.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	5.0	24	0	150	1	39.7	1	0.49	0	0.81	1	0.98	0	6.0	1	31.9	1	39.1	1	3.0	1	2.2	1	24.6	1	4.00	1	0.86	1			7.2	1	56.8	1			5.0	0								
HA-85-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			160	1																																											
SOIL24-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	160	1	38.7	1	0.07	1	0.53	0	3.1	1	4.5	1	14.7	1	7.3	1	0.92	1			17.2	1	0.82	1	0.17	1	0.51	0	3.2	1	59.9	1			2.8	0								
SOIL25-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.2	0	160	1	143	1	0.24	1	0.62	1	38.8	1	13.4	1	58.8	1	102	1	5.9	1			44.1	1	2.1	1	1.0	1	0.93	0	27.1	1	66.4	1			2.6	0								
SURF-05-0.0	10/26/92	D&M 1995	LKBD	SURF	KEN	T	0.0			160	1							4.3	1					20.0	1	1.0	1			16	1													5.0	0			50	0		
SOIL29-3	05/14/08	USEPA 2008	LKBD	SUB	KEN	S	2.5-3.0	6.6	0	165	1	34.2	1	0.05	1	0.48	0	1.8	1	5.1	0	12.5	1	6.5	1	0.24	1			17.6	1	0.8	1	0.11	1	0.48	0	2.3	1	59.3	1			2.7	0								
SOIL29-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.6	0	181	1	32.7	1	0.07	1	0.52	0	3.3	1	3.8	0	17.0	1	11.8	1	0.42	1			15.1	1	1.2	1	0.21	1	0.53	0	3.5	1	58.5	1			2.7	0								
MW-01-10.0	10/27/92	D&M 1995	LKBD	SUB	KEN	T	10.0			184	1							3.4	1					52.0	1	6.4	1			22	1													5.0	0								
TP-17F-0.5	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.5			189	1							34.4	1					32.0	1	2.0	1			28.0	1													5.0	0			50	0		
TP-11-12.0	08/23/90	D&M 1995	LKBD	SUB	CAL*	R	12.0	24	0	195	1	42.3	1	0.49	0	0.98	1	2.4	1	6.1	1	26.2	1	35.9	1	4.0	1	0.98	0	23.0	1	3	0	0.49	0			6.5	1	54.3	1			0.5	0								
SURF-14-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T	0.0	9.8	0	215	1	38.3	1	0.24	0	2.4	0	4	1	4.9	0	11	1	22.0	1	0.59	1	9.8	0	16	1	1	0	2.4	0			6.8	1	52.8	1												
HA-74-0.5	02/12/09	Arcadis 2009	LKBD	SURF	CAL*	S	0.5			230	1																																											
SOIL24-1	05/14/08	USEPA 2008	LKBD	SURF	KEN	S	0.0-0.5	6.8	0	238	1	36.9	1	0.011	1	0.56	0	4.2	1	4.6	1	20.5	1	15.6	1	1.2	1			19.2	1	1.2	1	0.19	1	0.65	0	4.7	1	59.4	1			2.8	0								
HA-81-0.5	02/12/09	Arcadis 2009	LKBD	SURF	KEN	T/S	0.5			240	1																																											
TP-18-0.7	10/22/92	D&M 1995	LKBD	SURF	KEN	T	0.7			271	1							6.1	1					62.0	1	0.2	0			26.0	1													5.0	0			50	0		

Lakebed Area

HA-82-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			280	1																																				
TP-15-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T	3.0			283	1							4.9	1					12.0	1	1.0	1			15.0	1													5.0	0	50	0
TP-10-4.0	08/23/90	D&M 1995	LKBD	SUB	KEN	T	4.0	25	0	305	1	58.9	1	0.5	0	0.81	1	4.2	1	8.1	1	38.5	1	25.0	1	3.0	1	1	0	26.2	1	3	0	0.5	0			9.1	1	65.3	1			0.5	0		
HA-81-2.0	02/12/09	Arcadis 2009	LKBD	SUB	KEN	T/S	2.0			320	1																																				
~~SOIL16-1~~	~~05/13/08~~	~~USEPA 2008~~	~~LKBD~~	~~SURF~~	~~KEN~~	~~S~~	~~0.0-0.5~~	~~7.6~~	~~0~~	~~502~~	~~1~~	~~78~~	~~1~~	~~0.12~~	~~1~~	~~0.42~~	~~0~~	~~7.9~~	~~1~~	~~10.6~~	~~1~~	~~81.3~~	~~1~~	~~386~~	~~1~~	~~28~~	~~1~~			~~37.9~~	~~1~~	~~4.8~~	~~1~~	~~5.6~~	~~1~~	~~1.4~~	~~1~~	~~6~~	~~0~~	~~118~~	~~1~~			~~3.2~~	~~0~~		
SURF-06C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,C																																									
SURF-06F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T/S,F																																									
SURF-15C-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,C																																									
SURF-15F-0.0	01/11/93	D&M 1995	LKBD	SURF	KEN	T,F																																									
TP-14C-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,C																																									
TP-14F-3.0	10/21/92	D&M 1995	LKBD	SUB	KEN	T,F																																									
TP-40-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0											14.0	1																							1	0				
TP-41-1.0	06/06/95	D&M 1995	LKBD	SURF	KEN	T/S	1.0											12.0	1																							1	0				
TP-45-2.0	06/06/95	D&M 1995	LKBD	SUB	KEN	T	2.0											7.9	1																							1	0				

Tailings Pile

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
HA-29-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	13	1	94	1	0.35	1	0.46	1	15	1	13	1	32	1	9.9	1	0.099	1	0.54	1	13	1	0.5	0	0.25	0	0.5	0	48	1	53	1												
SB-01-41.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	41.5	25	0	60	1	67.0	1	0.53	1	1.00	1	26.2	1	12.2	1	32.3	1	14.0	1	0.1	0	0.99	0	19	1	3	0	0.60	1			60	1	57.4	1			21.9	1								
SB-03-31.5	08/23/90	D&M 1995	TAIL	SUB	KEN	S	31.5	25	0	19	1	99.2	1	0.5	0	0.79	1	26.5	1	10.0	1	34.8	1	13.0	1	0.1	0	1.1	1	27.2	1	3	0	0.5	0			52.1	1	64.6	1			0.5	0								
TP-01-2.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	2.0	25	0	11	1	69.1	1	0.49	0	0.42	1	12.6	1	8.1	1	33.3	1	10.0	1	0.1	0	1.4	1	19.0	1	3	0	0.49	0			31.1	1	56.8	1			0.5	0								
TP-03-4.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	4.0	24	0	38	1	21.4	1	0.49	0	0.24	0	0.98	0	0.98	0	7.21	1	7.2	1	0.1	0	0.98	0	7.3	1	3	0	0.49	0			2.4	1	53	1			0.5	0								
TP-12-4.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	4.5	24	0	30	1	75.3	1	0.48	0	0.72	1	19.6	1	20.2	1	65	1	16.0	1	0.1	0	5.5	1	126.0	1	3	0	0.48	0			40.9	1	156	1			1.3	1								
HA-27-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	9.9	1	85	1	0.5	1	0.37	1	17	1	7.7	1	51	1	9.5	1	0.13	1	0.25	0	9.6	1	0.5	0	0.25	0	0.5	0	55	1	30	1												
HA-28-0.5	02/09/09	Arcadis 2009	TAIL	SURF	--	CS	0.5	0.50	0	27	1	83	1	0.23	1	0.25	0	19	1	6.0	1	24	1	9.4	1	0.20	1	0.82	1	14	1	0.5	0	0.25	0	0.5	0	28	1	42	1												
SB-05-24.5	11/02/92	D&M 1995	TAIL	SUB	MAR*	S	24.5			4.7	1							19	1					7.5	0	0.2	0			15	1																	25	0		
TP-25-1.0	10/23/92	D&M 1995	TAIL	SURF	MAR*	S	1.0	10	0	3	1	178	1	0.79	1	4.4	1	21.0	1	10.0	1	96.1	1	7.5	0	0.2	0	10	0	15.0	1	0.3	0	2.5	0			133	1	72.0	1					5.0	0						
TP-27-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5	9.8	0	5	1	176	1	0.68	1	3.6	1	17.0	1	15.0	1	63.3	1	10.0	1	0.2	0	9.8	0	11.0	1	0.3	0	2.5	0			84.3	1	62.8	1					5.0	0			25	0		
TP-28F-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5			6	1							30.8	1					10.0	1	0.2	0			27.0	1																	5.0	0						
TP-30-0.2	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.2	9.8	0	42	1	199	1	0.88	1	3.2	1	54.0	1	29.0	1	97.3	1	7.4	0	0.2	0	9.8	0	43.0	1	0.3	0	2.5	0			116	1	72.4	1					5.0	0						
SB-04-36.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	36.5	24	0	78	1	42.9	1	0.48	0	0.24	0	1.5	1	2.6	1	14.1	1	24.4	1	0.3	1	3.4	1	14	1	3	0	0.48	0			2.7	1	52.4	1			0.9	1								
TP-28C-0.5	10/23/92	D&M 1995	TAIL	SURF	--	SC	0.5			6	1							27.0	1					12.0	1	0.3	1			25.0	1															5.0	0						
TP-33-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	WR	0.2	10	0	88	1	207	1	1.4	1	4.3	1	29.5	1	26.0	1	91.5	1	12.0	1	0.3	1	10	0	23.0	1	0.3	0	2.5	0			148	1	85.2	1					5.0	0			25	0		
SB-03-20.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	20.0	25	0	125	1	33.6	1	0.49	0	0.25	0	2.5	1	2.2	1	18.1	1	23.0	1	0.4	1	1.3	1	22	1	3	0	1.2	1			4.8	1	109	1			0.75	1								
SB-03-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	24	0	212	1	56	1	0.48	0	0.34	1	6.7	1	6.8	1	26	1	15.1	1	0.4	1	4.1	1	27.9	1	3	0	0.68	1			7.8	1	68.3	1												
TP-12-2.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T/S	2.0	25	0	52	1	38.3	1	0.49	0	0.24	0	0.98	0	2.4	1	11.7	1	18.0	1	0.5	1	0.98	0	13.0	1	3	0	0.49	0			4.7	1	56.2	1			0.5	0								
TP-34-1.0	10/29/92	D&M 1995	TAIL	SURF	KEN	T	1.0			5	1							2.4	0					11.0	1	0.5	1			7.0	1																	50	0		
SB-02-5.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	5.0	24	0	184	1	52.3	1	0.48	0	0.24	0	2.9	1	7.4	1	29.3	1	46.5	1	0.6	1	2.3	1	24	1	3	0	0.48	0			60	1	54.7	1			0.5	0								
SB-04-45.0	08/23/90	D&M 1995	TAIL	SUB	MAR*	S	45.0	25	0	32	1	23.1	1	0.49	0	0.25	0	0.98	0	0.98	0	3.5	1	7.7	1	0.6	1	1.9	1	7.8	1	3	0	0.70	1			1.7	1	15.3	1			0.5	0								
SURF-09C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			66	1							3.1	1					10.0	1	0.6	1			8.5	1															5.0	0			50	0		
TP-29-0.3	10/27/92	D&M 1995	TAIL	SURF	--	SC	0.3	9.8	0	21	1	219	1	0.49	1	3.5	1	18.0	1	22.0	1	89.8	1	7.4	0	0.6	1	9.8	0	21.0	1	0.3	0	2.5	0			121	1	77.4	1					5.0	0						
SURF-20-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			214	1							3.9	1					23.0	1	0.72	1			16	1																				
TP-26-2.0	10/23/92	D&M 1995	TAIL	SUB	MAR*	S	2.0	10	0	9	1	226	1	0.93	1	3.2	1	44.9	1	23.0	1	80.1	1	10.0	1	0.9	1	10	0	33.0	1	0.3	0	2.5	0			114	1	86.1	1					5.0	0						
HA-26-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	0.50	0	93	1	52	1	0.25	1	0.44	1	5.8	1	6.5	1	30	1	17	1	1.1	1	0.25	0	12	1	0.5	0	0.25	0	0.5	0	22	1	44	1												
SB-03-30.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	30.0	25	0	93	1	33.9	1	0.5	0	0.25	0	2.1	1	1.0	1	6.33	1	11.0	1	1.2	1	3.5	1	12	1	3	0	0.64	1			1.9	1	33.1	1			0.5	0								
TP-02-0.5	08/23/90	D&M 1995	TAIL	SURF	KEN	T	0.5	24	0	35	1	90.7	1	0.48	0	0.95	1	14.2	1	7.8	1	46.3	1	23.0	1	1.2	1	1.3	1	24.0	1	3	0	0.48	0			39	1	76.5	1			0.5	0								
HA-26-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	T	0.5	0.50	0	110	1	72	1	0.29	1	0.54	1	7.1	1	8.5	1	36	1	21	1	1.4	1	0.27	1	14	1	0.5	0	0.25	0	0.5	0	30	1	53	1												
SURF-09F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			110	1							4.5	1					28.0	1	1.4	1			16	1															5.0	0			50	0		
SURF-17R-0.0 (dup)	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			230	1							6.3	1					55.0	1	1.7	1			26	1													5.0	0					50	0		
MW-02-25.0	10/28/92	D&M 1995	TAIL	SUB	KEN	T	25.0			8	1							2.5	0					19.0	1	2.0	1			7.8	1																	50	0		
SURF-08-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			158	1							3.4	1					35.0	1	2.0	1			16	1															5.0	0			50	0		
SURF-07C-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			102	1							3.5	1					26.0	1	2.1	1			12	1															5.0	0			50	0		
TP-52-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	120	1	47	1	1	0	1	1	3.6	1	4.9	1	22	1	23	1	2.1	1	1.0	1	13	1	2.5	0	1	0	4	0	6.6	1	46	1									950	1
SURF-07F-0.0	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.0			262	1							7.0	1					57.0	1	2.3	1			27	1															5.0	0			50	0		
SURF-17-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			220	1							4	1					35.0	1	2.6	1			22	1													5.0	0			50	0				
SURF-19-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			141	1							16	1					41.0	1	2.65	1			28	1																				
SB-02-12.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	12.0	25	0	177	1	55.0	1	0.49	0	0.43	1	2.7	1	6.9	1	30	1	49.7	1	3.0	1	3.0	1	26.4	1	3	0	0.63	1			6.5	1	72.2	1			0.5	0								
SB-01-8.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	8.0	25	0	153	1	28.2	1	0.5	0	0.92	1	4.0	1	5.8	1	28.3	1	38.1	1	3.3	1	1.4	1	23	1	3	0	0.5	0			6.8	1	70.3	1			0.5	0								
TP-54-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	220	1	65	1	1	0	1.3	1	7.0	1	6.9	1	33	1	52	1	3.3	1	1.3	1	20	1	2.5	0	1	0	4	0	12	1	71	1									890	1
SB-05A-23.0	11/02/92	D&M 1995	TAIL	SUB	KEN	T	23.0			219	1							4.7	1					46.0	1	3.5	1			24	1																	25	0		
SURF-18-0.0	01/11/93	D&M 1995	TAIL	SURF	KEN	T	0.0			186	1							7.5	1					64.0	1	3.87	1			27	1																				
SB-01-25.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	25.0	24	0	143	1	54.9	1	0.48	0	0.40	1	4.6	1	5.5	1	26.8	1	400.0	1	4.0	1	2.8	1	23	1	3	0	0.48	0			5.8	1	68.2	1			0.5	0								
SB-01-33.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	33.0	24	0	187	1	40.0	1	0.48	0	0.57	1	3.0	1	2.9	1	18.9	1	32.3	1	5.0	1	1.5	1	19	1	3	0	0.48	0			4.6	1	43.5	1			0.5	0								
TP-31-0.3	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.3	9.9	0	263	1	113	1	0.25	0	2.5	0	14.0	1	8.6	1	31.3	1	44.0	1	5	1	9.9	0	25.0	1	0.50	1	2.5	0			22	1	73.7	1					5.0	0						
SB-01-10.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	10.0	24	0	178	1	6.2	1	0.48	1	0.89	1	6.1	1	6.7	1	27.8	1	55.1	1	5.2	1	3.6	1	26.7	1	3	0	0.48	0			7.1	1	84.5	1			0.5	0								
SB-02-17.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.0	25	0	137	1	50.7	1	0.5	0	0.25	0	2.7	1	6.1	1	22	1	58.5	1	6.3	1	3.4	1	30.8	1	3	0	0.5	0			5.2	1	72.7	1			12.7	1								
TP-53-3.0	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	3.0-3.5	2.5	0	180	1	78	1	1	0	1.2	1	9.7	1	6.2	1	23	1	51	1	6.6	1	1.6	1	19	1	2.5	0	1	0	4	0	15	1	60	1									4600	1
SB-04-40.0	08/23/90	D&M 1995	TAIL	SUB	KEN	T	40.0	25	0	117	1	57.3	1	0.49	0	0.24	0	4	1	4.8	1	23.0	1	42.2	1	7.3	1	3.7	1	20	1	3	0	0.85	1			8.2	1	54.3	1			1.1	1								
HA-25-0.5	02/09/09	Arcadis 2009	TAIL	SURF	KEN	S	0.5	0.99	1	98	1	55	1	0.16	1	0.39	1	5.4	1	4.0	1	23	1	40	1	7.5	1	0.25	0	15	1	0.5	0	0.40	1	0.5	0	8.4	1	39	1												
MW-02-50.0	10/28/92	D&M 1995	TAIL	SUB	CAL*	S	50.0			18	1							39.2	1					9.5	1	8.0	1			36.0	1																	50	0		
SB-04-17.5	08/23/90	D&M 1995	TAIL	SUB	KEN	T	17.5	24	0	144	1	75.9	1	0.48	0	0.24	0	8.4	1	5.8	1	22.5	1	85.6	1	10	1	2.7	1	29.3	1	3	0	0.67	1			8.9	1	78.5	1			0.5	0								
TP-25-0.2	10/27/92	D&M 1995	TAIL	SURF	KEN	T	0.2			28	1							16.0	1					70.0	1	15.0	1			23.0	1															5.0	0						
HA-2-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR*	S	0.5			59	1																																										
HA-25-2.0	02/09/09	Arcadis 2009	TAIL	SUB	MAR	S	2.0			3.6	1																																									
HA-26-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			230	1																																								
HA-27-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			200	1																																								
HA-28-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			110	1																																								
HA-29-2.0	02/09/09	Arcadis 2009	TAIL	SUB	KEN	T	2.0			85	1																																								
HA-4-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR	S	0.5			11	1																																								
HA-7-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR*	S	0.5			46	1																																								
HA-8-0.5	02/09/09	Arcadis 2009	TAIL	SURF	MAR	S	0.5			28	1																																								
TP-47-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5											11.0	1																																		
TP-48-1.5	06/06/95	D&M 1995	TAIL	SUB	KEN	T	1.5											11.0	1																																		
TP-52-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			190	1																																								
TP-53-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			69	1																																								
TP-54-1.5	05/23/23	Geocon 2023	TAIL	SUB	KEN	T	1.5-2.0			250	1																																								

Cyanide Process Area

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-05-3.0	08/23/90	D&M 1995	PROC	SUB	MEL	S	3.0	24	0	14	1	36.8	1	0.9	1	1.5	1	12.4	1	3.7	1	92.9	1	2.4	0	0.1	0	0.96	0	13.0	1	3	0	1.0	1			86.6	1	111	1			5.0	0								
TP-06-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	24	0	63	1	158	1	0.56	1	1.8	1	88.3	1	21.3	1	66.8	1	14.0	1	0.1	0	0.97	0	89.2	1	3	0	0.48	0			52.6	1	59.3	1			5.0	0								
TP-07-1.0	08/23/90	D&M 1995	PROC	SURF	MEL	MR	1.0	25	0	52	1	73.6	1	0.74	1	1.1	1	228	1	30.7	1	86.7	1	17.0	1	0.1	0	5.9	1	221	1	3	0	0.99	1			74.8	1	62.0	1			5.0	0								
TP-08-1.0	08/23/90	D&M 1995	PROC	SURF	MEL*	MR	1.0	24	0	159	1	67.9	1	0.61	1	2.1	1	575	1	85.8	1	61.9	1	71.4	1	0.1	0	13.1	1	930	1	3	0	1.7	1			60.8	1	84.6	1			5.0	0								
TP-35-0.75	10/29/92	D&M 1995	PROC	SURF	MEL*	MS	0.75			12	1							235	1					7.5	0	0.2	0			158	1													5.0	0			25	0				
TP-65-SURFAC	05/22/23	Geocon 2023	PROC	SURF	N/A	ASPH	0.0-0.5	2.5	0	18	1	11	1	1	0	1	0	12	1	1.0	1	7.2	1	7.2	1	0.2	1	1	0	9.1	1	2.5	0	1	0	4	0	3.3	1	15	1									930	1
SURF-16-0.0	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0			69	1							1690	1					7.4	0	0.21	1			1340	1											5.0	0								
TP-66-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL*	S-FILL	0.0-0.5	5.8	1	450	1	100	1	1.4	1	2.7	1	150	1	24	1	60	1	42	1	0.24	1	2.3	1	180	1	2.5	0	2.1	1	4	0	39	1	100	1									1200	1
SURF-16R-0.0 (dup)	01/11/93	D&M 1995	PROC	SURF	MEL*	MR	0.0			12	1							431	1					7.3	0	0.26	1			567	1											5.0	0								
TP-21-0.3	10/22/92	D&M 1995	PROC	SURF	MEL	MR	0.3			257	1							259	1					7.9	1	0.30	1			149	1													5.0	0			50	0				
TP-64-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	2.5	0	110	1	63	1	1	0	2.3	1	67	1	12	1	49	1	18	1	0.44	1	1	0	75	1	2.5	0	1	0	4	0	20	1	71	1									340	1
TP-64R-0.0	05/22/23	Geocon 2023	PROC	SURF	MEL	S-FILL	0.0-0.5	2.5	0	96	1	52	1	1	0	1.7	1	59	1	10	1	44	1	22	1	0.46	1	1	0	65	1	2.5	0	1.0	1	4	0	17	1	77	1									370	1
TP-21-0.0	10/22/92	D&M 1995	PROC	SURF	KEN	T	0.0			71	1							50.5	1					44.0	1	0.50	1			82.5	1													5.0	0			50	0				
TP-35-0.0	10/29/92	D&M 1995	PROC	SURF	KEN	T	0.0			4	1							38.2	1					25.0	1	0.5	1			38.0	1													5.0	0			50	0				
TP-13-0.1	10/21/92	D&M 1995	PROC	SURF	KEN	T	0.1			80	1							10	1					8.9	1	1.0	1			21.0	1													5.0	0			50	0				
TP-13-2.5	10/21/92	D&M 1995	PROC	SUB	KEN	T	2.5			87	1							14	1					72.0	1	~~20~~	1			33.0	1													5.0	0			50	0				
HA-58-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			110	1																																											
HA-58-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			41	1																																										
HA-59-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			290	1																																										
HA-59-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			270	1																																										
HA-60-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			58	1																																										
HA-60-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			7.5	1																																										
HA-61-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			180	1																																										
HA-61-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			34	1																																										
HA-61-2.0 (dup	02/13/09	Arcadis 2009	PROC	SUB	MEL	S	2.0			31	1																																										
HA-62-0.5	02/13/09	Arcadis 2009	PROC	SURF	MEL*	S	0.5			410	1																																										
HA-62-2.0	02/13/09	Arcadis 2009	PROC	SUB	MEL*	S	2.0			260	1																																										
TP-13C-2.0	10/21/92	D&M 1995	PROC	SUB	KEN	T,C																																															
TP-13F-2.0	10/21/92	D&M 1995	PROC	SUB	KEN	T,F																																														
TP-42-1.0	06/06/95	D&M 1995	PROC	SURF	MEL	S	1.0											180	1																									1	0										
TP-46-1.0	06/06/95	D&M 1995	PROC	SURF	KEN	S	1.0											320	1																									1	0										
TP-65-0.0	05/22/23	Geocon 2023	PROC	SURF	KEN	S-FILL	0.0-0.5			260	1																																										

Bellwether Mine Waste Rock

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-22-0.0	01/11/93	D&M 1995	BELL	SURF	MEL	WR	0.0	10	0	9	1	72.5	1	0.25	0	2.5	0	12	1	16.0	1	34.1	1	17.0	1	0.320	1	10	0	24.0	1	1	0	2.5	0			24.0	1	60.7	1			5.0	0			50	0				
TP-22-2.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	9.9	0	7	1	126	1	0.25	0	2.5	0	26.3	1	18.0	1	22.0	1	12.0	1	0.018	1	9.9	0	24.0	1	1	0	2.5	0			40.6	1	47.6	1			5.0	0			50	0				
TP-22-3.0	10/23/92	D&M 1995	BELL	SUB	MEL	S	3.0	9.8	0	12	1	110	1	0.46	1	2.4	0	30.0	1	9.6	1	21.0	1	13.0	1	0.2	0	9.8	0	27.0	1	0.3	0	2.5	0			34.1	1	44.5	1					5.0	0			50	0		
TP-22R-2.5 (dup)	01/11/93	D&M 1995	BELL	SUB	MEL	WR	2.5	9.8	0	5	1	131	1	0.25	0	2.5	0	29.6	1	13.0	1	19.0	1	11.0	1	0.020	1	9.8	0	23.0	1	1	0	2.5	0			32.8	1	40.9	1			5.0	0			50	0				
TP-23-0.5	10/26/92	D&M 1995	BELL	SURF	MEL	WR	0.5	9.8	0	51	1	111	1	0.56	1	2.7	1	193	1	25.0	1	105	1	9.1	1	0.2	0	9.8	0	174	1	0.3	0	2.5	0			49.0	1	52.2	1					5.0	0			50	0		
TP-24C-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,C	1.5	9.8	0	139	1	67.0	1	0.82	1	5.0	1	69.0	1	39.0	1	120	1	11.0	1	0.24	1	9.8	0	86.0	1	0.3	0	2.5	0			74.0	1	90.0	1			5.0	0								
TP-24F-1.5	01/11/93	D&M 1995	BELL	SUB	MEL	WR,F	1.5	9.9	0	115	1	84.0	1	0.86	1	4.1	1	66.0	1	43.0	1	140	1	21.0	1	0.27	1	9.9	0	100	1	0.3	0	2.5	0			81.0	1	98.0	1			5.0	0								

Background, Non-Mineralized
All Data

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	9.9	0	3	1	27.1	1	0.36	1	2.5	0	43.7	1	5	0	112	1	7.5	0	0.2	0	9.9	0	12.0	1	0.40	1	2.5	0			21.0	1	14.0	1					5.0	0			50	0		
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	65.9	1	0.25	0	2.5	0	23.0	1	5	0	36.6	1	7.5	0	0.029	1	9.9	0	15.0	1	1	0	2.5	0			17.0	1	28.0	1			5.0	0								
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	75.2	1	0.25	0	2.5	0	28.2	1	5	0	36.3	1	7.5	0	0.044	1	9.9	0	18.0	1	1	0	2.5	0			17.0	1	32.0	1			5.0	0								
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	1	0	244	1	0.28	1	2.5	0	22.0	1	9.3	1	48.6	1	15.0	1	0.2	0	9.8	0	27	1	0.3	0	2.5	0			25.2	1	58.5	1					5.0	0						
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	5	1	156	1	0.27	1	2.5	0	44.9	1	9.3	1	54.8	1	19.0	1	0.2	0	9.8	0	33	1	0.30	1	2.5	0			25.5	1	69.8	1					5.0	0						
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	7	1	154	1	0.62	1	2.5	0	45.3	1	11.0	1	69.5	1	8.9	1	0.2	0	9.9	0	36	1	0.3	0	2.5	0			30.4	1	71.8	1					5.0	0						
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	6	1	265	1	0.25	0	2.5	0	25.5	1	9.8	1	56.3	1	21.0	1	0.2	0	10	0	31	1	0.30	1	2.5	0			20.0	1	85.7	1					5.0	0						
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	3	1	227	1	0.36	1	2.5	0	25.7	1	12.0	1	35.4	1	25.0	1	0.2	0	10	0	23	1	0.3	0	2.5	0			25.6	1	56.8	1					5.0	0			50	0		
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	10	0	5	1	155	1	0.5	1	2.5	0	32.3	1	13.0	1	58.5	1	12.0	1	0.2	0	9.8	0	29	1	0.3	0	2.5	0			36.3	1	61.1	1					5.0	0			50	0		
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	9.9	0	1	0	135	1	0.31	1	2.5	0	24.0	1	8.4	1	58.3	1	7.7	1	0.2	0	9.9	0	50.9	1	0.30	1	2.5	0			18	1	129	1					5.0	0						
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	7	1	154	1	0.25	0	2.5	0	17.0	1	5.8	1	48.0	1	22.0	1	0.2	1	9.9	0	21	1	0.3	0	2.5	0			17	1	61.6	1					5.0	0						
BKRD-06C-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,C																																																
BKRD-06F-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,F																																																
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	7	1	195	1	0.39	1	2.5	0	22.0	1	11.0	1	58.1	1	11.0	1	0.2	0	9.9	0	25	1	0.50	1	2.5	0			25	1	51.1	1					5.0	0						
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	12	1	219	1	0.52	1	2.5	0	37.4	1	4.9	0	77.3	1	12.0	1	0.2	0	9.9	0	42	1	0.50	1	2.5	0			31	1	68.9	1					5.0	0						
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	9.8	0	5	1	152	1	0.40	1	2.5	0	23.0	1	7.4	1	73.6	1	10.0	1	0.035	1	9.8	0	37	1	1	0	2.5	0			27	1	68.0	1			5.0	0								
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	4	1	277	1	0.29	1	2.5	0	24.0	1	10.0	1	63.1	1	12.0	1	0.2	0	9.9	0	24	1	0.50	1	2.5	0			24.9	1	69.1	1					5.0	0						
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.8	0	3	1	123	1	0.27	1	2.5	0	24.0	1	7.0	1	116	1	10.0	1	0.03	1	9.8	0	31	1	1	0	2.5	0			28.4	1	81.5	1			5.0	0								
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	3	1	143	1	0.31	1	2.5	0	22.0	1	4.9	0	118	1	11.0	1	0.026	1	9.9	0	23	1	1	0	2.5	0			29.4	1	61.6	1			5.0	0								
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	12	1	189	1	0.38	1	2.5	0	37.2	1	15.0	1	52.3	1	19.0	1	0.2	0	9.9	0	39	1	0.30	1	2.5	0			32.6	1	67.9	1					5.0	0						
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	13	1	197	1	0.5	1	2.5	0	55.0	1	16.0	1	54.7	1	15.0	1	0.2	0	9.9	0	61.6	1	0.30	1	2.5	0			39.3	1	82.7	1					5.0	0						
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	5	1	186	1	0.46	1	2.5	0	26.7	1	13.0	1	65.9	1	18.0	1	0.2	0	9.9	0	34	1	0.70	1	2.5	0			30.4	1	87.4	1					5.0	0						
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.8	0	2	1	107	1	0.29	1	2.5	1	22.0	1	6.9	1	55.4	1	15.0	1	0.033	1	9.8	0	31	1	1	0	2.5	0			20.0	1	71.6	1			5.0	0	5.0	0						
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	10	0	2	1	134	1	0.37	1	2.5	0	22.0	1	9.9	1	62.2	1	18.0	1	0.2	0	10	0	22	1	0.30	1	2.5	0			23.0	1	68.9	1					5.0	0						
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.9	0	2	1	105	1	0.25	0	2.5	0	21.0	1	6.8	1	58.6	1	11.0	1	0.032	1	9.9	0	29	1	1	0	2.5	0			20.0	1	72.9	1			5.0	0								
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	6	1	225	1	0.55	1	2.5	0	34.7	1	11.0	1	64	1	15.0	1	0.2	0	9.9	0	33	1	0.50	1	2.5	0			34.4	1	69.6	1					5.0	0						
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.8	0	2	1	278	1	0.25	0	2.5	0	16	1	101.0	1	178	1	23.0	1	0.065	1	9.8	0	111	1	1	0	2.5	0			14.0	1	86.3	1			5.0	0			50	0				
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.9	0	1	0	190	1	0.25	0	2.5	0	16	1	49.0	1	172	1	17.0	1	0.039	1	9.9	0	74.2	1	1	0	2.5	0			13.0	1	87.3	1			5.0	0			50	0				
HA-1-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.2	1																																												
HA-10-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.7	1																																												
HA-11-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.5	1																																												
HA-11-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7	1																																												
HA-12-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.7	1																																												
HA-13-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			10	1																																												
HA-14-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			15	1																																												
HA-15-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.2	1																																												
HA-16-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.7	1																																												
HA-17-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-18-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.7	1																																												
HA-19-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.8	1																																												
HA-20-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			9.3	1																																												
HA-21-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-22-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			15	1																																												
HA-23-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.1	1																																												
HA-24-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.7	1																																												
HA-3-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			19	1																																												
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			19	1																																												
HA-30-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																												
HA-43-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			18	1																																												
HA-48-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			27	1																																												
HA-5-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			13	1																																												
HA-52-0.5	02/10/09	Arcadis 2009	BKG	SURF	MEL	S	0.5			26	1																																												
HA-53-0.5 (dup)	02/13/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			33	1																																												

Background, Non-Mineralized
All Data

HA-53-0.5 (dup)	02/13/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			34	1																														
HA-6-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																														
HA-64-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																														
HA-66-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			35	1																														
HA-69-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			20	1																														
HA-69-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																														
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			17	1																														
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.7	1																														
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.5	1																														
HA-77-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.8	1																														
HA-77-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.3	1																														
HA-78-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.3	1																														
HA-79-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.6	1																														
HA-80-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.6	1																														
HA-9-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																														
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.8	1																														
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																														
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			5.1	1																														
HA-95-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.2	1																														
HA-96-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			10	1																														
HA-96-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.5	1																														
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	12.4	1	171	1	0.35	1	0.5	1	60.3	1	12.4	1	72.2	1	20.7	1	0.17	1	48.6	1	1.0	1	0.75	1	1.6	1	30.6	1	73.0	1	2.6	0
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.7	1	94.4	1	0.16	1	0.19	1	35.9	1	5.9	1	58.9	1	16.4	1	0.04	0	20.8	1	0.66	1	0.45	1	1.2	1	19.1	1	58.1	1	2.7	0
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	9.9	1	191	1	0.39	1	0.40	1	61.0	1	12.4	1	55.4	1	10.8	1	0.05	0	43.9	1	1.3	1	0.70	1	1.5	1	30.7	1	57.8	1	2.6	0
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	10.4	1	173	1	0.42	1	0.32	1	70.1	1	14.7	1	66.1	1	10.5	1	0.02	0	47.1	1	1.2	1	0.70	1	1.9	1	36.8	1	64.2	1	2.7	0
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	11.8	1	209	1	0.44	1	0.51	1	73.0	1	16.8	1	61.9	1	14.4	1	0.06	0	54.9	1	1.2	1	0.99	1	1.6	1	42.7	1	86.4	1	2.7	0
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.7	0	14.8	1	177	1	0.44	1	0.56	1	99.7	1	20.1	1	72.9	1	10.9	1	0.11	0	64.6	1	1.4	1	1.1	1	1.8	1	52.5	1	90.1	1	2.8	0
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	12	1	154	1	0.31	1	0.34	1	19.6	1	12.3	1	44.6	1	14.1	1	0.09	0	22.6	1	0.74	1	0.64	1	1.1	1	20.1	1	55.0	1	3.1	0
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.4	0	11.5	1	177	1	0.46	1	0.38	1	26.5	1	9.8	1	60.9	1	9.9	1	0.1	0	25.2	1	0.96	1	0.79	1	1.6	1	24.3	1	56.6	1	3.1	0
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10.1	1	211	1	0.33	1	0.48	1	31.9	1	15.5	1	54.4	1	17.7	1	0.03	0	38.7	1	1.4	1	0.42	1	1.5	1	23.7	1	74.6	1	2.6	0
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.1	1	172	1	0.42	1	0.45	1	66.7	1	12.4	1	84.0	1	12.3	1	0.04	0	59.7	1	1.6	1	0.63	1	1.7	1	32.8	1	70.9	1	2.7	0
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	6.6	1	222	1	0.31	1	0.62	1	30.6	1	20.8	1	82.4	1	16.1	1	0.06	0	50.1	1	1.6	1	0.77	1	1.7	1	22.9	1	83.3	1	2.6	0
SOIL06-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	8.5	1	240	1	0.31	1	0.63	1	28.4	1	18.1	1	73.0	1	38.0	1	0.09	0	44.4	1	1.4	1	0.66	1	1.5	1	22.8	1	85.1	1	2.7	0
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	18.7	1	203	1	0.42	1	0.41	1	34.0	1	14.4	1	64.6	1	22.4	1	0.09	0	33.3	1	1.2	1	0.58	1	1.6	1	25.0	1	66.9	1	2.7	0
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	12.2	1	182	1	0.38	1	0.29	1	26.0	1	12.9	1	52.2	1	15.7	1	0.05	0	27.0	1	1.0	1	0.46	1	1.3	1	22.5	1	52.1	1	2.7	0
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.8	0	9.1	1	128	1	0.25	1	0.30	1	22.7	1	5.0	1	63.4	1	18.7	1	0.09	0	21.2	1	1.4	1	0.36	1	1.2	1	18.7	1	61.7	1	2.9	0
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.3	1	91.3	1	0.24	1	0.39	1	21.4	1	7.3	1	100.0	1	8.2	1	0.03	0	61.7	1	1.5	1	0.69	1	1.7	1	15.5	1	175	1	2.7	0
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.1	0	10.5	1	196	1	0.32	1	0.45	1	34.8	1	14.6	1	53.6	1	17.3	1	0.06	0	37.3	1	1.5	1	0.60	1	1.5	1	23.6	1	72.7	1	2.6	0
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	7.7	1	162	1	0.3	1	0.33	1	29.9	1	12.1	1	52.2	1	12.0	1	0.04	0	33.2	1	1.2	1	0.53	1	1.5	1	22.1	1	59.4	1	2.6	0
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.4	1	208	1	0.35	1	0.32	1	28.3	1	10.1	1	55.2	1	19.0	1	0.07	0	27.3	1	1.3	1	0.64	1	1.4	1	22.4	1	57.5	1	2.7	0
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.9	1	181	1	0.41	1	0.29	1	30.0	1	14.6	1	75.5	1	16.5	1	0.02	0	31.1	1	1.2	1	0.74	1	1.8	1	26.5	1	26.5	1	2.7	0
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.7	0	9.8	1	259	1	0.34	1	0.34	0	25.9	1	10.4	1	61.6	1	23.5	1	0.086	1	34.7	1	1.3	1	0.8	1	0.96	1	23.5	1	23.5	1	2.8	0
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6	0	6.2	1	204	1	0.32	1	0.15	0	20.9	1	8.8	1	58.3	1	10.3	1	0.019	1	28.8	1	1.2	1	0.76	1	1.1	1	20.9	1	20.9	1	2.5	0
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	14.6	1	205	1	0.28	1	0.23	0	28.5	1	11	1	77.9	1	20.0	1	0.09	0	32.5	1	1.1	1	0.89	1	1.1	1	25.1	1	25.1	1	2.7	0
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	14.4	1	203	1	0.31	1	0.22	0	33.4	1	11.3	1	77.4	1	23.7	1	0.11	1	38.9	1	1.3	1	0.81	1	1.2	1	23.3	1	23.3	1	2.6	0
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	4.3	1	140	1	0.26	1	0.10	0	27	1	12.9	1	99.8	1	9.4	1	0.045	1	43.7	1	1	1	0.71	1	1.3	1	19.8	1	69.4	1	2.6	0
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	13.9	1	187	1	0.32	1	0.33	0	52	1	15.4	1	58.9	1	18.1	1	0.066	1	58.3	1	1.1	1	0.95	1	1.3	1	30.3	1	93.5	1	2.6	0
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.3	0	14.4	1	204	1	0.40	1	0.38	0	65.1	1	18.6	1	76.4	1	15.8	1	0.028	1	70.6	1	1.3	1	1	1	1.6	1	37.5	1	106	1	3.0	0
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7	0	9.8	1	174	1	0.30	1	0.16	0	22.8	1	6.6	1	62.8	1	16.9	1	0.071	1	20.5	1	1.6	1	0.62	1	1.2	1	20.5	1	58.8	1	2.9	0
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.3	1	107	1	0.26	1	0.07	0	15.8	1	5.1	1	62.9	1	9.4	1	0.039	1	17	1	1.8	1	0.47	1	1.0	1	15.7	1	42.9	1	2.7	0
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	112	1	0.3	1	0.05	0	17.4	1	5.7	1	71.6	1	10.2	1	0.038	1	19.8	1	2	1	0.61	1	1.1	1	17.8	1	48.6	1	2.7	0
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	8.3	1	178	1	0.29	1	0.15	0	20.6	1	7.9	1	81.2	1	17.0	1	0.08	1	21.5	1	1.2	1	0.77	1	1.0	1	20.3	1	50.1	1	2.6	0
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	2.8	1	106	1	0.25	1	0.05	0	17.1	1	4.1	0	65.4	1	13.9	1	0.052	1	17	1	0.94	1	0.42	1	1.0	1	15.9	1	42.3	1	2.6	0
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	11.2	1	186	1	0.29	1	0.19	0	45.8	1	14.2	1	58.6	1	11.0	1	0.031	1	48.5	1	1.1	1	0.81	1	1.3	1	25.8	1	74.4	1	2.6	0
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.2	0	5.5	1	107	1	0.18	1	0.1	0	40.6	1	7.7	1	62.4	1	6.3	1	0.12	0	32.9	1	1.0	1	0.69	1	1.0	1	17.6	1	62.2	1	3.0	0
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.2	0	13.1	1	307	1	0.39	1	0.52	0	59.0	1	29.9	1	90.7	1	26.3	1	0.12	1	77.7	1	1.4	1	1.3	1	1.5	1	35.4	1	160	1	3.4	0

SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	8.9	0	10.6	1	258	1	0.33	1	0.48	0	47.0	1	28.9	1	90.4	1	24.7	1	0.078	1			70	1	1.3	1	1.1	1	1.6	1	30.9	1	149	1	3.7	0		
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	10.1	1	231	1	0.55	1	0.24	0	38.4	1	19.4	1	66.6	1	18.0	1	0.054	1			39.3	1	1.2	1	1.1	1	1.5	1	38.6	1	97.5	1	3.1	0		
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.4	1	186	1	0.44	1	0.19	0	28.2	1	14.9	1	52.5	1	14.7	1	0.048	1			31.4	1	1.1	1	0.81	1	1.4	1	30.9	1	78.6	1	2.6	0		
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	6.2	1	182	1	0.50	1	0.40	0	26.6	1	18.5	1	65.9	1	14.1	1	0.02	0			35.8	1	0.66	1	0.13	1	0.94	1	37.3	1	85.1	1	2.7	0		
SOIL21-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	14.1	1	198	1	0.33	1	0.37	1	22.7	1	7.2	1	91.2	1	15.8	1	0.34	1			26.9	1	0.54	1	0.14	1	0.82	1	28.3	1	75.2	1	2.7	0		
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.3	1	193	1	0.36	1	0.38	1	25.1	1	7.2	1	87.2	1	11.3	1	0.05	0			26.3	1	0.94	1	1.1	0	0.94	1	30.2	1	71.8	1	2.7	0		
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	11.3	1	191	1	0.34	1	0.71	1	25.4	1	20.1	1	73.4	1	12.6	1	0.021	1			35	1	1.2	1	1.1	0	1.0	0	24.7	1	87.7	1	2.7	0		
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	10.4	1	161	1	0.37	1	0.65	1	26.7	1	18.3	1	80.3	1	15.4	1	0.023	1			27.8	1	1.3	1	1.1	0	0.97	0	24.6	1	69.9	1	2.7	0		
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	9.3	1	208	1	0.39	1	0.60	1	24.8	1	9.2	1	54.1	1	16.2	1	0.039	1			21.4	1	1.5	1	1.1	0	0.84	0	27.2	1	59.6	1	2.6	0		
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.8	1	203	1	0.41	1	0.62	1	32.6	1	10.2	1	70.7	1	14.3	1	0.031	1			21.9	1	1.7	1	1.1	0	0.97	0	32.6	1	60.5	1	2.7	0		
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	7.5	1	192	1	0.37	1	0.55	1	23.1	1	10.2	1	60.4	1	14.1	1	0.022	1			21.7	1	1.5	1	1.1	0	1	0	28.7	1	61.7	1	2.7	0		
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	16.3	1	185	1	0.32	1	0.73	1	45.3	1	13.2	1	58.1	1	14.8	1	0.068	1			46.3	1	1.5	1	1	0	1.1	0	32.2	1	73.7	1	2.6	0		
SOIL26-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	24.4	1	136	1	0.29	1	0.82	1	167	1	16.2	1	68.5	1	11.6	1	0.1	0			93.6	1	1.3	1	1	0	1.1	0	56.7	1	97.5	1	2.6	0		
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.7	1	207	1	0.39	1	0.60	1	26.3	1	9.5	1	64.6	1	15.4	1	0.048	1			24.7	1	1.5	1	0.52	1	0.95	0	27.4	1	61.5	1	2.7	0		
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	12.2	1	195	1	0.38	1	0.54	0	23.9	1	10.3	1	67.1	1	11.9	1	0.017	1			23.5	1	1.2	1	1.1	0	1.1	0	29.4	1	61.5	1	2.7	0		
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.3	1	198	1	0.34	1	0.51	0	24.2	1	10.4	1	61.3	1	11.9	1	0.01	0			21.6	1	1.4	1	0.15	1	0.98	0	26	1	57.1	1	2.7	0		
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.1	1	154	1	0.21	1	0.44	0	16.6	1	9.9	1	54.5	1	30.2	1	0.11	1			17.0	1	0.51	1	0.27	1	0.66	0	13	1	83.0	1	2.6	0		
SOIL31-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	3.9	1	86.3	1	0.22	0	0.27	0	17.0	1	6.0	1	58.9	1	15.3	1	0.04	0			12.2	1	3.7	0	0.14	1	0.68	0	13.3	1	62.1	1	2.6	0		
SOIL32-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	32.1	1	112	1	0.36	0	0.53	1	52.5	1	29.4	1	83.7	1	8.9	1	0.26	1			20.4	1	0.89	1	0.34	1	1.1	0	96.1	1	62.2	1	2.6	0		
SOIL32-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	6.2	1	78	1	0.22	0	0.39	0	57.0	1	31.3	1	69.1	1	2.7	1	0.04	0			17.1	1	0.79	1	0.37	1	0.99	0	84.6	1	54.2	1	2.7	0		
SOIL33-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	29.6	1	174	1	0.44	0	0.45	0	49.9	1	23.9	1	62.2	1	8.4	1	0.04	0			30.5	1	0.57	1	0.41	1	0.94	0	65.2	1	57.8	1	2.6	0		
SOIL33-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9	0	46.9	1	228	1	0.55	0	0.57	0	68.0	1	29.9	1	82.2	1	9.8	1	0.05	0			41.0	1	1.0	1	0.56	1	1.4	0	88.2	1	78.2	1	3.9	0		
SOIL44-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.9	0	13.5	1	124	1	0.21	1	0.41	1	15	1	14.2	1	38.9	1	12.6	1	0.15	1			21.6	1	1.1	1	1.3	0	3.3	0	17.0	1	59.5	1	3.3	0		
SOIL44-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9.9	0	12.9	1	149	1	0.47	1	0.39	1	28.7	1	12.3	1	63.9	1	16.5	1	0.23	1			28.1	1	1.0	1	1.7	0	0.81	1	33.1	1	61.6	1	4.1	0		
SOIL44-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	8.2	0	9.6	1	768	1	0.47	1	0.50	1	29.1	1	17.0	1	62.5	1	16.3	1	0.03	1			34.5	1	0.88	1	0.34	1	0.82	1	37.3	1	62.9	1	3.4	0		
SOIL46-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10	1	127	1	0.25	1	0.34	1	14.7	1	9.5	1	34.9	1	21.4	1	0.15	1			15.3	1	0.83	1	1.1	0	0.26	1	19.8	1	52.8	1	2.7	0		
SOIL46-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	113	1	0.34	1	0.36	1	23.7	1	10.2	1	41.8	1	14.6	1	0.22	1			21.2	1	0.76	1	1.1	0	0.39	1	26.8	1	47.9	1	2.7	0		
SOIL46-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	6.7	0	10.1	1	121	1	0.35	1	0.45	1	27.9	1	18.1	1	54.3	1	7.7	1	0.11	1			31.5	1	0.65	1	1.1	0	0.70	1	30.5	1	56.3	1	2.8	0		
SOIL47-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	20.7	1	108	1	0.20	1	0.36	1	66.4	1	28.8	1	67.7	1	13.2	1	0.10	1			59.7	1	0.99	1	1.1	0	0.28	1	32.9	1	75.5	1	2.7	0		
TP-55-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			7.7	1																																		
TP-55-1.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.0-1.5			4.9	1																																		
TP-56-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			14	1																																		
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	7	1	140	1	1	0	2	1	88	1	28	1	83	1	8.9	1	0.1	0	1	0	53	1	2.5	0	1	0	4	0	20	1	130	1			15	1
TP-56-2.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	2.0-2.5			2.2	1																																		
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			6	1																																		
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	1	0	110	1	1	0	1.5	1	14	1	3.8	1	62	1	9.6	1	0.1	0	3.7	1	19	1	2.5	0	1	0	4	0	19	1	57	1			41	1
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																		
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																		
TP-60-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			3.5	1																																		
TP-60-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																		
TP-60-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																		
TP-60-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																		
TP-60R-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																		
TP-61-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.9	1																																		
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1.2	1	140	1	12	1	2.9	1	11	1	15	1	71	1	5.1	1	0.1	0	1	0	9.4	1	2.5	0	1	0	4	0	99	1	54	1			51	1
TP-61-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																		
TP-61-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																		
TP-62-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			2.9	1																																		
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1	0	170	1	12	1	2.9	1	24	1	18	1	74	1	4.0	1	0.1	0	1	0	15	1	2.5	0	1	0	4	0	130	1	56	1			53	1
TP-62-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																		
TP-62-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																		
TP-63-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.2	1																																		
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	2.5	0	1	0	160	1	12	1	2.9	1	22	1	19	1	75	1	3.2	1	0.1	0	1	0	13	1	2.5	0	1	0	4	0	130	1	52	1			40	1
TP-63-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2	0																																		
TP-63-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2.3	1																																		
TP-63R-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2.2	1																																		

Background, Non-Mineralized
Intermediate Data Set

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	2.5	0	1	0	160	1	12	1	2.9	1	22	1	19	1	75	1	3.2	1	0.1	0	1	0	13	1	2.5	0	1	0	4	0	130	1	52	1											40	1
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1	0	170	1	12	1	2.9	1	24	1	18	1	74	1	4.0	1	0.1	0	1	0	15	1	2.5	0	1	0	4	0	130	1	56	1											53	1
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	1	0	110	1	1	0	1.5	1	14	1	3.8	1	62	1	9.6	1	0.1	0	3.7	1	19	1	2.5	0	1	0	4	0	19	1	57	1											41	1
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	9.9	0	1	0	135	1	0.31	1	2.5	0	24.0	1	8.4	1	58.3	1	7.7	1	0.2	0	9.9	0	50.9	1	0.30	1	2.5	0			18	1	129	1					5.0	0						
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	1	0	244	1	0.28	1	2.5	0	22.0	1	9.3	1	48.6	1	15.0	1	0.2	0	9.8	0	27	1	0.3	0	2.5	0			25.2	1	58.5	1					5.0	0						
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	65.9	1	0.25	0	2.5	0	23.0	1	5	0	36.6	1	7.5	0	0.029	1	9.9	0	15.0	1	1	0	2.5	0			17.0	1	28.0	1			5.0	0								
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.9	0	1	0	190	1	0.25	0	2.5	0	16	1	49.0	1	172	1	17.0	1	0.039	1	9.9	0	74.2	1	1	0	2.5	0			13.0	1	87.3	1			5.0	0			50	0				
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	75.2	1	0.25	0	2.5	0	28.2	1	5	0	36.3	1	7.5	0	0.044	1	9.9	0	18.0	1	1	0	2.5	0			17.0	1	32.0	1			5.0	0								
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1.2	1	140	1	12	1	2.9	1	11	1	15	1	71	1	5.1	1	0.1	0	1	0	9.4	1	2.5	0	1	0	4	0	99	1	54	1											51	1
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	10	0	2	1	134	1	0.37	1	2.5	0	22.0	1	9.9	1	62.2	1	18.0	1	0.2	0	10	0	22	1	0.30	1	2.5	0			23.0	1	68.9	1					5.0	0						
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.9	0	2	1	105	1	0.25	0	2.5	0	21.0	1	6.8	1	58.6	1	11.0	1	0.032	1	9.9	0	29	1	1	0	2.5	0			20.0	1	72.9	1			5.0	0								
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.8	0	2	1	107	1	0.29	1	2.5	1	22.0	1	6.9	1	55.4	1	15.0	1	0.033	1	9.8	0	31	1	1	0	2.5	0			20.0	1	71.6	1			5.0	0	5.0	0						
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.8	0	2	1	278	1	0.25	0	2.5	0	16	1	101.0	1	178	1	23.0	1	0.065	1	9.8	0	111	1	1	0	2.5	0			14.0	1	86.3	1			5.0	0			50	0				
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																												
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																											
TP-60-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																											
TP-60-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5			2	0																																											
TP-60-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0			2	0																																											
TP-60R-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0			2	0																																											
TP-61-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																											
TP-61-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																											
TP-62-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2	0																																											
TP-62-4.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	4.5-5.0			2	0																																											
TP-63-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2	0																																											
TP-56-2.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	2.0-2.5			2.2	1																																											
TP-63R-2.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	2.0-2.5			2.2	1																																											
TP-63-3.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	3.0-3.5			2.3	1																																											
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	2.8	1	106	1	0.25	1	0.05	0	17.1	1	4.1	0	65.4	1	13.9	1	0.052	1			17	1	0.94	1	0.42	1	1.0	1	15.9	1	42.3	1			2.6	0								
TP-62-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			2.9	1																																												
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	3	1	227	1	0.36	1	2.5	0	25.7	1	12.0	1	35.4	1	25.0	1	0.2	0	10	0	23	1	0.3	0	2.5	0			25.6	1	56.8	1					5.0	0			50	0		
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	9.9	0	3	1	27.1	1	0.36	1	2.5	0	43.7	1	5	0	112	1	7.5	0	0.2	0	9.9	0	12.0	1	0.40	1	2.5	0			21.0	1	14.0	1					5.0	0			50	0		
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	3	1	143	1	0.31	1	2.5	0	22.0	1	4.9	0	118	1	11.0	1	0.026	1	9.9	0	23	1	1	0	2.5	0			29.4	1	61.6	1			5.0	0								
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.8	0	3	1	123	1	0.27	1	2.5	0	24.0	1	7.0	1	116	1	10.0	1	0.03	1	9.8	0	31	1	1	0	2.5	0			28.4	1	81.5	1			5.0	0								
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.3	1	91.3	1	0.24	1	0.39	1	21.4	1	7.3	1	100.0	1	8.2	1	0.03	0			61.7	1	1.5	1	0.69	1	1.7	1	15.5	1	175	1			2.7	0								
TP-60-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			3.5	1																																											
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.7	1	94.4	1	0.16	1	0.19	1	35.9	1	5.9	1	58.9	1	16.4	1	0.04	0			20.8	1	0.66	1	0.45	1	1.2	1	19.1	1	58.1	1			2.7	0								
~~SOIL31-3~~	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0																																														
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	4	1	277	1	0.29	1	2.5	0	24.0	1	10.0	1	63.1	1	12.0	1	0.2	0	9.9	0	24	1	0.50	1	2.5	0			24.9	1	69.1	1					5.0	0						
TP-63-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.2	1																																											
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	4.3	1	140	1	0.26	1	0.10	0	27	1	12.9	1	99.8	1	9.4	1	0.045	1			43.7	1	1	1	0.71	1	1.3	1	19.8	1	69.4	1			2.6	0								
HA-78-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.3	1																																											
HA-79-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			4.6	1																																											
TP-55-1.0	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.0-1.5			4.9	1																																											
TP-61-0.0	05/22/23	Geocon 2023	BKG	SURF	MAR	S	0.0-0.5			4.9	1																																											
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	10	0	5	1	155	1	0.5	1	2.5	0	32.3	1	13.0	1	58.5	1	12.0	1	0.2	0	9.8	0	29	1	0.3	0	2.5	0			36.3	1	61.1	1					5.0	0			50	0		
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	5	1	156	1	0.27	1	2.5	0	44.9	1	9.3	1	54.8	1	19.0	1	0.2	0	9.8	0	33	1	0.30	1	2.5	0			25.5	1	69.8	1					5.0	0						
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	5	1	186	1	0.46	1	2.5	0	26.7	1	13.0	1	65.9	1	18.0	1	0.2	0	9.9	0	34	1	0.70	1	2.5	0			30.4	1	87.4	1					5.0	0						
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	9.8	0	5	1	152	1	0.40	1	2.5	0	23.0	1	7.4	1	73.6	1	10.0	1	0.035	1	9.8	0	37	1	1	0	2.5	0			27	1	68.0	1			5.0	0								
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			5.1	1																																											
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.2	0	5.5	1	107	1	0.18	1	0.1	0	40.6	1	7.7	1	62.4	1	6.3	1	0.12	0			32.9	1	1.0	1	0.69	1	1.0	1	17.6	1	62.2	1			3.0	0								
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	6	1	265	1	0.25	0	2.5	0	25.5	1	9.8	1	56.3	1	21.0	1	0.2	0	10	0	31	1	0.30	1	2.5	0			20.0	1	85.7	1					5.0	0						
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	6	1	225	1	0.55	1	2.5	0	34.7	1	11.0	1	64	1	15.0	1	0.2	0	9.9	0	33	1	0.50	1	2.5	0			34.4	1	69.6	1					5.0	0						
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			6	1																																											

Background, Non-Mineralized
Intermediate Data Set

HA-23-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.1	1																																				
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	6.2	1	182	1	0.50	1	0.40	0	26.6	1	18.5	1	65.9	1	14.1	1	0.02	0			35.8	1	0.66	1	0.13	1	0.94	1	37.3	1	85.1	1	2.7	0				
SOIL32-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	6.2	1	78	1	0.22	0	0.39	0	57.0	1	31.3	1	69.1	1	2.7	1	0.04	0			17.1	1	0.79	1	0.37	1	0.99	0	84.6	1	54.2	1	2.7	0				
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6	0	6.2	1	204	1	0.32	1	0.15	0	20.9	1	8.8	1	58.3	1	10.3	1	0.019	1			28.8	1	1.2	1	0.76	1	1.1	1	20.9	1	20.9	1	2.5	0				
HA-15-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.2	1																																				
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	6.6	1	222	1	0.31	1	0.62	1	30.6	1	20.8	1	82.4	1	16.1	1	0.06	0			50.1	1	1.6	1	0.77	1	1.7	1	22.9	1	83.3	1	2.6	0				
HA-80-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.6	1																																				
HA-10-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.7	1																																				
HA-16-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			6.7	1																																				
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			6.8	1																																				
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	7	1	140	1	1	0	2	1	88	1	28	1	83	1	8.9	1	0.1	0	1	0	53	1	2.5	0	1	0	4	0	20	1	130	1					15	1
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	7	1	154	1	0.62	1	2.5	0	45.3	1	11.0	1	69.5	1	8.9	1	0.2	0	9.9	0	36	1	0.3	0	2.5	0			30.4	1	71.8	1			5.0	0		
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	7	1	154	1	0.25	0	2.5	0	17.0	1	5.8	1	48.0	1	22.0	1	0.2	1	9.9	0	21	1	0.3	0	2.5	0			17	1	61.6	1			5.0	0		
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	7	1	195	1	0.39	1	2.5	0	22.0	1	11.0	1	58.1	1	11.0	1	0.2	0	9.9	0	25	1	0.50	1	2.5	0			25	1	51.1	1			5.0	0		
HA-11-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7	1																																				
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.1	1	172	1	0.42	1	0.45	1	66.7	1	12.4	1	84.0	1	12.3	1	0.04	0			59.7	1	1.6	1	0.63	1	1.7	1	32.8	1	70.9	1	2.7	0				
HA-95-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.2	1																																				
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.3	1	193	1	0.36	1	0.38	1	25.1	1	7.2	1	87.2	1	11.3	1	0.05	0			26.3	1	0.94	1	1.1	0	0.94	1	30.2	1	71.8	1	2.7	0				
HA-77-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.3	1																																				
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	7.5	1	192	1	0.37	1	0.55	1	23.1	1	10.2	1	60.4	1	14.1	1	0.022	1			21.7	1	1.5	1	1.1	0	1	0	28.7	1	61.7	1	2.7	0				
HA-11-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.5	1																																				
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.5	1																																				
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	7.7	1	162	1	0.3	1	0.33	1	29.9	1	12.1	1	52.2	1	12.0	1	0.04	0			33.2	1	1.2	1	0.53	1	1.5	1	22.1	1	59.4	1	2.6	0				
HA-12-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.7	1																																				
HA-18-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			7.7	1																																				
TP-55-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			7.7	1																																				
HA-77-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			7.8	1																																				
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.1	1	154	1	0.21	1	0.44	0	16.6	1	9.9	1	54.5	1	30.2	1	0.11	1			17.0	1	0.51	1	0.27	1	0.66	0	13	1	83.0	1	2.6	0				
HA-1-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.2	1																																				
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.3	1	107	1	0.26	1	0.07	0	15.8	1	5.1	1	62.9	1	9.4	1	0.039	1			17	1	1.8	1	0.47	1	1.0	1	15.7	1	42.9	1	2.7	0				
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	8.3	1	178	1	0.29	1	0.15	0	20.6	1	7.9	1	81.2	1	17.0	1	0.08	1			21.5	1	1.2	1	0.77	1	1.0	1	20.3	1	50.1	1	2.6	0				
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.4	1	186	1	0.44	1	0.19	0	28.2	1	14.9	1	52.5	1	14.7	1	0.048	1			31.4	1	1.1	1	0.81	1	1.4	1	30.9	1	78.6	1	2.6	0				
~~SOIL06-3~~	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0																																								
HA-96-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.5	1																																				
HA-24-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.7	1																																				
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			8.7	1																																				
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.8	1	203	1	0.41	1	0.62	1	32.6	1	10.2	1	70.7	1	14.3	1	0.031	1			21.9	1	1.7	1	1.1	0	0.97	0	32.6	1	60.5	1	2.7	0				
HA-19-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			8.8	1																																				
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.8	0	9.1	1	128	1	0.25	1	0.30	1	22.7	1	5.0	1	63.4	1	18.7	1	0.09	0			21.2	1	1.4	1	0.36	1	1.2	1	18.7	1	61.7	1	2.9	0				
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	9.3	1	208	1	0.39	1	0.60	1	24.8	1	9.2	1	54.1	1	16.2	1	0.039	1			21.4	1	1.5	1	1.1	0	0.84	0	27.2	1	59.6	1	2.6	0				
HA-20-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			9.3	1																																				
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	112	1	0.3	1	0.05	0	17.4	1	5.7	1	71.6	1	10.2	1	0.038	1			19.8	1	2	1	0.61	1	1.1	1	17.8	1	48.6	1	2.7	0				
SOIL46-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	113	1	0.34	1	0.36	1	23.7	1	10.2	1	41.8	1	14.6	1	0.22	1			21.2	1	0.76	1	1.1	0	0.39	1	26.8	1	47.9	1	2.7	0				
SOIL44-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	8.2	0	9.6	1	768	1	0.47	1	0.50	1	29.1	1	17.0	1	62.5	1	16.3	1	0.03	1			34.5	1	0.88	1	0.34	1	0.82	1	37.3	1	62.9	1	3.4	0				
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7	0	9.8	1	174	1	0.30	1	0.16	0	22.8	1	6.6	1	62.8	1	16.9	1	0.071	1			20.5	1	1.6	1	0.62	1	1.2	1	20.5	1	58.8	1	2.9	0				
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.7	0	9.8	1	259	1	0.34	1	0.34	0	25.9	1	10.4	1	61.6	1	23.5	1	0.086	1			34.7	1	1.3	1	0.8	1	0.96	1	23.5	1	23.5	1	2.8	0				
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	9.9	1	191	1	0.39	1	0.40	1	61.0	1	12.4	1	55.4	1	10.8	1	0.05	0			43.9	1	1.3	1	0.70	1	1.5	1	30.7	1	57.8	1	2.6	0				
SOIL46-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10	1	127	1	0.25	1	0.34	1	14.7	1	9.5	1	34.9	1	21.4	1	0.15	1			15.3	1	0.83	1	1.1	0	0.26	1	19.8	1	52.8	1	2.7	0				
HA-13-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			10	1																																				
HA-96-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			10	1																																				
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10.1	1	211	1	0.33	1	0.48	1	31.9	1	15.5	1	54.4	1	17.7	1	0.03	0			38.7	1	1.4	1	0.42	1	1.5	1	23.7	1	74.6	1	2.6	0				
SOIL46-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	6.7	0	10.1	1	121	1	0.35	1	0.45	1	27.9	1	18.1	1	54.3	1	7.7	1	0.11	1			31.5	1	0.65	1	1.1	0	0.70	1	30.5	1	56.3	1	2.8	0				
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	10.1	1	231	1	0.55	1	0.24	0	38.4	1	19.4	1	66.6	1	18.0	1	0.054	1			39.3	1	1.2	1	1.1	1	1.5	1	38.6	1	97.5	1	3.1	0				
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	10.4	1	173	1	0.42	1	0.32	1	70.1	1	14.7	1	66.1	1	10.5	1	0.02	0			47.1	1	1.2	1	0.70	1	1.9	1	36.8	1	64.2	1	2.7	0				
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	10.4	1	161	1	0.37	1	0.65	1	26.7	1	18.3	1	80.3	1	15.4	1	0.023	1			27.8	1	1.3	1	1.1	0	0.97	0	24.6	1	69.9	1	2.7	0				
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.1	0	10.5	1	196	1	0.32	1	0.45	1	34.8	1	14.6	1	53.6	1	17.3	1	0.06	0			37.3	1	1.5	1	0.60	1	1.5	1	23.6	1	72.7	1	2.6	0				

Background, Non-Mineralized
Intermediate Data Set

SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	8.9	0	10.6	1	258	1	0.33	1	0.48	0	47.0	1	28.9	1	90.4	1	24.7	1	0.078	1			70	1	1.3	1	1.1	1	1.6	1	30.9	1	149	1	3.7	0		
HA-17-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																		
HA-21-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																		
HA-30-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																		
HA-6-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																		
HA-9-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			11	1																																		
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	11.2	1	186	1	0.29	1	0.19	0	45.8	1	14.2	1	58.6	1	11.0	1	0.031	1			48.5	1	1.1	1	0.81	1	1.3	1	25.8	1	74.4	1	2.6	0		
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.3	1	198	1	0.34	1	0.51	0	24.2	1	10.4	1	61.3	1	11.9	1	0.01	0			21.6	1	1.4	1	0.15	1	0.98	0	26	1	57.1	1	2.7	0		
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	11.3	1	191	1	0.34	1	0.71	1	25.4	1	20.1	1	73.4	1	12.6	1	0.021	1			35	1	1.2	1	1.1	0	1.0	0	24.7	1	87.7	1	2.7	0		
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.4	0	11.5	1	177	1	0.46	1	0.38	1	26.5	1	9.8	1	60.9	1	9.9	1	0.1	0			25.2	1	0.96	1	0.79	1	1.6	1	24.3	1	56.6	1	3.1	0		
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	11.8	1	209	1	0.44	1	0.51	1	73.0	1	16.8	1	61.9	1	14.4	1	0.06	0			54.9	1	1.2	1	0.99	1	1.6	1	42.7	1	86.4	1	2.7	0		
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.9	1	181	1	0.41	1	0.29	1	30.0	1	14.6	1	75.5	1	16.5	1	0.02	0			31.1	1	1.2	1	0.74	1	1.8	1	26.5	1	26.5	1	2.7	0		
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	12	1	154	1	0.31	1	0.34	1	19.6	1	12.3	1	44.6	1	14.1	1	0.09	0			22.6	1	0.74	1	0.64	1	1.1	1	20.1	1	55.0	1	3.1	0		
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	12	1	189	1	0.38	1	2.5	0	37.2	1	15.0	1	52.3	1	19.0	1	0.2	0	9.9	0	39	1	0.30	1	2.5	0			32.6	1	67.9	1			5.0	0
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	12	1	219	1	0.52	1	2.5	0	37.4	1	4.9	0	77.3	1	12.0	1	0.2	0	9.9	0	42	1	0.50	1	2.5	0			31	1	68.9	1			5.0	0
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	12.2	1	182	1	0.38	1	0.29	1	26.0	1	12.9	1	52.2	1	15.7	1	0.05	0			27.0	1	1.0	1	0.46	1	1.3	1	22.5	1	52.1	1	2.7	0		
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	12.2	1	195	1	0.38	1	0.54	0	23.9	1	10.3	1	67.1	1	11.9	1	0.017	1			23.5	1	1.2	1	1.1	0	1.1	0	29.4	1	61.5	1	2.7	0		
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	12.4	1	171	1	0.35	1	0.5	1	60.3	1	12.4	1	72.2	1	20.7	1	0.17	1			48.6	1	1.0	1	0.75	1	1.6	1	30.6	1	73.0	1	2.6	0		
SOIL44-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9.9	0	12.9	1	149	1	0.47	1	0.39	1	28.7	1	12.3	1	63.9	1	16.5	1	0.23	1			28.1	1	1.0	1	1.7	0	0.81	1	33.1	1	61.6	1	4.1	0		
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	13	1	197	1	0.5	1	2.5	0	55.0	1	16.0	1	54.7	1	15.0	1	0.2	0	9.9	0	61.6	1	0.30	1	2.5	0			39.3	1	82.7	1			5.0	0
HA-5-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			13	1																																		
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.2	0	13.1	1	307	1	0.39	1	0.52	0	59.0	1	29.9	1	90.7	1	26.3	1	0.12	1			77.7	1	1.4	1	1.3	1	1.5	1	35.4	1	160	1	3.4	0		
SOIL44-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.9	0	13.5	1	124	1	0.21	1	0.41	1	15	1	14.2	1	38.9	1	12.6	1	0.15	1			21.6	1	1.1	1	1.3	0	3.3	0	17.0	1	59.5	1	3.3	0		
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	13.9	1	187	1	0.32	1	0.33	0	52	1	15.4	1	58.9	1	18.1	1	0.066	1			58.3	1	1.1	1	0.95	1	1.3	1	30.3	1	93.5	1	2.6	0		
TP-56-0.0	05/23/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5			14	1																																		
~~SOIL21-1~~	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5																																						
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	14.4	1	203	1	0.31	1	0.22	0	33.4	1	11.3	1	77.4	1	23.7	1	0.11	1			38.9	1	1.3	1	0.81	1	1.2	1	23.3	1	23.3	1	2.6	0		
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.3	0	14.4	1	204	1	0.40	1	0.38	0	65.1	1	18.6	1	76.4	1	15.8	1	0.028	1			70.6	1	1.3	1	1	1	1.6	1	37.5	1	106	1	3.0	0		
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	14.6	1	205	1	0.28	1	0.23	0	28.5	1	11	1	77.9	1	20.0	1	0.09	0			32.5	1	1.1	1	0.89	1	1.1	1	25.1	1	25.1	1	2.7	0		
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.7	0	14.8	1	177	1	0.44	1	0.56	1	99.7	1	20.1	1	72.9	1	10.9	1	0.11	0			64.6	1	1.4	1	1.1	1	1.8	1	52.5	1	90.1	1	2.8	0		
HA-14-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			15	1																																		
HA-22-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			15	1																																		
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	16.3	1	185	1	0.32	1	0.73	1	45.3	1	13.2	1	58.1	1	14.8	1	0.068	1			46.3	1	1.5	1	1	0	1.1	0	32.2	1	73.7	1	2.6	0		
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			17	1																																		
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.4	1	208	1	0.35	1	0.32	1	28.3	1	10.1	1	55.2	1	19.0	1	0.07	0			27.3	1	1.3	1	0.64	1	1.4	1	22.4	1	57.5	1	2.7	0		
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.7	1	207	1	0.39	1	0.60	1	26.3	1	9.5	1	64.6	1	15.4	1	0.048	1			24.7	1	1.5	1	0.52	1	0.95	0	27.4	1	61.5	1	2.7	0		
HA-43-0.5	02/10/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			18	1																																		
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	18.7	1	203	1	0.42	1	0.41	1	34.0	1	14.4	1	64.6	1	22.4	1	0.09	0			33.3	1	1.2	1	0.58	1	1.6	1	25.0	1	66.9	1	2.7	0		
HA-3-0.5	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			19	1																																		
HA-3-0.5 (dup)	02/09/09	Arcadis 2009	BKG	SURF	MAR	S	0.5			19	1																																		
HA-69-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			20	1																																		
SOIL47-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	20.7	1	108	1	0.20	1	0.36	1	66.4	1	28.8	1	67.7	1	13.2	1	0.10	1			59.7	1	0.99	1	1.1	0	0.28	1	32.9	1	75.5	1	2.7	0		
HA-64-0.5	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																		
HA-69-0.5 (dup)	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																		
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5			23	1																																		
~~SOIL26-3~~	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0																																						
~~HA-52-0.5~~	02/10/09	Arcadis 2009	BKG	SURF	MEL	S	0.5																																						
~~HA-48-0.5~~	02/10/09	Arcadis 2009	BKG	SURF	CAL	S	0.5																																						
~~SOIL33-1~~	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5																																						
~~SOIL32-1~~	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5																																						
~~HA-53-0.5 (dup)~~	02/13/09	Arcadis 2009	BKG	SURF	CAL	S	0.5																																						
~~HA-53-0.5 (dup)~~	02/13/09	Arcadis 2009	BKG	SURF	CAL	S	0.5																																						
~~HA-66-0.5~~	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5																																						
~~SOIL33-3~~	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0																																						
BKRD-06C-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,C																																							
BKRD-06F-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S,F																																							

Background, Non-Mineralized
Culled Data Set

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
SOIL32-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	6.2	1	78	1	0.22	0	0.39	0	57.0	1	31.3	1	69.1	1	2.7	1	0.04	0			17.1	1	0.79	1	0.37	1	0.99	0	84.6	1	54.2	1			2.7	0								
TP-63-1.0	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.0-1.5	2.5	0	1	0	160	1	12	1	2.9	1	22	1	19	1	75	1	3.2	1	0.1	0	1	0	13	1	2.5	0	1	0	4	0	130	1	52	1											40	1
TP-62-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1	0	170	1	12	1	2.9	1	24	1	18	1	74	1	4.0	1	0.1	0	1	0	15	1	2.5	0	1	0	4	0	130	1	56	1											53	1
TP-61-1.5	05/22/23	Geocon 2023	BKG	SUB	MAR	S	1.5-2.0	2.5	0	1.2	1	140	1	12	1	2.9	1	11	1	15	1	71	1	5.1	1	0.1	0	1	0	9.4	1	2.5	0	1	0	4	0	99	1	54	1											51	1
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.2	0	5.5	1	107	1	0.18	1	0.1	0	40.6	1	7.7	1	62.4	1	6.3	1	0.12	0			32.9	1	1.0	1	0.69	1	1.0	1	17.6	1	62.2	1			3.0	0								
BKRD-01-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	65.9	1	0.25	0	2.5	0	23.0	1	5	0	36.6	1	7.5	0	0.029	1	9.9	0	15.0	1	1	0	2.5	0			17.0	1	28.0	1			5.0	0								
BKRD-01R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	1	0	75.2	1	0.25	0	2.5	0	28.2	1	5	0	36.3	1	7.5	0	0.044	1	9.9	0	18.0	1	1	0	2.5	0			17.0	1	32.0	1			5.0	0								
BKRD-01-0.5	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.5	9.9	0	3	1	27.1	1	0.36	1	2.5	0	43.7	1	5	0	112	1	7.5	0	0.2	0	9.9	0	12.0	1	0.40	1	2.5	0			21.0	1	14.0	1					5.0	0			50	0		
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	9.9	0	1	0	135	1	0.31	1	2.5	0	24.0	1	8.4	1	58.3	1	7.7	1	0.2	0	9.9	0	50.9	1	0.30	1	2.5	0			18	1	129	1					5.0	0						
SOIL46-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	6.7	0	10.1	1	121	1	0.35	1	0.45	1	27.9	1	18.1	1	54.3	1	7.7	1	0.11	1			31.5	1	0.65	1	1.1	0	0.70	1	30.5	1	56.3	1			2.8	0								
SOIL08-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.3	1	91.3	1	0.24	1	0.39	1	21.4	1	7.3	1	100.0	1	8.2	1	0.03	0			61.7	1	1.5	1	0.69	1	1.7	1	15.5	1	175	1			2.7	0								
TP-56-1.5	05/23/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	7	1	140	1	1	0	2	1	88	1	28	1	83	1	8.9	1	0.1	0	1	0	53	1	2.5	0	1	0	4	0	20	1	130	1											15	1
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	7	1	154	1	0.62	1	2.5	0	45.3	1	11.0	1	69.5	1	8.9	1	0.2	0	9.9	0	36	1	0.3	0	2.5	0			30.4	1	71.8	1					5.0	0						
SOIL12-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	4.3	1	140	1	0.26	1	0.10	0	27	1	12.9	1	99.8	1	9.4	1	0.045	1			43.7	1	1	1	0.71	1	1.3	1	19.8	1	69.4	1			2.6	0								
SOIL14-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.3	1	107	1	0.26	1	0.07	0	15.8	1	5.1	1	62.9	1	9.4	1	0.039	1			17	1	1.8	1	0.47	1	1.0	1	15.7	1	42.9	1			2.7	0								
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	2.5	0	1	0	110	1	1	0	1.5	1	14	1	3.8	1	62	1	9.6	1	0.1	0	3.7	1	19	1	2.5	0	1	0	4	0	19	1	57	1											41	1
SOIL04-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.4	0	11.5	1	177	1	0.46	1	0.38	1	26.5	1	9.8	1	60.9	1	9.9	1	0.1	0			25.2	1	0.96	1	0.79	1	1.6	1	24.3	1	56.6	1			3.1	0								
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.8	0	3	1	123	1	0.27	1	2.5	0	24.0	1	7.0	1	116	1	10.0	1	0.03	1	9.8	0	31	1	1	0	2.5	0			28.4	1	81.5	1			5.0	0								
BKRD-07-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	R	2.0	9.8	0	5	1	152	1	0.40	1	2.5	0	23.0	1	7.4	1	73.6	1	10.0	1	0.035	1	9.8	0	37	1	1	0	2.5	0			27	1	68.0	1			5.0	0								
SOIL14-3 (dup)	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	112	1	0.3	1	0.05	0	17.4	1	5.7	1	71.6	1	10.2	1	0.038	1			19.8	1	2	1	0.61	1	1.1	1	17.8	1	48.6	1			2.7	0								
SOIL11-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6	0	6.2	1	204	1	0.32	1	0.15	0	20.9	1	8.8	1	58.3	1	10.3	1	0.019	1			28.8	1	1.2	1	0.76	1	1.1	1	20.9	1	20.9	1			2.5	0								
SOIL02-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	10.4	1	173	1	0.42	1	0.32	1	70.1	1	14.7	1	66.1	1	10.5	1	0.02	0			47.1	1	1.2	1	0.70	1	1.9	1	36.8	1	64.2	1			2.7	0								
SOIL02-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	9.9	1	191	1	0.39	1	0.40	1	61.0	1	12.4	1	55.4	1	10.8	1	0.05	0			43.9	1	1.3	1	0.70	1	1.5	1	30.7	1	57.8	1			2.6	0								
SOIL03-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.7	0	14.8	1	177	1	0.44	1	0.56	1	99.7	1	20.1	1	72.9	1	10.9	1	0.11	0			64.6	1	1.4	1	1.1	1	1.8	1	52.5	1	90.1	1			2.8	0								
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.9	0	2	1	105	1	0.25	0	2.5	0	21.0	1	6.8	1	58.6	1	11.0	1	0.032	1	9.9	0	29	1	1	0	2.5	0			20.0	1	72.9	1			5.0	0								
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	9.9	0	3	1	143	1	0.31	1	2.5	0	22.0	1	4.9	0	118	1	11.0	1	0.026	1	9.9	0	23	1	1	0	2.5	0			29.4	1	61.6	1			5.0	0								
BKRD-07-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	7	1	195	1	0.39	1	2.5	0	22.0	1	11.0	1	58.1	1	11.0	1	0.2	0	9.9	0	25	1	0.50	1	2.5	0			25	1	51.1	1					5.0	0						
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	11.2	1	186	1	0.29	1	0.19	0	45.8	1	14.2	1	58.6	1	11.0	1	0.031	1			48.5	1	1.1	1	0.81	1	1.3	1	25.8	1	74.4	1			2.6	0								
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.3	1	193	1	0.36	1	0.38	1	25.1	1	7.2	1	87.2	1	11.3	1	0.05	0			26.3	1	0.94	1	1.1	0	0.94	1	30.2	1	71.8	1			2.7	0								
SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.3	1	198	1	0.34	1	0.51	0	24.2	1	10.4	1	61.3	1	11.9	1	0.01	0			21.6	1	1.4	1	0.15	1	0.98	0	26	1	57.1	1			2.7	0								
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	12.2	1	195	1	0.38	1	0.54	0	23.9	1	10.3	1	67.1	1	11.9	1	0.017	1			23.5	1	1.2	1	1.1	0	1.1	0	29.4	1	61.5	1			2.7	0								
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	4	1	277	1	0.29	1	2.5	0	24.0	1	10.0	1	63.1	1	12.0	1	0.2	0	9.9	0	24	1	0.50	1	2.5	0			24.9	1	69.1	1					5.0	0						
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	10	0	5	1	155	1	0.5	1	2.5	0	32.3	1	13.0	1	58.5	1	12.0	1	0.2	0	9.8	0	29	1	0.3	0	2.5	0			36.3	1	61.1	1					5.0	0			50	0		
SOIL09-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	0	7.7	1	162	1	0.3	1	0.33	1	29.9	1	12.1	1	52.2	1	12.0	1	0.04	0			33.2	1	1.2	1	0.53	1	1.5	1	22.1	1	59.4	1			2.6	0								
BKRD-07-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	9.9	0	12	1	219	1	0.52	1	2.5	0	37.4	1	4.9	0	77.3	1	12.0	1	0.2	0	9.9	0	42	1	0.50	1	2.5	0			31	1	68.9	1					5.0	0						
SOIL05-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	7.1	1	172	1	0.42	1	0.45	1	66.7	1	12.4	1	84.0	1	12.3	1	0.04	0			59.7	1	1.6	1	0.63	1	1.7	1	32.8	1	70.9	1			2.7	0								
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	11.3	1	191	1	0.34	1	0.71	1	25.4	1	20.1	1	73.4	1	12.6	1	0.021	1			35	1	1.2	1	1.1	0	1.0	0	24.7	1	87.7	1			2.7	0								
SOIL44-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.9	0	13.5	1	124	1	0.21	1	0.41	1	15	1	14.2	1	38.9	1	12.6	1	0.15	1			21.6	1	1.1	1	1.3	0	3.3	0	17.0	1	59.5	1			3.3	0								
SOIL47-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	20.7	1	108	1	0.20	1	0.36	1	66.4	1	28.8	1	67.7	1	13.2	1	0.10	1			59.7	1	0.99	1	1.1	0	0.28	1	32.9	1	75.5	1			2.7	0								
SOIL15-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.3	0	2.8	1	106	1	0.25	1	0.05	0	17.1	1	4.1	0	65.4	1	13.9	1	0.052	1			17	1	0.94	1	0.42	1	1.0	1	15.9	1	42.3	1			2.6	0								
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	6.2	1	182	1	0.50	1	0.40	0	26.6	1	18.5	1	65.9	1	14.1	1	0.02	0			35.8	1	0.66	1	0.13	1	0.94	1	37.3	1	85.1	1			2.7	0								
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	7.5	1	192	1	0.37	1	0.55	1	23.1	1	10.2	1	60.4	1	14.1	1	0.022	1			21.7	1	1.5	1	1.1	0	1	0	28.7	1	61.7	1			2.7	0								
SOIL04-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	12	1	154	1	0.31	1	0.34	1	19.6	1	12.3	1	44.6	1	14.1	1	0.09	0			22.6	1	0.74	1	0.64	1	1.1	1	20.1	1	55.0	1			3.1	0								
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	8.8	1	203	1	0.41	1	0.62	1	32.6	1	10.2	1	70.7	1	14.3	1	0.031	1			21.9	1	1.7	1	1.1	0	0.97	0	32.6	1	60.5	1			2.7	0								
SOIL03-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	11.8	1	209	1	0.44	1	0.51	1	73.0	1	16.8	1	61.9	1	14.4	1	0.06	0			54.9	1	1.2	1	0.99	1	1.6	1	42.7	1	86.4	1			2.7	0								
SOIL46-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	9.5	1	113	1	0.34	1	0.36	1	23.7	1	10.2	1	41.8	1	14.6	1	0.22	1			21.2	1	0.76	1	1.1	0	0.39	1	26.8	1	47.9	1			2.7	0								
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	8.4	1	186	1	0.44	1	0.19	0	28.2	1	14.9	1	52.5	1	14.7	1	0.048	1			31.4	1	1.1	1	0.81	1	1.4	1	30.9	1	78.6	1			2.6	0								
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	16.3	1	185	1	0.32	1	0.73	1	45.3	1	13.2	1	58.1	1	14.8	1	0.068	1			46.3	1	1.5	1	1	0	1.1	0	32.2	1	73.7	1			2.6	0								
BKRD-02-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	1	0	244	1	0.28	1	2.5	0	22.0	1	9.3	1	48.6	1	15.0	1	0.2	0	9.8	0	27	1	0.3	0	2.5	0			25.2	1	58.5	1					5.0	0						
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	9.8	0	2	1	107	1	0.29	1	2.5	1	22.0	1	6.9	1	55.4	1	15.0	1	0.033	1	9.8	0	31	1	1	0	2.5	0			20.0	1	71.6	1			5.0	0	5.0	0						
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	6	1	225	1	0.55	1	2.5	0	34.7	1	11.0	1	64	1	15.0	1	0.2	0	9.9	0	33	1	0.50	1	2.5	0			34.4	1	69.6	1					5.0	0						
BKRD-10-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	13	1	197	1	0.5	1	2.5	0	55.0	1	16.0	1	54.7	1	15.0	1	0.2	0	9.9	0	61.6	1	0.30	1	2.5	0			39.3	1	82.7	1					5.0	0						
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	10.4	1	161	1	0.37	1	0.65	1	26.7	1	18.3	1	80.3	1	15.4	1	0.023	1			27.8	1	1.3	1	1.1	0	0.97	0	24.6	1	69.9	1			2.7	0								

Background, Non-Mineralized
Culled Data Set

SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.7	1	207	1	0.39	1	0.60	1	26.3	1	9.5	1	64.6	1	15.4	1	0.048	1			24.7	1	1.5	1	0.52	1	0.95	0	27.4	1	61.5	1	2.7	0						
SOIL07-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.5	0	12.2	1	182	1	0.38	1	0.29	1	26.0	1	12.9	1	52.2	1	15.7	1	0.05	0			27.0	1	1.0	1	0.46	1	1.3	1	22.5	1	52.1	1	2.7	0						
SOIL13-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.3	0	14.4	1	204	1	0.40	1	0.38	0	65.1	1	18.6	1	76.4	1	15.8	1	0.028	1			70.6	1	1.3	1	1	1	1.6	1	37.5	1	106	1	3.0	0						
SOIL06-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	6.6	1	222	1	0.31	1	0.62	1	30.6	1	20.8	1	82.4	1	16.1	1	0.06	0			50.1	1	1.6	1	0.77	1	1.7	1	22.9	1	83.3	1	2.6	0						
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.3	0	9.3	1	208	1	0.39	1	0.60	1	24.8	1	9.2	1	54.1	1	16.2	1	0.039	1			21.4	1	1.5	1	1.1	0	0.84	0	27.2	1	59.6	1	2.6	0						
SOIL44-5	05/15/08	USEPA 2008	BKG	SUB	CAL	S	4.5-6.0	8.2	0	9.6	1	768	1	0.47	1	0.50	1	29.1	1	17.0	1	62.5	1	16.3	1	0.03	1			34.5	1	0.88	1	0.34	1	0.82	1	37.3	1	62.9	1	3.4	0						
SOIL01-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.4	0	3.7	1	94.4	1	0.16	1	0.19	1	35.9	1	5.9	1	58.9	1	16.4	1	0.04	0			20.8	1	0.66	1	0.45	1	1.2	1	19.1	1	58.1	1	2.7	0						
SOIL10-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.6	0	11.9	1	181	1	0.41	1	0.29	1	30.0	1	14.6	1	75.5	1	16.5	1	0.02	0			31.1	1	1.2	1	0.74	1	1.8	1	26.5	1	26.5	1	2.7	0						
SOIL44-3	05/15/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	9.9	0	12.9	1	149	1	0.47	1	0.39	1	28.7	1	12.3	1	63.9	1	16.5	1	0.23	1			28.1	1	1.0	1	1.7	0	0.81	1	33.1	1	61.6	1	4.1	0						
SOIL14-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7	0	9.8	1	174	1	0.30	1	0.16	0	22.8	1	6.6	1	62.8	1	16.9	1	0.071	1			20.5	1	1.6	1	0.62	1	1.2	1	20.5	1	58.8	1	2.9	0						
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.9	0	1	0	190	1	0.25	0	2.5	0	16	1	49.0	1	172	1	17.0	1	0.039	1	9.9	0	74.2	1	1	0	2.5	0			13.0	1	87.3	1	5.0	0			50	0		
SOIL15-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	8.3	1	178	1	0.29	1	0.15	0	20.6	1	7.9	1	81.2	1	17.0	1	0.08	1			21.5	1	1.2	1	0.77	1	1.0	1	20.3	1	50.1	1	2.6	0						
SOIL09-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.1	0	10.5	1	196	1	0.32	1	0.45	1	34.8	1	14.6	1	53.6	1	17.3	1	0.06	0			37.3	1	1.5	1	0.60	1	1.5	1	23.6	1	72.7	1	2.6	0						
SOIL05-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10.1	1	211	1	0.33	1	0.48	1	31.9	1	15.5	1	54.4	1	17.7	1	0.03	0			38.7	1	1.4	1	0.42	1	1.5	1	23.7	1	74.6	1	2.6	0						
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	10	0	2	1	134	1	0.37	1	2.5	0	22.0	1	9.9	1	62.2	1	18.0	1	0.2	0	10	0	22	1	0.30	1	2.5	0			23.0	1	68.9	1			5.0	0				
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	9.9	0	5	1	186	1	0.46	1	2.5	0	26.7	1	13.0	1	65.9	1	18.0	1	0.2	0	9.9	0	34	1	0.70	1	2.5	0			30.4	1	87.4	1			5.0	0				
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	7.5	0	10.1	1	231	1	0.55	1	0.24	0	38.4	1	19.4	1	66.6	1	18.0	1	0.054	1			39.3	1	1.2	1	1.1	1	1.5	1	38.6	1	97.5	1	3.1	0						
SOIL13-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	13.9	1	187	1	0.32	1	0.33	0	52	1	15.4	1	58.9	1	18.1	1	0.066	1			58.3	1	1.1	1	0.95	1	1.3	1	30.3	1	93.5	1	2.6	0						
SOIL08-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.8	0	9.1	1	128	1	0.25	1	0.30	1	22.7	1	5.0	1	63.4	1	18.7	1	0.09	0			21.2	1	1.4	1	0.36	1	1.2	1	18.7	1	61.7	1	2.9	0						
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.8	0	5	1	156	1	0.27	1	2.5	0	44.9	1	9.3	1	54.8	1	19.0	1	0.2	0	9.8	0	33	1	0.30	1	2.5	0			25.5	1	69.8	1			5.0	0				
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	12	1	189	1	0.38	1	2.5	0	37.2	1	15.0	1	52.3	1	19.0	1	0.2	0	9.9	0	39	1	0.30	1	2.5	0			32.6	1	67.9	1			5.0	0				
SOIL10-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	17.4	1	208	1	0.35	1	0.32	1	28.3	1	10.1	1	55.2	1	19.0	1	0.07	0			27.3	1	1.3	1	0.64	1	1.4	1	22.4	1	57.5	1	2.7	0						
SOIL12-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.5	0	14.6	1	205	1	0.28	1	0.23	0	28.5	1	11	1	77.9	1	20.0	1	0.09	0			32.5	1	1.1	1	0.89	1	1.1	1	25.1	1	25.1	1	2.7	0						
SOIL01-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	12.4	1	171	1	0.35	1	0.5	1	60.3	1	12.4	1	72.2	1	20.7	1	0.17	1			48.6	1	1.0	1	0.75	1	1.6	1	30.6	1	73.0	1	2.6	0						
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	6	1	265	1	0.25	0	2.5	0	25.5	1	9.8	1	56.3	1	21.0	1	0.2	0	10	0	31	1	0.30	1	2.5	0			20.0	1	85.7	1			5.0	0				
SOIL46-1	05/15/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	10	1	127	1	0.25	1	0.34	1	14.7	1	9.5	1	34.9	1	21.4	1	0.15	1			15.3	1	0.83	1	1.1	0	0.26	1	19.8	1	52.8	1	2.7	0						
BKRD-06-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	9.9	0	7	1	154	1	0.25	0	2.5	0	17.0	1	5.8	1	48.0	1	22.0	1	0.2	1	9.9	0	21	1	0.3	0	2.5	0			17	1	61.6	1			5.0	0				
SOIL07-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.4	0	18.7	1	203	1	0.42	1	0.41	1	34.0	1	14.4	1	64.6	1	22.4	1	0.09	0			33.3	1	1.2	1	0.58	1	1.6	1	25.0	1	66.9	1	2.7	0						
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	9.8	0	2	1	278	1	0.25	0	2.5	0	16	1	101.0	1	178	1	23.0	1	0.065	1	9.8	0	111	1	1	0	2.5	0			14.0	1	86.3	1	5.0	0			50	0		
SOIL11-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.7	0	9.8	1	259	1	0.34	1	0.34	0	25.9	1	10.4	1	61.6	1	23.5	1	0.086	1			34.7	1	1.3	1	0.8	1	0.96	1	23.5	1	23.5	1	2.8	0						
SOIL12-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	6.2	0	14.4	1	203	1	0.31	1	0.22	0	33.4	1	11.3	1	77.4	1	23.7	1	0.11	1			38.9	1	1.3	1	0.81	1	1.2	1	23.3	1	23.3	1	2.6	0						
SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	8.9	0	10.6	1	258	1	0.33	1	0.48	0	47.0	1	28.9	1	90.4	1	24.7	1	0.078	1			70	1	1.3	1	1.1	1	1.6	1	30.9	1	149	1	3.7	0						
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	10	0	3	1	227	1	0.36	1	2.5	0	25.7	1	12.0	1	35.4	1	25.0	1	0.2	0	10	0	23	1	0.3	0	2.5	0			25.6	1	56.8	1			5.0	0			50	0
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.2	0	13.1	1	307	1	0.39	1	0.52	0	59.0	1	29.9	1	90.7	1	26.3	1	0.12	1			77.7	1	1.4	1	1.3	1	1.5	1	35.4	1	160	1	3.4	0						

Background, Mineralized
All Data

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
HA-31-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			160	1																																											
HA-32-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			150	1																																										
HA-33-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			54	1																																									
HA-34-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			210	1																																									
HA-35-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			15	1																																									
HA-36-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			77	1																																									
HA-37-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			29	1																																									
HA-37-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			27	1																																									
HA-38-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			18	1																																									
HA-39-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			360	1																																									
HA-40-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			37	1																																									
HA-41-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			550	1																																									
HA-42-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			350	1																																									
HA-42-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			330	1																																									
HA-44-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			140	1																																									
HA-45-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			220	1																																									
HA-46-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			87	1																																									
HA-47-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			81	1																																									
HA-49-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			120	1																																									
HA-50-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			70	1																																									
HA-51-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			130	1																																									
HA-54-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			49	1																																									
HA-55-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			43	1																																									
HA-56-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			27	1																																									
HA-57-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			67	1																																									
HA-63-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			63	1																																									
HA-86-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			39	1																																									
HA-86-0.5 (dup	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			50	1																																									
HA-87-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			77	1																																									
HA-88-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			23	1																																									
HA-90-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			68	1																																									
HA-91-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			33	1																																									
SOIL36-1	05/14/08	EPA 20	MBK	SURF	CAL	S	0.0-0.5	6.2	0	72.7	1	114	1	0.27	0	0.35	0	28.6	1	11	1	44.7	1	13.0	1	0.3	1			34.1	1	0.82	1	0.23	1	0.85	0	21.6	1	51.3	1			2.6	0										
SOIL36-3	05/14/08	EPA 20	MBK	SUB	CAL	S	2.5-3.0	6.2	0	36.3	1	86.2	1	0.22	0	0.26	0	21.5	1	7.1	1	56.9	1	6.8	1	0.04	0			27.1	1	0.73	1	0.17	1	0.71	0	18.2	1	49.8	1			2.6	0										
SOIL37-1	05/14/08	EPA 20	MBK	SURF	CAL	S	0.0-0.5	6.2	0	56.6	1	230	1	0.38	0	0.43	0	49.7	1	23.1	1	60.5	1	18.4	1	0.23	1			48.5	1	0.82	1	0.71	1	0.84	0	32.5	1	60.2	1			2.6	0										
SOIL37-3	05/14/08	EPA 20	MBK	SUB	CAL	S	2.5-3.0	6.6	0	32	1	180	1	0.38	0	0.37	1	271	1	11.6	1	84.8	1	8.3	1	0.04	0			115	1	0.66	1	1.1	0	0.96	1	51.4	1	105	1			2.7	0										
SOIL38-1	05/14/08	EPA 20	MBK	SURF	CAL	S	0.0-0.5	6.2	0	23.5	1	143	1	0.3	0	0.3	0	63.3	1	14.2	1	47.9	1	12.7	1	0.05	0			41.7	1	0.54	1	0.19	1	0.8	0	35.4	1	58.0	1			2.6	0										
SOIL38-3	05/14/08	EPA 20	MBK	SUB	CAL	S	2.5-3.0	7	0	16.8	1	159	1	0.29	0	0.3	0	62.4	1	18.6	1	47.3	1	10.9	1	0.04	0			46.8	1	0.79	1	0.23	1	0.9	0	34.4	1	66.6	1			2.9	0										
SOIL39-1	05/14/08	EPA 20	MBK	SURF	CAL	S	0.0-0.5	6.4	0	45.5	1	185	1	0.22	0	0.55	1	41.1	1	18.6	1	47.4	1	16.8	1	0.22	1			45	1	0.61	1	0.55	1	0.69	0	21.6	1	87.3	1			2.7	0										
SOIL39-1 (dup)	05/14/08	EPA 20	MBK	SURF	CAL	S	0.0-0.5	6.4	0	43.6	1	194	1	0.21	0	0.52	1	43.4	1	18.9	1	48.5	1	16.6	1	0.21	1			44.8	1	1.2	1	0.61	1	0.66	0	22.6	1	89.0	1			2.7	0										
SOIL39-3	05/14/08	EPA 20	MBK	SUB	CAL	S	2.5-3.0	6.5	0	25.2	1	208	1	0.2	0	0.3	0	31.9	1	35.9	1	62.5	1	14.7	1	0.09	0			58.5	1	0.71	1	0.68	1	0.56	0	10.9	1	68.4	1			2.7	0										
TP-20-1.5	10/22/92	D&M 1995	MBK	SUB	MEL	MS	1.5			153	1							241	1					9.3	1	0.2	0			214	1															5.0	0		50	0				
TP-23-2.0	10/26/92	D&M 1995	MBK	SUB	MEL	MR	2.0	9.9	0	31	1	79.1	1	0.79	1	3.3	1	943	1	129	1	164	1	7.5	0	0.2	0	9.9	0	473	1	0.3	0	2.5	0			53.9	1	51.3	1					5.0	0		50	0				
TP-24-3.0	10/26/92	D&M 1995	MBK	SUB	MEL	S	3.0	9.9	0	40	1	97.2	1	1.6	1	5.4	1	136	1	29.0	1	115	1	7.4	0	0.2	0	9.9	0	79.1	1	0.3	0	2.5	0			61.3	1	61.3	1					5.0	0		50	0				
TP-43-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0											620	1																							1	0										
TP-44-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0											140	1																							1	0										
TP-49-0.0	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5			950	1																																									
TP-49-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0	12	1	620	1	22	1	1.2	1	5.8	1	180	1	140	1	130	1	18	1	0.14	1	1	0	790	1	2.5	0	1	0	4	0	31	1	53	1									37	1
TP-49-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			480	1																																								
TP-49-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			510	1																																								
TP-49R-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0	17	1	760	1	27	1	1.5	1	6.2	1	210	1	100	1	140	1	20	1	0.1	0	1	0	910	1	2.5	0	1	0	4	0	34	1	56	1									50	1

Background, Mineralized
All Data

TP-50-0.0	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5			58	1																																
TP-50-0.5	05/22/23	Geoco	MBK	SUB	MEL	MR	0.5-1.0	2.5	0	5.4	1	54	1	1.2	1	1.4	1	10	1	9.0	1	74	1	3.6	1	0.1	0	1	0	32	1	2.5	0	1	0	4	0	29	1	44	1	29	1
TP-50-1.0	05/22/23	Geoco	MBK	SUB	MEL	MR	1.0-1.5			2	0																																
TP-50-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0			2	0																																
TP-51-0.0	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5			280	1																																
TP-51-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0	2.5	0	59	1	60	1	2.1	1	3.1	1	19	1	19	1	72	1	2.5	0	0.1	0	1	0	60	1	2.5	0	1	0	4	0	91	1	61	1	7.8	1
TP-51-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			42	1																																
TP-51-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			14	1																																
TP-51R-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			8.3	1																																
TP-58-0.0	05/23/23	Geoco	MBK	SURF	CAL	MS	0.0-0.5			67	1																																
TP-58-1.5	05/23/23	Geoco	MBK	SUB	CAL	MR	1.5-2.0			32	1																																
TP-58-3.0	05/23/23	Geoco	MBK	SUB	CAL	MR	3.0-3.5			79	1																																
TP-58-4.5	05/23/23	Geoco	MBK	SUB	CAL	MR	4.5-5.0			26	1																																
TP-64-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			100	1																																
TP-65-3.0	05/22/23	Geoco	MBK	SUB	MEL	MS	3.0-3.5	20	1	1300	1	71	1	5	0	6.6	1	450	1	110	1	170	1	360	1	0.13	1	120	1	1000	1	2.5	0	1	0	4	0	53	1	120	1	290	1
TP-66-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			100	1																																

Background, Mineralized
Intermediate Dataset 1

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-50-1.0	05/22/23	Geoco	MBK	SUB	MEL	MR	1.0-1.5			2	0																																											
TP-50-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0			2	0																																											
TP-50-0.5	05/22/23	Geoco	MBK	SUB	MEL	MR	0.5-1.0	2.5	0	5.4	1	54	1	1.2	1	1.4	1	10	1	9.0	1	74	1	3.6	1	0.1	0	1	0	32	1	2.5	0	1	0	4	0	29	1	44	1									29	1
TP-51R-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			8.3	1																																										
TP-51-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			14	1																																										
HA-35-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			15	1																																										
SOIL38-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	7	0	16.8	1	159	1	0.29	0	0.3	0	62.4	1	18.6	1	47.3	1	10.9	1	0.04	0			46.8	1	0.79	1	0.23	1	0.9	0	34.4	1	66.6	1			2.9	0								
HA-38-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			18	1																																										
HA-88-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			23	1																																										
SOIL38-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.2	0	23.5	1	143	1	0.3	0	0.3	0	63.3	1	14.2	1	47.9	1	12.7	1	0.05	0			41.7	1	0.54	1	0.19	1	0.8	0	35.4	1	58.0	1			2.6	0								
SOIL39-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	6.5	0	25.2	1	208	1	0.2	0	0.3	0	31.9	1	35.9	1	62.5	1	14.7	1	0.09	0			58.5	1	0.71	1	0.68	1	0.56	0	10.9	1	68.4	1			2.7	0								
TP-58-4.5	05/23/23	Geoco	MBK	SUB	CAL	MR	4.5-5.0			26	1																																										
HA-37-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			27	1																																									
HA-56-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			27	1																																									
HA-37-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			29	1																																									
TP-23-2.0	10/26/92	D&M 1995	MBK	SUB	MEL	MR	2.0	9.9	0	31	1	79.1	1	0.79	1	3.3	1	943	1	129	1	164	1	7.5	0	0.2	0	9.9	0	473	1	0.3	0	2.5	0			53.9	1	51.3	1					5.0	0			50	0		
SOIL37-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	6.6	0	32	1	180	1	0.38	0	0.37	1	271	1	11.6	1	84.8	1	8.3	1	0.04	0			115	1	0.66	1	1.1	0	0.96	1	51.4	1	105	1			2.7	0								
TP-58-1.5	05/23/23	Geoco	MBK	SUB	CAL	MR	1.5-2.0			32	1																																										
HA-91-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			33	1																																									
SOIL36-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	6.2	0	36.3	1	86.2	1	0.22	0	0.26	0	21.5	1	7.1	1	56.9	1	6.8	1	0.04	0			27.1	1	0.73	1	0.17	1	0.71	0	18.2	1	49.8	1			2.6	0								
HA-40-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			37	1																																									
HA-86-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			39	1																																									
TP-24-3.0	10/26/92	D&M 1995	MBK	SUB	MEL	S	3.0	9.9	0	40	1	97.2	1	1.6	1	5.4	1	136	1	29.0	1	115	1	7.4	0	0.2	0	9.9	0	79.1	1	0.3	0	2.5	0			61.3	1	61.3	1					5.0	0			50	0		
TP-51-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			42	1																																										
HA-55-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			43	1																																									
SOIL39-1 (dup)	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.4	0	43.6	1	194	1	0.21	0	0.52	1	43.4	1	18.9	1	48.5	1	16.6	1	0.21	1			44.8	1	1.2	1	0.61	1	0.66	0	22.6	1	89.0	1			2.7	0								
SOIL39-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.4	0	45.5	1	185	1	0.22	0	0.55	1	41.1	1	18.6	1	47.4	1	16.8	1	0.22	1			45	1	0.61	1	0.55	1	0.69	0	21.6	1	87.3	1			2.7	0								
HA-54-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			49	1																																									
HA-86-0.5 (dup	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			50	1																																									
HA-33-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			54	1																																									
SOIL37-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.2	0	56.6	1	230	1	0.38	0	0.43	0	49.7	1	23.1	1	60.5	1	18.4	1	0.23	1			48.5	1	0.82	1	0.71	1	0.84	0	32.5	1	60.2	1			2.6	0								
TP-50-0.0	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5			58	1																																										
TP-51-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0	2.5	0	59	1	60	1	2.1	1	3.1	1	19	1	19	1	72	1	2.5	0	0.1	0	1	0	60	1	2.5	0	1	0	4	0	91	1	61	1									7.8	1
HA-63-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			63	1																																										
HA-57-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			67	1																																										
TP-58-0.0	05/23/23	Geoco	MBK	SURF	CAL	MS	0.0-0.5			67	1																																										
HA-90-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			68	1																																										
HA-50-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			70	1																																										
SOIL36-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.2	0	72.7	1	114	1	0.27	0	0.35	0	28.6	1	11	1	44.7	1	13.0	1	0.3	1			34.1	1	0.82	1	0.23	1	0.85	0	21.6	1	51.3	1			2.6	0								
HA-36-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			77	1																																									
HA-87-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			77	1																																									
TP-58-3.0	05/23/23	Geoco	MBK	SUB	CAL	MR	3.0-3.5			79	1																																									
HA-47-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			81	1																																									
HA-46-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			87	1																																									
TP-64-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			100	1																																									
TP-66-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			100	1																																									
HA-49-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			120	1																																									
HA-51-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			130	1																																									
HA-44-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			140	1																																									
HA-32-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			150	1																																									
TP-20-1.5	10/22/92	D&M 1995	MBK	SUB	MEL	MS	1.5			153	1							241	1					9.3	1	0.2	0			214	1															5.0	0			50	0		

Background, Mineralized
Intermediate Dataset 1

HA-31-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			160	1								
HA-34-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			210	1								
HA-45-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			220	1								
TP-51-0.0	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5			280	1								
~~HA-42-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~HA-42-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~HA-39-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~TP-49-3.0~~	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5												
~~TP-49-4.5~~	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0												
~~HA-41-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~TP-49-1.5~~	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0											37	1
~~TP-49R-1.5~~	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0											50	1
~~TP-49-0.0~~	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5												
~~TP-65-3.0~~	05/22/23	Geoco	MBK	SUB	MEL	MS	3.0-3.5											290	1
TP-43-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0			620	1					1	0		
TP-44-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0			140	1					1	0		

Background, Mineralized
Intermediate Dataset 2

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-50-1.0	05/22/23	Geoco	MBK	SUB	MEL	MR	1.0-1.5			2	0																																											
TP-50-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0			2	0																																											
TP-50-0.5	05/22/23	Geoco	MBK	SUB	MEL	MR	0.5-1.0	2.5	0	5.4	1	54	1	1.2	1	1.4	1	10	1	9.0	1	74	1	3.6	1	0.1	0	1	0	32	1	2.5	0	1	0	4	0	29	1	44	1									29	1
TP-51R-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			8.3	1																																										
TP-51-4.5	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0			14	1																																										
HA-35-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			15	1																																										
SOIL38-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	7	0	16.8	1	159	1	0.29	0	0.3	0	62.4	1	18.6	1	47.3	1	10.9	1	0.04	0			46.8	1	0.79	1	0.23	1	0.9	0	34.4	1	66.6	1			2.9	0								
HA-38-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			18	1																																										
HA-88-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			23	1																																										
SOIL38-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.2	0	23.5	1	143	1	0.3	0	0.3	0	63.3	1	14.2	1	47.9	1	12.7	1	0.05	0			41.7	1	0.54	1	0.19	1	0.8	0	35.4	1	58.0	1			2.6	0								
SOIL39-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	6.5	0	25.2	1	208	1	0.2	0	0.3	0	31.9	1	35.9	1	62.5	1	14.7	1	0.09	0			58.5	1	0.71	1	0.68	1	0.56	0	10.9	1	68.4	1			2.7	0								
TP-58-4.5	05/23/23	Geoco	MBK	SUB	CAL	MR	4.5-5.0			26	1																																										
HA-37-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			27	1																																									
HA-56-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			27	1																																									
HA-37-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			29	1																																									
TP-23-2.0	10/26/92	D&M 1995	MBK	SUB	MEL	MR	2.0	9.9	0	31	1	79.1	1	0.79	1	3.3	1	943	1	129	1	164	1	7.5	0	0.2	0	9.9	0	473	1	0.3	0	2.5	0			53.9	1	51.3	1					5.0	0			50	0		
SOIL37-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	6.6	0	32	1	180	1	0.38	0	0.37	1	271	1	11.6	1	84.8	1	8.3	1	0.04	0			115	1	0.66	1	1.1	0	0.96	1	51.4	1	105	1			2.7	0								
TP-58-1.5	05/23/23	Geoco	MBK	SUB	CAL	MR	1.5-2.0			32	1																																										
HA-91-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			33	1																																									
SOIL36-3	05/14/08	EPA 2(	MBK	SUB	CAL	S	2.5-3.0	6.2	0	36.3	1	86.2	1	0.22	0	0.26	0	21.5	1	7.1	1	56.9	1	6.8	1	0.04	0			27.1	1	0.73	1	0.17	1	0.71	0	18.2	1	49.8	1			2.6	0								
HA-40-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			37	1																																									
HA-86-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			39	1																																									
TP-24-3.0	10/26/92	D&M 1995	MBK	SUB	MEL	S	3.0	9.9	0	40	1	97.2	1	1.6	1	5.4	1	136	1	29.0	1	115	1	7.4	0	0.2	0	9.9	0	79.1	1	0.3	0	2.5	0			61.3	1	61.3	1					5.0	0			50	0		
TP-51-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			42	1																																										
HA-55-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			43	1																																									
~~SOIL39-1 (dup~~	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5																																													
SOIL39-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.4	0	45.5	1	185	1	0.22	0	0.55	1	41.1	1	18.6	1	47.4	1	16.8	1	0.22	1			45	1	0.61	1	0.55	1	0.69	0	21.6	1	87.3	1			2.7	0								
HA-54-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			49	1																																									
HA-86-0.5 (dup	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			50	1																																									
HA-33-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			54	1																																									
SOIL37-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.2	0	56.6	1	230	1	0.38	0	0.43	0	49.7	1	23.1	1	60.5	1	18.4	1	0.23	1			48.5	1	0.82	1	0.71	1	0.84	0	32.5	1	60.2	1			2.6	0								
TP-50-0.0	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5			58	1																																										
TP-51-1.5	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0	2.5	0	59	1	60	1	2.1	1	3.1	1	19	1	19	1	72	1	2.5	0	0.1	0	1	0	60	1	2.5	0	1	0	4	0	91	1	61	1									7.8	1
HA-63-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			63	1																																										
HA-57-0.5	02/13/09	Arcad	MBK	SURF	CAL	S	0.5			67	1																																									
TP-58-0.0	05/23/23	Geoco	MBK	SURF	CAL	MS	0.0-0.5			67	1																																									
HA-90-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			68	1																																									
HA-50-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			70	1																																									
SOIL36-1	05/14/08	EPA 2(	MBK	SURF	CAL	S	0.0-0.5	6.2	0	72.7	1	114	1	0.27	0	0.35	0	28.6	1	11	1	44.7	1	13.0	1	0.3	1			34.1	1	0.82	1	0.23	1	0.85	0	21.6	1	51.3	1			2.6	0								
HA-36-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			77	1																																									
HA-87-0.5	02/13/09	Arcad	MBK	SURF	MEL	S	0.5			77	1																																									
TP-58-3.0	05/23/23	Geoco	MBK	SUB	CAL	MR	3.0-3.5			79	1																																									
HA-47-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			81	1																																									
HA-46-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			87	1																																									
TP-64-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			100	1																																									
TP-66-3.0	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5			100	1																																									
HA-49-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			120	1																																									
HA-51-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			130	1																																									
HA-44-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			140	1																																									
HA-32-0.5	02/10/09	Arcad	MBK	SURF	MEL	S	0.5			150	1																																									
TP-20-1.5	10/22/92	D&M 1995	MBK	SUB	MEL	MS	1.5			153	1							241	1					9.3	1	0.2	0			214	1															5.0	0			50	0		

Background, Mineralized
Intermediate Dataset 2

~~HA-31-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~HA-34-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~HA-45-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~TP-51-0.0~~	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5												
~~HA-42-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~HA-42-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~HA-39-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~TP-49-3.0~~	05/22/23	Geoco	MBK	SUB	MEL	MR	3.0-3.5												
~~TP-49-4.5~~	05/22/23	Geoco	MBK	SUB	MEL	MR	4.5-5.0												
~~HA-41-0.5~~	02/10/09	Arcad	MBK	SURF	MEL	S	0.5												
~~TP-49-1.5~~	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0											37	1
~~TP-49R-1.5~~	05/22/23	Geoco	MBK	SUB	MEL	MR	1.5-2.0											50	1
~~TP-49-0.0~~	05/22/23	Geoco	MBK	SURF	MEL	MS	0.0-0.5												
~~TP-65-3.0~~	05/22/23	Geoco	MBK	SUB	MEL	MS	3.0-3.5											290	1
TP-43-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0			620	1						1	0	
TP-44-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0			140	1						1	0	

Background, Mineralized
Culled Dataset

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	Sb	D_Sb	As	D_As	Ba	D_Ba	Be	D_Be	Cd	D_Cd	Cr	D_Cr	Co	D_Co	Cu	D_Cu	Pb	D_Pb	Hg	D_Hg	Mo	D_Mo	Ni	D_Ni	Se	D_Se	Ag	D_Ag	Tl	D_Tl	V	D_V	Zn	D_Zn	CrVI	D_CrVI	CN	D_CN	RCN	D_RCN	S2-	D_S2-	RS2-	D_RS2-	S	D_S
TP-50-1.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.0-1.5			2	0																																											
TP-50-1.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0			2	0																																										
TP-50-0.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	0.5-1.0	2.5	0	5.4	1	54	1	1.2	1	1.4	1	10	1	9.0	1	74	1	3.6	1	0.1	0	1	0	32	1	2.5	0	1	0	4	0	29	1	44	1											29	1
TP-51R-4.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	4.5-5.0			8.3	1																																										
TP-51-4.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	4.5-5.0			14	1																																										
HA-35-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			15	1																																										
SOIL38-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	7	0	16.8	1	159	1	0.29	0	0.3	0	62.4	1	18.6	1	47.3	1	10.9	1	0.04	0			46.8	1	0.79	1	0.23	1	0.9	0	34.4	1	66.6	1			2.9	0								
HA-38-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			18	1																																										
HA-88-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			23	1																																										
SOIL38-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.2	0	23.5	1	143	1	0.3	0	0.3	0	63.3	1	14.2	1	47.9	1	12.7	1	0.05	0			41.7	1	0.54	1	0.19	1	0.8	0	35.4	1	58.0	1			2.6	0								
SOIL39-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	6.5	0	25.2	1	208	1	0.2	0	0.3	0	31.9	1	35.9	1	62.5	1	14.7	1	0.09	0			58.5	1	0.71	1	0.68	1	0.56	0	10.9	1	68.4	1			2.7	0								
TP-58-4.5	05/23/23	Geocon 2023	MBK	SUB	CAL	MR	4.5-5.0			26	1																																										
HA-37-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			27	1																																										
HA-56-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			27	1																																										
HA-37-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			29	1																																										
TP-23-2.0	10/26/92	D&M 1995	MBK	SUB	MEL	MR	2.0	9.9	0	31	1	79.1	1	0.79	1	3.3	1	943	1	129	1	164	1	7.5	0	0.2	0	9.9	0	473	1	0.3	0	2.5	0			53.9	1	51.3	1					5.0	0			50	0		
SOIL37-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	6.6	0	32	1	180	1	0.38	0	0.37	1	271	1	11.6	1	84.8	1	8.3	1	0.04	0			115	1	0.66	1	1.1	0	0.96	1	51.4	1	105	1			2.7	0								
TP-58-1.5	05/23/23	Geocon 2023	MBK	SUB	CAL	MR	1.5-2.0			32	1																																										
HA-91-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			33	1																																										
SOIL36-3	05/14/08	USEPA 2008	MBK	SUB	CAL	S	2.5-3.0	6.2	0	36.3	1	86.2	1	0.22	0	0.26	0	21.5	1	7.1	1	56.9	1	6.8	1	0.04	0			27.1	1	0.73	1	0.17	1	0.71	0	18.2	1	49.8	1			2.6	0								
HA-40-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			37	1																																										
HA-86-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			39	1																																										
TP-24-3.0	10/26/92	D&M 1995	MBK	SUB	MEL	S	3.0	9.9	0	40	1	97.2	1	1.6	1	5.4	1	136	1	29.0	1	115	1	7.4	0	0.2	0	9.9	0	79.1	1	0.3	0	2.5	0			61.3	1	61.3	1					5.0	0			50	0		
TP-51-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			42	1																																										
HA-55-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			43	1																																										
SOIL39-1 (dup)	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.4	0	43.6	1	194	1	0.21	0	0.52	1	43.4	1	18.9	1	48.5	1	16.6	1	0.21	1			44.8	1	1.2	1	0.61	1	0.66	0	22.6	1	89.0	1			2.7	0								
SOIL39-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.4	0	45.5	1	185	1	0.22	0	0.55	1	41.1	1	18.6	1	47.4	1	16.8	1	0.22	1			45	1	0.61	1	0.55	1	0.69	0	21.6	1	87.3	1			2.7	0								
HA-54-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			49	1																																										
HA-86-0.5 (dup	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			50	1																																										
HA-33-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			54	1																																										
SOIL37-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.2	0	56.6	1	230	1	0.38	0	0.43	0	49.7	1	23.1	1	60.5	1	18.4	1	0.23	1			48.5	1	0.82	1	0.71	1	0.84	0	32.5	1	60.2	1			2.6	0								
TP-50-0.0	05/22/23	Geocon 2023	MBK	SURF	MEL	MS	0.0-0.5			58	1																																										
TP-51-1.5	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0	2.5	0	59	1	60	1	2.1	1	3.1	1	19	1	19	1	72	1	2.5	0	0.1	0	1	0	60	1	2.5	0	1	0	4	0	91	1	61	1											7.8	1
HA-63-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			63	1																																										
HA-57-0.5	02/13/09	Arcadis 2009	MBK	SURF	CAL	S	0.5			67	1																																										
TP-58-0.0	05/23/23	Geocon 2023	MBK	SURF	CAL	MS	0.0-0.5			67	1																																										
HA-90-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			68	1																																										
HA-50-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			70	1																																										
SOIL36-1	05/14/08	USEPA 2008	MBK	SURF	CAL	S	0.0-0.5	6.2	0	72.7	1	114	1	0.27	0	0.35	0	28.6	1	11	1	44.7	1	13.0	1	0.3	1			34.1	1	0.82	1	0.23	1	0.85	0	21.6	1	51.3	1			2.6	0								
HA-36-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			77	1																																										
HA-87-0.5	02/13/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			77	1																																										
TP-58-3.0	05/23/23	Geocon 2023	MBK	SUB	CAL	MR	3.0-3.5			79	1																																										
HA-47-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			81	1																																										
HA-46-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			87	1																																										
TP-64-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			100	1																																										
TP-66-3.0	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5			100	1																																										
HA-49-0.5	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5			120	1																																										
~~HA-51-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5																																													
~~HA-44-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5																																												
~~HA-32-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5																																												
~~TP-20-1.5~~	10/22/92	D&M 1995	MBK	SUB	MEL	MS	1.5																																											
~~HA-31-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5																																											

Background, Mineralized
Culled Dataset

~~HA-34-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5				
~~HA-45-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5				
~~TP-51-0.0~~	05/22/23	Geocon 2023	MBK	SURF	MEL	MS	0.0-0.5				
~~HA-42-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5				
~~HA-42-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5				
~~HA-39-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5				
~~TP-49-3.0~~	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	3.0-3.5				
~~TP-49-4.5~~	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	4.5-5.0				
~~HA-41-0.5~~	02/10/09	Arcadis 2009	MBK	SURF	MEL	S	0.5				
~~TP-49-1.5~~	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0				
~~TP-49R-1.5~~	05/22/23	Geocon 2023	MBK	SUB	MEL	MR	1.5-2.0				
~~TP-49-0.0~~	05/22/23	Geocon 2023	MBK	SURF	MEL	MS	0.0-0.5				
~~TP-65-3.0~~	05/22/23	Geocon 2023	MBK	SUB	MEL	MS	3.0-3.5				
TP-43-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0	620	1	1	0
TP-44-1.0	06/06/95	D&M 1995	MBK	SURF	MEL	S	1.0	140	1	1	0

Central Tendency Comparison
Bellwether Mine WR and
Culled Mineralized Background

As Bkg	D_As Bkg	Pb Bkg	D_Pb Bkg	Hg Bkg	D_Hg Bkg	As Bell	D_As Bell	Pb Bell	D_Pb Bell	Hg Bell	D_Hg Bell
2	0					9	1	17	1	0.32	1
2	0					7	1	12	1	0.018	1
5.4	1	3.6	1	0.1	0	12	1	13	1	0.2	0
8.3	1					5	1	11	1	0.02	1
14	1					51	1	9.1	1	0.2	0
15	1					139	1	11	1	0.24	1
16.8	1	10.9	1	0.04	0	115	1	21	1	0.27	1
18	1										
23	1										
23.5	1	12.7	1	0.05	0						
25.2	1	14.7	1	0.09	0						
26	1										
27	1										
27	1										
29	1										
31	1	7.5	0	0.2	0						
32	1	8.3	1	0.04	0						
32	1										
33	1										
36.3	1	6.8	1	0.04	0						
37	1										
39	1										
40	1	7.4	0	0.2	0						
42	1										
43	1										
43.6	1	16.6	1	0.21	1						
45.5	1	16.8	1	0.22	1						
49	1										
50	1										
54	1										
56.6	1	18.4	1	0.23	1						
58	1										
59	1	2.5	0	0.1	0						
63	1										
67	1										
67	1										
68	1										
70	1										
72.7	1	13.0	1	0.3	1						
77	1										
77	1										
79	1										
81	1										
87	1										
100	1										
100	1										
120	1										

Northern Background Area,
Comparison of Arsenic and Lead
Central Tendency Values
With and Without HA-93, SOIL20, and SOIL26

SAMPLE ID	SAMPLE DATE	DATA SOURCE	AREA	DEPTH	GEOLOGY	MEDIUM	DEPTH (ft)	As-All	D_As-All	Hg-All	D_Hg-All	As-Culled	D_As-Culled	Hg-Culled	D_Hg-Culled
BKRD-03-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	5	1	0.2	0	5	1	0.2	0
BKRD-03-1.5	10/28/92	D&M 1995	BKG	SUB	CAL	S	1.5	7	1	0.2	0	7	1	0.2	0
BKRD-04-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	6	1	0.2	0	6	1	0.2	0
BKRD-05-0.0	10/26/92	D&M 1995	BKG	SURF	CAL	S	0.0	3	1	0.2	0	3	1	0.2	0
BKRD-05-2.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	2.0	5	1	0.2	0	5	1	0.2	0
BKRD-05-3.0	10/28/92	D&M 1995	BKG	SUB	CAL	S	3.0	1	0	0.2	0	1	0	0.2	0
BKRD-08-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	4	1	0.2	0	4	1	0.2	0
BKRD-08-1.5	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	3	1	0.03	1	3	1	0.03	1
BKRD-08R-1.5 (dup)	01/11/93	D&M 1995	BKG	SUB	CAL	R	1.5	3	1	0.026	1	3	1	0.026	1
BKRD-09-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	12	1	0.2	0	12	1	0.2	0
BKRD-11-0.2	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.2	5	1	0.2	0	5	1	0.2	0
BKRD-11-1.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	2	1	0.033	1	2	1	0.033	1
BKRD-11-1.3	10/28/92	D&M 1995	BKG	SUB	CAL	R	1.3	2	1	0.2	0	2	1	0.2	0
BKRD-11R-1.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	1.0	2	1	0.032	1	2	1	0.032	1
BKRD-12-0.0	10/28/92	D&M 1995	BKG	SURF	CAL	S	0.0	6	1	0.2	0	6	1	0.2	0
BKRD-13-0.0	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	2	1	0.065	1	2	1	0.065	1
BKRD-13R-0.0 (dup)	01/11/93	D&M 1995	BKG	SURF	CAL	R	0.0	1	0	0.039	1	1	0	0.039	1
HA-73-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	17	1			17	1		
HA-75-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	8.7	1			8.7	1		
HA-76-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	7.5	1			7.5	1		
HA-92-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	6.8	1			6.8	1		
HA-93-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	23	1						
HA-94-0.5	02/12/09	Arcadis 2009	BKG	SURF	CAL	S	0.5	5.1	1			5.1	1		
SOIL17-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	11.2	1	0.031	1	11.2	1	0.031	1
SOIL17-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	5.5	1	0.12	0	5.5	1	0.12	0
SOIL18-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	13.1	1	0.12	1	13.1	1	0.12	1
SOIL18-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	10.6	1	0.078	1	10.6	1	0.078	1
SOIL19-1	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	10.1	1	0.054	1	10.1	1	0.054	1
SOIL19-1 (dup)	05/13/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.4	1	0.048	1	8.4	1	0.048	1
SOIL19-3	05/13/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	6.2	1	0.02	0	6.2	1	0.02	0
SOIL20-1	05/14/08	05/14/08	BKG	SURF	CAL	S	0.0-0.5	37.6	1	0.26	1				
SOIL20-3	05/14/08	05/14/08	BKG	SUB	CAL	S	2.5-3.0	23.9	1	0.076	0				
SOIL21-1	05/14/08	05/14/08	BKG	SURF	CAL	S	0.0-0.5	14.1	1	0.34	1	14.1	1	0.34	1
SOIL21-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.3	1	0.05	0	7.3	1	0.05	0
SOIL22-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	11.3	1	0.021	1	11.3	1	0.021	1
SOIL22-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	10.4	1	0.023	1	10.4	1	0.023	1
SOIL23-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	9.3	1	0.039	1	9.3	1	0.039	1
SOIL23-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	8.8	1	0.031	1	8.8	1	0.031	1
SOIL23-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	7.5	1	0.022	1	7.5	1	0.022	1
SOIL26-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	16.3	1	0.068	1				
SOIL26-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	24.4	1	0.1	0				
SOIL27-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	17.7	1	0.048	1	17.7	1	0.048	1
SOIL27-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	12.2	1	0.017	1	12.2	1	0.017	1

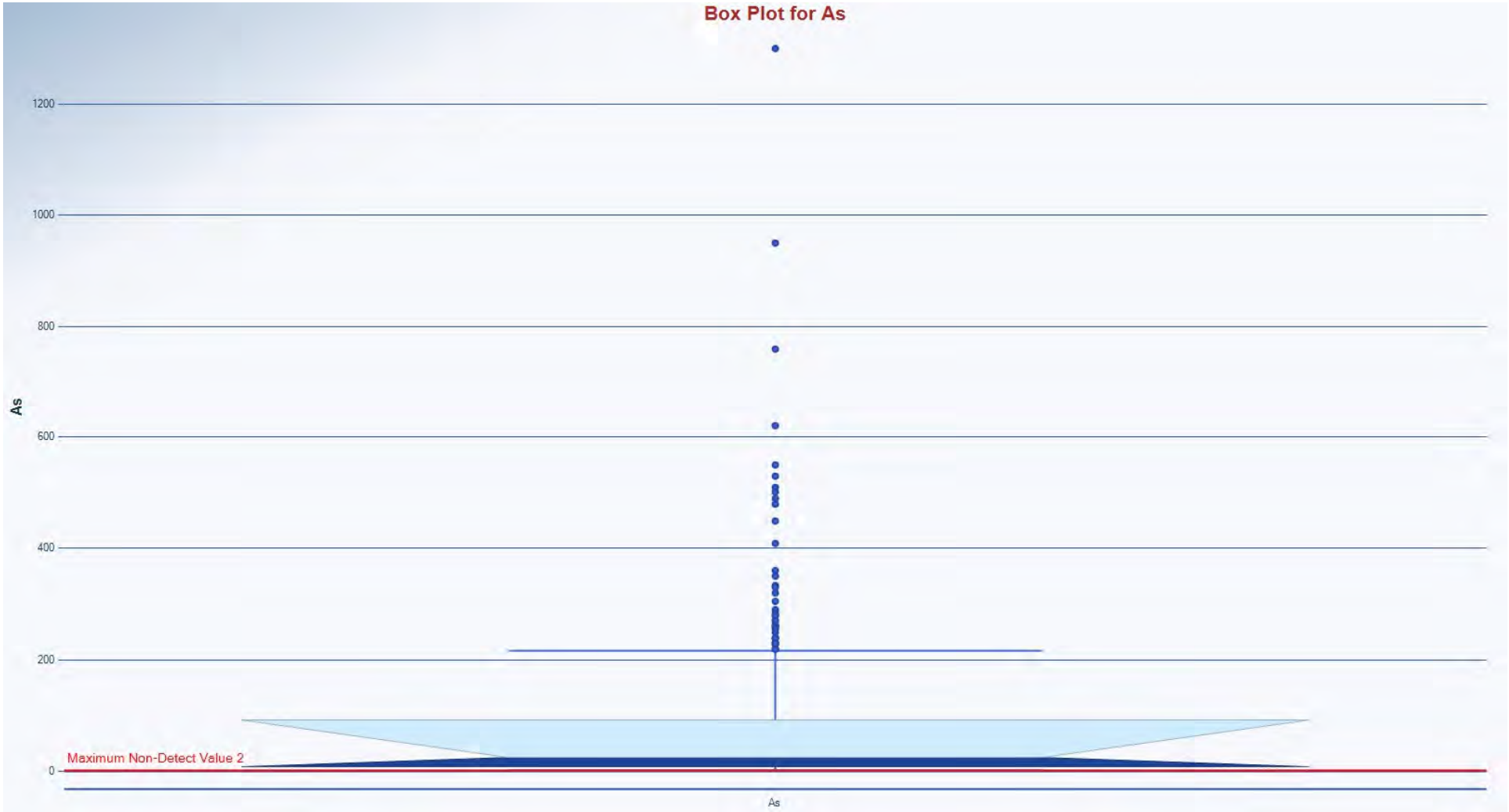
Northern Background Area,
Comparison of Arsenic and Lead
Central Tendency Values
With and Without HA-93, SOIL20, and SOIL26

SOIL27-3 (dup)	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	11.3	1	0.01	0	11.3	1	0.01	0
SOIL31-1	05/14/08	USEPA 2008	BKG	SURF	CAL	S	0.0-0.5	8.1	1	0.11	1	8.1	1	0.11	1
SOIL31-3	05/14/08	USEPA 2008	BKG	SUB	CAL	S	2.5-3.0	3.9	1	0.044	0	3.9	1	0.044	0
TP-59-0.0	05/22/23	Geocon 2023	BKG	SURF	CAL	S	0.0-0.5	6	1			6	1		
TP-59-1.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	1.5-2.0	1	0	0.1	0	1	0	0.1	0
TP-59-3.0	05/22/23	Geocon 2023	BKG	SUB	CAL	S	3.0-3.5	2	0			2	0		
TP-59-4.5	05/22/23	Geocon 2023	BKG	SUB	CAL	S	4.5-5.0	2	0			2	0		

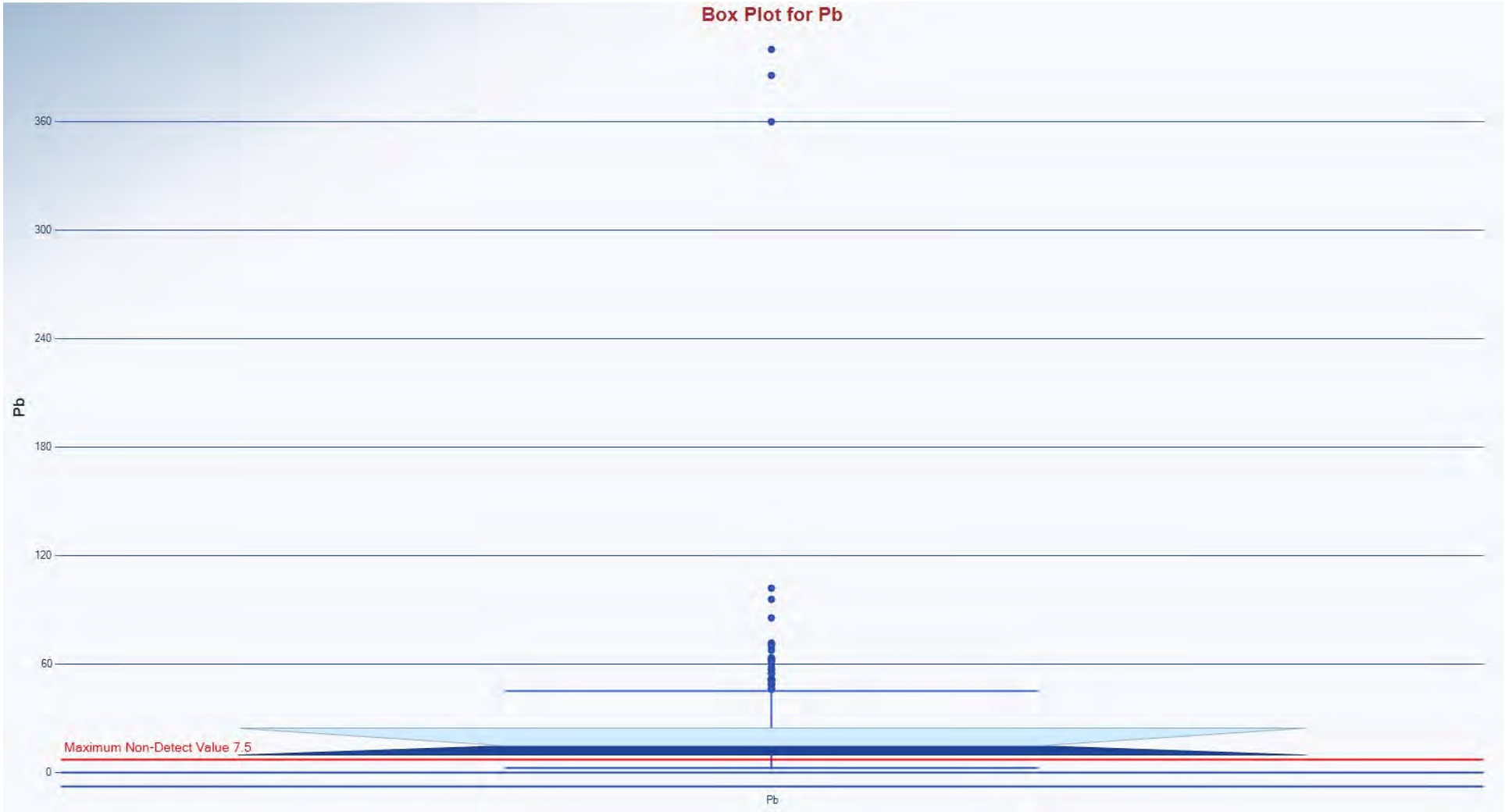
Western Area and Southern Area, Arsenic

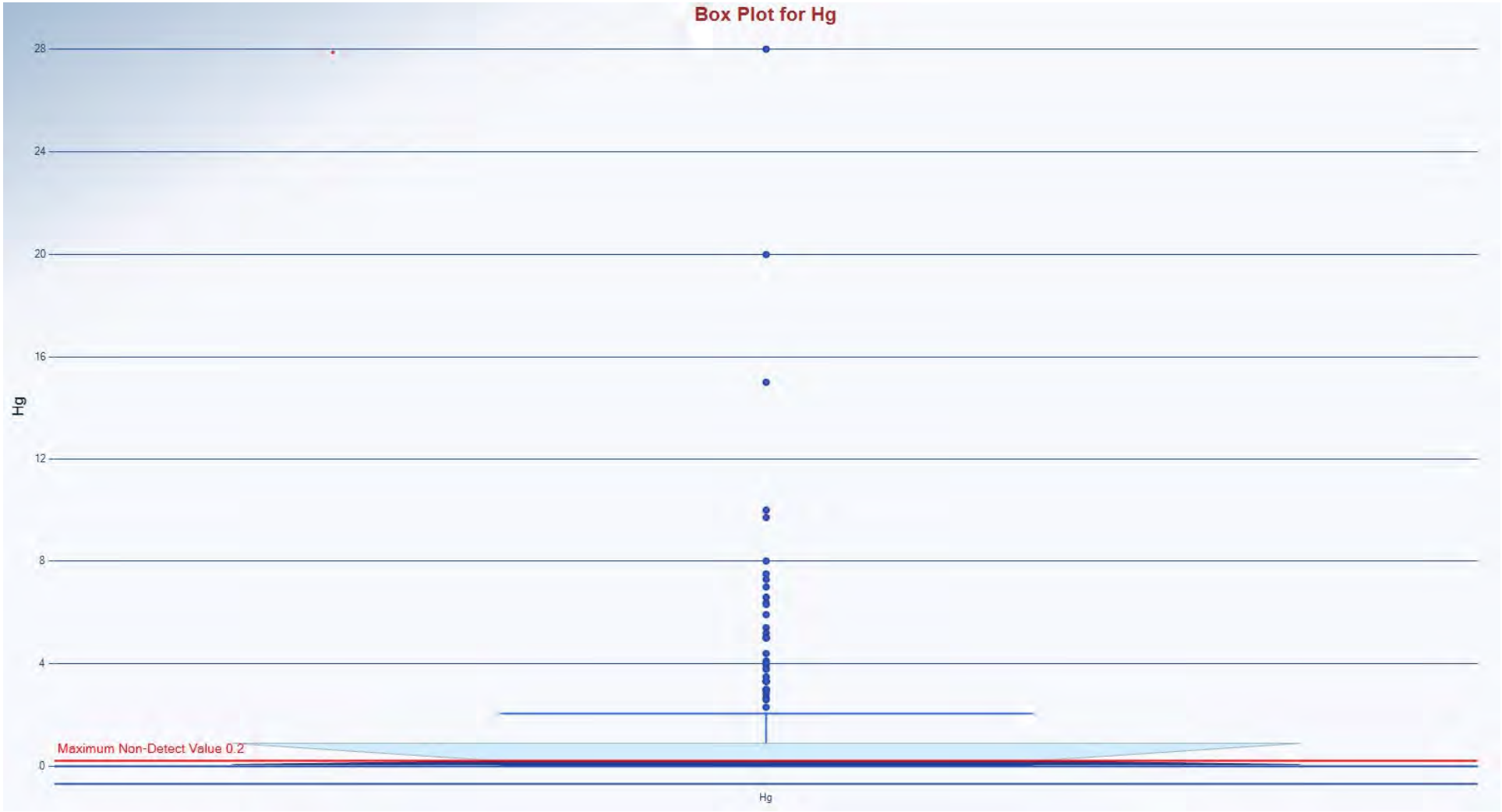
As Western&Southern
35
38
59
19
19
13
11
46
28

Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data

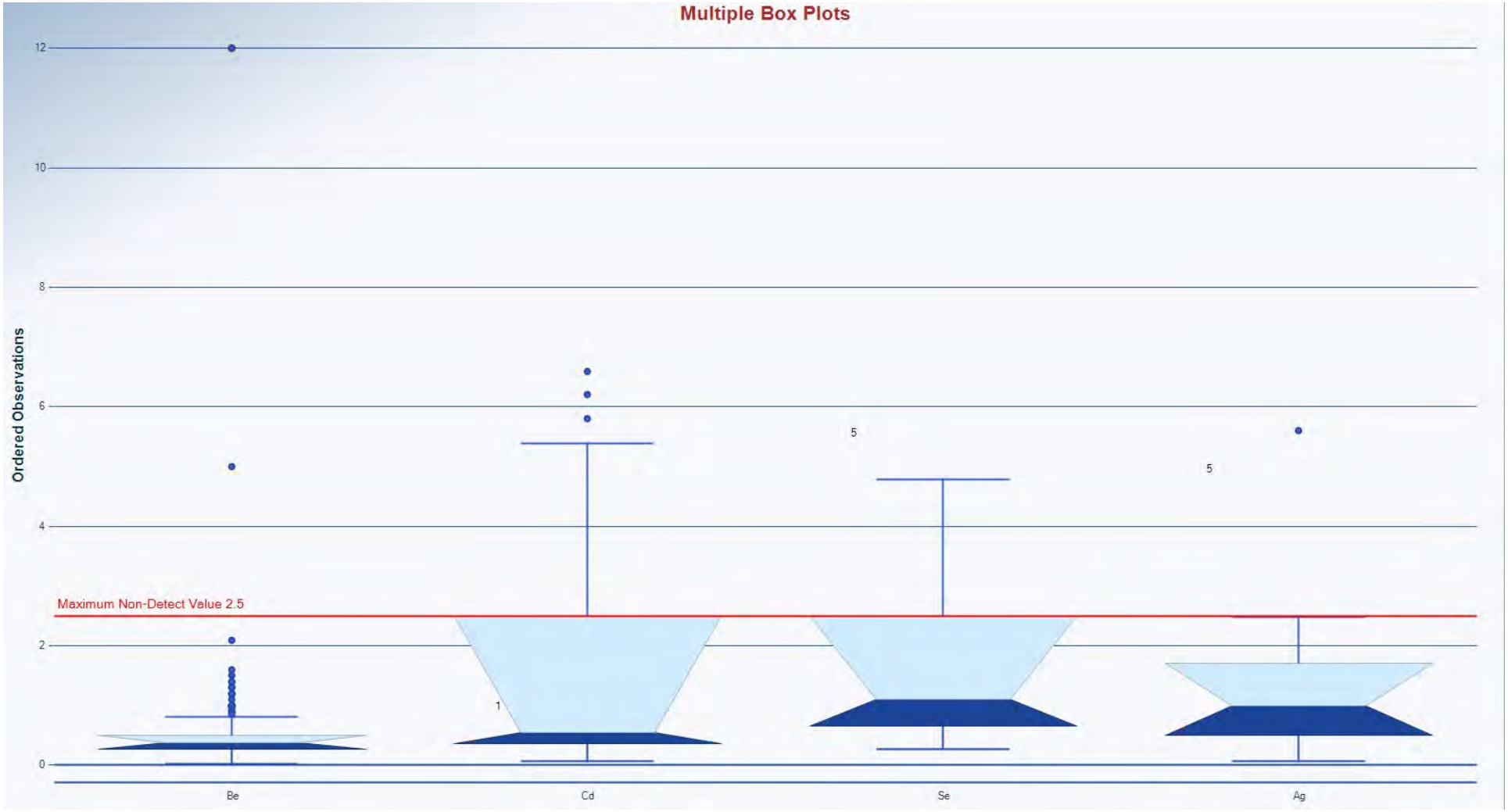


Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data

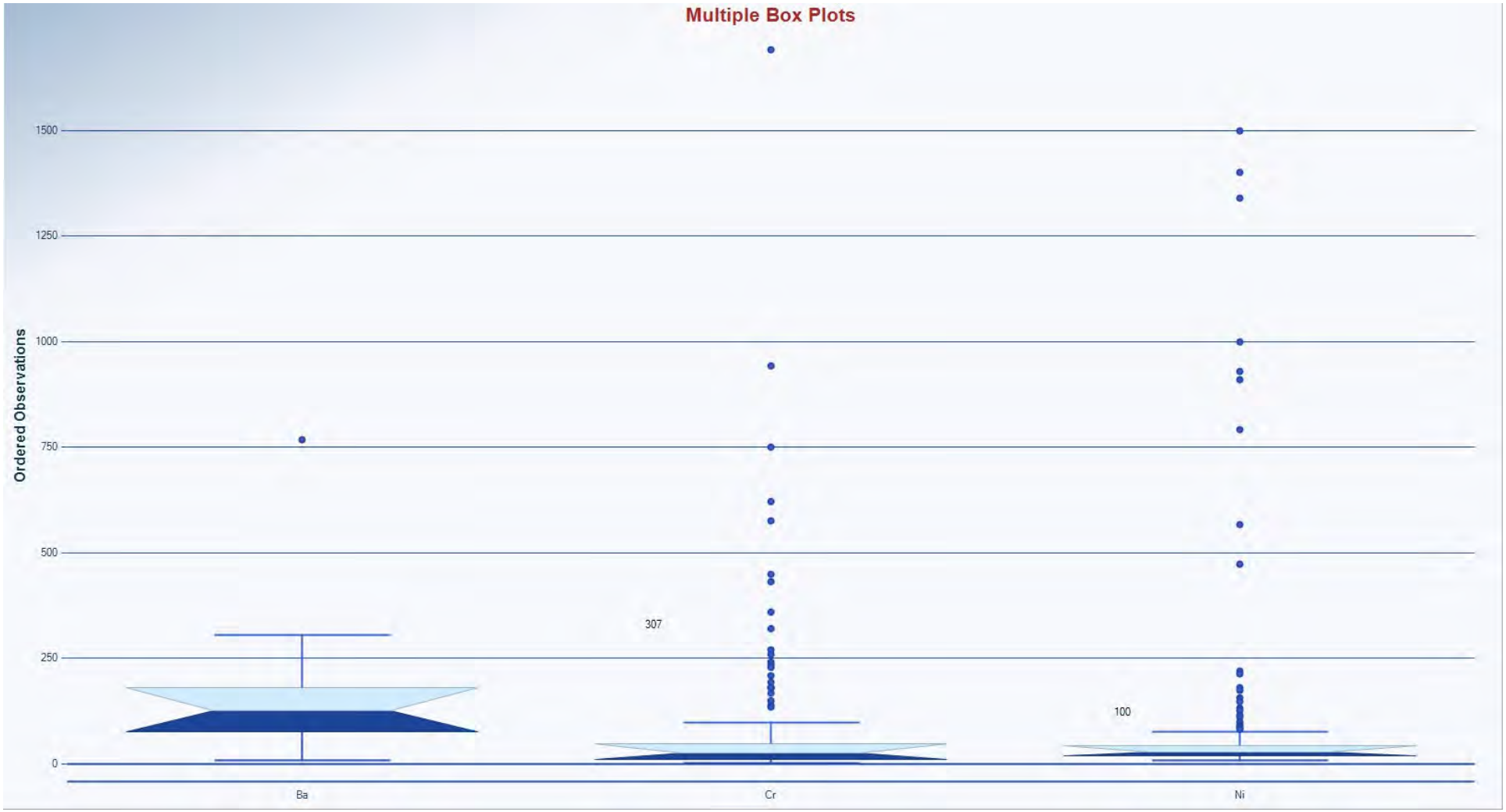



Box Plot for Hg
28
24
20
16
12
8
4
0
Hg
Maximum Non-Detect Value 0.2
Hg

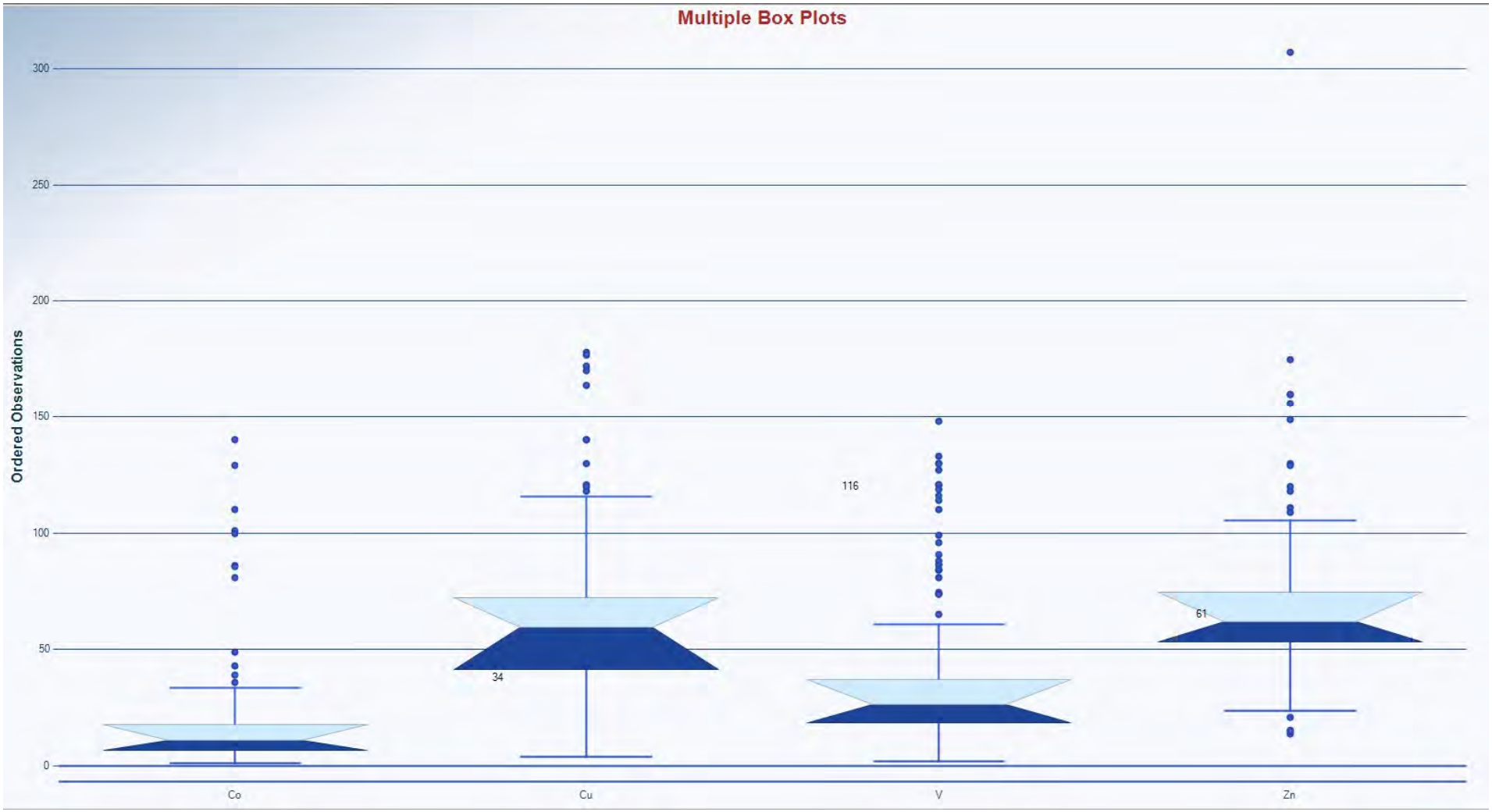
Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data



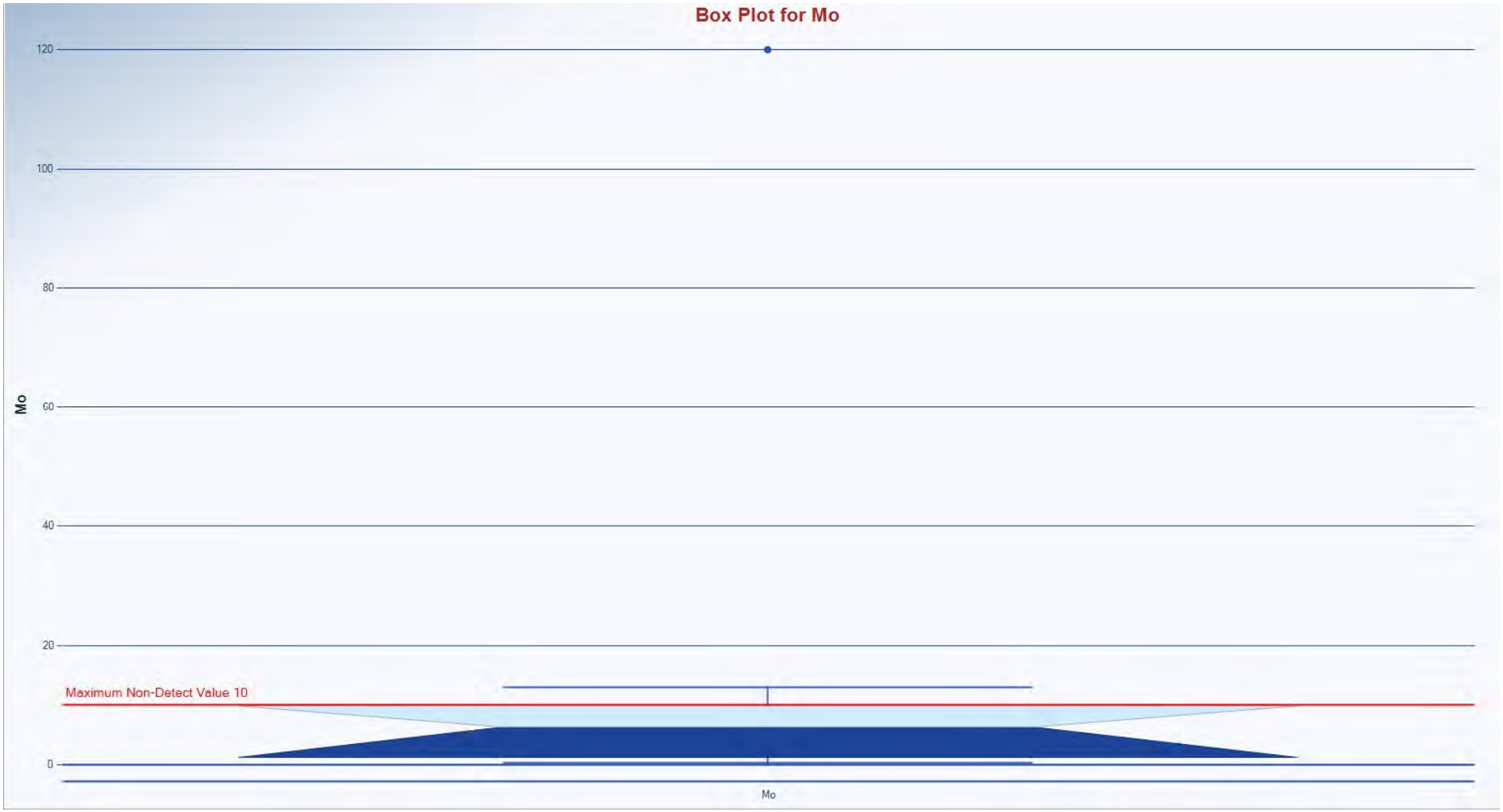
Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data



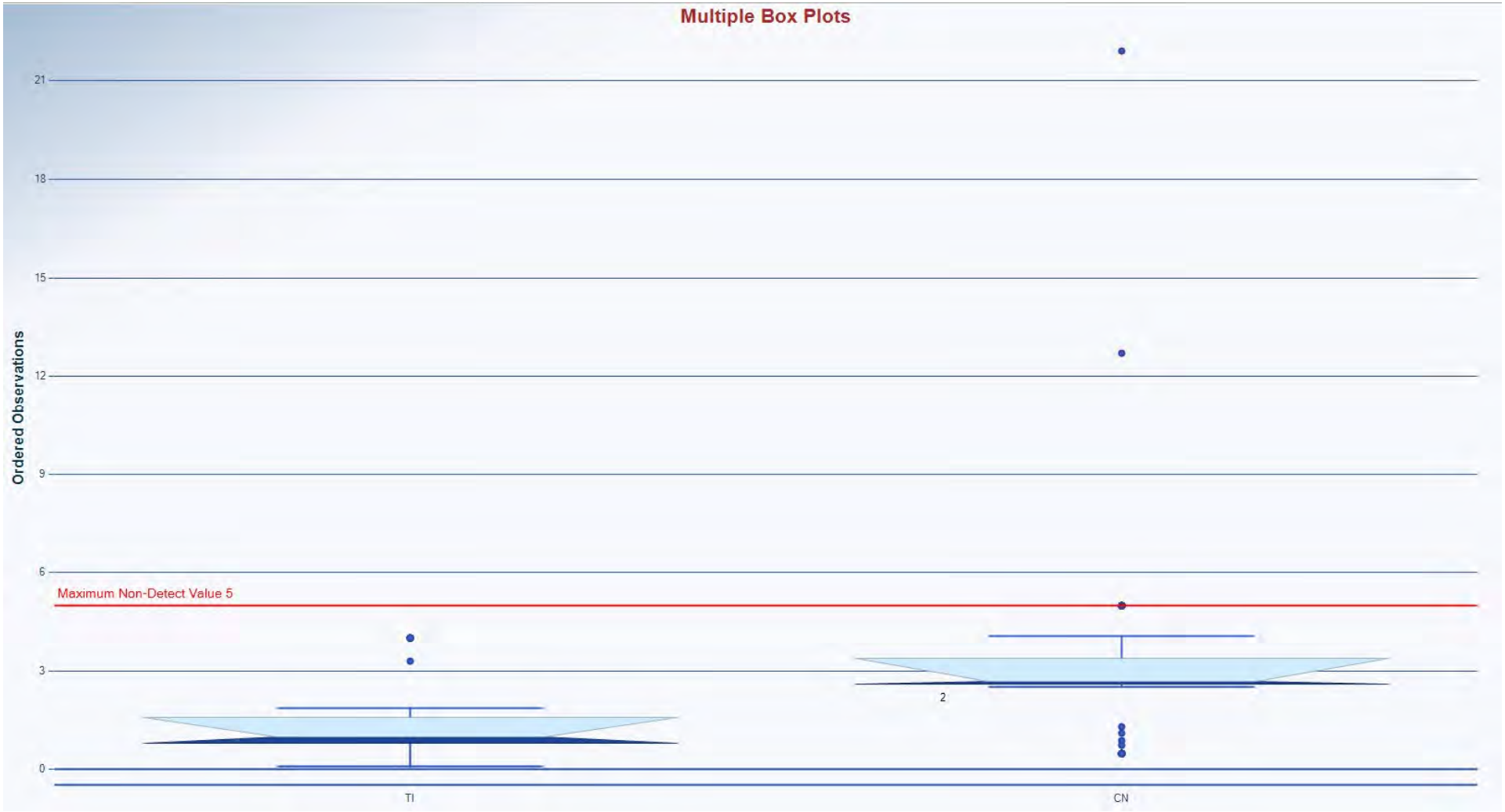
Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data

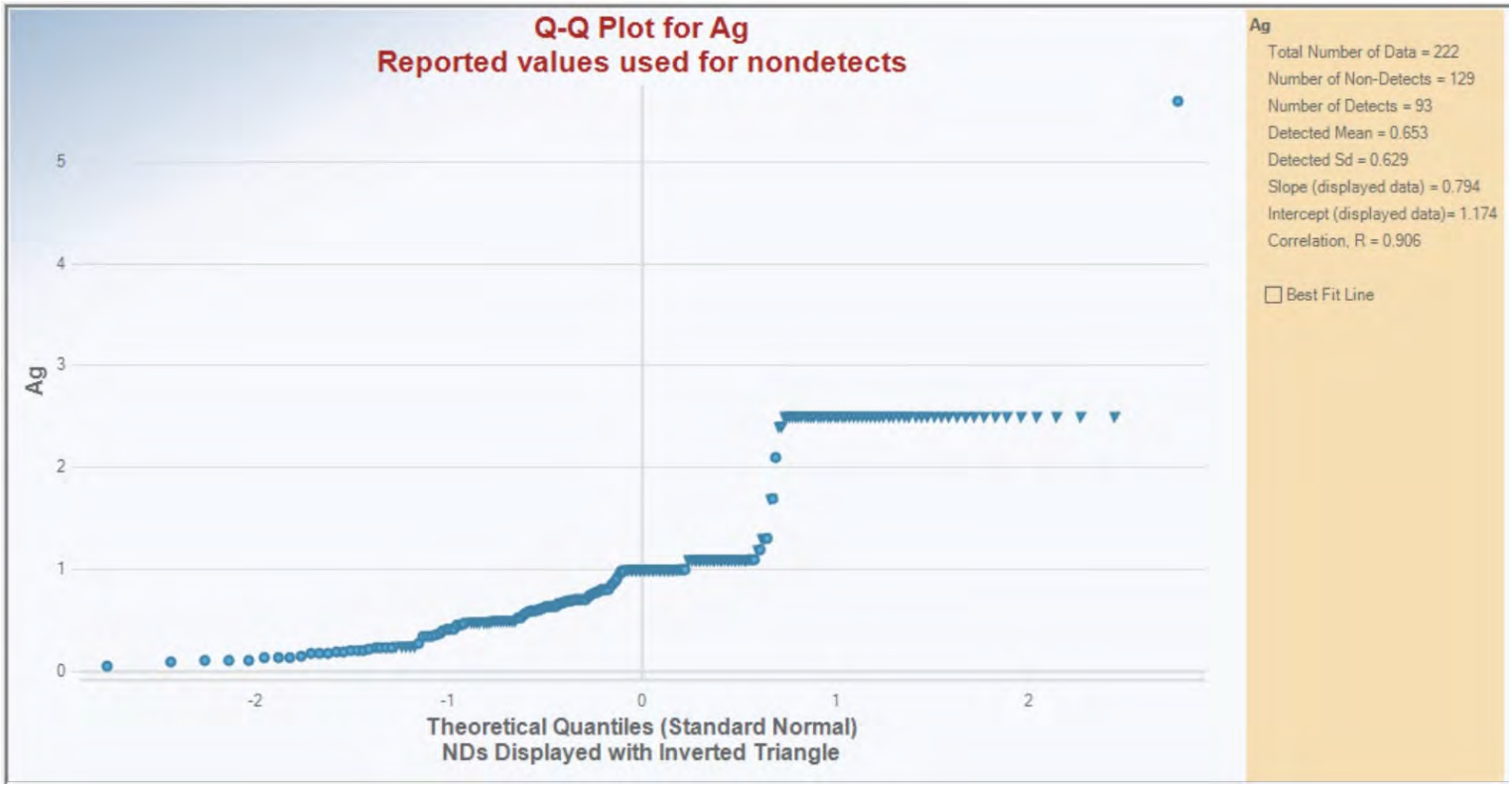


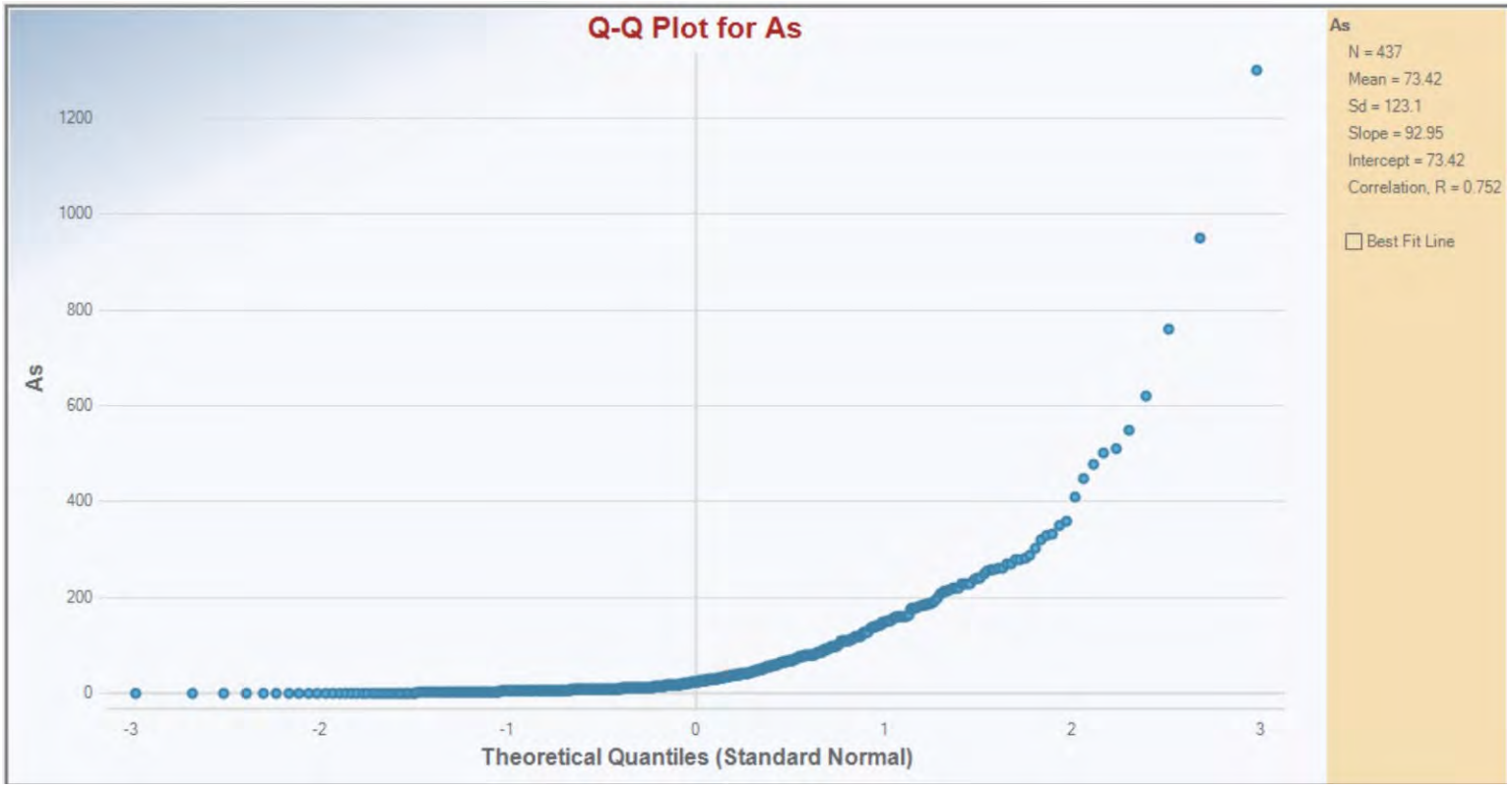
Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data

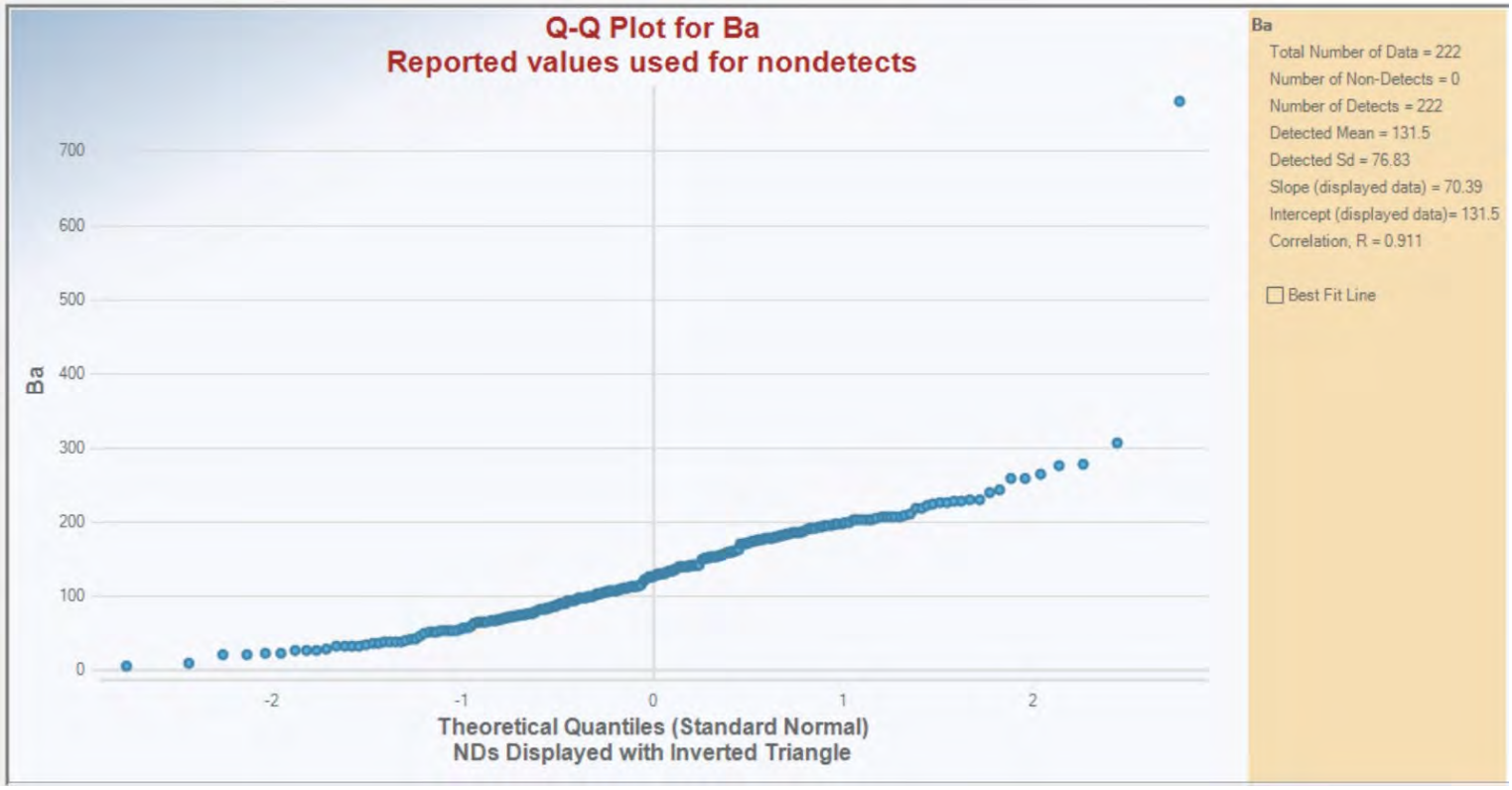


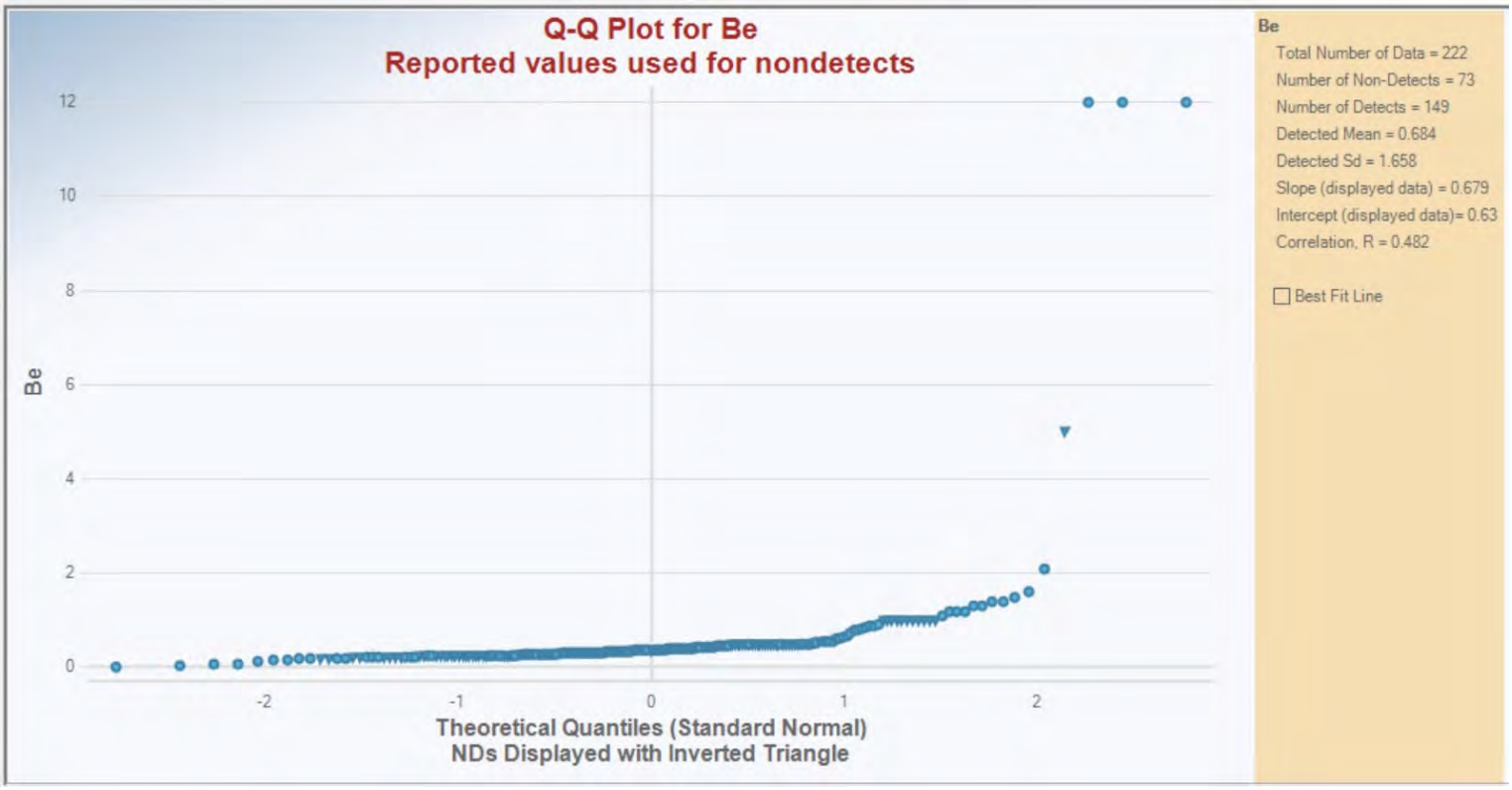
Box Plots: Soil, Tailings and Weathered Rock, Entire Site, All Validated Data

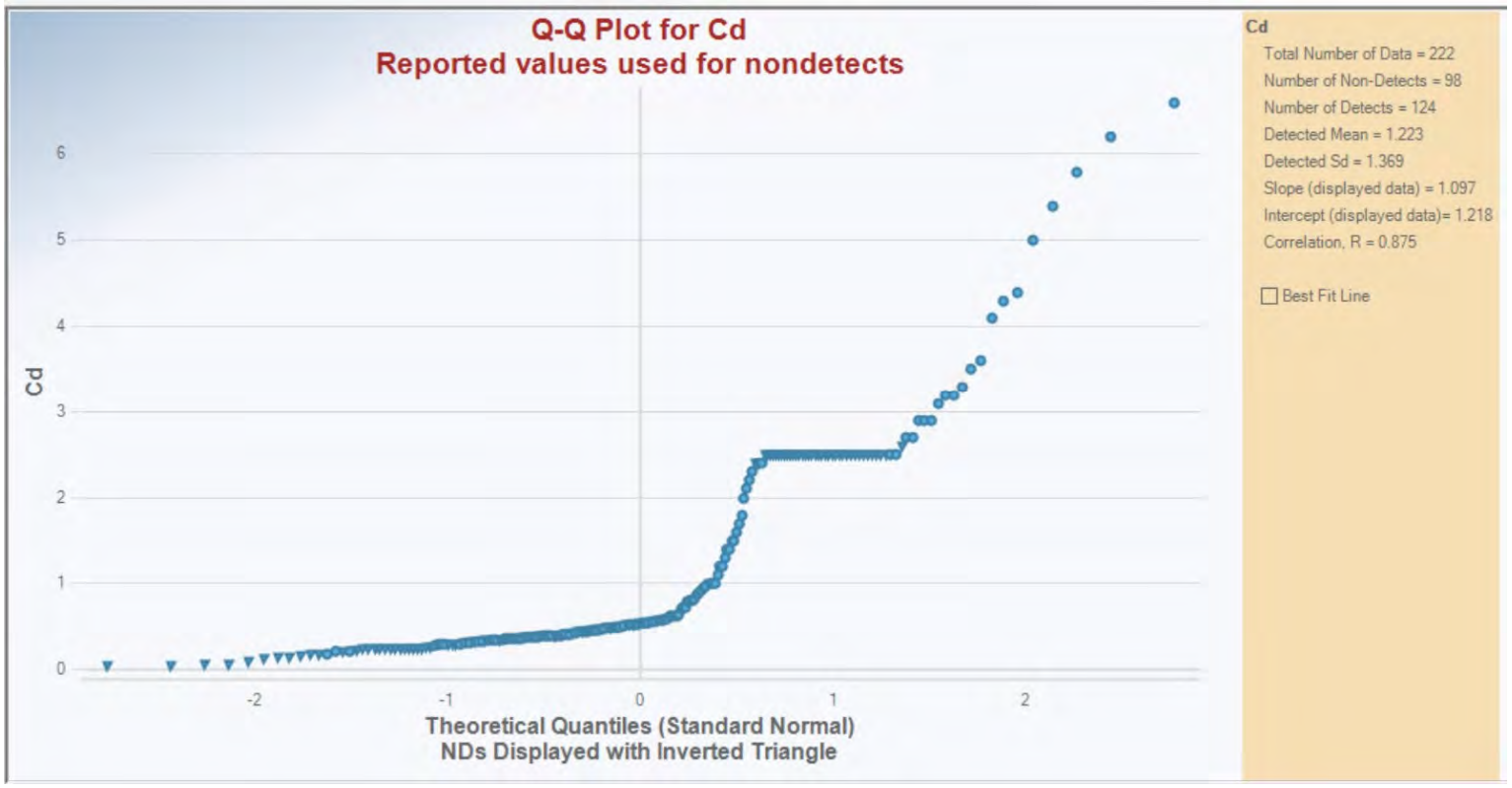


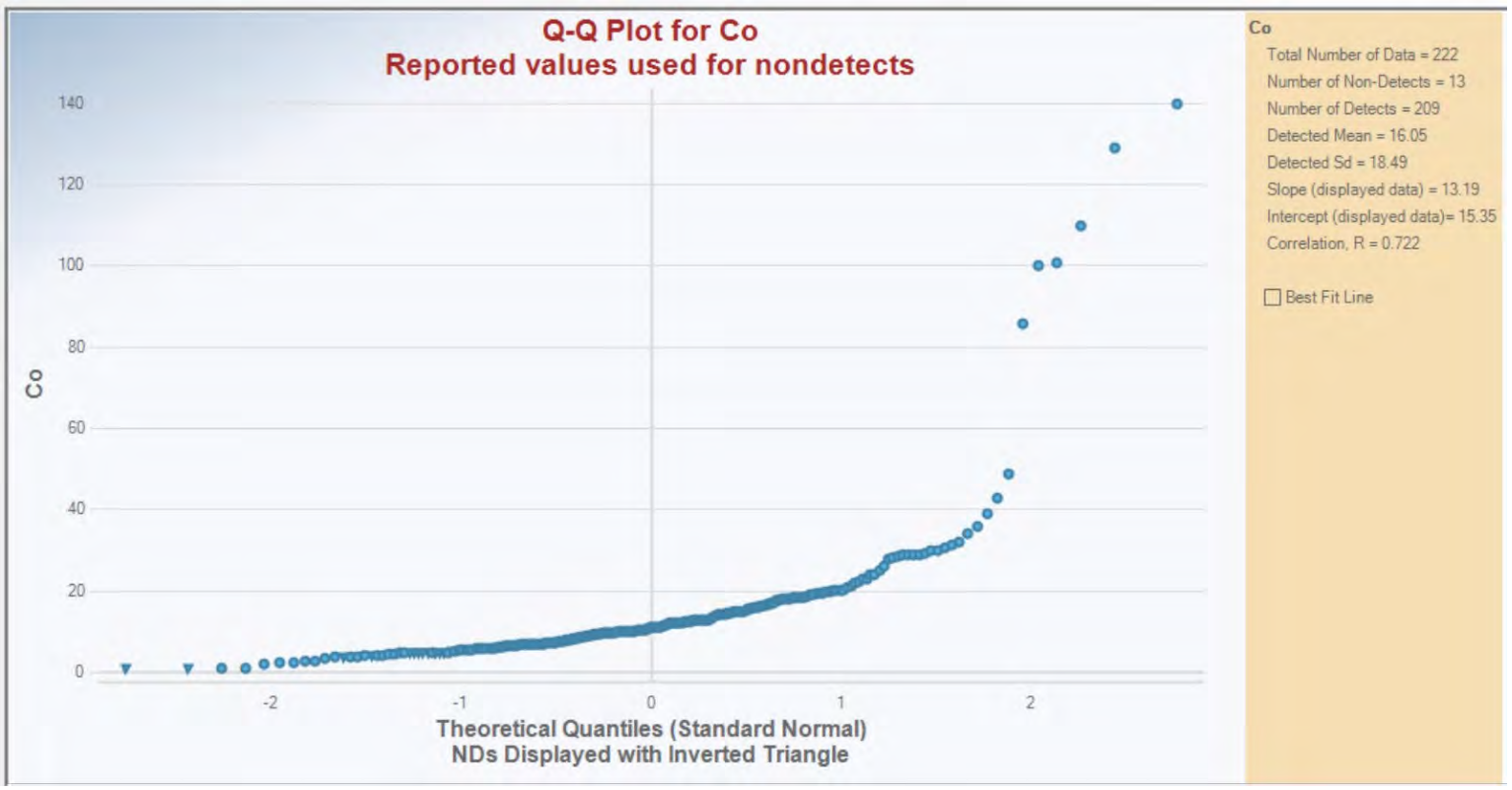

Q-Q Plot for Ag
Reported values used for nondetects
Ag
Total Number of Data = 222
Number of Non-Detects = 129
Number of Detects = 93
Detected Mean = 0.653
Detected Sd = 0.629
Slope (displayed data) = 0.794
Intercept (displayed data)= 1.174
Correlation, R = 0.906
Best Fit Line
Ag
Theoretical Quantiles (Standard Normal)
NDs Displayed with Inverted Triangle


Q-Q Plot for As
As
N = 437
Mean = 73.42
Sd = 123.1
Slope = 92.95
Intercept = 73.42
Correlation, R = 0.752
Best Fit Line
As
Theoretical Quantiles (Standard Normal)

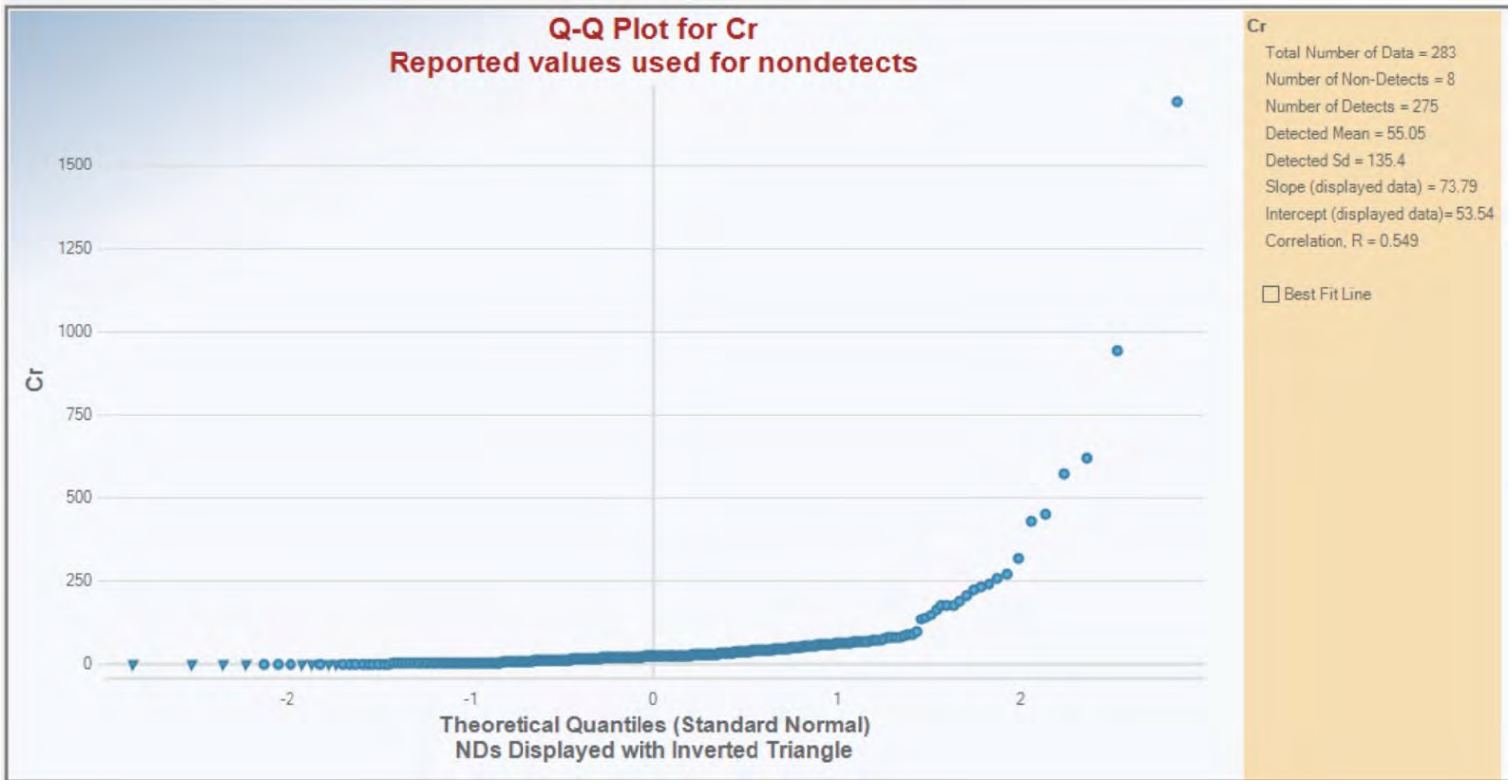

Q-Q Plot for Ba
Reported values used for nondetects
Ba
Total Number of Data = 222
Number of Non-Detects = 0
Number of Detects = 222
Detected Mean = 131.5
Detected Sd = 76.83
Slope (displayed data) = 70.39
Intercept (displayed data)= 131.5
Correlation, R = 0.911
Best Fit Line
Ba
700
600
500
400
300
200
100
0
-2
-1
0
1
2
Theoretical Quantiles (Standard Normal)
NDs Displayed with Inverted Triangle

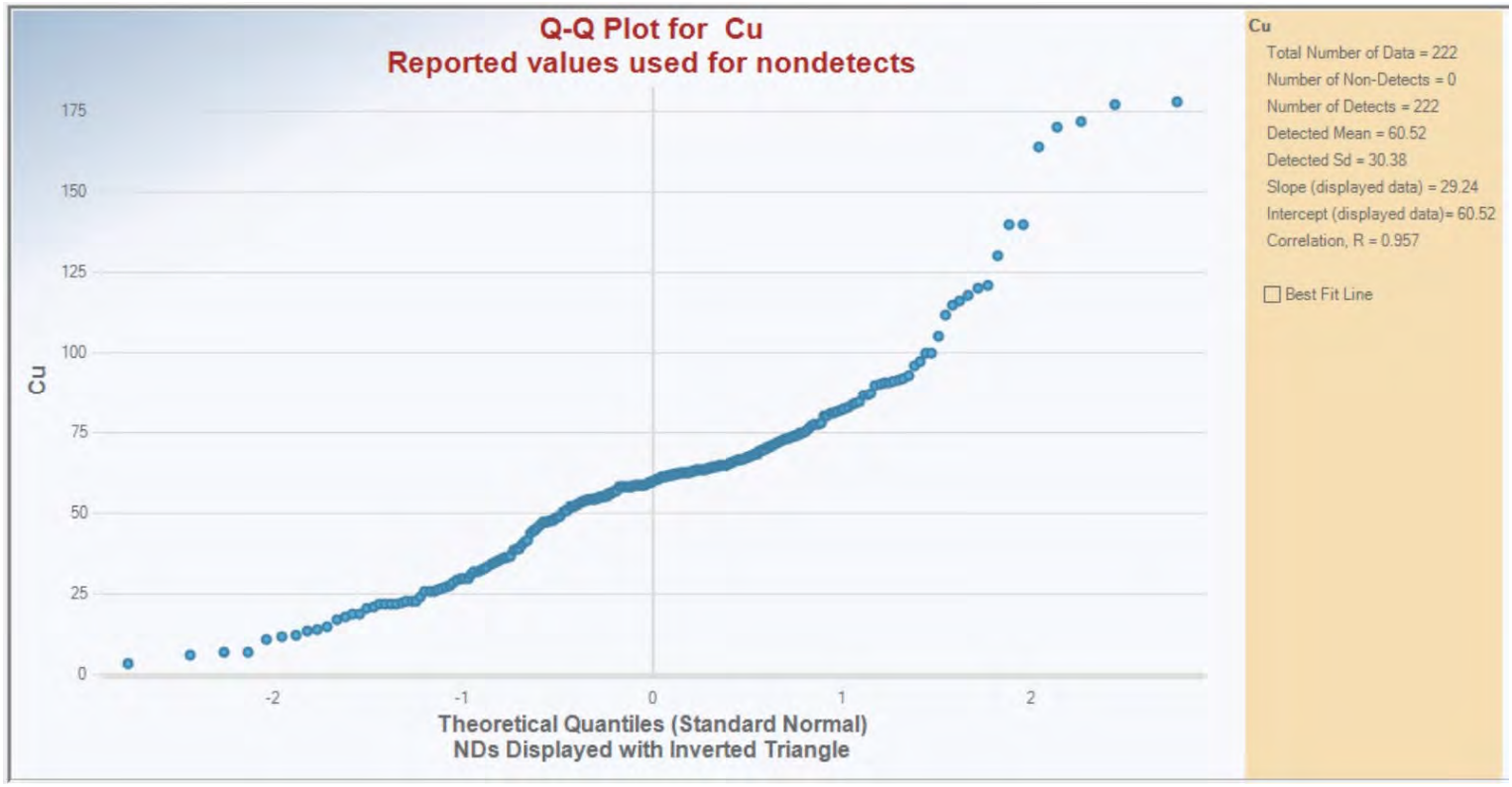

Q-Q Plot for Be
Reported values used for nondetects
Be
Total Number of Data = 222
Number of Non-Detects = 73
Number of Detects = 149
Detected Mean = 0.684
Detected Sd = 1.658
Slope (displayed data) = 0.679
Intercept (displayed data)= 0.63
Correlation, R = 0.482
Best Fit Line
Be
12
10
8
6
4
2
0
-2
-1
0
1
2
Theoretical Quantiles (Standard Normal)
NDs Displayed with Inverted Triangle


Q-Q Plot for Cd
Reported values used for nondetects
Cd
Theoretical Quantiles (Standard Normal)
NDs Displayed with Inverted Triangle
Cd
Total Number of Data = 222
Number of Non-Detects = 98
Number of Detects = 124
Detected Mean = 1.223
Detected Sd = 1.369
Slope (displayed data) = 1.097
Intercept (displayed data)= 1.218
Correlation, R = 0.875
Best Fit Line

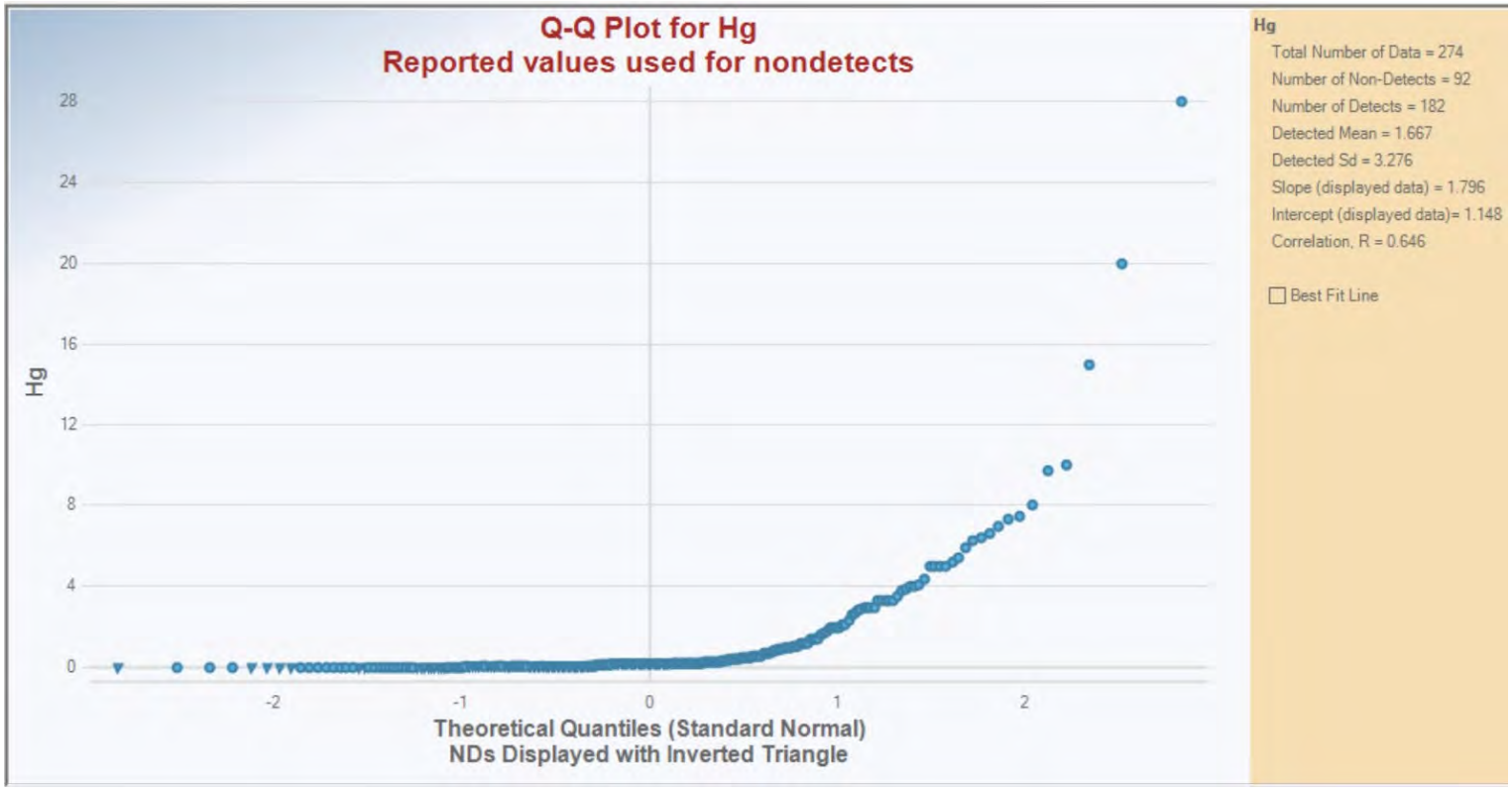

Q-Q Plot for Co
Reported values used for nondetects
Co
Theoretical Quantiles (Standard Normal)
NDs Displayed with Inverted Triangle
Co
Total Number of Data = 222
Number of Non-Detects = 13
Number of Detects = 209
Detected Mean = 16.05
Detected Sd = 18.49
Slope (displayed data) = 13.19
Intercept (displayed data)= 15.35
Correlation, R = 0.722
Best Fit Line

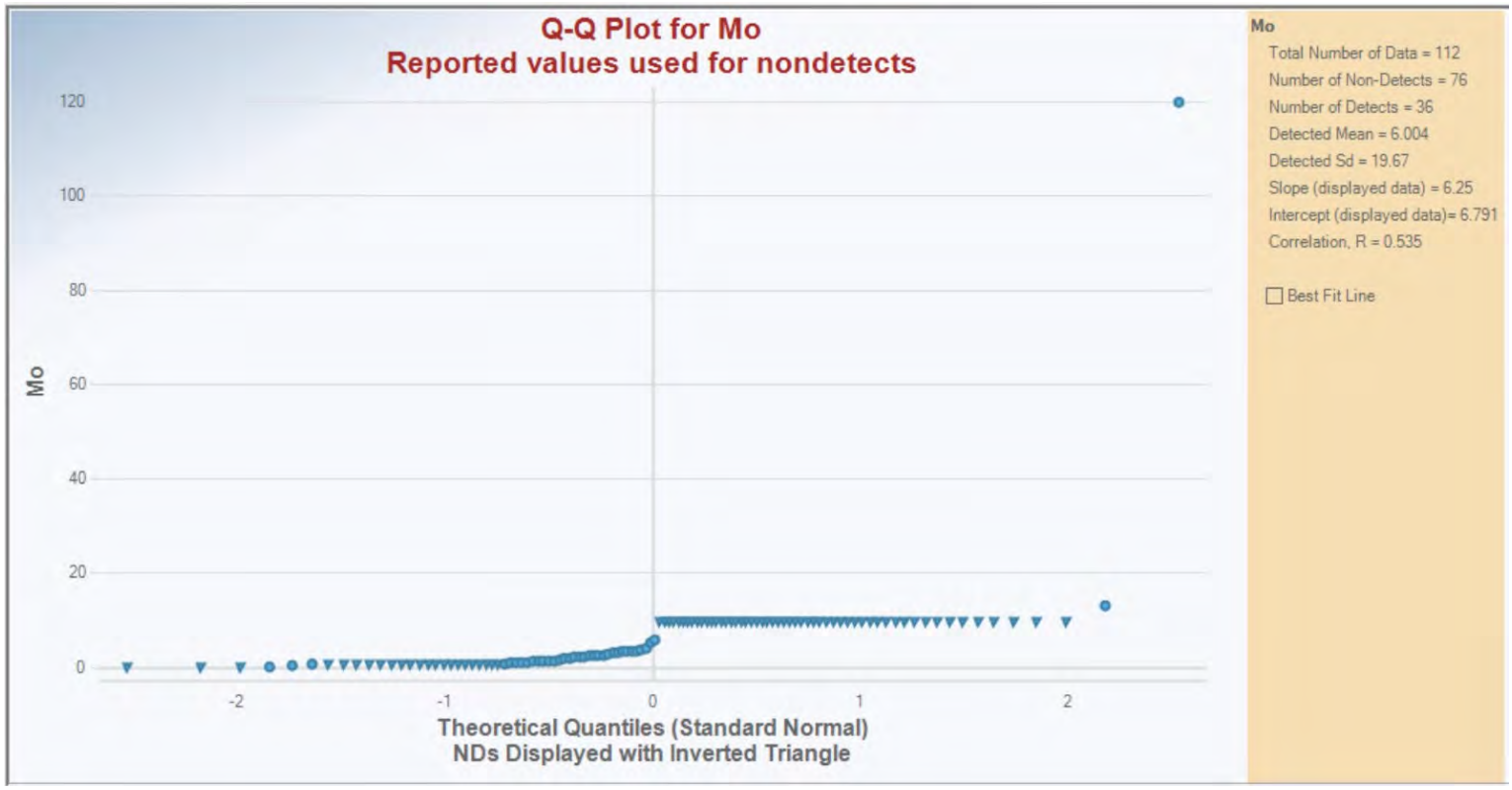
Q-Q Plots: Soil, Tailings and Weathered Rock, Entire Site



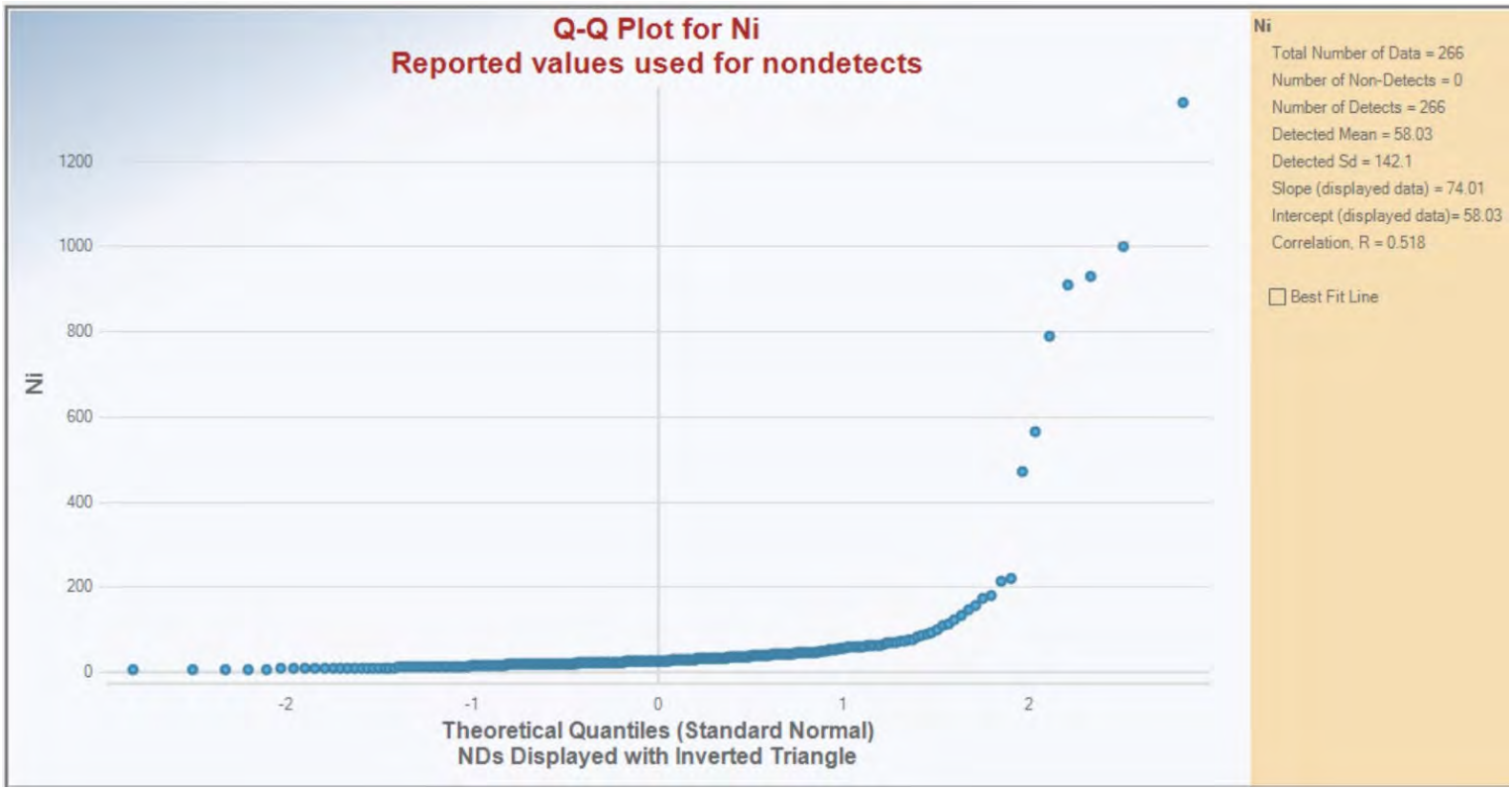


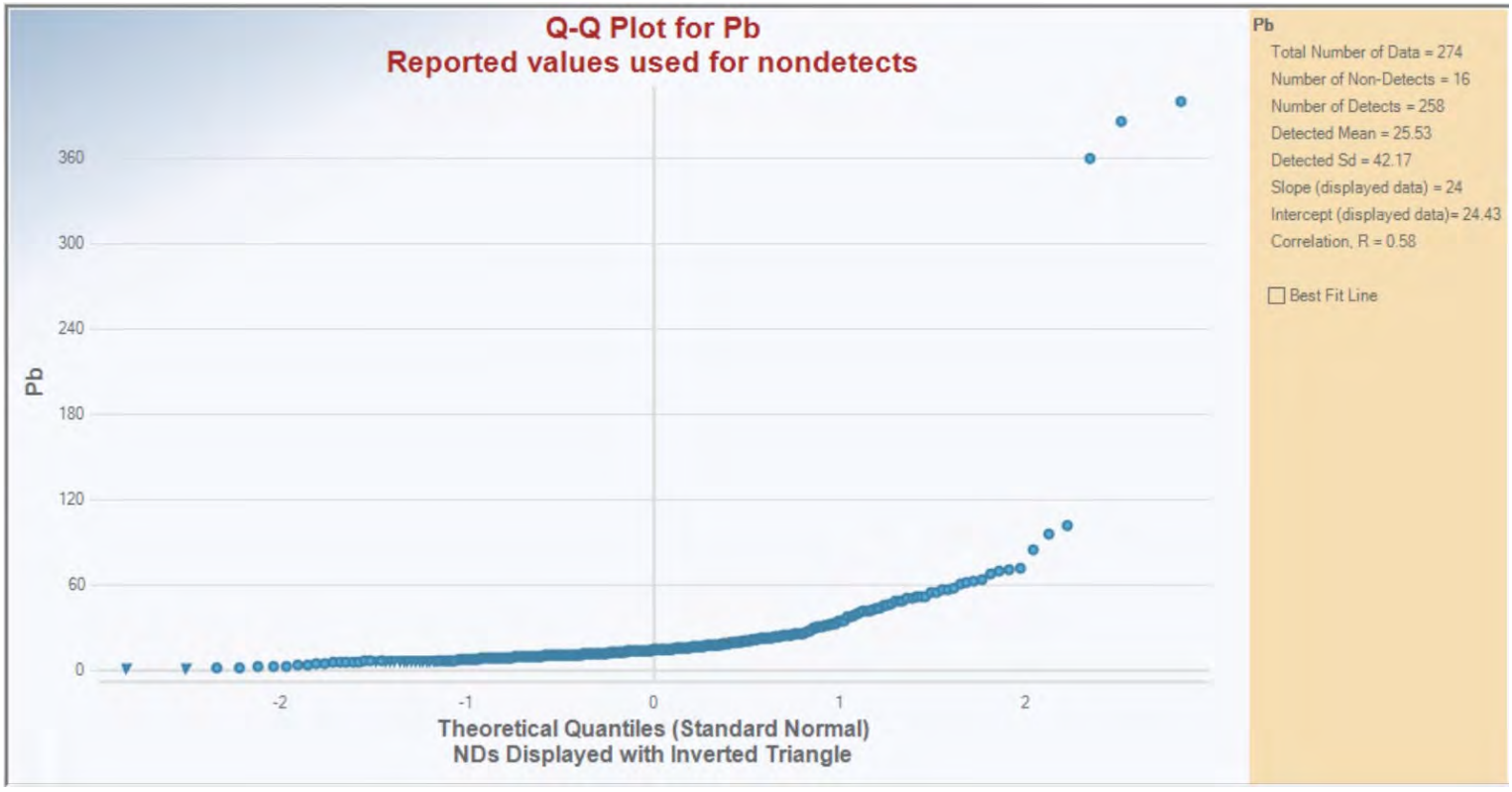
Q-Q Plots: Soil, Tailings and Weathered Rock, Entire Site



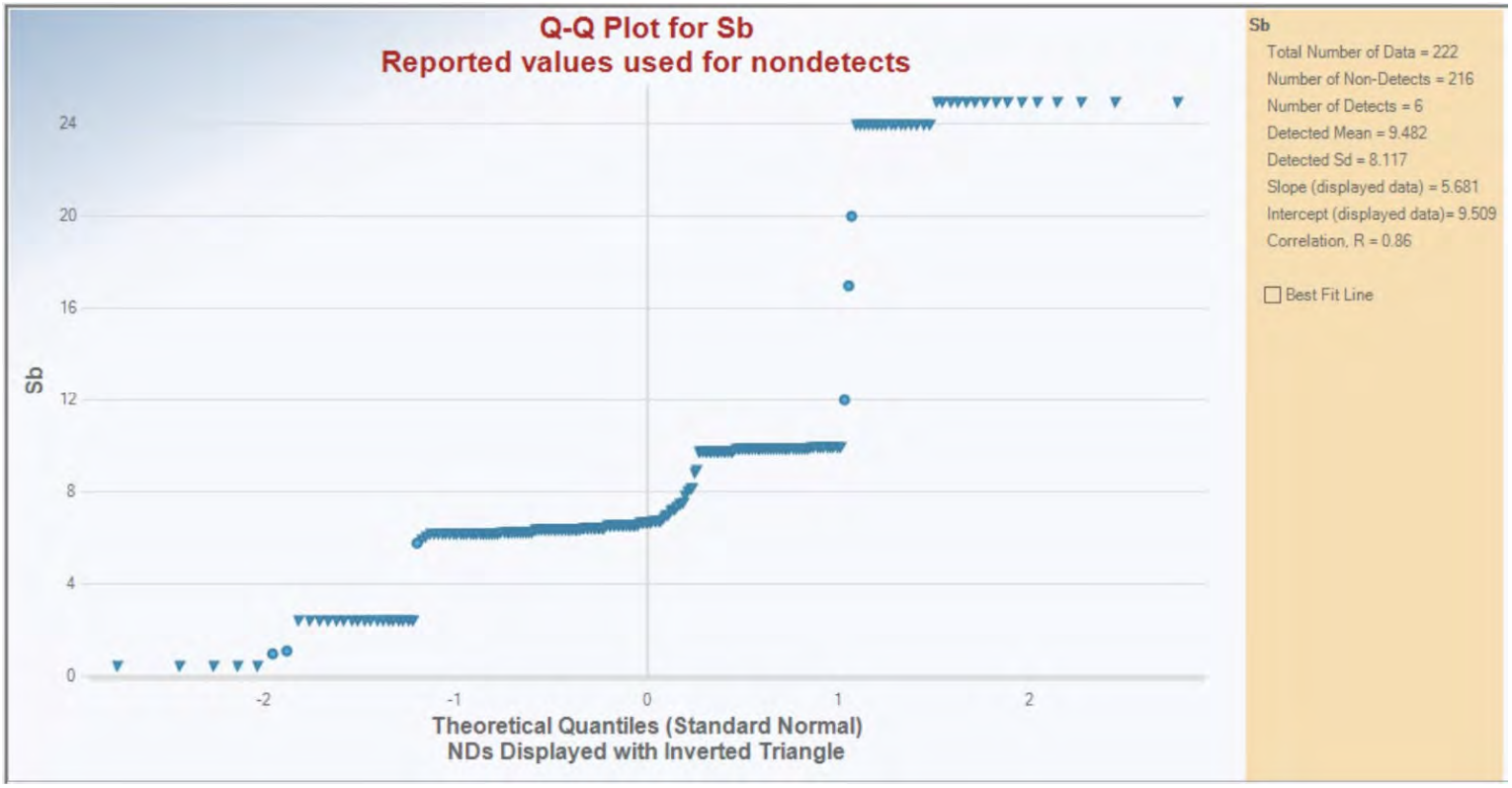


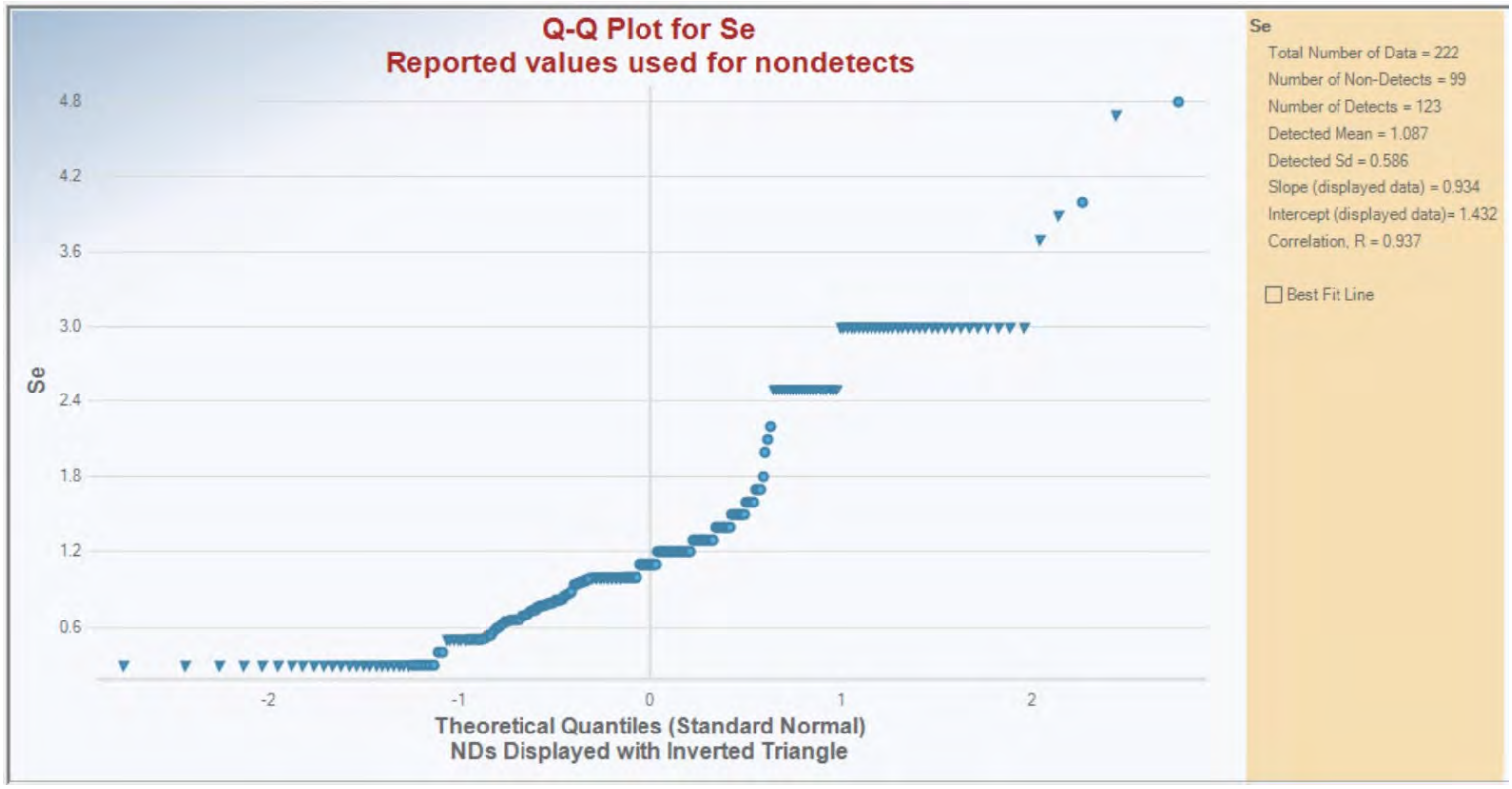
Q-Q Plots: Soil, Tailings and Weathered Rock, Entire Site



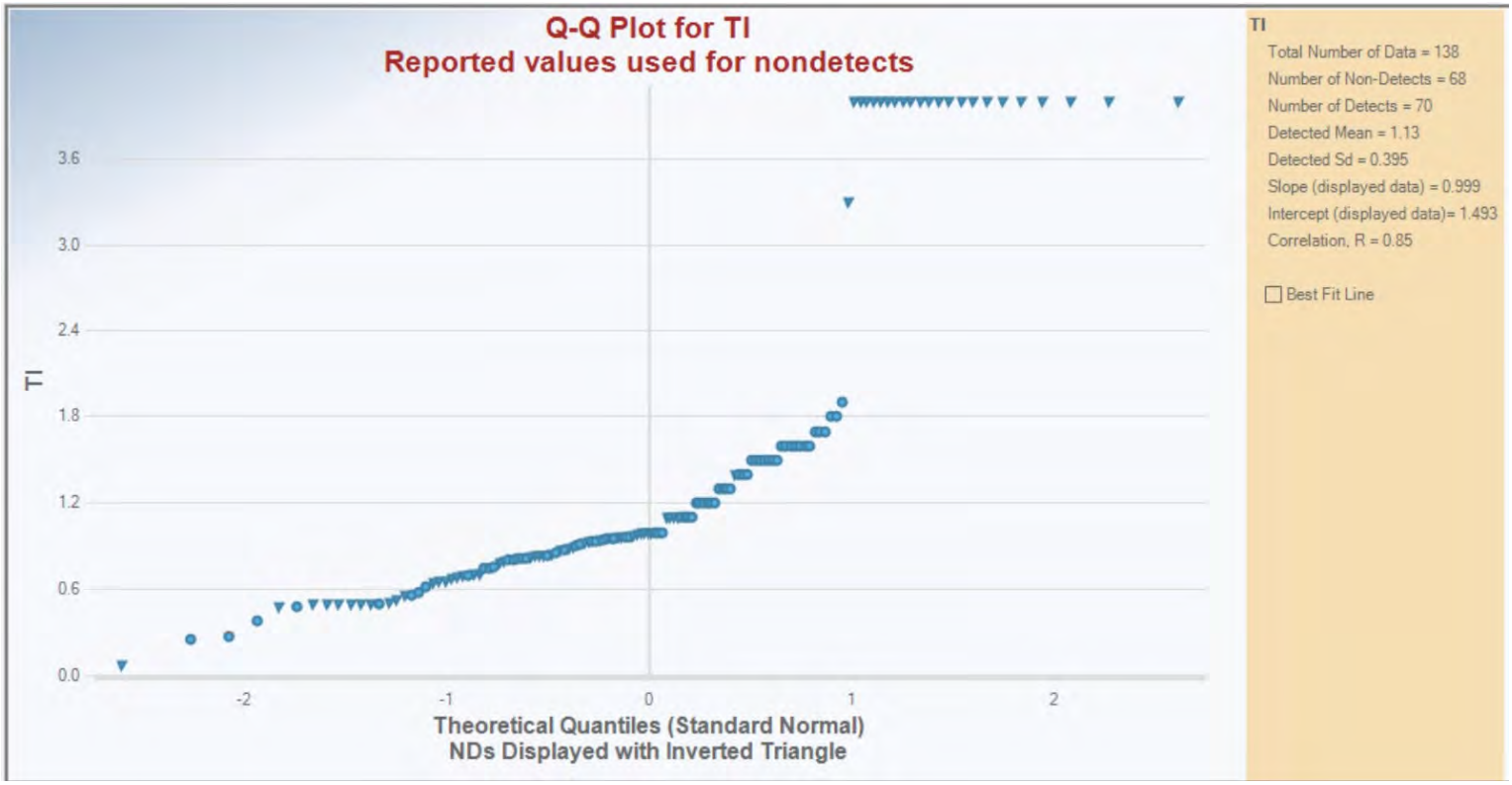


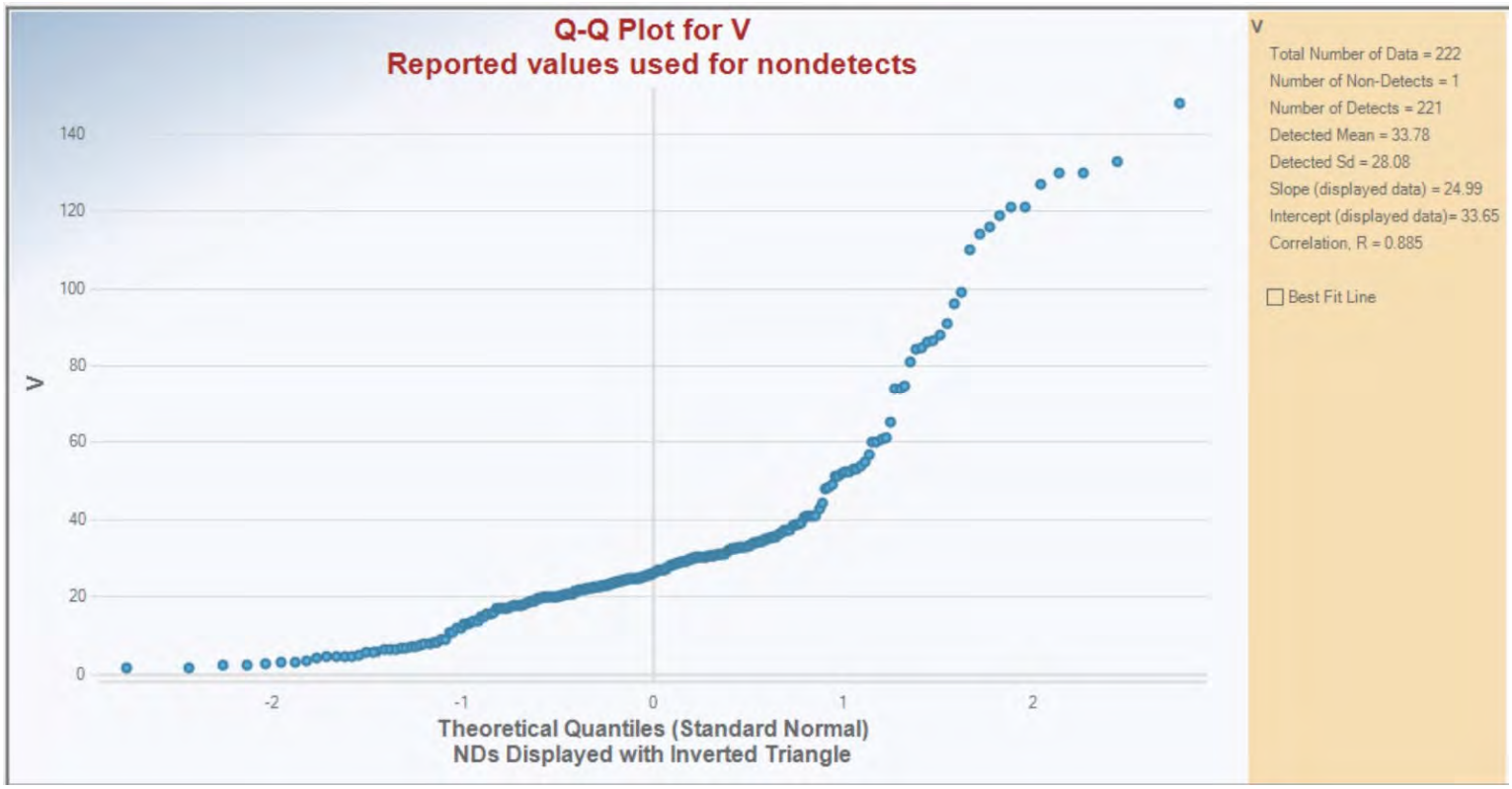
Q-Q Plots: Soil, Tailings and Weathered Rock, Entire Site



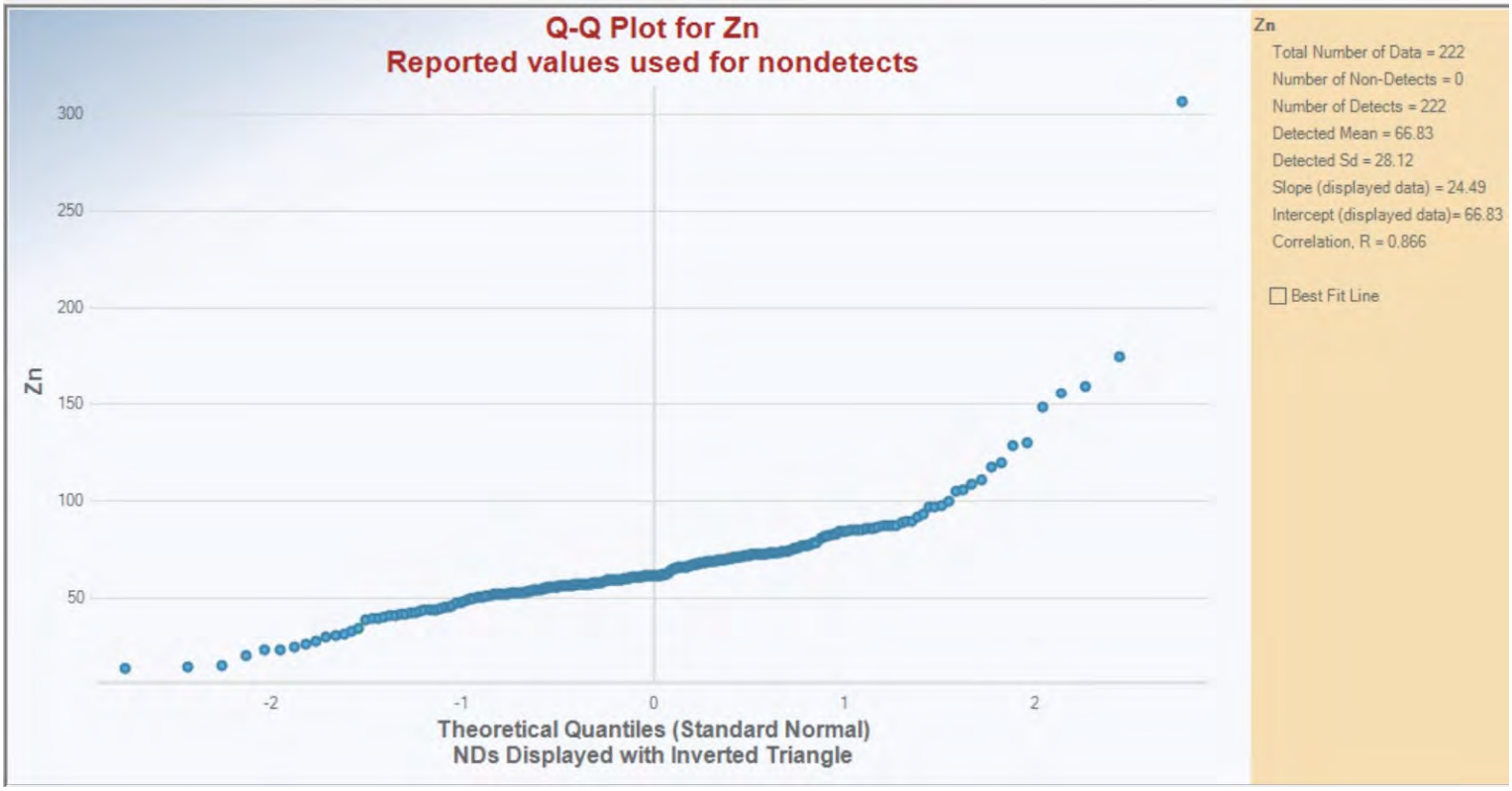


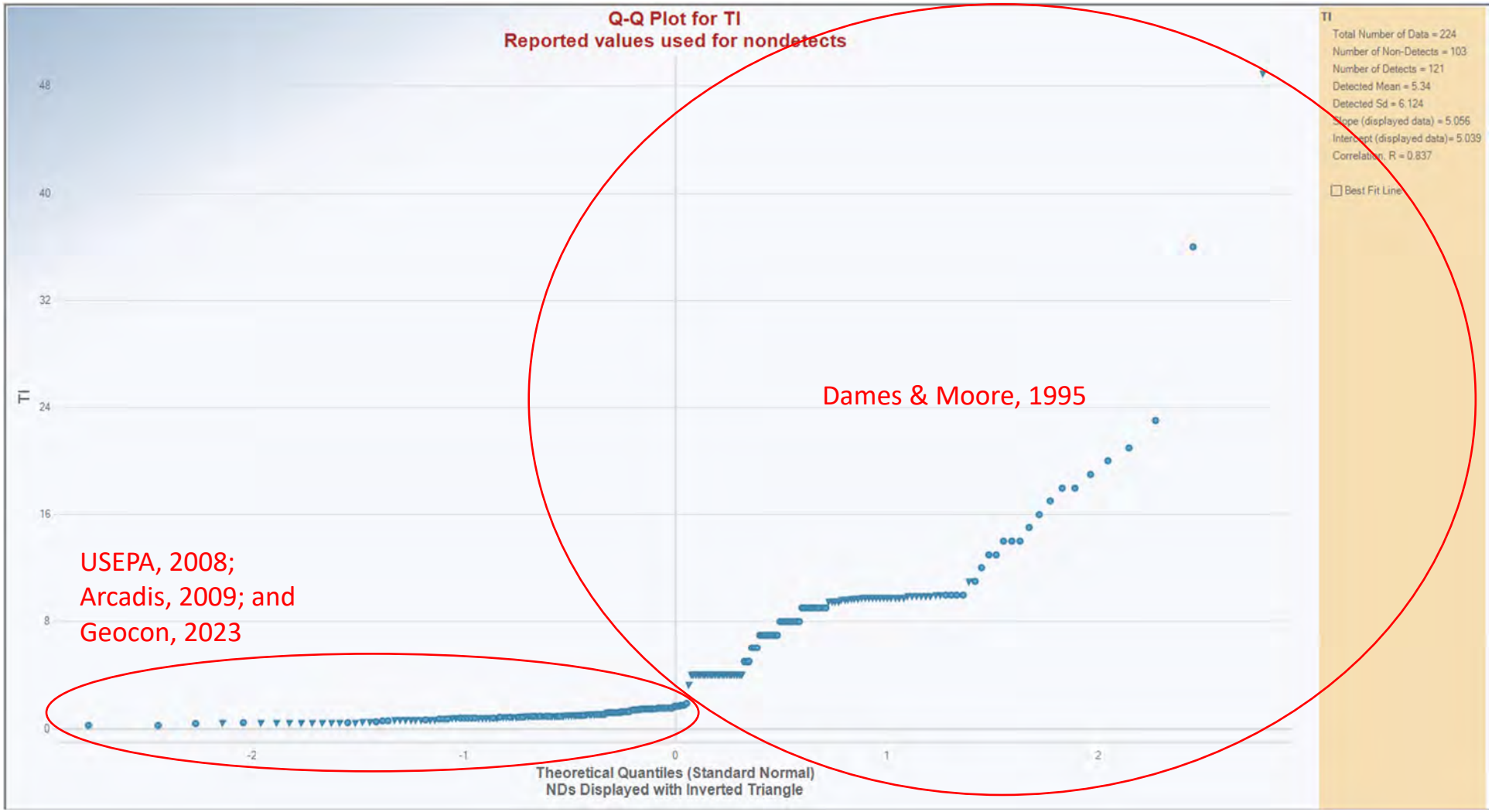
Q-Q Plots: Soil, Tailings and Weathered Rock, Entire Site





Q-Q Plots: Soil, Tailings and Weathered Rock, Entire Site




Q-Q Plot for TI
Reported values used for nondetects
TI
Total Number of Data = 224
Number of Non-Detects = 103
Number of Detects = 121
Detected Mean = 5.34
Detected Sd = 6.124
Slope (displayed data) = 5.056
Intercept (displayed data)= 5.039
Correlation, R = 0.837
Best Fit Line
48
40
32
24
16
8
0
TI
-2
-1
0
1
2
Theoretical Quantiles (Standard Normal)
NDs Displayed with Inverted Triangle
Dames & Moore, 1995
USEPA, 2008;
Arcadis, 2009; and
Geocon, 2023

Outlier Tests for Selected Uncensored Variables

User Selected Options

Date/Time of Computation	ProUCL 5.2 7/28/2023 3:28:18 PM
From File	A1 Soil, Total Metals, Entire Site.xls
Full Precision	OFF

Rosner's Outlier Test for Sb

Mean	**9.509**
Standard Deviation	**6.566**
Number of data	**222**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	9.509	6.551	25	30	2.365	3.635	4.006

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for As

Mean	**73.42**
Standard Deviation	**123.1**
Number of data	**437**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	73.42	123	1300	428	9.973	3.828	4.192

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 1300

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 1300

Rosner's Outlier Test for Ba

Mean	**131.5**
Standard Deviation	**76.83**
Number of data	**222**
Number of suspected outliers	**1**

			Potential	Obs.	Test	Critical	Critical

	A	B	C	D	E	F	G	H	I	J	K	L
53	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
54	1	131.5	76.66	768	184	8.303	3.635	4.006				
55												
56	For 5% Significance Level, there is 1 Potential Outlier											
57	Potential outliers is: 768											
58												
59	For 1% Significance Level, there is 1 Potential Outlier											
60	Potential outliers is: 768											
61												
62												
63	**Rosner's Outlier Test for Be**											
64												
65												
66	**Mean**	**0.63**										
67	**Standard Deviation**	**1.4**										
68	**Number of data**	**222**										
69	**Number of suspected outliers**	**1**										
70												
71				Potential	Obs.	Test	Critical	Critical				
72	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
73	1	0.63	1.397	12	211	8.139	3.635	4.006				
74												
75	For 5% Significance Level, there is 1 Potential Outlier											
76	Potential outliers is: 12											
77												
78	For 1% Significance Level, there is 1 Potential Outlier											
79	Potential outliers is: 12											
80												
81												
82	**Rosner's Outlier Test for Cd**											
83												
84												
85	**Mean**	**1.218**										
86	**Standard Deviation**	**1.247**										
87	**Number of data**	**222**										
88	**Number of suspected outliers**	**1**										
89												
90				Potential	Obs.	Test	Critical	Critical				
91	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
92	1	1.218	1.244	6.6	217	4.327	3.635	4.006				
93												
94	For 5% Significance Level, there is 1 Potential Outlier											
95	Potential outliers is: 6.6											
96												
97	For 1% Significance Level, there is 1 Potential Outlier											
98	Potential outliers is: 6.6											
99												
100												
101	**Rosner's Outlier Test for Cr**											
102												
103												
104	**Mean**	**53.54**										

	A	B	C	D	E	F	G	H	I	J	K	L
105			**Standard Deviation**	**133.8**								
106			**Number of data**	**283**								
107			**Number of suspected outliers**	**1**								
108												
109				Potential	Obs.	Test	Critical	Critical				
110	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
111	1	53.54	133.5	1690	66	12.26	3.703	4.073				
112												
113	For 5% Significance Level, there is 1 Potential Outlier											
114	Potential outliers is: 1690											
115												
116	For 1% Significance Level, there is 1 Potential Outlier											
117	Potential outliers is: 1690											
118												
119												
120	**Rosner's Outlier Test for Co**											
121												
122												
123			**Mean**	**15.35**								
124			**Standard Deviation**	**18.16**								
125			**Number of data**	**222**								
126			**Number of suspected outliers**	**1**								
127												
128				Potential	Obs.	Test	Critical	Critical				
129	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
130	1	15.35	18.12	140	201	6.881	3.635	4.006				
131												
132	For 5% Significance Level, there is 1 Potential Outlier											
133	Potential outliers is: 140											
134												
135	For 1% Significance Level, there is 1 Potential Outlier											
136	Potential outliers is: 140											
137												
138												
139	**Rosner's Outlier Test for Cu**											
140												
141												
142			**Mean**	**60.52**								
143			**Standard Deviation**	**30.38**								
144			**Number of data**	**222**								
145			**Number of suspected outliers**	**1**								
146												
147				Potential	Obs.	Test	Critical	Critical				
148	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
149	1	60.52	30.31	178	27	3.875	3.635	4.006				
150												
151	For 5% Significance Level, there is 1 Potential Outlier											
152	Potential outliers is: 178											
153												
154	For 1% Significance Level, there is no Potential Outlier											
155												
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Rosner's Outlier Test for Pb**											
158												
159												
160				**Mean**	**24.43**							
161				**Standard Deviation**	**41.15**							
162				**Number of data**	**274**							
163				**Number of suspected outliers**	**1**							
164												
165				Potential	Obs.	Test	Critical	Critical				
166	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
167	1	24.43	41.07	400	35	9.143	3.694	4.064				
168												
169	For 5% Significance Level, there is 1 Potential Outlier											
170	Potential outliers is: 400											
171												
172	For 1% Significance Level, there is 1 Potential Outlier											
173	Potential outliers is: 400											
174												
175												
176	**Rosner's Outlier Test for Hg**											
177												
178												
179				**Mean**	**1.148**							
180				**Standard Deviation**	**2.766**							
181				**Number of data**	**274**							
182				**Number of suspected outliers**	**1**							
183												
184				Potential	Obs.	Test	Critical	Critical				
185	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
186	1	1.148	2.761	28	161	9.725	3.694	4.064				
187												
188	For 5% Significance Level, there is 1 Potential Outlier											
189	Potential outliers is: 28											
190												
191	For 1% Significance Level, there is 1 Potential Outlier											
192	Potential outliers is: 28											
193												
194												
195	**Rosner's Outlier Test for Mo**											
196												
197												
198				**Mean**	**6.791**							
199				**Standard Deviation**	**11.57**							
200				**Number of data**	**112**							
201				**Number of suspected outliers**	**1**							
202												
203				Potential	Obs.	Test	Critical	Critical				
204	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
205	1	6.791	11.52	120	107	9.826	3.414	3.784				
206												
207	For 5% Significance Level, there is 1 Potential Outlier											
208	Potential outliers is: 120											

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 120

Rosner's Outlier Test for Ni

Mean	**58.03**
Standard Deviation	**142.1**
Number of data	**266**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	58.03	141.8	1340	66	9.039	3.686	4.056

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 1340

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 1340

Rosner's Outlier Test for Se

Mean	**1.432**
Standard Deviation	**0.991**
Number of data	**222**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	1.432	0.989	4.8	117	3.406	3.635	4.006

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Ag

Mean	**1.174**
Standard Deviation	**0.871**
Number of data	**222**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	1.174	0.869	5.6	117	5.09	3.635	4.006

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 5.6

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 5.6

Rosner's Outlier Test for Tl

Mean	**1.493**
Standard Deviation	**1.166**
Number of data	**138**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	1.493	1.162	4	117	2.158	3.486	3.856

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for V

Mean	**33.65**
Standard Deviation	**28.08**
Number of data	**222**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	33.65	28.02	148	84	4.081	3.635	4.006

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 148

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 148

Rosner's Outlier Test for Zn

Mean	**66.83**
Standard Deviation	**28.12**
Number of data	**222**
Number of suspected outliers	**1**

	A	B	C	D	E	F	G	H	I	J	K	L
313				Potential	Obs.	Test	Critical	Critical				
314	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
315	1	66.83	28.06	307	68	8.559	3.635	4.006				
316												
317	For 5% Significance Level, there is 1 Potential Outlier											
318	Potential outliers is: 307											
319												
320	For 1% Significance Level, there is 1 Potential Outlier											
321	Potential outliers is: 307											
322												
323												
324	**Dixon's Outlier Test for CrVI**											
325												
326	Number of Observations = 9											
327	10% critical value: 0.441											
328	5% critical value: 0.512											
329	1% critical value: 0.635											
330												
331	**1. Observation Value 1 is a Potential Outlier (Upper Tail)?**											
332												
333	Test Statistic: NaN											
334												
335	For 10% significance level, 1 is an outlier.											
336	For 5% significance level, 1 is an outlier.											
337	For 1% significance level, 1 is an outlier.											
338												
339	**2. Observation Value 1 is a Potential Outlier (Lower Tail)?**											
340												
341	Test Statistic: NaN											
342												
343	For 10% significance level, 1 is an outlier.											
344	For 5% significance level, 1 is an outlier.											
345	For 1% significance level, 1 is an outlier.											
346												
347												
348	**Rosner's Outlier Test for CN**											
349												
350												
351	**Mean**	**3.15**										
352	**Standard Deviation**	**2.078**										
353	**Number of data**	**167**										
354	**Number of suspected outliers**	**1**										
355												
356				Potential	Obs.	Test	Critical	Critical				
357	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
358	1	3.15	2.072	21.9	14	9.049	3.551	3.921				
359												
360	For 5% Significance Level, there is 1 Potential Outlier											
361	Potential outliers is: 21.9											
362												
363	For 1% Significance Level, there is 1 Potential Outlier											
364	Potential outliers is: 21.9											

Rosner's Outlier Test for RCN

Mean	**5**
Standard Deviation	**0**

Dixon's Outlier Test for S2-

Number of Observations = 7

10% critical value: 0.434

5% critical value: 0.507

1% critical value: 0.637

1. Observation Value 50 is a Potential Outlier (Upper Tail)?

Test Statistic: NaN

For 10% significance level, 50 is an outlier.

For 5% significance level, 50 is an outlier.

For 1% significance level, 50 is an outlier.

2. Observation Value 50 is a Potential Outlier (Lower Tail)?

Test Statistic: NaN

For 10% significance level, 50 is an outlier.

For 5% significance level, 50 is an outlier.

For 1% significance level, 50 is an outlier.

Rosner's Outlier Test for RS2-

Mean	**45**
Standard Deviation	**10.13**
Number of data	**40**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	45	10	25	6	2	3.04	3.38

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

	A	B	C	D	E	F	G	H	I	J	K	L
417	**Dixon's Outlier Test for S**											
418												
419	Number of Observations = 22											
420	10% critical value: 0.382											
421	5% critical value: 0.43											
422	1% critical value: 0.514											
423												
424	**1. Observation Value 4600 is a Potential Outlier (Upper Tail**											
425												
426	Test Statistic: 0.799											
427												
428	For 10% significance level, 4600 is an outlier.											
429	For 5% significance level, 4600 is an outlier.											
430	For 1% significance level, 4600 is an outlier.											
431												
432	**2. Observation Value 7.8 is a Potential Outlier (Lower Tail)?**											
433												
434	Test Statistic: 0.023											
435												
436	For 10% significance level, 7.8 is not an outlier.											
437	For 5% significance level, 7.8 is not an outlier.											
438	For 1% significance level, 7.8 is not an outlier.											
439												

Outlier Tests for Selected Uncensored Variables

User Selected Options

Date/Time of Computation	ProUCL 5.2 8/6/2023 5:31:25 PM
From File	Lakebed Area.xls
Full Precision	OFF

Rosner's Outlier Test for As

Mean	**113.5**
Standard Deviation	**95.64**
Number of data	**66**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	113.5	94.92	502	66	4.093	3.236	3.596

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 502

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 502

Rosner's Outlier Test for Pb

Mean	**33.69**
Standard Deviation	**57.07**
Number of data	**47**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	33.69	56.46	386	47	6.24	3.1	3.46

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 386

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 386

Rosner's Outlier Test for Hg

Mean	**2.375**
Standard Deviation	**4.45**
Number of data	**47**
Number of suspected outliers	**1**

				Potential	Obs.	Test	Critical	Critical				
	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
	1	2.375	4.403	28	47	5.821	3.1	3.46				

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 28

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 28

Rosner's Outlier Test for Se

Mean	**1.684**
Standard Deviation	**1.114**
Number of data	**36**
Number of suspected outliers	**1**

				Potential	Obs.	Test	Critical	Critical				
	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
	1	1.684	1.098	4.8	36	2.837	2.99	3.33				

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Ag

Mean	**1.093**
Standard Deviation	**1.134**
Number of data	**36**
Number of suspected outliers	**1**

				Potential	Obs.	Test	Critical	Critical				
	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
	1	1.093	1.118	5.6	36	4.031	2.99	3.33				

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 5.6

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 5.6

Outlier Tests for Selected Uncensored Variables

User Selected Options

Date/Time of Computation	ProUCL 5.2 8/6/2023 5:53:32 PM
From File	Tailings Pile.xls
Full Precision	OFF

Rosner's Outlier Test for As

Mean	**101.1**
Standard Deviation	**80.74**
Number of data	**67**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	101.1	80.13	263	59	2.021	3.242	3.602

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for Pb

Mean	**34.19**
Standard Deviation	**53.91**
Number of data	**55**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	34.19	53.41	400	10	6.848	3.165	3.52

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 400

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 400

Rosner's Outlier Test for Hg

Mean	**2.35**
Standard Deviation	**2.981**
Number of data	**55**
Number of suspected outliers	**1**

			Potential	Obs.	Test	Critical	Critical

	A	B	C	D	E	F	G	H	I	J	K	L
53	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
54	1	2.35	2.954	15	42	4.282	3.165	3.52				
55												
56	For 5% Significance Level, there is 1 Potential Outlier											
57	Potential outliers is: 15											
58												
59	For 1% Significance Level, there is 1 Potential Outlier											
60	Potential outliers is: 15											
61												
62												
63	**Rosner's Outlier Test for Se**											
64												
65												
66	**Mean**	**2.049**										
67	**Standard Deviation**	**1.233**										
68	**Number of data**	**37**										
69	**Number of suspected outliers**	**1**										
70												
71				Potential	Obs.	Test	Critical	Critical				
72	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
73	1	2.049	1.216	0.3	28	1.437	3	3.34				
74												
75	For 5% Significance Level, there is no Potential Outlier											
76												
77	For 1% Significance Level, there is no Potential Outlier											
78												
79												
80	**Rosner's Outlier Test for Ag**											
81												
82												
83	**Mean**	**0.931**										
84	**Standard Deviation**	**0.799**										
85	**Number of data**	**37**										
86	**Number of suspected outliers**	**1**										
87												
88				Potential	Obs.	Test	Critical	Critical				
89	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
90	1	0.931	0.788	2.5	28	1.992	3	3.34				
91												
92	For 5% Significance Level, there is no Potential Outlier											
93												
94	For 1% Significance Level, there is no Potential Outlier											
95												

Outlier Tests for Selected Uncensored Variables

User Selected Options

Date/Time of Computation	ProUCL 5.2 8/6/2023 5:29:50 PM
From File	Cyanide Process Area.xls
Full Precision	OFF

Rosner's Outlier Test for As

Mean	**125.2**
Standard Deviation	**124.7**
Number of data	**28**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	125.2	122.4	450	28	2.653	2.88	3.2

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Dixon's Outlier Test for Pb

Number of Observations = 16

10% critical value: 0.454

5% critical value: 0.507

1% critical value: 0.595

1. Observation Value 72 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.433

For 10% significance level, 72 is not an outlier.

For 5% significance level, 72 is not an outlier.

For 1% significance level, 72 is not an outlier.

2. Observation Value 2.4 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.118

For 10% significance level, 2.4 is not an outlier.

For 5% significance level, 2.4 is not an outlier.

For 1% significance level, 2.4 is not an outlier.

Dixon's Outlier Test for Hg

Number of Observations = 16

10% critical value: 0.454

	A	B	C	D	E	F	G	H	I	J	K	L
53	5% critical value: 0.507											
54	1% critical value: 0.595											
55												
56	**1. Observation Value 20 is a Potential Outlier (Upper Tail)?**											
57												
58	Test Statistic: 0.980											
59												
60	For 10% significance level, 20 is an outlier.											
61	For 5% significance level, 20 is an outlier.											
62	For 1% significance level, 20 is an outlier.											
63												
64	**2. Observation Value 0.1 is a Potential Outlier (Lower Tail)?**											
65												
66	Test Statistic: 0.000											
67												
68	For 10% significance level, 0.1 is not an outlier.											
69	For 5% significance level, 0.1 is not an outlier.											
70	For 1% significance level, 0.1 is not an outlier.											
71												
72												
73	**Dixon's Outlier Test for Se**											
74												
75	Number of Observations = 8											
76	10% critical value: 0.479											
77	5% critical value: 0.554											
78	1% critical value: 0.683											
79												
80	**1. Observation Value 3 is a Potential Outlier (Upper Tail)?**											
81												
82	Test Statistic: 0.000											
83												
84	For 10% significance level, 3 is not an outlier.											
85	For 5% significance level, 3 is not an outlier.											
86	For 1% significance level, 3 is not an outlier.											
87												
88	**2. Observation Value 2.5 is a Potential Outlier (Lower Tail)?**											
89												
90	Test Statistic: 0.000											
91												
92	For 10% significance level, 2.5 is not an outlier.											
93	For 5% significance level, 2.5 is not an outlier.											
94	For 1% significance level, 2.5 is not an outlier.											
95												
96												
97	**Dixon's Outlier Test for Ag**											
98												
99	Number of Observations = 8											
100	10% critical value: 0.479											
101	5% critical value: 0.554											
102	1% critical value: 0.683											
103												
104	**1. Observation Value 2.1 is a Potential Outlier (Upper Tail)?**											

	A	B	C	D	E	F	G	H	I	J	K	L
105												
106	Test Statistic: 0.360											
107												
108	For 10% significance level, 2.1 is not an outlier.											
109	For 5% significance level, 2.1 is not an outlier.											
110	For 1% significance level, 2.1 is not an outlier.											
111												
112	**2. Observation Value 0.48 is a Potential Outlier (Lower Tail)?**											
113												
114	Test Statistic: 0.418											
115												
116	For 10% significance level, 0.48 is not an outlier.											
117	For 5% significance level, 0.48 is not an outlier.											
118	For 1% significance level, 0.48 is not an outlier.											
119												

	A	B	C	D	E	F	G	H	I	J	K	L	M
1				General Statistics on Uncensored Data									
2		Date/Time of Computation		ProUCL 5.2 7/28/2023 3:17:18 PM									
3		User Selected Options											
4		From File		A1 Soil, Total Metals, Entire Site.xls									
5		Full Precision		OFF									
6													
7	From File: A1 Soil, Total Metals, Entire Site.xls												
8													
9	General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method												
10													

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	222	226	6	216	97.30%	0.5	25	1.097	4.897	2.213	2.018
As	437	11	416	21	4.81%	1	2	73.39	15130	123	1.676
Ba	222	226	222	0	0.00%	N/A	N/A	131.5	5903	76.83	0.584
Be	222	226	149	73	32.88%	0.2	5	0.536	1.884	1.372	2.562
Cd	222	226	124	98	44.14%	0.05	2.6	0.808	1.315	1.147	1.42
Cr	283	165	275	8	2.83%	0.98	2.5	53.52	17829	133.5	2.495
Co	222	226	209	13	5.86%	0.98	5.1	15.26	330.3	18.18	1.191
Cu	222	226	222	0	0.00%	N/A	N/A	60.52	923.1	30.38	0.502
Pb	274	174	258	16	5.84%	2.4	7.5	24.31	1692	41.13	1.692
Hg	274	174	182	92	33.58%	0.01	0.2	1.12	7.682	2.772	2.474
Mo	112	336	36	76	67.86%	0.25	10	2.769	127	11.27	4.07
Ni	266	182	266	0	0.00%	N/A	N/A	58.03	20190	142.1	2.449
Se	222	226	123	99	44.59%	0.3	4.7	0.893	0.319	0.565	0.632
Ag	222	226	93	129	58.11%	0.25	2.5	0.529	0.227	0.476	0.901
Tl	138	310	70	68	49.28%	0.08	4	0.855	0.236	0.486	0.568
V	222	226	221	1	0.45%	6	6	33.64	785.5	28.03	0.833
Zn	222	226	222	0	0.00%	N/A	N/A	66.83	791	28.12	0.421
CrVI	9	128	0	9	100.00%	1	1	N/A	N/A	N/A	N/A
CN	167	82	6	161	96.41%	0.5	5	0.801	3.602	1.898	2.368
RCN	57	71	0	57	100.00%	5	5	N/A	N/A	N/A	N/A
S2-	7	102	0	7	100.00%	50	50	N/A	N/A	N/A	N/A
RS2-	40	88	0	40	100.00%	25	50	N/A	N/A	N/A	N/A
S	22	426	22	0	0.00%	N/A	N/A	472.6	983727	991.8	2.099

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	6	226	0.99	20	9.482	8.9	65.88	8.117	11.65	0.198	0.856
As	416	11	1.2	1300	77.04	29.25	15653	125.1	34.17	4.44	1.624
Ba	222	226	6.2	768	131.5	126.5	5903	76.83	77.39	2.63	0.584
Be	149	226	0.011	12	0.684	0.36	2.749	1.658	0.119	6.53	2.424
Cd	124	226	0.19	6.6	1.223	0.565	1.873	1.369	0.334	2.045	1.119
Cr	275	165	1.5	1690	55.05	26.2	18332	135.4	24.76	8.242	2.46
Co	209	226	1	140	16.05	11.6	341.9	18.49	7.116	4.415	1.152
Cu	222	226	3.5	178	60.52	59.9	923.1	30.38	20.9	1.174	0.502
Pb	258	174	2.7	400	25.53	15.5	1778	42.17	8.228	7.229	1.652
Hg	182	174	0.017	28	1.667	0.42	10.73	3.276	0.565	4.62	1.965
Mo	36	336	0.27	120	6.004	2.4	386.7	19.67	1.557	5.886	3.276
Ni	266	182	7	1340	58.03	27.55	20190	142.1	15.64	6.395	2.449
Se	123	226	0.3	4.8	1.087	1	0.343	0.586	0.445	3.098	0.539
Ag	93	226	0.05	5.6	0.653	0.63	0.396	0.629	0.341	5.499	0.964

	A	B	C	D	E	F	G	H	I	J	K	L	M
53		Tl	70	310	0.26	1.9	1.13	1.1	0.156	0.395	0.437	-0.102	0.35
54		V	221	226	1.7	148	33.78	26.5	788.6	28.08	12.9	1.967	0.831
55		Zn	222	226	14	307	66.83	61.85	791	28.12	15.64	3.508	0.421
56		CrVI	0	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
57		CN	6	82	0.75	21.9	6.438	1.2	79.28	8.904	0.571	1.402	1.383
58		RCN	0	71	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
59		S2-	0	102	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
60		RS2-	0	88	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
61		S	22	426	7.8	4600	472.6	77	983727	991.8	85.25	3.755	2.099
62													
63		**Percentiles using all Detects (Ds) and Non-Detects (NDs)**											
64													
65		**Variable**	**NumObs**	**# Missing**	**10%ile**	**20%ile**	**25%ile(Q1)**	**50%ile(Q2)**	**75%ile(Q3)**	**80%ile**	**90%ile**	**95%ile**	**99%ile**
66		Sb	222	226	2.5	6.2	6.3	6.7	9.9	9.9	24	25	25
67		As	437	11	4	7.12	8.5	25.2	88	116.6	197	264.4	535.6
68		Ba	222	226	42.36	67.18	76.43	126.5	181.8	191	208	228	277.8
69		Be	222	226	0.221	0.25	0.27	0.38	0.49	0.516	1	1.2	10.53
70		Cd	222	226	0.24	0.33	0.36	0.54	2.5	2.5	2.5	3.2	5.716
71		Cr	283	165	4	7.66	11	25.9	46.15	57.6	79.72	180.9	583.1
72		Co	222	226	4.9	6	6.8	11	17.88	18.98	28.09	31.97	108.1
73		Cu	222	226	23	34.82	41.5	59.9	72.15	77.12	91.17	116	171.6
74		Pb	274	174	7.5	9.5	10.05	15	24.33	28	46.85	59.37	171.7
75		Hg	274	174	0.039	0.06	0.0815	0.2	0.888	1.2	3.3	5.27	11.35
76		Mo	112	336	0.991	1	1.25	5.7	9.9	9.9	9.9	10	12.76
77		Ni	266	182	13	17.6	20.43	27.55	44.05	48.5	70.65	131.3	917
78		Se	222	226	0.3	0.546	0.7	1.1	2.5	2.5	3	3	3.979
79		Ag	222	226	0.25	0.48	0.5	1	1.7	2.5	2.5	2.5	2.5
80		Tl	138	310	0.524	0.726	0.813	1	1.6	1.7	4	4	4
81		V	222	226	7.11	16.12	18.33	26.25	36.68	41.08	73.12	98.86	130
82		Zn	222	226	42.91	52.02	53.18	61.85	74.23	78.44	87.67	106	159.2
83		CrVI	9	128	1	1	1	1	1	1	1	1	1
84		CN	167	82	0.828	2.6	2.6	2.7	3.4	5	5	5	7.618
85		RCN	57	71	5	5	5	5	5	5	5	5	5
86		S2-	7	102	50	50	50	50	50	50	50	50	50
87		RS2-	40	88	25	45	50	50	50	50	50	50	50
88		S	22	426	29.8	40	40.25	77	362.5	786	948	1188	3886

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/15/2023 4:24:00 PM	
User Selected Options		
From File	04 Lakebed Area.xls	
Full Precision	OFF	

From File: 04 Lakebed Area.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	35	29	0	35	100.00%	2.5	25	N/A	N/A	N/A	N/A
As	65	0	65	0	0.00%	N/A	N/A	107.5	6896	83.04	0.772
Ba	35	29	35	0	0.00%	N/A	N/A	92.32	2155	46.42	0.503
Be	35	29	18	17	48.57%	0.2	1	0.276	0.102	0.319	1.159
Cd	35	29	16	19	54.29%	0.13	2.6	0.64	0.391	0.625	0.977
Cr	49	25	48	1	2.04%	0.98	0.98	25.95	619.4	24.89	0.959
Co	35	29	31	4	11.43%	3.8	5.1	10.33	55.17	7.428	0.719
Cu	35	29	35	0	0.00%	N/A	N/A	46.03	460.7	21.46	0.466
Pb	46	18	44	2	4.35%	7.4	7.5	25.97	502.2	22.41	0.863
Hg	46	18	37	9	19.57%	0.07	0.2	1.797	5.288	2.3	1.279
Mo	17	47	6	11	64.71%	0.98	10	1.952	0.942	0.97	0.497
Ni	46	18	46	0	0.00%	N/A	N/A	29.51	169.3	13.01	0.441
Se	35	29	20	15	42.86%	0.3	3	1.052	0.423	0.651	0.618
Ag	35	29	17	18	51.43%	0.49	2.5	0.352	0.0841	0.29	0.823
Tl	22	37	3	19	86.36%	0.08	4	0.305	0.176	0.419	1.377
V	35	29	35	0	0.00%	N/A	N/A	25.44	587.6	24.24	0.953
Zn	35	29	35	0	0.00%	N/A	N/A	65.03	1908	43.68	0.672
CN	29	35	0	29	100.00%	0.5	5	N/A	N/A	N/A	N/A

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	0	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
As	65	0	4	320	107.5	88	6896	83.04	76.95	0.827	0.772
Ba	35	29	23.9	178	92.32	96.6	2155	46.42	64.34	0.132	0.503
Be	18	29	0.011	1.3	0.415	0.295	0.153	0.391	0.141	1.431	0.942
Cd	16	29	0.39	2.5	1.049	0.84	0.41	0.64	0.408	1.404	0.611
Cr	48	25	1.8	92.4	26.47	16.5	632.2	25.14	18.98	0.984	0.95
Co	31	29	2.5	34	11.22	9.6	57.1	7.556	5.189	1.652	0.674
Cu	35	29	11	90.9	46.03	50.3	460.7	21.46	21.79	-0.0632	0.466
Pb	44	18	4.9	102	26.87	18.9	518	22.76	16.31	1.664	0.847
Hg	37	18	0.023	9.7	2.221	1	5.813	2.411	1.319	1.315	1.086
Mo	6	47	1.5	3.9	2.6	2.6	0.624	0.79	0.445	0.493	0.304
Ni	46	18	12	67	29.51	26.3	169.3	13.01	14.53	0.727	0.441
Se	20	29	0.66	4	1.246	1.1	0.535	0.731	0.356	3.109	0.587
Ag	17	29	0.09	1	0.393	0.21	0.102	0.319	0.148	0.863	0.813
Tl	3	37	0.75	1.6	1.053	0.81	0.225	0.474	0.089	1.701	0.45
V	35	29	2.3	121	25.44	22.3	587.6	24.24	19.57	2.288	0.953
Zn	35	29	31	307	65.03	58.5	1908	43.68	11.71	5.263	0.672
CN	0	35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	Percentiles using all Detects (Ds) and Non-Detects (NDs)												
54													
55	Variable		NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
56	Sb		35	29	3.98	6.2	6.25	6.6	9.9	9.92	24	25	25
57	As		65	0	14.4	37.3	39.1	88	160	168.2	234.8	278.2	310.4
58	Ba		35	29	33.48	38.62	41	96.6	130	140.6	148.4	167.5	178
59	Be		35	29	0.122	0.24	0.25	0.3	0.495	0.526	1	1.13	1.266
60	Cd		35	29	0.324	0.464	0.49	0.57	1.5	2.4	2.5	2.5	2.566
61	Cr		49	25	3.38	4.26	4.5	14	40.2	44.36	61.02	76.6	87.7
62	Co		35	29	4.14	4.84	5	8.8	12.8	13.48	19.8	23.6	33.32
63	Cu		35	29	15.62	25.2	26.6	50.3	63	63.68	69.44	75.85	86.38
64	Pb		46	18	7.35	7.9	11	16.7	35.18	43	51.7	62.75	99.26
65	Hg		46	18	0.086	0.2	0.2	0.83	3	3.8	5.2	6.275	8.485
66	Mo		17	47	1	1.1	1.5	2.8	9.9	9.9	9.9	9.92	9.984
67	Ni		46	18	15.05	17.2	19.4	26.3	40.33	41.7	44.8	50.58	61.92
68	Se		35	29	0.676	0.8	0.895	1.2	2.5	2.6	3	3	3.66
69	Ag		35	29	0.174	0.21	0.215	0.86	1.05	1.36	2.5	2.5	2.5
70	Tl		22	37	0.512	0.66	0.703	0.835	1	1.48	4	4	4
71	V		35	29	4.4	6.74	7.45	22.3	32.75	34.78	46.66	61.97	109.2
72	Zn		35	29	43.68	48.52	51.6	58.5	66.4	66.88	74.02	78.36	231.5
73	CN		29	35	2.6	2.6	2.6	2.7	5	5	5	5	5

	General Statistics on Uncensored Data
Date/Time of Computation	ProUCL 5.2 8/14/2023 7:33:32 AM
User Selected Options	
From File	05 Tailings Pile.xls
Full Precision	OFF

From File: 05 Tailings Pile.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	37	17	1	36	97.30%	0.5	25	0.582	0.0333	0.183	0.314
As	67	2	67	0	0.00%	N/A	N/A	101.1	6519	80.74	0.799
Ba	37	17	37	0	0.00%	N/A	N/A	81.62	3398	58.29	0.714
Be	37	17	14	23	62.16%	0.25	1	0.381	0.0697	0.264	0.693
Cd	37	17	25	12	32.43%	0.24	2.5	1.04	1.494	1.222	1.175
Cr	57	9	52	5	8.77%	0.98	2.5	11.61	131.3	11.46	0.987
Co	37	17	35	2	5.41%	0.98	0.98	8.769	47.35	6.881	0.785
Cu	37	17	37	0	0.00%	N/A	N/A	36.5	649.1	25.48	0.698
Pb	55	0	51	4	7.27%	7.4	7.5	34.17	2854	53.42	1.563
Hg	55	0	45	10	18.18%	0.1	0.2	2.341	8.766	2.961	1.264
Mo	37	17	24	13	35.14%	0.25	10	1.846	1.925	1.388	0.752
Ni	55	0	55	0	0.00%	N/A	N/A	21.91	264.9	16.28	0.743
Se	37	17	1	36	97.30%	0.3	3	0.315	0.00284	0.0533	0.169
Ag	37	17	9	28	75.68%	0.25	2.5	0.412	0.0565	0.238	0.578
Tl	9	43	0	9	100.00%	0.5	4	N/A	N/A	N/A	N/A
V	37	17	37	0	0.00%	N/A	N/A	35.82	1759	41.95	1.171
Zn	37	17	37	0	0.00%	N/A	N/A	63.92	568.8	23.85	0.373
CN	22	32	6	16	72.73%	0.5	5	2.13	24.99	4.999	2.347

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	1	17	0.99	0.99	0.99	0.99	N/A	N/A	0	N/A	N/A
As	67	2	3	263	101.1	93	6519	80.74	106.7	0.408	0.799
Ba	37	17	6.2	226	81.62	65	3398	58.29	32.77	1.38	0.714
Be	14	17	0.16	1.4	0.569	0.495	0.116	0.341	0.334	1.115	0.599
Cd	25	17	0.34	4.4	1.413	0.89	1.849	1.36	0.667	1.281	0.962
Cr	52	9	1.5	54	12.62	7.3	134.9	11.62	6.672	1.657	0.92
Co	35	17	1	29	9.214	6.9	47.75	6.91	2.965	1.551	0.75
Cu	37	17	3.5	97.3	36.5	29.3	649.1	25.48	10.08	1.303	0.698
Pb	51	0	7.2	400	36.29	23	3077	55.47	19.27	5.853	1.529
Hg	45	0	0.099	15	2.839	2	9.563	3.092	2.224	1.911	1.089
Mo	24	17	0.27	5.5	2.226	1.75	1.748	1.322	1.394	0.636	0.594
Ni	55	0	7	126	21.91	20	264.9	16.28	8.895	4.982	0.743
Se	1	17	0.5	0.5	0.5	0.5	N/A	N/A	0	N/A	N/A
Ag	9	17	0.4	1.2	0.708	0.67	0.0477	0.218	0.0593	1.401	0.309
Tl	0	43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V	37	17	1.7	148	35.82	15	1759	41.95	18.68	1.427	1.171
Zn	37	17	15.3	156	63.92	62.8	568.8	23.85	14.68	1.458	0.373
CN	6	32	0.75	21.9	6.438	1.2	79.28	8.904	0.571	1.402	1.383

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	Percentiles using all Detects (Ds) and Non-Detects (NDs)												
54													
55	Variable		NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
56	Sb		37	17	0.5	2.5	9.8	24	25	25	25	25	25
57	As		67	2	7.2	18.2	27.5	93	177.5	185.6	219.4	230	262.3
58	Ba		37	17	31.44	40.58	47	65	90.7	98.16	186.4	209.4	223.5
59	Be		37	17	0.274	0.48	0.48	0.49	0.5	0.65	0.958	1	1.256
60	Cd		37	17	0.24	0.25	0.25	0.46	1	1.28	3.32	3.74	4.364
61	Cr		57	9	2.46	3.02	3.5	7	17	18.8	26.7	32.48	48.9
62	Co		37	17	2.32	4.16	4.9	6.8	10	11.76	20.92	23.6	27.92
63	Cu		37	17	13.14	22	22.5	29.3	36	50.06	83.98	92.42	96.87
64	Pb		55	0	8.38	10	10	23	43.1	47.14	56.24	65.8	230.2
65	Hg		55	0	0.112	0.2	0.3	1.2	3.3	3.896	6.48	7.65	12.3
66	Mo		37	17	0.432	0.982	1	1.9	3.7	5.22	9.84	10	10
67	Ni		55	0	10.16	13	14	20	26.2	27	28.78	33.9	81.18
68	Se		37	17	0.3	0.5	0.5	3	3	3	3	3	3
69	Ag		37	17	0.25	0.48	0.48	0.5	1	1.16	2.5	2.5	2.5
70	Tl		9	43	0.5	0.5	0.5	0.5	4	4	4	4	4
71	V		37	17	3.84	5.32	6.5	15	52.1	59	114.8	123.4	142.6
72	Zn		37	17	40.8	47.28	53	62.8	72.7	75.94	84.78	90.68	139.1
73	CN		22	32	0.5	0.5	0.5	0.5	1.045	1.26	5	12.32	19.97

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/15/2023 4:45:12 PM	
User Selected Options		
From File	06 Cyanide Process Area.xls	
Full Precision	OFF	

From File: 06 Cyanide Process Area.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	8	4	1	7	87.50%	2.5	25	3.325	2.042	1.429	0.43
As	28	4	28	0	0.00%	N/A	N/A	125.2	15539	124.7	0.996
Ba	8	4	8	0	0.00%	N/A	N/A	70.29	1945	44.11	0.627
Be	8	4	5	3	37.50%	1	1	0.79	0.0684	0.261	0.331
Cd	8	4	7	1	12.50%	1	1	1.775	0.297	0.545	0.307
Cr	18	13	18	0	0.00%	N/A	N/A	245.5	155258	394	1.605
Co	8	4	8	0	0.00%	N/A	N/A	23.56	735.9	27.13	1.151
Cu	8	4	8	0	0.00%	N/A	N/A	58.56	713.4	26.71	0.456
Pb	16	0	12	4	25.00%	2.4	7.5	22.89	487.8	22.09	0.965
Hg	15	0	10	5	33.33%	0.1	0.2	0.307	0.0558	0.236	0.769
Mo	8	4	3	5	62.50%	0.96	1	3.263	16.4	4.049	1.241
Ni	16	0	16	0	0.00%	N/A	N/A	248.2	143519	378.8	1.526
Se	8	4	0	8	100.00%	2.5	3	N/A	N/A	N/A	N/A
Ag	8	4	5	3	37.50%	0.48	1	1.093	0.272	0.521	0.477
Tl	4	8	0	4	100.00%	4	4	N/A	N/A	N/A	N/A
V	8	4	8	0	0.00%	N/A	N/A	44.26	872.2	29.53	0.667
Zn	8	4	8	0	0.00%	N/A	N/A	72.49	856.9	29.27	0.404
CN	6	3	0	6	100.00%	5	5	N/A	N/A	N/A	N/A

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	1	4	5.8	5.8	5.8	5.8	N/A	N/A	0	N/A	N/A
As	28	4	4	450	125.2	75.5	15539	124.7	88.21	1.229	0.996
Ba	8	4	11	158	70.29	65.45	1945	44.11	31.21	0.996	0.627
Be	5	4	0.56	1.4	0.842	0.74	0.115	0.339	0.237	1.481	0.402
Cd	7	4	1.1	2.7	1.886	1.8	0.281	0.53	0.445	0.112	0.281
Cr	18	13	10	1690	245.5	119.2	155258	394	158.6	3.215	1.605
Co	8	4	1	85.8	23.56	16.65	735.9	27.13	15.05	2.081	1.151
Cu	8	4	7.2	92.9	58.56	60.95	713.4	26.71	21.42	-0.761	0.456
Pb	12	0	7.2	72	29.12	20	538.2	23.2	17.2	1.088	0.797
Hg	10	0	0.2	1	0.411	0.37	0.0573	0.239	0.193	1.81	0.582
Mo	3	4	2.3	13.1	7.1	5.9	30.24	5.499	5.337	0.935	0.775
Ni	16	0	9.1	1340	248.2	85.85	143519	378.8	101.6	2.202	1.526
Se	0	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag	5	4	0.99	2.1	1.358	1	0.265	0.515	0.0148	0.938	0.379
Tl	0	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V	8	4	3.3	86.6	44.26	45.8	872.2	29.53	40.47	0.0447	0.667
Zn	8	4	15	111	72.49	74	856.9	29.27	19.79	-0.863	0.404
CN	0	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	Percentiles using all Detects (Ds) and Non-Detects (NDs)												
54													
55	Variable		NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
56	Sb		8	4	2.5	2.5	2.5	14.9	24	24	24.3	24.65	24.93
57	As		28	4	12	23.2	33.25	75.5	199.3	258.8	276	368	439.2
58	Ba		8	4	29.06	42.88	48.2	65.45	80.2	89.44	117.4	137.7	153.9
59	Be		8	4	0.595	0.662	0.708	0.95	1	1	1.12	1.26	1.372
60	Cd		8	4	1.07	1.26	1.4	1.75	2.15	2.22	2.42	2.56	2.672
61	Cr		18	13	12.28	23.68	41.28	119.2	253	295.6	474.2	742.2	1500
62	Co		8	4	2.89	6.22	8.425	16.65	25.68	28.02	47.23	66.52	81.94
63	Cu		8	4	32.96	46	47.75	60.95	71.78	78.74	88.56	90.73	92.47
64	Pb		16	0	7.25	7.4	7.475	15.5	29.25	42	57.7	71.55	71.91
65	Hg		15	0	0.1	0.1	0.15	0.24	0.45	0.468	0.5	0.65	0.93
66	Mo		8	4	0.967	0.982	0.993	1	3.2	4.46	8.06	10.58	12.6
67	Ni		16	0	17	33	36.75	85.85	190.3	221	748.5	1033	1279
68	Se		8	4	2.5	2.5	2.5	2.75	3	3	3	3	3
69	Ag		8	4	0.837	0.994	0.998	1	1.175	1.42	1.82	1.96	2.072
70	Tl		4	8	4	4	4	4	4	4	4	4	4
71	V		8	4	12.89	18.2	19.25	45.8	64.3	69.2	78.34	82.47	85.77
72	Zn		8	4	46.01	60.38	61.33	74	88.45	93.84	103.3	107.2	110.2
73	CN		6	3	5	5	5	5	5	5	5	5	5

	A	B	C	D	E	F	G	H	I	J	K	L	M
1				General Statistics on Uncensored Data									
2			Date/Time of Computation	ProUCL 5.2 8/14/2023 7:38:54 AM									
3			User Selected Options										
4			From File	07 Bellweather Mine Waste Rock.xls									
5			Full Precision	OFF									
6													
7	From File: 07 Bellweather Mine Waste Rock.xls												
8													
9	General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method												
10													
11	Variable		NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
12	Sb		7	0	0	7	100.00%	9.8	10	N/A	N/A	N/A	N/A
13	As		7	0	7	0	0.00%	N/A	N/A	48.29	3188	56.46	1.169
14	Ba		7	0	7	0	0.00%	N/A	N/A	100.2	659.8	25.69	0.256
15	Be		7	0	4	3	42.86%	0.25	0.25	0.493	0.0606	0.246	0.5
16	Cd		7	0	3	4	57.14%	2.4	2.5	3.057	0.96	0.98	0.32
17	Cr		7	0	7	0	0.00%	N/A	N/A	60.84	3844	62	1.019
18	Co		7	0	7	0	0.00%	N/A	N/A	23.37	168.8	12.99	0.556
19	Cu		7	0	7	0	0.00%	N/A	N/A	65.87	2850	53.39	0.81
20	Pb		7	0	7	0	0.00%	N/A	N/A	13.44	17.14	4.14	0.308
21	Hg		7	0	5	2	28.57%	0.2	0.2	0.129	0.0167	0.129	0.999
22	Mo		7	0	0	7	100.00%	9.8	10	N/A	N/A	N/A	N/A
23	Ni		7	0	7	0	0.00%	N/A	N/A	65.43	3353	57.9	0.885
24	Se		7	0	0	7	100.00%	0.3	1	N/A	N/A	N/A	N/A
25	Ag		7	0	0	7	100.00%	2.5	2.5	N/A	N/A	N/A	N/A
26	V		7	0	7	0	0.00%	N/A	N/A	47.93	470.2	21.68	0.452
27	Zn		7	0	7	0	0.00%	N/A	N/A	61.99	522.8	22.86	0.369
28	CN		5	2	0	5	100.00%	5	5	N/A	N/A	N/A	N/A
29													
30	General Statistics for Raw Data Sets using Detected Data Only												
31													
32	Variable		NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
33	Sb		0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
34	As		7	0	5	139	48.29	12	3188	56.46	10.38	1.016	1.169
35	Ba		7	0	67	131	100.2	110	659.8	25.69	31.13	-0.188	0.256
36	Be		4	0	0.46	0.86	0.675	0.69	0.0382	0.196	0.222	-0.185	0.29
37	Cd		3	0	2.7	5	3.933	4.1	1.343	1.159	1.334	-0.634	0.295
38	Cr		7	0	12	193	60.84	30	3844	62	26.69	2.047	1.019
39	Co		7	0	9.6	43	23.37	18	168.8	12.99	10.38	0.756	0.556
40	Cu		7	0	19	140	65.87	34.1	2850	53.39	22.39	0.485	0.81
41	Pb		7	0	9.1	21	13.44	12	17.14	4.14	1.483	1.192	0.308
42	Hg		5	0	0.018	0.32	0.174	0.24	0.0207	0.144	0.119	-0.428	0.829
43	Mo		0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
44	Ni		7	0	23	174	65.43	27	3353	57.9	5.93	1.267	0.885
45	Se		0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
46	Ag		0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
47	V		7	0	24	81	47.93	40.6	470.2	21.68	12.45	0.771	0.452
48	Zn		7	0	40.9	98	61.99	52.2	522.8	22.86	12.6	0.977	0.369
49	CN		0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50													
51	Percentiles using all Detects (Ds) and Non-Detects (NDs)												
52													

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	**Variable**		**NumObs**	**# Missing**	**10%ile**	**20%ile**	**25%ile(Q1)**	**50%ile(Q2)**	**75%ile(Q3)**	**80%ile**	**90%ile**	**95%ile**	**99%ile**
54	Sb		7	0	9.8	9.8	9.8	9.8	9.9	9.9	9.94	9.97	9.994
55	As		7	0	6.2	7.4	8	12	83	102.2	124.6	131.8	137.6
56	Ba		7	0	70.3	74.8	78.25	110	118.5	123	128	129.5	130.7
57	Be		7	0	0.25	0.25	0.25	0.46	0.69	0.768	0.836	0.848	0.858
58	Cd		7	0	2.46	2.5	2.5	2.5	3.4	3.82	4.46	4.73	4.946
59	Cr		7	0	20.58	26.96	27.95	30	67.5	68.4	118.6	155.8	185.6
60	Co		7	0	11.64	13.6	14.5	18	32	36.2	40.6	41.8	42.76
61	Cu		7	0	20.2	21.2	21.5	34.1	112.5	117	128	134	138.8
62	Pb		7	0	10.24	11	11	12	15	16.2	18.6	19.8	20.76
63	Hg		7	0	0.0192	0.056	0.11	0.2	0.255	0.264	0.29	0.305	0.317
64	Mo		7	0	9.8	9.8	9.8	9.8	9.9	9.9	9.94	9.97	9.994
65	Ni		7	0	23.6	24	24	27	93	97.2	129.6	151.8	169.6
66	Se		7	0	0.3	0.3	0.3	0.3	1	1	1	1	1
67	Ag		7	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
68	V		7	0	29.28	33.06	33.45	40.6	61.5	69	76.8	78.9	80.58
69	Zn		7	0	43.06	45.12	46.05	52.2	75.35	84.14	93.2	95.6	97.52
70	CN		5	2	5	5	5	5	5	5	5	5	5

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/14/2023 8:16:22 AM	
User Selected Options		
From File	08 Background, Non-Mineralized, All Data.xls	
Full Precision	OFF	

From File: 08 Background, Non-Mineralized, All Data.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	95	67	0	95	100.00%	2.5	10	N/A	N/A	N/A	N/A
As	163	2	144	19	11.66%	1	2	9.515	57.53	7.585	0.797
Ba	95	67	95	0	0.00%	N/A	N/A	176.7	6351	79.69	0.451
Be	95	67	81	14	14.74%	0.22	1	0.704	4.17	2.042	2.9
Cd	95	67	44	51	53.68%	0.05	2.5	0.47	0.342	0.585	1.244
Cr	95	67	95	0	0.00%	N/A	N/A	34.63	480.5	21.92	0.633
Co	95	67	89	6	6.32%	4.1	5	14.12	136.1	11.66	0.826
Cu	95	67	95	0	0.00%	N/A	N/A	68.47	501	22.38	0.327
Pb	95	67	92	3	3.16%	7.5	7.5	14.31	35.07	5.922	0.414
Hg	95	67	45	50	52.63%	0.01	0.2	0.0565	0.00333	0.0577	1.022
Mo	31	131	1	30	96.77%	1	10	1.54	1.166	1.08	0.701
Ni	95	67	95	0	0.00%	N/A	N/A	34.68	328.9	18.14	0.523
Se	95	67	75	20	21.05%	0.3	3.7	0.96	0.191	0.437	0.455
Ag	95	67	49	46	48.42%	1	2.5	0.623	0.0653	0.256	0.41
Tl	69	93	47	22	31.88%	0.66	4	1.085	0.214	0.463	0.426
V	95	67	95	0	0.00%	N/A	N/A	31.49	463	21.52	0.683
Zn	95	67	95	0	0.00%	N/A	N/A	68.44	682.4	26.12	0.382
CN	73	65	0	73	100.00%	2.5	5	N/A	N/A	N/A	N/A

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	0	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
As	144	2	1.2	46.9	10.64	8.95	54.7	7.396	4.522	1.944	0.695
Ba	95	67	27.1	768	176.7	177	6351	79.69	45.96	4.324	0.451
Be	81	67	0.16	12	0.784	0.35	4.906	2.215	0.089	4.983	2.824
Cd	44	67	0.19	2.9	0.732	0.455	0.534	0.731	0.178	2.326	0.999
Cr	95	67	11	167	34.63	26.7	480.5	21.92	8.599	3.024	0.633
Co	89	67	3.8	101	14.81	12.3	139.1	11.8	4.744	4.893	0.796
Cu	95	67	34.9	178	68.47	63.4	501	22.38	13.05	2.507	0.327
Pb	92	67	2.7	38	14.63	14.5	33.12	5.755	5.189	0.915	0.393
Hg	45	67	0.017	0.34	0.0808	0.048	0.00534	0.0731	0.0326	1.797	0.904
Mo	1	131	3.7	3.7	3.7	3.7	N/A	N/A	0	N/A	N/A
Ni	95	67	9.4	111	34.68	31	328.9	18.14	13.94	1.594	0.523
Se	75	67	0.3	2	1.051	1.1	0.166	0.407	0.445	-0.248	0.387
Ag	49	67	0.13	1.3	0.637	0.64	0.072	0.268	0.252	0.0905	0.422
Tl	47	93	0.26	1.9	1.251	1.3	0.153	0.391	0.445	-0.705	0.313
V	95	67	13	130	31.49	25.6	463	21.52	8.302	3.055	0.683
Zn	95	67	14	175	68.44	62.9	682.4	26.12	14.83	1.413	0.382
CN	0	65	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	Percentiles using all Detects (Ds) and Non-Detects (NDs)												
54													
55	**Variable**		**NumObs**	**# Missing**	**10%ile**	**20%ile**	**25%ile(Q1)**	**50%ile(Q2)**	**75%ile(Q3)**	**80%ile**	**90%ile**	**95%ile**	**99%ile**
56	Sb		95	67	6.2	6.3	6.3	6.5	9.8	9.9	9.9	9.9	10
57	As		163	2	2	3.12	4.45	8.2	12	13.06	18.56	24.26	34.38
58	Ba		95	67	107	123.8	135.5	177	203	207.2	229.8	260.8	334.7
59	Be		95	67	0.25	0.26	0.285	0.34	0.415	0.44	0.512	0.734	12
60	Cd		95	67	0.19	0.32	0.34	0.51	2.5	2.5	2.5	2.5	2.9
61	Cr		95	67	17.04	22	22.7	26.7	39.5	45.4	60.72	68.63	103.7
62	Co		95	67	5.74	7.28	8.6	12	16.1	18.1	22.66	29.55	52.12
63	Cu		95	67	52.2	54.78	57.2	63.4	74.5	77.5	89.12	103.6	172.4
64	Pb		95	67	7.9	9.88	10.4	14.3	17.15	18.02	21.76	24	30.67
65	Hg		95	67	0.0268	0.0328	0.039	0.07	0.135	0.2	0.2	0.2	0.265
66	Mo		31	131	1	9.8	9.8	9.9	9.9	9.9	9.9	10	10
67	Ni		95	67	17.04	21.2	21.65	31	41.5	46.46	59.7	70.18	94.64
68	Se		95	67	0.3	0.634	0.75	1	1.35	1.4	1.6	2.5	2.572
69	Ag		95	67	0.414	0.596	0.64	1	2.5	2.5	2.5	2.5	2.5
70	Tl		69	93	0.818	0.956	0.97	1.2	1.6	1.6	1.82	4	4
71	V		95	67	17	19.96	20.2	25.6	32.4	33.36	41.34	85.68	130
72	Zn		95	67	44.9	54.84	56.9	62.9	76.85	83.06	89.14	112.9	160.9
73	CN		73	65	2.6	2.6	2.6	2.7	3	3.22	5	5	5

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/6/2023 1:31:24 PM	
User Selected Options		
From File	Background, Non-Mineralized, Culled.xls	
Full Precision	OFF	

From File: Background, Non-Mineralized, Culled.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
As	151	3	132	19	12.58%	1	2	8.188	27.46	5.241	0.64
Pb	88	63	85	3	3.41%	7.5	7.5	14.22	30.4	5.513	0.388
Hg	88	63	43	45	51.14%	0.01	0.2	0.0527	0.00215	0.0463	0.879
Se	88	63	69	19	21.59%	0.3	2.5	0.959	0.198	0.445	0.463
Ag	88	63	43	45	51.14%	1	2.5	0.658	0.0587	0.242	0.369

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
As	132	3	1.2	23	9.221	8.6	23.11	4.808	4.003	0.769	0.521
Pb	85	63	2.7	30.2	14.57	14.6	28.12	5.303	5.189	0.31	0.364
Hg	43	63	0.017	0.23	0.0706	0.048	0.00312	0.0559	0.0297	1.483	0.791
Se	69	63	0.3	2	1.06	1.1	0.17	0.412	0.445	-0.285	0.389
Ag	43	63	0.13	1.3	0.673	0.69	0.0658	0.256	0.178	0.0875	0.381

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
As	151	3	2	3	4.25	7.7	11.1	12	14.8	18.35	23
Pb	88	63	7.7	10	10.73	14.35	17.4	18.06	21.58	23.63	26.81
Hg	88	63	0.0251	0.0314	0.0388	0.069	0.128	0.2	0.2	0.2	0.221
Se	88	63	0.3	0.654	0.755	1.05	1.325	1.4	1.6	2.325	2.5
Ag	88	63	0.457	0.634	0.698	1	2.5	2.5	2.5	2.5	2.5

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/6/2023 1:54:49 PM	
User Selected Options		
From File	Background, Non-Mineralized, Culled.xls	
Full Precision	OFF	

From File: Background, Non-Mineralized, Culled.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
As	147	4	128	19	12.93%	1	2	7.887	23.64	4.862	0.617
Pb	87	0	84	3	3.45%	7.5	7.5	14.03	27.78	5.27	0.376
Hg	87	0	42	45	51.72%	0.01	0.2	0.0519	0.00213	0.0461	0.889
Se	87	0	68	19	21.84%	0.3	2.5	0.965	0.198	0.445	0.461
Ag	87	0	42	45	51.72%	1	2.5	0.667	0.0563	0.237	0.356

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
As	128	4	1.2	20.7	8.907	8.45	19.25	4.387	4.151	0.52	0.493
Pb	84	0	2.7	26.3	14.38	14.5	25.48	5.048	5.189	0.11	0.351
Hg	42	0	0.017	0.23	0.0697	0.0465	0.00316	0.0562	0.0297	1.538	0.807
Se	68	0	0.3	2	1.068	1.15	0.168	0.41	0.371	-0.319	0.384
Ag	42	0	0.13	1.3	0.683	0.695	0.0633	0.252	0.17	0.08	0.369

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
As	147	4	2	3	4.1	7.5	11	11.88	14.4	17.28	19.54
Pb	87	0	7.7	10	10.65	14.3	17.15	18	21.16	23.35	25.18
Hg	87	0	0.0248	0.0312	0.0385	0.068	0.135	0.2	0.2	0.2	0.221
Se	87	0	0.3	0.66	0.775	1.1	1.35	1.4	1.6	2.35	2.5
Ag	87	0	0.466	0.64	0.7	1	2.5	2.5	2.5	2.5	2.5

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/14/2023 8:17:39 AM	
User Selected Options		
From File	11 Background, Mineralized, All Data.xls	
Full Precision	OFF	

From File: 11 Background, Mineralized, All Data.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	16	50	3	13	81.25%	2.5	9.9	5.094	31.19	5.585	1.096
As	65	2	63	2	3.08%	2	2	151.2	55968	236.6	1.565
Ba	16	50	16	0	0.00%	N/A	N/A	119.3	4478	66.92	0.561
Be	16	50	6	10	62.50%	0.2	5	0.679	0.411	0.641	0.943
Cd	16	50	10	6	37.50%	0.26	0.43	2.176	5.789	2.406	1.106
Cr	19	47	19	0	0.00%	N/A	N/A	187.5	59513	244	1.301
Co	16	50	16	0	0.00%	N/A	N/A	43.44	2188	46.77	1.077
Cu	16	50	16	0	0.00%	N/A	N/A	85.34	1918	43.79	0.513
Pb	17	49	14	3	17.65%	2.5	7.5	31.78	6764	82.24	2.588
Hg	17	49	6	11	64.71%	0.04	0.2	0.102	0.0073	0.0854	0.841
Mo	7	59	1	6	85.71%	1	9.9	18	1734	41.64	2.313
Ni	17	49	17	0	0.00%	N/A	N/A	236.4	113190	336.4	1.423
Se	16	50	9	7	43.75%	0.3	2.5	0.68	0.0581	0.241	0.354
Ag	16	50	8	8	50.00%	1	2.5	0.421	0.049	0.221	0.526
Tl	14	52	1	13	92.86%	0.56	4	0.604	0.0158	0.126	0.208
V	16	50	16	0	0.00%	N/A	N/A	37.61	407	20.17	0.536
Zn	16	50	16	0	0.00%	N/A	N/A	67.64	465	21.56	0.319
CN	9	32	0	9	100.00%	2.6	2.9	N/A	N/A	N/A	N/A

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	3	50	12	20	16.33	17	16.33	4.041	4.448	-0.722	0.247
As	63	2	5.4	1300	155.9	63	57936	240.7	53.37	2.886	1.544
Ba	16	50	22	230	119.3	105.6	4478	66.92	77.84	0.159	0.561
Be	6	50	0.79	2.1	1.398	1.35	0.198	0.445	0.297	0.387	0.319
Cd	10	50	0.37	6.6	3.324	3.2	6.387	2.527	3.892	0.0583	0.76
Cr	19	47	10	943	187.5	63.3	59513	244	79.02	2.119	1.301
Co	16	50	7.1	140	43.44	18.95	2188	46.77	13.27	1.304	1.077
Cu	16	50	44.7	170	85.34	67.25	1918	43.79	29.06	0.942	0.513
Pb	14	49	3.6	360	37.79	13.85	8623	92.86	6.449	3.724	2.457
Hg	6	49	0.13	0.3	0.205	0.215	0.00395	0.0628	0.0667	0.218	0.307
Mo	1	59	120	120	120	120	N/A	N/A	0	N/A	N/A
Ni	17	49	27.1	1000	236.4	58.5	113190	336.4	36.17	1.592	1.423
Se	9	50	0.54	1.2	0.764	0.73	0.0357	0.189	0.133	1.586	0.247
Ag	8	50	0.17	0.71	0.421	0.39	0.056	0.237	0.311	0.115	0.562
Tl	1	52	0.96	0.96	0.96	0.96	N/A	N/A	0	N/A	N/A
V	16	50	10.9	91	37.61	33.25	407	20.17	17.27	1.271	0.536
Zn	16	50	44	120	67.64	60.6	465	21.56	12.68	1.359	0.319
CN	0	32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	Percentiles using all Detects (Ds) and Non-Detects (NDs)												
54													
55	Variable		NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
56	Sb		16	50	4.35	6.2	6.2	6.45	9.9	9.9	14.5	17.75	19.55
57	As		65	2	17.28	27	32	59	140	170	432	606	1076
58	Ba		16	50	40.5	60	68.25	105.6	181.3	185	201	213.5	226.7
59	Be		16	50	0.215	0.22	0.258	0.38	1.275	1.5	1.85	2.825	4.565
60	Cd		16	50	0.3	0.34	0.348	0.535	3.825	5.4	6	6.3	6.54
61	Cr		19	47	21	30.58	36.5	63.3	225.5	253	484	652.3	884.9
62	Co		16	50	10	11.6	13.55	18.95	51.93	100	119.5	131.8	138.4
63	Cu		16	50	47.35	47.9	48.35	67.25	118.8	130	152	165.5	169.1
64	Pb		17	49	5.52	7.42	7.5	12.7	16.8	17.76	19.04	88	305.6
65	Hg		17	49	0.04	0.058	0.09	0.13	0.2	0.208	0.224	0.244	0.289
66	Mo		7	59	1	1	1	1	9.9	9.9	53.94	86.97	113.4
67	Ni		17	49	33.26	42.32	44.8	58.5	214	421.2	838	928	985.6
68	Se		16	50	0.42	0.61	0.648	0.805	2.5	2.5	2.5	2.5	2.5
69	Ag		16	50	0.21	0.23	0.47	0.855	1	1	1.8	2.5	2.5
70	Tl		14	52	0.669	0.702	0.733	0.875	4	4	4	4	4
71	V		16	50	19.9	21.6	22.35	33.25	51.8	53	57.6	68.73	86.55
72	Zn		16	50	50.55	51.3	52.58	60.6	73.13	87.3	97	108.8	117.8
73	CN		9	32	2.6	2.6	2.6	2.7	2.7	2.7	2.74	2.82	2.884

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/6/2023 2:43:44 PM	
User Selected Options		
From File	Background, Mineralized, Intermediate.xls	
Full Precision	OFF	

From File: Background, Mineralized, Intermediate.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
As	55	0	53	2	3.64%	2	2	65.73	3216	56.71	0.863
Pb	14	37	11	3	21.43%	2.5	7.5	10.16	27.26	5.221	0.514
Hg	14	37	4	10	71.43%	0.04	0.2	0.0971	0.00852	0.0923	0.95
Se	13	26	9	4	30.77%	0.3	2.5	0.68	0.0581	0.241	0.354
Ag	13	26	8	5	38.46%	1	2.5	0.421	0.049	0.221	0.526

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
As	53	0	5.4	280	68.13	50	3240	56.92	34.1	1.809	0.835
Pb	11	37	3.6	18.4	11.92	12.7	21.37	4.622	5.782	-0.324	0.388
Hg	4	37	0.21	0.3	0.24	0.225	0.00167	0.0408	0.0148	1.764	0.17
Se	9	26	0.54	1.2	0.764	0.73	0.0357	0.189	0.133	1.586	0.247
Ag	8	26	0.17	0.71	0.421	0.39	0.056	0.237	0.311	0.115	0.562

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
As	55	0	15.72	25.84	28	49	78	89.6	146	175	247.6
Pb	14	37	4.56	7.16	7.425	10.1	14.28	15.46	16.74	17.36	18.19
Hg	14	37	0.04	0.046	0.06	0.15	0.208	0.214	0.227	0.255	0.291
Se	13	26	0.348	0.568	0.61	0.73	0.82	1.048	2.24	2.5	2.5
Ag	13	26	0.198	0.23	0.23	0.68	1	1.06	2.22	2.5	2.5

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/6/2023 3:00:20 PM	
User Selected Options		
From File	Background, Mineralized, Culled.xls	
Full Precision	OFF	

From File: Background, Mineralized, Culled.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
As	50	1	48	2	4.00%	2	2	54.03	1403	37.45	0.693
Pb	13	38	10	3	23.08%	2.5	7.5	9.662	25.92	5.091	0.527
Hg	13	38	3	10	76.92%	0.04	0.2	0.0885	0.00812	0.0901	1.019
Se	12	27	8	4	33.33%	0.3	2.5	0.628	0.0341	0.185	0.294
Ag	12	27	7	5	41.67%	1	2.5	0.394	0.0502	0.224	0.568

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
As	48	1	5.4	153	56.19	47.25	1372	37.04	31.13	1.069	0.659
Pb	10	38	3.6	18.4	11.45	11.8	21.06	4.589	4.744	-0.139	0.401
Hg	3	38	0.22	0.3	0.25	0.23	0.0019	0.0436	0.0148	1.63	0.174
Se	8	27	0.54	0.82	0.71	0.72	0.0103	0.102	0.126	-0.517	0.143
Ag	7	27	0.17	0.71	0.394	0.23	0.0586	0.242	0.089	0.492	0.614

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
As	50	1	14.9	24.86	27	44.25	72.03	77.4	102	135.5	151.5
Pb	13	38	4.24	7.04	7.4	9.3	13	14.02	16.38	17.44	18.21
Hg	13	38	0.04	0.044	0.05	0.1	0.2	0.212	0.228	0.258	0.292
Se	12	27	0.324	0.554	0.593	0.72	0.82	0.82	2.332	2.5	2.5
Ag	12	27	0.194	0.23	0.23	0.695	1.025	1.08	2.36	2.5	2.5

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/6/2023 4:06:47 PM	
User Selected Options		
From File	Background, Mineralized, Culled.xls	
Full Precision	OFF	

From File: Background, Mineralized, Culled.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
As	47	0	45	2	4.26%	2	2	46.21	748.9	27.37	0.592
Pb	13	26	10	3	23.08%	2.5	7.5	10.22	29.3	5.413	0.529
Hg	13	26	4	9	69.23%	0.04	0.2	0.102	0.00891	0.0944	0.929
Se	13	26	9	4	30.77%	0.3	2.5	0.68	0.0581	0.241	0.354
Ag	13	26	8	5	38.46%	1	2.5	0.421	0.049	0.221	0.526

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
As	45	0	5.4	120	48.18	43	707.2	26.59	26.39	0.625	0.552
Pb	10	26	3.6	18.4	12.18	12.85	22.9	4.786	5.708	-0.514	0.393
Hg	4	26	0.21	0.3	0.24	0.225	0.00167	0.0408	0.0148	1.764	0.17
Se	9	26	0.54	1.2	0.764	0.73	0.0357	0.189	0.133	1.586	0.247
Ag	8	26	0.17	0.71	0.421	0.39	0.056	0.237	0.311	0.115	0.562

Percentiles using all Detects (Ds) and Non-Detects (NDs)

Variable	NumObs	# Missing	10%ile	20%ile	25%ile(Q1)	50%ile(Q2)	75%ile(Q3)	80%ile	90%ile	95%ile	99%ile
As	47	0	14.6	23.84	26.5	42	67	69.6	79.8	96.1	110.8
Pb	13	26	4.24	7.04	7.4	10.9	14.7	15.84	16.76	17.44	18.21
Hg	13	26	0.04	0.044	0.05	0.1	0.21	0.216	0.228	0.258	0.292
Se	13	26	0.348	0.568	0.61	0.73	0.82	1.048	2.24	2.5	2.5
Ag	13	26	0.198	0.23	0.23	0.68	1	1.06	2.22	2.5	2.5

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 7/28/2023 3:16:02 PM
From File	A1 Soil, Total Metals, Entire Site.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sb

General Statistics

Total Number of Observations	222	Number of Distinct Observations	34
		Number of Missing Observations	226
Number of Detects	6	Number of Non-Detects	216
Number of Distinct Detects	6	Number of Distinct Non-Detects	28
Minimum Detect	0.99	Minimum Non-Detect	0.5
Maximum Detect	20	Maximum Non-Detect	25
Variance Detects	65.88	Percent Non-Detects	97.3%
Mean Detects	9.482	SD Detects	8.117
Median Detects	8.9	CV Detects	0.856
Skewness Detects	0.198	Kurtosis Detects	-2.09
Mean of Logged Detects	1.693	SD of Logged Detects	1.348

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.097	KM Standard Error of Mean	0.278
90KM SD	2.213	95% KM (BCA) UCL	1.608
95% KM (t) UCL	1.557	95% KM (Percentile Bootstrap) UCL	1.547
95% KM (z) UCL	1.555	95% KM Bootstrap t UCL	1.519
90% KM Chebyshev UCL	1.932	95% KM Chebyshev UCL	2.311
97.5% KM Chebyshev UCL	2.836	99% KM Chebyshev UCL	3.868

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.435	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.23	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.341	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.033	k star (bias corrected MLE)	0.628
Theta hat (MLE)	9.177	Theta star (bias corrected MLE)	15.1

53					nu hat (MLE)	12.4				nu star (bias corrected)		7.533
54					Mean (detects)	9.482						
55												
56					**Gamma ROS Statistics using Imputed Non-Detects**							
57					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
58					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
59					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
60					This is especially true when the sample size is small.							
61					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
62					Minimum	0.01				Mean		0.627
63					Maximum	20				Median		0.01
64					SD	2.234				CV		3.562
65					k hat (MLE)	0.223				k star (bias corrected MLE)		0.223
66					Theta hat (MLE)	2.814				Theta star (bias corrected MLE)		2.814
67					nu hat (MLE)	98.93				nu star (bias corrected)		98.93
68					Adjusted Level of Significance (β)	0.0489						
69					Approximate Chi Square Value (98.93, α)	76.98				Adjusted Chi Square Value (98.93, β)		76.86
70					95% Gamma Approximate UCL	0.806				95% Gamma Adjusted UCL		0.807
71												
72					**Estimates of Gamma Parameters using KM Estimates**							
73					Mean (KM)	1.097				SD (KM)		2.213
74					Variance (KM)	4.897				SE of Mean (KM)		0.278
75					k hat (KM)	0.246				k star (KM)		0.245
76					nu hat (KM)	109				nu star (KM)		108.9
77					theta hat (KM)	4.465				theta star (KM)		4.471
78					80% gamma percentile (KM)	1.582				90% gamma percentile (KM)		3.296
79					95% gamma percentile (KM)	5.339				99% gamma percentile (KM)		10.79
80												
81					**Gamma Kaplan-Meier (KM) Statistics**							
82					Approximate Chi Square Value (108.91, α)	85.82				Adjusted Chi Square Value (108.91, β)		85.69
83					95% KM Approximate Gamma UCL	1.392				95% KM Adjusted Gamma UCL		1.394
84					**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**							
85												
86					**Lognormal GOF Test on Detected Observations Only**							
87					Shapiro Wilk Test Statistic	0.842				**Shapiro Wilk GOF Test**		
88					10% Shapiro Wilk Critical Value	0.826				Detected Data appear Lognormal at 10% Significance Level		
89					Lilliefors Test Statistic	0.222				**Lilliefors GOF Test**		
90					10% Lilliefors Critical Value	0.298				Detected Data appear Lognormal at 10% Significance Level		
91					**Detected Data appear Lognormal at 10% Significance Level**							
92					**Note GOF tests may be unreliable for small sample sizes**							
93												
94					**Lognormal ROS Statistics Using Imputed Non-Detects**							
95					Mean in Original Scale	0.748				Mean in Log Scale		-1.424
96					SD in Original Scale	2.03				SD in Log Scale		1.448
97					95% t UCL (assumes normality of ROS data)	0.973				95% Percentile Bootstrap UCL		0.99
98					95% BCA Bootstrap UCL	1.05				95% Bootstrap t UCL		1.152
99					95% H-UCL (Log ROS)	0.881						
100												
101					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
102					KM Mean (logged)	-0.347				KM Geo Mean		0.707
103					KM SD (logged)	0.666				95% Critical H Value (KM-Log)		1.901
104					KM Standard Error of Mean (logged)	0.162				95% H-UCL (KM -Log)		0.961

105				KM SD (logged)	0.666			95% Critical H Value (KM-Log)				1.901
106				KM Standard Error of Mean (logged)	0.162							
107	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
108												
109	**DL/2 Statistics**											
110	**DL/2 Normal**					**DL/2 Log-Transformed**						
111				Mean in Original Scale	4.883			Mean in Log Scale				1.351
112				SD in Original Scale	3.534			SD in Log Scale				0.731
113				95% t UCL (Assumes normality)	5.274			95% H-Stat UCL				5.55
114	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
115												
116	**Nonparametric Distribution Free UCL Statistics**											
117	**Detected Data appear Normal Distributed at 1% Significance Level**											
118												
119	**Suggested UCL to Use**											
120				95% KM (t) UCL	1.557							
121												
122	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
123	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
124	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
125												
126	**As**											
127												
128	**General Statistics**											
129				Total Number of Observations	437			Number of Distinct Observations				246
130								Number of Missing Observations				11
131				Number of Detects	416			Number of Non-Detects				21
132				Number of Distinct Detects	245			Number of Distinct Non-Detects				2
133				Minimum Detect	1.2			Minimum Non-Detect				1
134				Maximum Detect	1300			Maximum Non-Detect				2
135				Variance Detects	15653			Percent Non-Detects				4.805%
136				Mean Detects	77.04			SD Detects				125.1
137				Median Detects	29.25			CV Detects				1.624
138				Skewness Detects	4.44			Kurtosis Detects				30.46
139				Mean of Logged Detects	3.424			SD of Logged Detects				1.403
140												
141	**Normal GOF Test on Detects Only**											
142				Shapiro Wilk Test Statistic	0.602			**Normal GOF Test on Detected Observations Only**				
143				1% Shapiro Wilk P Value	0			Detected Data Not Normal at 1% Significance Level				
144				Lilliefors Test Statistic	0.272			**Lilliefors GOF Test**				
145				1% Lilliefors Critical Value	0.0507			Detected Data Not Normal at 1% Significance Level				
146	**Detected Data Not Normal at 1% Significance Level**											
147												
148	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
149				KM Mean	73.39			KM Standard Error of Mean				5.891
150				90KM SD	123			95% KM (BCA) UCL				83.98
151				95% KM (t) UCL	83.1			95% KM (Percentile Bootstrap) UCL				83.49
152				95% KM (z) UCL	83.08			95% KM Bootstrap t UCL				85.71
153				90% KM Chebyshev UCL	91.06			95% KM Chebyshev UCL				99.07
154				97.5% KM Chebyshev UCL	110.2			99% KM Chebyshev UCL				132
155												
156	**Gamma GOF Tests on Detected Observations Only**											

157				A-D Test Statistic	9.259	**Anderson-Darling GOF Test**						
158				5% A-D Critical Value	0.807	Detected Data Not Gamma Distributed at 5% Significance Level						
159				K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**						
160				5% K-S Critical Value	0.0465	Detected Data Not Gamma Distributed at 5% Significance Level						
161	**Detected Data Not Gamma Distributed at 5% Significance Level**											
162												
163	**Gamma Statistics on Detected Data Only**											
164				k hat (MLE)	0.662	k star (bias corrected MLE)	0.659					
165				Theta hat (MLE)	116.4	Theta star (bias corrected MLE)	117					
166				nu hat (MLE)	550.6	nu star (bias corrected)	548					
167				Mean (detects)	77.04							
168												
169	**Gamma ROS Statistics using Imputed Non-Detects**											
170	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
171	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
172	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
173	This is especially true when the sample size is small.											
174	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
175				Minimum	0.01	Mean	73.34					
176				Maximum	1300	Median	25.2					
177				SD	123.2	CV	1.679					
178				k hat (MLE)	0.505	k star (bias corrected MLE)	0.503					
179				Theta hat (MLE)	145.3	Theta star (bias corrected MLE)	145.9					
180				nu hat (MLE)	441	nu star (bias corrected)	439.3					
181				Adjusted Level of Significance (β)	0.0495							
182				Approximate Chi Square Value (439.32, α)	391.7	Adjusted Chi Square Value (439.32, β)	391.6					
183				95% Gamma Approximate UCL	82.25	95% Gamma Adjusted UCL	82.28					
184												
185	**Estimates of Gamma Parameters using KM Estimates**											
186				Mean (KM)	73.39	SD (KM)	123					
187				Variance (KM)	15130	SE of Mean (KM)	5.891					
188				k hat (KM)	0.356	k star (KM)	0.355					
189				nu hat (KM)	311.1	nu star (KM)	310.3					
190				theta hat (KM)	206.2	theta star (KM)	206.7					
191				80% gamma percentile (KM)	116.5	90% gamma percentile (KM)	211.5					
192				95% gamma percentile (KM)	317.6	99% gamma percentile (KM)	588					
193												
194	**Gamma Kaplan-Meier (KM) Statistics**											
195				Approximate Chi Square Value (310.32, α)	270.5	Adjusted Chi Square Value (310.32, β)	270.4					
196				95% KM Approximate Gamma UCL	84.19	95% KM Adjusted Gamma UCL	84.23					
197												
198	**Lognormal GOF Test on Detected Observations Only**											
199				Shapiro Wilk Approximate Test Statistic	0.959	**Shapiro Wilk GOF Test**						
200				10% Shapiro Wilk P Value	2.950E-10	Detected Data Not Lognormal at 10% Significance Level						
201				Lilliefors Test Statistic	0.09	**Lilliefors GOF Test**						
202				10% Lilliefors Critical Value	0.0401	Detected Data Not Lognormal at 10% Significance Level						
203	**Detected Data Not Lognormal at 10% Significance Level**											
204												
205	**Lognormal ROS Statistics Using Imputed Non-Detects**											
206				Mean in Original Scale	73.4	Mean in Log Scale	3.263					
207				SD in Original Scale	123.1	SD in Log Scale	1.548					
208				95% t UCL (assumes normality of ROS data)	83.11	95% Percentile Bootstrap UCL	83.5					

209				95% BCA Bootstrap UCL	84.26				95% Bootstrap t UCL	84.06		
210				95% H-UCL (Log ROS)	104.9							
211												
212	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
213				KM Mean (logged)	3.26				KM Geo Mean	26.05		
214				KM SD (logged)	1.55				95% Critical H Value (KM-Log)	2.596		
215				KM Standard Error of Mean (logged)	0.0742				95% H-UCL (KM -Log)	105		
216				KM SD (logged)	1.55				95% Critical H Value (KM-Log)	2.596		
217				KM Standard Error of Mean (logged)	0.0742							
218												
219	**DL/2 Statistics**											
220	**DL/2 Normal**					**DL/2 Log-Transformed**						
221				Mean in Original Scale	73.38				Mean in Log Scale	3.247		
222				SD in Original Scale	123.1				SD in Log Scale	1.582		
223				95% t UCL (Assumes normality)	83.09				95% H-Stat UCL	109.6		
224	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
225												
226	**Nonparametric Distribution Free UCL Statistics**											
227	**Data do not follow a Discernible Distribution**											
228												
229	**Suggested UCL to Use**											
230				95% KM (t) UCL	83.1							
231												
232	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
233	**Please verify the data were collected from random locations.**											
234	**If the data were collected using judgmental or other non-random methods,**											
235	**then contact a statistician to correctly calculate UCLs.**											
236												
237	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
238	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
239	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
240												
241												
242	**Ba**											
243												
244	**General Statistics**											
245				Total Number of Observations	222				Number of Distinct Observations	163		
246									Number of Missing Observations	226		
247				Minimum	6.2				Mean	131.5		
248				Maximum	768				Median	126.5		
249				SD	76.83				Std. Error of Mean	5.157		
250				Coefficient of Variation	0.584				Skewness	2.63		
251												
252	**Normal GOF Test**											
253				Shapiro Wilk Test Statistic	0.867	**Shapiro Wilk GOF Test**						
254				1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level						
255				Lilliefors Test Statistic	0.067	**Lilliefors GOF Test**						
256				1% Lilliefors Critical Value	0.0693	Data appear Normal at 1% Significance Level						
257	**Data appear Approximate Normal at 1% Significance Level**											
258												
259	**Assuming Normal Distribution**											
260	**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**						

261				95% Student's-t UCL	140				95% Adjusted-CLT UCL (Chen-1995)			140.9
262									95% Modified-t UCL (Johnson-1978)			140.1
263												
264	**Gamma GOF Test**											
265				A-D Test Statistic	1.868	**Anderson-Darling Gamma GOF Test**						
266				5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level						
267				K-S Test Statistic	0.0675	**Kolmogorov-Smirnov Gamma GOF Test**						
268				5% K-S Critical Value	0.0615	Data Not Gamma Distributed at 5% Significance Level						
269	**Data Not Gamma Distributed at 5% Significance Level**											
270												
271	**Gamma Statistics**											
272				k hat (MLE)	2.964	k star (bias corrected MLE)						2.927
273				Theta hat (MLE)	44.35	Theta star (bias corrected MLE)						44.91
274				nu hat (MLE)	1316	nu star (bias corrected)						1300
275				MLE Mean (bias corrected)	131.5	MLE Sd (bias corrected)						76.84
276						Approximate Chi Square Value (0.05)							1217
277				Adjusted Level of Significance	0.0489	Adjusted Chi Square Value						1216
278												
279	**Assuming Gamma Distribution**											
280				95% Approximate Gamma UCL	140.4	95% Adjusted Gamma UCL						140.4
281												
282	**Lognormal GOF Test**											
283				Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk Lognormal GOF Test**						
284				10% Shapiro Wilk P Value	3.308E-11	Data Not Lognormal at 10% Significance Level						
285				Lilliefors Test Statistic	0.0918	**Lilliefors Lognormal GOF Test**						
286				10% Lilliefors Critical Value	0.0548	Data Not Lognormal at 10% Significance Level						
287	**Data Not Lognormal at 10% Significance Level**											
288												
289	**Lognormal Statistics**											
290				Minimum of Logged Data	1.825	Mean of logged Data						4.701
291				Maximum of Logged Data	6.644	SD of logged Data						0.654
292												
293	**Assuming Lognormal Distribution**											
294				95% H-UCL	148.1	90% Chebyshev (MVUE) UCL						155.7
295				95% Chebyshev (MVUE) UCL	164.6	97.5% Chebyshev (MVUE) UCL						177
296				99% Chebyshev (MVUE) UCL	201.3							
297												
298	**Nonparametric Distribution Free UCL Statistics**											
299	**Data appear to follow a Discernible Distribution**											
300												
301	**Nonparametric Distribution Free UCLs**											
302				95% CLT UCL	139.9	95% BCA Bootstrap UCL						141.1
303				95% Standard Bootstrap UCL	139.7	95% Bootstrap-t UCL						141
304				95% Hall's Bootstrap UCL	142.1	95% Percentile Bootstrap UCL						139.7
305				90% Chebyshev(Mean, Sd) UCL	146.9	95% Chebyshev(Mean, Sd) UCL						153.9
306				97.5% Chebyshev(Mean, Sd) UCL	163.7	99% Chebyshev(Mean, Sd) UCL						182.8
307												
308	**Suggested UCL to Use**											
309				95% Student's-t UCL	140							
310												
311	When a data set follows an approximate distribution passing only one of the GOF tests,											
312	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
315	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
316	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
317												
318	**Be**											
319												
320	**General Statistics**											
321	Total Number of Observations					222		Number of Distinct Observations				62
322								Number of Missing Observations				226
323	Number of Detects					149		Number of Non-Detects				73
324	Number of Distinct Detects					60		Number of Distinct Non-Detects				18
325	Minimum Detect					0.011		Minimum Non-Detect				0.2
326	Maximum Detect					12		Maximum Non-Detect				5
327	Variance Detects					2.749		Percent Non-Detects				32.88%
328	Mean Detects					0.684		SD Detects				1.658
329	Median Detects					0.36		CV Detects				2.424
330	Skewness Detects					6.53		Kurtosis Detects				42.74
331	Mean of Logged Detects					-0.913		SD of Logged Detects				0.798
332												
333	**Normal GOF Test on Detects Only**											
334	Shapiro Wilk Test Statistic					0.258		**Normal GOF Test on Detected Observations Only**				
335	1% Shapiro Wilk P Value					0		Detected Data Not Normal at 1% Significance Level				
336	Lilliefors Test Statistic					0.359		**Lilliefors GOF Test**				
337	1% Lilliefors Critical Value					0.0844		Detected Data Not Normal at 1% Significance Level				
338	**Detected Data Not Normal at 1% Significance Level**											
339												
340	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
341	KM Mean					0.536		KM Standard Error of Mean				0.0926
342	90KM SD					1.372		95% KM (BCA) UCL				0.701
343	95% KM (t) UCL					0.689		95% KM (Percentile Bootstrap) UCL				0.696
344	95% KM (z) UCL					0.688		95% KM Bootstrap t UCL				0.768
345	90% KM Chebyshev UCL					0.813		95% KM Chebyshev UCL				0.939
346	97.5% KM Chebyshev UCL					1.114		99% KM Chebyshev UCL				1.457
347												
348	**Gamma GOF Tests on Detected Observations Only**											
349	A-D Test Statistic					17.82		**Anderson-Darling GOF Test**				
350	5% A-D Critical Value					0.782		Detected Data Not Gamma Distributed at 5% Significance Level				
351	K-S Test Statistic					0.276		**Kolmogorov-Smirnov GOF**				
352	5% K-S Critical Value					0.079		Detected Data Not Gamma Distributed at 5% Significance Level				
353	**Detected Data Not Gamma Distributed at 5% Significance Level**											
354												
355	**Gamma Statistics on Detected Data Only**											
356	k hat (MLE)					1.073		k star (bias corrected MLE)				1.056
357	Theta hat (MLE)					0.638		Theta star (bias corrected MLE)				0.648
358	nu hat (MLE)					319.7		nu star (bias corrected)				314.6
359	Mean (detects)					0.684						
360												
361	**Gamma ROS Statistics using Imputed Non-Detects**											
362	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
363	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
364	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

365	This is especially true when the sample size is small.											
366	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
367					Minimum	0.01			Mean	0.499		
368					Maximum	12			Median	0.31		
369					SD	1.391			CV	2.79		
370					k hat (MLE)	0.541			k star (bias corrected MLE)	0.537		
371					Theta hat (MLE)	0.922			Theta star (bias corrected MLE)	0.929		
372					nu hat (MLE)	240.2			nu star (bias corrected)	238.3		
373					Adjusted Level of Significance (β)	0.0489						
374					Approximate Chi Square Value (238.26, α)	203.5			Adjusted Chi Square Value (238.26, β)	203.3		
375					95% Gamma Approximate UCL	0.584			95% Gamma Adjusted UCL	0.584		
376												
377	**Estimates of Gamma Parameters using KM Estimates**											
378					Mean (KM)	0.536			SD (KM)	1.372		
379					Variance (KM)	1.884			SE of Mean (KM)	0.0926		
380					k hat (KM)	0.152			k star (KM)	0.153		
381					nu hat (KM)	67.62			nu star (KM)	68.04		
382					theta hat (KM)	3.517			theta star (KM)	3.495		
383					80% gamma percentile (KM)	0.593			90% gamma percentile (KM)	1.593		
384					95% gamma percentile (KM)	2.936			99% gamma percentile (KM)	6.815		
385												
386	**Gamma Kaplan-Meier (KM) Statistics**											
387					Approximate Chi Square Value (68.04, α)	50.06			Adjusted Chi Square Value (68.04, β)	49.96		
388					95% KM Approximate Gamma UCL	0.728			95% KM Adjusted Gamma UCL	0.73		
389												
390	**Lognormal GOF Test on Detected Observations Only**											
391					Shapiro Wilk Approximate Test Statistic	0.841			**Shapiro Wilk GOF Test**			
392					10% Shapiro Wilk P Value	0			Detected Data Not Lognormal at 10% Significance Level			
393					Lilliefors Test Statistic	0.176			**Lilliefors GOF Test**			
394					10% Lilliefors Critical Value	0.0668			Detected Data Not Lognormal at 10% Significance Level			
395	**Detected Data Not Lognormal at 10% Significance Level**											
396												
397	**Lognormal ROS Statistics Using Imputed Non-Detects**											
398					Mean in Original Scale	0.53			Mean in Log Scale	-1.172		
399					SD in Original Scale	1.377			SD in Log Scale	0.819		
400					95% t UCL (assumes normality of ROS data)	0.683			95% Percentile Bootstrap UCL	0.697		
401					95% BCA Bootstrap UCL	0.733			95% Bootstrap t UCL	0.753		
402					95% H-UCL (Log ROS)	0.484						
403												
404	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
405					KM Mean (logged)	-1.169			KM Geo Mean	0.311		
406					KM SD (logged)	0.884			95% Critical H Value (KM-Log)	2.055		
407					KM Standard Error of Mean (logged)	0.0775			95% H-UCL (KM -Log)	0.519		
408					KM SD (logged)	0.884			95% Critical H Value (KM-Log)	2.055		
409					KM Standard Error of Mean (logged)	0.0775						
410	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
411												
412	**DL/2 Statistics**											
413	**DL/2 Normal**								**DL/2 Log-Transformed**			
414					Mean in Original Scale	0.545			Mean in Log Scale	-1.131		
415					SD in Original Scale	1.382			SD in Log Scale	0.797		
416					95% t UCL (Assumes normality)	0.698			95% H-Stat UCL	0.493		

	A	B	C	D	E	F	G	H	I	J	K	L
417	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
418												
419	**Nonparametric Distribution Free UCL Statistics**											
420	**Data do not follow a Discernible Distribution**											
421												
422	**Suggested UCL to Use**											
423	95% KM (t) UCL					0.689						
424												
425	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
426	**Please verify the data were collected from random locations.**											
427	**If the data were collected using judgmental or other non-random methods,**											
428	**then contact a statistician to correctly calculate UCLs.**											
429												
430	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
431	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
432	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
433												
434	**Cd**											
435												
436	**General Statistics**											
437	Total Number of Observations					222		Number of Distinct Observations				90
438								Number of Missing Observations				226
439	Number of Detects					124		Number of Non-Detects				98
440	Number of Distinct Detects					76		Number of Distinct Non-Detects				39
441	Minimum Detect					0.19		Minimum Non-Detect				0.05
442	Maximum Detect					6.6		Maximum Non-Detect				2.6
443	Variance Detects					1.873		Percent Non-Detects				44.14%
444	Mean Detects					1.223		SD Detects				1.369
445	Median Detects					0.565		CV Detects				1.119
446	Skewness Detects					2.045		Kurtosis Detects				3.864
447	Mean of Logged Detects					-0.241		SD of Logged Detects				0.879
448												
449	**Normal GOF Test on Detects Only**											
450	Shapiro Wilk Test Statistic					0.691		**Normal GOF Test on Detected Observations Only**				
451	1% Shapiro Wilk P Value					0		Detected Data Not Normal at 1% Significance Level				
452	Lilliefors Test Statistic					0.266		**Lilliefors GOF Test**				
453	1% Lilliefors Critical Value					0.0924		Detected Data Not Normal at 1% Significance Level				
454	**Detected Data Not Normal at 1% Significance Level**											
455												
456	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
457	KM Mean					0.808		KM Standard Error of Mean				0.079
458	90KM SD					1.147		95% KM (BCA) UCL				0.952
459	95% KM (t) UCL					0.938		95% KM (Percentile Bootstrap) UCL				0.947
460	95% KM (z) UCL					0.937		95% KM Bootstrap t UCL				0.947
461	90% KM Chebyshev UCL					1.045		95% KM Chebyshev UCL				1.152
462	97.5% KM Chebyshev UCL					1.301		99% KM Chebyshev UCL				1.593
463	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
464												
465	**Gamma GOF Tests on Detected Observations Only**											
466	A-D Test Statistic					7.715		**Anderson-Darling GOF Test**				
467	5% A-D Critical Value					0.776		Detected Data Not Gamma Distributed at 5% Significance Level				
468	K-S Test Statistic					0.214		**Kolmogorov-Smirnov GOF**				

	A	B	C	D	E	F	G	H	I	J	K	L
469					5% K-S Critical Value	0.0852	Detected Data Not Gamma Distributed at 5% Significance Level					
470	**Detected Data Not Gamma Distributed at 5% Significance Level**											
471												
472	**Gamma Statistics on Detected Data Only**											
473					k hat (MLE)	1.271				k star (bias corrected MLE)		1.246
474					Theta hat (MLE)	0.962				Theta star (bias corrected MLE)		0.982
475					nu hat (MLE)	315.2				nu star (bias corrected)		308.9
476					Mean (detects)	1.223						
477												
478	**Gamma ROS Statistics using Imputed Non-Detects**											
479	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
480	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
481	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
482	This is especially true when the sample size is small.											
483	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
484					Minimum	0.01				Mean		0.771
485					Maximum	6.6				Median		0.389
486					SD	1.179				CV		1.53
487					k hat (MLE)	0.439				k star (bias corrected MLE)		0.436
488					Theta hat (MLE)	1.757				Theta star (bias corrected MLE)		1.769
489					nu hat (MLE)	194.8				nu star (bias corrected)		193.5
490					Adjusted Level of Significance (β)	0.0489						
491					Approximate Chi Square Value (193.46, α)	162.3				Adjusted Chi Square Value (193.46, β)		162.1
492					95% Gamma Approximate UCL	0.919				95% Gamma Adjusted UCL		0.92
493												
494	**Estimates of Gamma Parameters using KM Estimates**											
495					Mean (KM)	0.808				SD (KM)		1.147
496					Variance (KM)	1.315				SE of Mean (KM)		0.079
497					k hat (KM)	0.496				k star (KM)		0.492
498					nu hat (KM)	220.2				nu star (KM)		218.5
499					theta hat (KM)	1.628				theta star (KM)		1.641
500					80% gamma percentile (KM)	1.325				90% gamma percentile (KM)		2.192
501					95% gamma percentile (KM)	3.12				99% gamma percentile (KM)		5.404
502												
503	**Gamma Kaplan-Meier (KM) Statistics**											
504					Approximate Chi Square Value (218.54, α)	185.3				Adjusted Chi Square Value (218.54, β)		185.1
505					95% KM Approximate Gamma UCL	0.952				95% KM Adjusted Gamma UCL		0.953
506	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
507												
508	**Lognormal GOF Test on Detected Observations Only**											
509					Shapiro Wilk Approximate Test Statistic	0.886	**Shapiro Wilk GOF Test**					
510					10% Shapiro Wilk P Value	5.063E-14	Detected Data Not Lognormal at 10% Significance Level					
511					Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**					
512					10% Lilliefors Critical Value	0.0731	Detected Data Not Lognormal at 10% Significance Level					
513	**Detected Data Not Lognormal at 10% Significance Level**											
514												
515	**Lognormal ROS Statistics Using Imputed Non-Detects**											
516					Mean in Original Scale	0.813				Mean in Log Scale		-0.831
517					SD in Original Scale	1.139				SD in Log Scale		1.07
518					95% t UCL (assumes normality of ROS data)	0.939				95% Percentile Bootstrap UCL		0.949
519					95% BCA Bootstrap UCL	0.951				95% Bootstrap t UCL		0.953
520					95% H-UCL (Log ROS)	0.905						

521												
522	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
523					KM Mean (logged)	-0.979			KM Geo Mean	0.376		
524					KM SD (logged)	1.297			95% Critical H Value (KM-Log)	2.417		
525					KM Standard Error of Mean (logged)	0.105			95% H-UCL (KM -Log)	1.076		
526					KM SD (logged)	1.297			95% Critical H Value (KM-Log)	2.417		
527					KM Standard Error of Mean (logged)	0.105						
528												
529	**DL/2 Statistics**											
530				**DL/2 Normal**					**DL/2 Log-Transformed**			
531					Mean in Original Scale	0.95			Mean in Log Scale	-0.609		
532					SD in Original Scale	1.125			SD in Log Scale	1.101		
533					95% t UCL (Assumes normality)	1.075			95% H-Stat UCL	1.176		
534	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
535												
536	**Nonparametric Distribution Free UCL Statistics**											
537	**Data do not follow a Discernible Distribution**											
538												
539	**Suggested UCL to Use**											
540					95% KM (t) UCL	0.938						
541												
542	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
543	**Please verify the data were collected from random locations.**											
544	**If the data were collected using judgmental or other non-random methods,**											
545	**then contact a statistician to correctly calculate UCLs.**											
546												
547	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
548	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
549	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
550												
551	**Cr**											
552												
553	**General Statistics**											
554					Total Number of Observations	283			Number of Distinct Observations	200		
555									Number of Missing Observations	165		
556					Number of Detects	275			Number of Non-Detects	8		
557					Number of Distinct Detects	199			Number of Distinct Non-Detects	3		
558					Minimum Detect	1.5			Minimum Non-Detect	0.98		
559					Maximum Detect	1690			Maximum Non-Detect	2.5		
560					Variance Detects	18332			Percent Non-Detects	2.827%		
561					Mean Detects	55.05			SD Detects	135.4		
562					Median Detects	26.2			CV Detects	2.46		
563					Skewness Detects	8.242			Kurtosis Detects	85.78		
564					Mean of Logged Detects	3.204			SD of Logged Detects	1.17		
565												
566	**Normal GOF Test on Detects Only**											
567					Shapiro Wilk Test Statistic	0.35			**Normal GOF Test on Detected Observations Only**			
568					1% Shapiro Wilk P Value	0			Detected Data Not Normal at 1% Significance Level			
569					Lilliefors Test Statistic	0.346			**Lilliefors GOF Test**			
570					1% Lilliefors Critical Value	0.0623			Detected Data Not Normal at 1% Significance Level			
571	**Detected Data Not Normal at 1% Significance Level**											
572												

	A	B	C	D	E	F	G	H	I	J	K	L
573	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
574					KM Mean	53.52			KM Standard Error of Mean			7.952
575					90KM SD	133.5			95% KM (BCA) UCL			66.87
576					95% KM (t) UCL	66.65			95% KM (Percentile Bootstrap) UCL			66.75
577					95% KM (z) UCL	66.6			95% KM Bootstrap t UCL			75.63
578					90% KM Chebyshev UCL	77.38			95% KM Chebyshev UCL			88.18
579					97.5% KM Chebyshev UCL	103.2			99% KM Chebyshev UCL			132.6
580												
581	**Gamma GOF Tests on Detected Observations Only**											
582					A-D Test Statistic	10.99	**Anderson-Darling GOF Test**					
583					5% A-D Critical Value	0.797	Detected Data Not Gamma Distributed at 5% Significance Level					
584					K-S Test Statistic	0.151	**Kolmogorov-Smirnov GOF**					
585					5% K-S Critical Value	0.0572	Detected Data Not Gamma Distributed at 5% Significance Level					
586	**Detected Data Not Gamma Distributed at 5% Significance Level**											
587												
588	**Gamma Statistics on Detected Data Only**											
589					k hat (MLE)	0.745			k star (bias corrected MLE)			0.74
590					Theta hat (MLE)	73.84			Theta star (bias corrected MLE)			74.41
591					nu hat (MLE)	410			nu star (bias corrected)			406.9
592					Mean (detects)	55.05						
593												
594	**Gamma ROS Statistics using Imputed Non-Detects**											
595	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
596	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
597	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
598	This is especially true when the sample size is small.											
599	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
600					Minimum	0.01			Mean			53.49
601					Maximum	1690			Median			25.9
602					SD	133.8			CV			2.501
603					k hat (MLE)	0.618			k star (bias corrected MLE)			0.614
604					Theta hat (MLE)	86.58			Theta star (bias corrected MLE)			87.17
605					nu hat (MLE)	349.7			nu star (bias corrected)			347.3
606					Adjusted Level of Significance (β)	0.0492						
607					Approximate Chi Square Value (347.32, α)	305.1			Adjusted Chi Square Value (347.32, β)			304.9
608					95% Gamma Approximate UCL	60.89			95% Gamma Adjusted UCL			60.93
609												
610	**Estimates of Gamma Parameters using KM Estimates**											
611					Mean (KM)	53.52			SD (KM)			133.5
612					Variance (KM)	17829			SE of Mean (KM)			7.952
613					k hat (KM)	0.161			k star (KM)			0.161
614					nu hat (KM)	90.95			nu star (KM)			91.32
615					theta hat (KM)	333.1			theta star (KM)			331.7
616					80% gamma percentile (KM)	61.66			90% gamma percentile (KM)			160.1
617					95% gamma percentile (KM)	290.2			99% gamma percentile (KM)			662.5
618												
619	**Gamma Kaplan-Meier (KM) Statistics**											
620					Approximate Chi Square Value (91.32, α)	70.28			Adjusted Chi Square Value (91.32, β)			70.19
621					95% KM Approximate Gamma UCL	69.54			95% KM Adjusted Gamma UCL			69.64
622												
623	**Lognormal GOF Test on Detected Observations Only**											
624					Shapiro Wilk Approximate Test Statistic	0.969	**Shapiro Wilk GOF Test**					

625					10% Shapiro Wilk P Value	0.00167	Detected Data Not Lognormal at 10% Significance Level					
626					Lilliefors Test Statistic	0.0739	**Lilliefors GOF Test**					
627					10% Lilliefors Critical Value	0.0493	Detected Data Not Lognormal at 10% Significance Level					
628	**Detected Data Not Lognormal at 10% Significance Level**											
629												
630	**Lognormal ROS Statistics Using Imputed Non-Detects**											
631					Mean in Original Scale	53.53	Mean in Log Scale	3.124				
632					SD in Original Scale	133.8	SD in Log Scale	1.246				
633					95% t UCL (assumes normality of ROS data)	66.65	95% Percentile Bootstrap UCL	68.22				
634					95% BCA Bootstrap UCL	71.19	95% Bootstrap t UCL	73.99				
635					95% H-UCL (Log ROS)	58.86						
636												
637	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
638					KM Mean (logged)	3.117	KM Geo Mean	22.59				
639					KM SD (logged)	1.26	95% Critical H Value (KM-Log)	2.362				
640					KM Standard Error of Mean (logged)	0.0751	95% H-UCL (KM -Log)	59.65				
641					KM SD (logged)	1.26	95% Critical H Value (KM-Log)	2.362				
642					KM Standard Error of Mean (logged)	0.0751						
643												
644	**DL/2 Statistics**											
645	**DL/2 Normal**						**DL/2 Log-Transformed**					
646					Mean in Original Scale	53.52	Mean in Log Scale	3.107				
647					SD in Original Scale	133.8	SD in Log Scale	1.291				
648					95% t UCL (Assumes normality)	66.64	95% H-Stat UCL	61.75				
649	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
650												
651	**Nonparametric Distribution Free UCL Statistics**											
652	**Data do not follow a Discernible Distribution**											
653												
654	**Suggested UCL to Use**											
655					95% KM (t) UCL	66.65						
656												
657	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
658	**Please verify the data were collected from random locations.**											
659	**If the data were collected using judgmental or other non-random methods,**											
660	**then contact a statistician to correctly calculate UCLs.**											
661												
662	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
663	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
664	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
665												
666	**Co**											
667												
668	**General Statistics**											
669					Total Number of Observations	222	Number of Distinct Observations	137				
670							Number of Missing Observations	226				
671					Number of Detects	209	Number of Non-Detects	13				
672					Number of Distinct Detects	136	Number of Distinct Non-Detects	6				
673					Minimum Detect	1	Minimum Non-Detect	0.98				
674					Maximum Detect	140	Maximum Non-Detect	5.1				
675					Variance Detects	341.9	Percent Non-Detects	5.856%				
676					Mean Detects	16.05	SD Detects	18.49				

677				Median Detects	11.6					CV Detects	1.152	
678				Skewness Detects	4.415					Kurtosis Detects	22.61	
679				Mean of Logged Detects	2.463					SD of Logged Detects	0.742	
680												
681				**Normal GOF Test on Detects Only**								
682				Shapiro Wilk Test Statistic	0.542	**Normal GOF Test on Detected Observations Only**						
683				1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level						
684				Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**						
685				1% Lilliefors Critical Value	0.0714	Detected Data Not Normal at 1% Significance Level						
686				**Detected Data Not Normal at 1% Significance Level**								
687												
688				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**								
689				KM Mean	15.26	KM Standard Error of Mean	1.223					
690				90KM SD	18.18	95% KM (BCA) UCL	17.69					
691				95% KM (t) UCL	17.28	95% KM (Percentile Bootstrap) UCL	17.47					
692				95% KM (z) UCL	17.27	95% KM Bootstrap t UCL	17.75					
693				90% KM Chebyshev UCL	18.93	95% KM Chebyshev UCL	20.59					
694				97.5% KM Chebyshev UCL	22.9	99% KM Chebyshev UCL	27.43					
695												
696				**Gamma GOF Tests on Detected Observations Only**								
697				A-D Test Statistic	5.384	**Anderson-Darling GOF Test**						
698				5% A-D Critical Value	0.769	Detected Data Not Gamma Distributed at 5% Significance Level						
699				K-S Test Statistic	0.123	**Kolmogorov-Smirnov GOF**						
700				5% K-S Critical Value	0.0636	Detected Data Not Gamma Distributed at 5% Significance Level						
701				**Detected Data Not Gamma Distributed at 5% Significance Level**								
702												
703				**Gamma Statistics on Detected Data Only**								
704				k hat (MLE)	1.746	k star (bias corrected MLE)	1.724					
705				Theta hat (MLE)	9.19	Theta star (bias corrected MLE)	9.307					
706				nu hat (MLE)	729.8	nu star (bias corrected)	720.7					
707				Mean (detects)	16.05							
708												
709				**Gamma ROS Statistics using Imputed Non-Detects**								
710				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
711				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
712				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
713				This is especially true when the sample size is small.								
714				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
715				Minimum	0.01	Mean	15.11					
716				Maximum	140	Median	11					
717				SD	18.33	CV	1.213					
718				k hat (MLE)	0.88	k star (bias corrected MLE)	0.871					
719				Theta hat (MLE)	17.17	Theta star (bias corrected MLE)	17.35					
720				nu hat (MLE)	390.6	nu star (bias corrected)	386.6					
721				Adjusted Level of Significance (β)	0.0489							
722				Approximate Chi Square Value (386.62, α)	342.1	Adjusted Chi Square Value (386.62, β)	341.8					
723				95% Gamma Approximate UCL	17.08	95% Gamma Adjusted UCL	17.09					
724												
725				**Estimates of Gamma Parameters using KM Estimates**								
726				Mean (KM)	15.26	SD (KM)	18.18					
727				Variance (KM)	330.3	SE of Mean (KM)	1.223					
728				k hat (KM)	0.705	k star (KM)	0.699					

729					nu hat (KM)	313				nu star (KM)	310.1	
730					theta hat (KM)	21.65				theta star (KM)	21.85	
731					80% gamma percentile (KM)	25.09				90% gamma percentile (KM)	38.33	
732					95% gamma percentile (KM)	51.98				99% gamma percentile (KM)	84.59	
733												
734					**Gamma Kaplan-Meier (KM) Statistics**							
735					Approximate Chi Square Value (310.14, α)	270.3				Adjusted Chi Square Value (310.14, β)	270.1	
736					95% KM Approximate Gamma UCL	17.51				95% KM Adjusted Gamma UCL	17.52	
737												
738					**Lognormal GOF Test on Detected Observations Only**							
739					Shapiro Wilk Approximate Test Statistic	0.968				**Shapiro Wilk GOF Test**		
740					10% Shapiro Wilk P Value	0.0059				Detected Data Not Lognormal at 10% Significance Level		
741					Lilliefors Test Statistic	0.0693				**Lilliefors GOF Test**		
742					10% Lilliefors Critical Value	0.0565				Detected Data Not Lognormal at 10% Significance Level		
743					**Detected Data Not Lognormal at 10% Significance Level**							
744												
745					**Lognormal ROS Statistics Using Imputed Non-Detects**							
746					Mean in Original Scale	15.28				Mean in Log Scale	2.378	
747					SD in Original Scale	18.2				SD in Log Scale	0.799	
748					95% t UCL (assumes normality of ROS data)	17.29				95% Percentile Bootstrap UCL	17.43	
749					95% BCA Bootstrap UCL	17.68				95% Bootstrap t UCL	17.74	
750					95% H-UCL (Log ROS)	16.52						
751												
752					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
753					KM Mean (logged)	2.365				KM Geo Mean	10.64	
754					KM SD (logged)	0.832				95% Critical H Value (KM-Log)	2.016	
755					KM Standard Error of Mean (logged)	0.0569				95% H-UCL (KM -Log)	16.84	
756					KM SD (logged)	0.832				95% Critical H Value (KM-Log)	2.016	
757					KM Standard Error of Mean (logged)	0.0569						
758												
759					**DL/2 Statistics**							
760					**DL/2 Normal**					**DL/2 Log-Transformed**		
761					Mean in Original Scale	15.23				Mean in Log Scale	2.355	
762					SD in Original Scale	18.24				SD in Log Scale	0.851	
763					95% t UCL (Assumes normality)	17.25				95% H-Stat UCL	17	
764					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
765												
766					**Nonparametric Distribution Free UCL Statistics**							
767					**Data do not follow a Discernible Distribution**							
768												
769					**Suggested UCL to Use**							
770					95% KM (t) UCL	17.28						
771												
772					**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**							
773					**Please verify the data were collected from random locations.**							
774					**If the data were collected using judgmental or other non-random methods,**							
775					**then contact a statistician to correctly calculate UCLs.**							
776												
777					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
778					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
779					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782	**Cu**											
783												
784	**General Statistics**											
785					Total Number of Observations	222			Number of Distinct Observations	189		
786									Number of Missing Observations	226		
787					Minimum	3.5			Mean	60.52		
788					Maximum	178			Median	59.9		
789					SD	30.38			Std. Error of Mean	2.039		
790					Coefficient of Variation	0.502			Skewness	1.174		
791												
792	**Normal GOF Test**											
793					Shapiro Wilk Test Statistic	0.909		**Shapiro Wilk GOF Test**				
794					1% Shapiro Wilk P Value	0		Data Not Normal at 1% Significance Level				
795					Lilliefors Test Statistic	0.108		**Lilliefors GOF Test**				
796					1% Lilliefors Critical Value	0.0693		Data Not Normal at 1% Significance Level				
797	**Data Not Normal at 1% Significance Level**											
798												
799	**Assuming Normal Distribution**											
800					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
801					95% Student's-t UCL	63.89			95% Adjusted-CLT UCL (Chen-1995)	64.05		
802									95% Modified-t UCL (Johnson-1978)	63.92		
803												
804	**Gamma GOF Test**											
805					A-D Test Statistic	3.919		**Anderson-Darling Gamma GOF Test**				
806					5% A-D Critical Value	0.758		Data Not Gamma Distributed at 5% Significance Level				
807					K-S Test Statistic	0.133		**Kolmogorov-Smirnov Gamma GOF Test**				
808					5% K-S Critical Value	0.0614		Data Not Gamma Distributed at 5% Significance Level				
809	**Data Not Gamma Distributed at 5% Significance Level**											
810												
811	**Gamma Statistics**											
812					k hat (MLE)	3.619			k star (bias corrected MLE)	3.573		
813					Theta hat (MLE)	16.73			Theta star (bias corrected MLE)	16.94		
814					nu hat (MLE)	1607			nu star (bias corrected)	1586		
815					MLE Mean (bias corrected)	60.52			MLE Sd (bias corrected)	32.02		
816									Approximate Chi Square Value (0.05)	1495		
817					Adjusted Level of Significance	0.0489			Adjusted Chi Square Value	1494		
818												
819	**Assuming Gamma Distribution**											
820					95% Approximate Gamma UCL	64.23			95% Adjusted Gamma UCL	64.25		
821												
822	**Lognormal GOF Test**											
823					Shapiro Wilk Test Statistic	0.908		**Shapiro Wilk Lognormal GOF Test**				
824					10% Shapiro Wilk P Value	0		Data Not Lognormal at 10% Significance Level				
825					Lilliefors Test Statistic	0.169		**Lilliefors Lognormal GOF Test**				
826					10% Lilliefors Critical Value	0.0548		Data Not Lognormal at 10% Significance Level				
827	**Data Not Lognormal at 10% Significance Level**											
828												
829	**Lognormal Statistics**											
830					Minimum of Logged Data	1.253			Mean of logged Data	3.959		
831					Maximum of Logged Data	5.182			SD of logged Data	0.595		
832												

833	**Assuming Lognormal Distribution**											
834					95% H-UCL	67.35			90% Chebyshev (MVUE) UCL	70.56		
835					95% Chebyshev (MVUE) UCL	74.23			97.5% Chebyshev (MVUE) UCL	79.32		
836					99% Chebyshev (MVUE) UCL	89.31						
837												
838	**Nonparametric Distribution Free UCL Statistics**											
839	**Data do not follow a Discernible Distribution**											
840												
841	**Nonparametric Distribution Free UCLs**											
842					95% CLT UCL	63.88			95% BCA Bootstrap UCL	63.82		
843					95% Standard Bootstrap UCL	63.74			95% Bootstrap-t UCL	63.85		
844					95% Hall's Bootstrap UCL	63.87			95% Percentile Bootstrap UCL	63.76		
845					90% Chebyshev(Mean, Sd) UCL	66.64			95% Chebyshev(Mean, Sd) UCL	69.41		
846					97.5% Chebyshev(Mean, Sd) UCL	73.26			99% Chebyshev(Mean, Sd) UCL	80.81		
847												
848	**Suggested UCL to Use**											
849					95% Student's-t UCL	63.89						
850												
851	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
852	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
853	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
854												
855	**Pb**											
856												
857	**General Statistics**											
858					Total Number of Observations	274			Number of Distinct Observations	155		
859									Number of Missing Observations	174		
860					Number of Detects	258			Number of Non-Detects	16		
861					Number of Distinct Detects	151			Number of Distinct Non-Detects	5		
862					Minimum Detect	2.7			Minimum Non-Detect	2.4		
863					Maximum Detect	400			Maximum Non-Detect	7.5		
864					Variance Detects	1778			Percent Non-Detects	5.839%		
865					Mean Detects	25.53			SD Detects	42.17		
866					Median Detects	15.5			CV Detects	1.652		
867					Skewness Detects	7.229			Kurtosis Detects	58.92		
868					Mean of Logged Detects	2.864			SD of Logged Detects	0.741		
869												
870	**Normal GOF Test on Detects Only**											
871					Shapiro Wilk Test Statistic	0.37			**Normal GOF Test on Detected Observations Only**			
872					1% Shapiro Wilk P Value	0			Detected Data Not Normal at 1% Significance Level			
873					Lilliefors Test Statistic	0.294			**Lilliefors GOF Test**			
874					1% Lilliefors Critical Value	0.0643			Detected Data Not Normal at 1% Significance Level			
875	**Detected Data Not Normal at 1% Significance Level**											
876												
877	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
878					KM Mean	24.31			KM Standard Error of Mean	2.49		
879					90KM SD	41.13			95% KM (BCA) UCL	28.98		
880					95% KM (t) UCL	28.42			95% KM (Percentile Bootstrap) UCL	28.58		
881					95% KM (z) UCL	28.4			95% KM Bootstrap t UCL	30.6		
882					90% KM Chebyshev UCL	31.78			95% KM Chebyshev UCL	35.16		
883					97.5% KM Chebyshev UCL	39.86			99% KM Chebyshev UCL	49.08		
884												

	A	B	C	D	E	F	G	H	I	J	K	L
885	**Gamma GOF Tests on Detected Observations Only**											
886					A-D Test Statistic	12.06	**Anderson-Darling GOF Test**					
887					5% A-D Critical Value	0.772	Detected Data Not Gamma Distributed at 5% Significance Level					
888					K-S Test Statistic	0.163	**Kolmogorov-Smirnov GOF**					
889					5% K-S Critical Value	0.058	Detected Data Not Gamma Distributed at 5% Significance Level					
890	**Detected Data Not Gamma Distributed at 5% Significance Level**											
891												
892	**Gamma Statistics on Detected Data Only**											
893					k hat (MLE)	1.475	k star (bias corrected MLE)					1.461
894					Theta hat (MLE)	17.3	Theta star (bias corrected MLE)					17.48
895					nu hat (MLE)	761.2	nu star (bias corrected)					753.7
896					Mean (detects)	25.53						
897												
898	**Gamma ROS Statistics using Imputed Non-Detects**											
899	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
900	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
901	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
902	This is especially true when the sample size is small.											
903	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
904					Minimum	0.01	Mean					24.04
905					Maximum	400	Median					15
906					SD	41.35	CV					1.72
907					k hat (MLE)	0.791	k star (bias corrected MLE)					0.784
908					Theta hat (MLE)	30.4	Theta star (bias corrected MLE)					30.64
909					nu hat (MLE)	433.3	nu star (bias corrected)					429.9
910					Adjusted Level of Significance (β)	0.0491						
911					Approximate Chi Square Value (429.88, α)	382.8	Adjusted Chi Square Value (429.88, β)					382.6
912					95% Gamma Approximate UCL	26.99	95% Gamma Adjusted UCL					27.01
913												
914	**Estimates of Gamma Parameters using KM Estimates**											
915					Mean (KM)	24.31	SD (KM)					41.13
916					Variance (KM)	1692	SE of Mean (KM)					2.49
917					k hat (KM)	0.349	k star (KM)					0.348
918					nu hat (KM)	191.3	nu star (KM)					190.6
919					theta hat (KM)	69.61	theta star (KM)					69.89
920					80% gamma percentile (KM)	38.44	90% gamma percentile (KM)					70.26
921					95% gamma percentile (KM)	105.9	99% gamma percentile (KM)					197
922												
923	**Gamma Kaplan-Meier (KM) Statistics**											
924					Approximate Chi Square Value (190.57, α)	159.6	Adjusted Chi Square Value (190.57, β)					159.5
925					95% KM Approximate Gamma UCL	29.02	95% KM Adjusted Gamma UCL					29.04
926												
927	**Lognormal GOF Test on Detected Observations Only**											
928					Shapiro Wilk Approximate Test Statistic	0.943	**Shapiro Wilk GOF Test**					
929					10% Shapiro Wilk P Value	8.194E-12	Detected Data Not Lognormal at 10% Significance Level					
930					Lilliefors Test Statistic	0.0963	**Lilliefors GOF Test**					
931					10% Lilliefors Critical Value	0.0509	Detected Data Not Lognormal at 10% Significance Level					
932	**Detected Data Not Lognormal at 10% Significance Level**											
933												
934	**Lognormal ROS Statistics Using Imputed Non-Detects**											
935					Mean in Original Scale	24.28	Mean in Log Scale					2.779
936					SD in Original Scale	41.22	SD in Log Scale					0.801

937				95% t UCL (assumes normality of ROS data)		28.39				95% Percentile Bootstrap UCL		28.59
938				95% BCA Bootstrap UCL		29.41				95% Bootstrap t UCL		30.77
939				95% H-UCL (Log ROS)		24.41						
940												
941					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
942				KM Mean (logged)		2.781				KM Geo Mean		16.13
943				KM SD (logged)		0.798				95% Critical H Value (KM-Log)		1.979
944				KM Standard Error of Mean (logged)		0.0489				95% H-UCL (KM -Log)		24.41
945				KM SD (logged)		0.798				95% Critical H Value (KM-Log)		1.979
946				KM Standard Error of Mean (logged)		0.0489						
947												
948					**DL/2 Statistics**							
949				**DL/2 Normal**						**DL/2 Log-Transformed**		
950				Mean in Original Scale		24.23				Mean in Log Scale		2.765
951				SD in Original Scale		41.24				SD in Log Scale		0.826
952				95% t UCL (Assumes normality)		28.35				95% H-Stat UCL		24.69
953					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
954												
955					**Nonparametric Distribution Free UCL Statistics**							
956					**Data do not follow a Discernible Distribution**							
957												
958					**Suggested UCL to Use**							
959				95% KM (t) UCL		28.42						
960												
961					**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**							
962					**Please verify the data were collected from random locations.**							
963					**If the data were collected using judgmental or other non-random methods,**							
964					**then contact a statistician to correctly calculate UCLs.**							
965												
966					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
967					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
968					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
969												
970	**Hg**											
971												
972					**General Statistics**							
973				Total Number of Observations		274				Number of Distinct Observations		117
974										Number of Missing Observations		174
975				Number of Detects		182				Number of Non-Detects		92
976				Number of Distinct Detects		111				Number of Distinct Non-Detects		12
977				Minimum Detect		0.017				Minimum Non-Detect		0.01
978				Maximum Detect		28				Maximum Non-Detect		0.2
979				Variance Detects		10.73				Percent Non-Detects		33.58%
980				Mean Detects		1.667				SD Detects		3.276
981				Median Detects		0.42				CV Detects		1.965
982				Skewness Detects		4.62				Kurtosis Detects		28.81
983				Mean of Logged Detects		-0.851				SD of Logged Detects		1.786
984												
985					**Normal GOF Test on Detects Only**							
986				Shapiro Wilk Test Statistic		0.54				**Normal GOF Test on Detected Observations Only**		
987				1% Shapiro Wilk P Value		0				Detected Data Not Normal at 1% Significance Level		
988				Lilliefors Test Statistic		0.307				**Lilliefors GOF Test**		

989				1% Lilliefors Critical Value		0.0764	Detected Data Not Normal at 1% Significance Level					
990	**Detected Data Not Normal at 1% Significance Level**											
991												
992	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
993				KM Mean		1.12	KM Standard Error of Mean					0.168
994				90KM SD		2.772	95% KM (BCA) UCL					1.418
995				95% KM (t) UCL		1.398	95% KM (Percentile Bootstrap) UCL					1.407
996				95% KM (z) UCL		1.397	95% KM Bootstrap t UCL					1.488
997				90% KM Chebyshev UCL		1.624	95% KM Chebyshev UCL					1.852
998				97.5% KM Chebyshev UCL		2.169	99% KM Chebyshev UCL					2.791
999												
1000	**Gamma GOF Tests on Detected Observations Only**											
1001				A-D Test Statistic		4.173	**Anderson-Darling GOF Test**					
1002				5% A-D Critical Value		0.828	Detected Data Not Gamma Distributed at 5% Significance Level					
1003				K-S Test Statistic		0.131	**Kolmogorov-Smirnov GOF**					
1004				5% K-S Critical Value		0.0725	Detected Data Not Gamma Distributed at 5% Significance Level					
1005	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1006												
1007	**Gamma Statistics on Detected Data Only**											
1008				k hat (MLE)		0.471	k star (bias corrected MLE)					0.466
1009				Theta hat (MLE)		3.543	Theta star (bias corrected MLE)					3.574
1010				nu hat (MLE)		171.3	nu star (bias corrected)					169.8
1011				Mean (detects)		1.667						
1012												
1013	**Gamma ROS Statistics using Imputed Non-Detects**											
1014	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1015	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1016	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1017	This is especially true when the sample size is small.											
1018	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1019				Minimum		0.01	Mean					1.111
1020				Maximum		28	Median					0.0995
1021				SD		2.78	CV					2.503
1022				k hat (MLE)		0.309	k star (bias corrected MLE)					0.309
1023				Theta hat (MLE)		3.59	Theta star (bias corrected MLE)					3.601
1024				nu hat (MLE)		169.6	nu star (bias corrected)					169.1
1025				Adjusted Level of Significance (β)		0.0491						
1026				Approximate Chi Square Value (169.07, α)		140	Adjusted Chi Square Value (169.07, β)					139.9
1027				95% Gamma Approximate UCL		1.342	95% Gamma Adjusted UCL					1.343
1028												
1029	**Estimates of Gamma Parameters using KM Estimates**											
1030				Mean (KM)		1.12	SD (KM)					2.772
1031				Variance (KM)		7.682	SE of Mean (KM)					0.168
1032				k hat (KM)		0.163	k star (KM)					0.164
1033				nu hat (KM)		89.56	nu star (KM)					89.91
1034				theta hat (KM)		6.856	theta star (KM)					6.829
1035				80% gamma percentile (KM)		1.307	90% gamma percentile (KM)					3.357
1036				95% gamma percentile (KM)		6.054	99% gamma percentile (KM)					13.74
1037												
1038	**Gamma Kaplan-Meier (KM) Statistics**											
1039				Approximate Chi Square Value (89.91, α)		69.05	Adjusted Chi Square Value (89.91, β)					68.95
1040				95% KM Approximate Gamma UCL		1.459	95% KM Adjusted Gamma UCL					1.461

	A	B	C	D	E	F	G	H	I	J	K	L
1041												
1042	**Lognormal GOF Test on Detected Observations Only**											
1043					Shapiro Wilk Approximate Test Statistic	0.953	**Shapiro Wilk GOF Test**					
1044					10% Shapiro Wilk P Value	2.0166E-5	Detected Data Not Lognormal at 10% Significance Level					
1045					Lilliefors Test Statistic	0.0592	**Lilliefors GOF Test**					
1046					10% Lilliefors Critical Value	0.0605	Detected Data appear Lognormal at 10% Significance Level					
1047	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
1048												
1049	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1050					Mean in Original Scale	1.122	Mean in Log Scale	-1.811				
1051					SD in Original Scale	2.776	SD in Log Scale	2.105				
1052					95% t UCL (assumes normality of ROS data)	1.399	95% Percentile Bootstrap UCL	1.414				
1053					95% BCA Bootstrap UCL	1.437	95% Bootstrap t UCL	1.471				
1054					95% H-UCL (Log ROS)	2.267						
1055												
1056	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1057					KM Mean (logged)	-1.729	KM Geo Mean	0.178				
1058					KM SD (logged)	1.938	95% Critical H Value (KM-Log)	3.056				
1059					KM Standard Error of Mean (logged)	0.121	95% H-UCL (KM -Log)	1.663				
1060					KM SD (logged)	1.938	95% Critical H Value (KM-Log)	3.056				
1061					KM Standard Error of Mean (logged)	0.121						
1062												
1063	**DL/2 Statistics**											
1064				**DL/2 Normal**			**DL/2 Log-Transformed**					
1065					Mean in Original Scale	1.128	Mean in Log Scale	-1.577				
1066					SD in Original Scale	2.774	SD in Log Scale	1.825				
1067					95% t UCL (Assumes normality)	1.404	95% H-Stat UCL	1.51				
1068	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1069												
1070	**Nonparametric Distribution Free UCL Statistics**											
1071	**Detected Data appear Approximate Lognormal Distributed at 10% Significance Level**											
1072												
1073	**Suggested UCL to Use**											
1074					KM H-UCL	1.663						
1075												
1076	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1077	**Please verify the data were collected from random locations.**											
1078	**If the data were collected using judgmental or other non-random methods,**											
1079	**then contact a statistician to correctly calculate UCLs.**											
1080												
1081	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1082	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1083	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1084												
1085	**Mo**											
1086												
1087	**General Statistics**											
1088					Total Number of Observations	112	Number of Distinct Observations	35				
1089							Number of Missing Observations	336				
1090					Number of Detects	36	Number of Non-Detects	76				
1091					Number of Distinct Detects	27	Number of Distinct Non-Detects	9				
1092					Minimum Detect	0.27	Minimum Non-Detect	0.25				

1093				Maximum Detect	120				Maximum Non-Detect	10	
1094				Variance Detects	386.7				Percent Non-Detects	67.86%	
1095				Mean Detects	6.004				SD Detects	19.67	
1096				Median Detects	2.4				CV Detects	3.276	
1097				Skewness Detects	5.886				Kurtosis Detects	35.03	
1098				Mean of Logged Detects	0.884				SD of Logged Detects	0.974	
1099											
1100				**Normal GOF Test on Detects Only**							
1101				Shapiro Wilk Test Statistic	0.241	**Shapiro Wilk GOF Test**					
1102				1% Shapiro Wilk Critical Value	0.912	Detected Data Not Normal at 1% Significance Level					
1103				Lilliefors Test Statistic	0.447	**Lilliefors GOF Test**					
1104				1% Lilliefors Critical Value	0.17	Detected Data Not Normal at 1% Significance Level					
1105				**Detected Data Not Normal at 1% Significance Level**							
1106											
1107				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1108				KM Mean	2.769	KM Standard Error of Mean	1.089				
1109				90KM SD	11.27	95% KM (BCA) UCL	5.009				
1110				95% KM (t) UCL	4.574	95% KM (Percentile Bootstrap) UCL	4.866				
1111				95% KM (z) UCL	4.559	95% KM Bootstrap t UCL	10.34				
1112				90% KM Chebyshev UCL	6.034	95% KM Chebyshev UCL	7.514				
1113				97.5% KM Chebyshev UCL	9.567	99% KM Chebyshev UCL	13.6				
1114											
1115				**Gamma GOF Tests on Detected Observations Only**							
1116				A-D Test Statistic	5.059	**Anderson-Darling GOF Test**					
1117				5% A-D Critical Value	0.796	Detected Data Not Gamma Distributed at 5% Significance Level					
1118				K-S Test Statistic	0.338	**Kolmogorov-Smirnov GOF**					
1119				5% K-S Critical Value	0.153	Detected Data Not Gamma Distributed at 5% Significance Level					
1120				**Detected Data Not Gamma Distributed at 5% Significance Level**							
1121											
1122				**Gamma Statistics on Detected Data Only**							
1123				k hat (MLE)	0.669	k star (bias corrected MLE)	0.632				
1124				Theta hat (MLE)	8.968	Theta star (bias corrected MLE)	9.497				
1125				nu hat (MLE)	48.2	nu star (bias corrected)	45.52				
1126				Mean (detects)	6.004						
1127											
1128				**Gamma ROS Statistics using Imputed Non-Detects**							
1129				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1130				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1131				For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1132				This is especially true when the sample size is small.							
1133				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1134				Minimum	0.01	Mean	3.168				
1135				Maximum	120	Median	0.01				
1136				SD	11.82	CV	3.733				
1137				k hat (MLE)	0.235	k star (bias corrected MLE)	0.235				
1138				Theta hat (MLE)	13.45	Theta star (bias corrected MLE)	13.47				
1139				nu hat (MLE)	52.74	nu star (bias corrected)	52.66				
1140				Adjusted Level of Significance (β)	0.0479						
1141				Approximate Chi Square Value (52.66, α)	36.99	Adjusted Chi Square Value (52.66, β)	36.82				
1142				95% Gamma Approximate UCL	4.509	95% Gamma Adjusted UCL	4.53				
1143											
1144				**Estimates of Gamma Parameters using KM Estimates**							

1145					Mean (KM)	2.769					SD (KM)	11.27
1146					Variance (KM)	127					SE of Mean (KM)	1.089
1147					k hat (KM)	0.0604					k star (KM)	0.0647
1148					nu hat (KM)	13.52					nu star (KM)	14.49
1149					theta hat (KM)	45.87					theta star (KM)	42.8
1150					80% gamma percentile (KM)	0.818					90% gamma percentile (KM)	5.592
1151					95% gamma percentile (KM)	15.75					99% gamma percentile (KM)	54.05
1152												
1153					**Gamma Kaplan-Meier (KM) Statistics**							
1154					Approximate Chi Square Value (14.49, α)	6.909					Adjusted Chi Square Value (14.49, β)	6.84
1155					95% KM Approximate Gamma UCL	5.807					95% KM Adjusted Gamma UCL	5.865
1156												
1157					**Lognormal GOF Test on Detected Observations Only**							
1158					Shapiro Wilk Test Statistic	0.868					**Shapiro Wilk GOF Test**	
1159					10% Shapiro Wilk Critical Value	0.945					Detected Data Not Lognormal at 10% Significance Level	
1160					Lilliefors Test Statistic	0.183					**Lilliefors GOF Test**	
1161					10% Lilliefors Critical Value	0.134					Detected Data Not Lognormal at 10% Significance Level	
1162					**Detected Data Not Lognormal at 10% Significance Level**							
1163												
1164					**Lognormal ROS Statistics Using Imputed Non-Detects**							
1165					Mean in Original Scale	2.809					Mean in Log Scale	0.069
1166					SD in Original Scale	11.34					SD in Log Scale	1.175
1167					95% t UCL (assumes normality of ROS data)	4.586					95% Percentile Bootstrap UCL	4.91
1168					95% BCA Bootstrap UCL	6.028					95% Bootstrap t UCL	11.69
1169					95% H-UCL (Log ROS)	2.787						
1170												
1171					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1172					KM Mean (logged)	0.0547					KM Geo Mean	1.056
1173					KM SD (logged)	1.167					95% Critical H Value (KM-Log)	2.376
1174					KM Standard Error of Mean (logged)	0.166					95% H-UCL (KM -Log)	2.714
1175					KM SD (logged)	1.167					95% Critical H Value (KM-Log)	2.376
1176					KM Standard Error of Mean (logged)	0.166						
1177					**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**							
1178												
1179					**DL/2 Statistics**							
1180					**DL/2 Normal**						**DL/2 Log-Transformed**	
1181					Mean in Original Scale	4.361					Mean in Log Scale	0.859
1182					SD in Original Scale	11.23					SD in Log Scale	1.11
1183					95% t UCL (Assumes normality)	6.121					95% H-Stat UCL	5.581
1184					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
1185												
1186					**Nonparametric Distribution Free UCL Statistics**							
1187					**Data do not follow a Discernible Distribution**							
1188												
1189					**Suggested UCL to Use**							
1190					95% KM (t) UCL	4.574						
1191												
1192					**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**							
1193					**Please verify the data were collected from random locations.**							
1194					**If the data were collected using judgmental or other non-random methods,**							
1195					**then contact a statistician to correctly calculate UCLs.**							
1196												

	A	B	C	D	E	F	G	H	I	J	K	L
1197	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1198	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1199	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1200												
1201												
1202	**Ni**											
1203												
1204	**General Statistics**											
1205					Total Number of Observations	266			Number of Distinct Observations	175		
1206									Number of Missing Observations	182		
1207					Minimum	7			Mean	58.03		
1208					Maximum	1340			Median	27.55		
1209					SD	142.1			Std. Error of Mean	8.712		
1210					Coefficient of Variation	2.449			Skewness	6.395		
1211												
1212	**Normal GOF Test**											
1213					Shapiro Wilk Test Statistic	0.299			**Shapiro Wilk GOF Test**			
1214					1% Shapiro Wilk P Value	0			Data Not Normal at 1% Significance Level			
1215					Lilliefors Test Statistic	0.367			**Lilliefors GOF Test**			
1216					1% Lilliefors Critical Value	0.0633			Data Not Normal at 1% Significance Level			
1217	**Data Not Normal at 1% Significance Level**											
1218												
1219	**Assuming Normal Distribution**											
1220					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1221					95% Student's-t UCL	72.41			95% Adjusted-CLT UCL (Chen-1995)	76.01		
1222									95% Modified-t UCL (Johnson-1978)	72.98		
1223												
1224	**Gamma GOF Test**											
1225					A-D Test Statistic	26.83			**Anderson-Darling Gamma GOF Test**			
1226					5% A-D Critical Value	0.786			Data Not Gamma Distributed at 5% Significance Level			
1227					K-S Test Statistic	0.237			**Kolmogorov-Smirnov Gamma GOF Test**			
1228					5% K-S Critical Value	0.0578			Data Not Gamma Distributed at 5% Significance Level			
1229	**Data Not Gamma Distributed at 5% Significance Level**											
1230												
1231	**Gamma Statistics**											
1232					k hat (MLE)	0.963			k star (bias corrected MLE)	0.955		
1233					Theta hat (MLE)	60.24			Theta star (bias corrected MLE)	60.77		
1234					nu hat (MLE)	512.5			nu star (bias corrected)	508		
1235					MLE Mean (bias corrected)	58.03			MLE Sd (bias corrected)	59.38		
1236									Approximate Chi Square Value (0.05)	456.7		
1237					Adjusted Level of Significance	0.0491			Adjusted Chi Square Value	456.5		
1238												
1239	**Assuming Gamma Distribution**											
1240					95% Approximate Gamma UCL	64.54			95% Adjusted Gamma UCL	64.58		
1241												
1242	**Lognormal GOF Test**											
1243					Shapiro Wilk Test Statistic	0.873			**Shapiro Wilk Lognormal GOF Test**			
1244					10% Shapiro Wilk P Value	0			Data Not Lognormal at 10% Significance Level			
1245					Lilliefors Test Statistic	0.111			**Lilliefors Lognormal GOF Test**			
1246					10% Lilliefors Critical Value	0.0501			Data Not Lognormal at 10% Significance Level			
1247	**Data Not Lognormal at 10% Significance Level**											
1248												

1249	**Lognormal Statistics**											
1250					Minimum of Logged Data	1.946			Mean of logged Data	3.459		
1251					Maximum of Logged Data	7.2			SD of logged Data	0.823		
1252												
1253	**Assuming Lognormal Distribution**											
1254					95% H-UCL	49.33			90% Chebyshev (MVUE) UCL	52.28		
1255					95% Chebyshev (MVUE) UCL	55.8			97.5% Chebyshev (MVUE) UCL	60.67		
1256					99% Chebyshev (MVUE) UCL	70.26						
1257												
1258	**Nonparametric Distribution Free UCL Statistics**											
1259	**Data do not follow a Discernible Distribution**											
1260												
1261	**Nonparametric Distribution Free UCLs**											
1262					95% CLT UCL	72.36			95% BCA Bootstrap UCL	77.93		
1263					95% Standard Bootstrap UCL	72.2			95% Bootstrap-t UCL	77.22		
1264					95% Hall's Bootstrap UCL	74.23			95% Percentile Bootstrap UCL	73.19		
1265					90% Chebyshev(Mean, Sd) UCL	84.16			95% Chebyshev(Mean, Sd) UCL	96		
1266					97.5% Chebyshev(Mean, Sd) UCL	112.4			99% Chebyshev(Mean, Sd) UCL	144.7		
1267												
1268	**Suggested UCL to Use**											
1269					95% Student's-t UCL	72.41						
1270												
1271	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1272	**Please verify the data were collected from random locations.**											
1273	**If the data were collected using judgmental or other non-random methods,**											
1274	**then contact a statistician to correctly calculate UCLs.**											
1275												
1276	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1277	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1278	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1279												
1280	**Se**											
1281												
1282	**General Statistics**											
1283					Total Number of Observations	222			Number of Distinct Observations	50		
1284									Number of Missing Observations	226		
1285					Number of Detects	123			Number of Non-Detects	99		
1286					Number of Distinct Detects	45			Number of Distinct Non-Detects	8		
1287					Minimum Detect	0.3			Minimum Non-Detect	0.3		
1288					Maximum Detect	4.8			Maximum Non-Detect	4.7		
1289					Variance Detects	0.343			Percent Non-Detects	44.59%		
1290					Mean Detects	1.087			SD Detects	0.586		
1291					Median Detects	1			CV Detects	0.539		
1292					Skewness Detects	3.098			Kurtosis Detects	16.71		
1293					Mean of Logged Detects	-0.0312			SD of Logged Detects	0.483		
1294												
1295	**Normal GOF Test on Detects Only**											
1296					Shapiro Wilk Test Statistic	0.779			**Normal GOF Test on Detected Observations Only**			
1297					1% Shapiro Wilk P Value	0			Detected Data Not Normal at 1% Significance Level			
1298					Lilliefors Test Statistic	0.147			**Lilliefors GOF Test**			
1299					1% Lilliefors Critical Value	0.0928			Detected Data Not Normal at 1% Significance Level			
1300	**Detected Data Not Normal at 1% Significance Level**											

1301												
1302	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1303				KM Mean	0.893			KM Standard Error of Mean	0.0425			
1304				90KM SD	0.565			95% KM (BCA) UCL	0.964			
1305				95% KM (t) UCL	0.964			95% KM (Percentile Bootstrap) UCL	0.963			
1306				95% KM (z) UCL	0.963			95% KM Bootstrap t UCL	0.972			
1307				90% KM Chebyshev UCL	1.021			95% KM Chebyshev UCL	1.079			
1308				97.5% KM Chebyshev UCL	1.159			99% KM Chebyshev UCL	1.316			
1309	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1310												
1311	**Gamma GOF Tests on Detected Observations Only**											
1312				A-D Test Statistic	1.256			**Anderson-Darling GOF Test**				
1313				5% A-D Critical Value	0.755			Detected Data Not Gamma Distributed at 5% Significance Level				
1314				K-S Test Statistic	0.0842			**Kolmogorov-Smirnov GOF**				
1315				5% K-S Critical Value	0.0837			Detected Data Not Gamma Distributed at 5% Significance Level				
1316	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1317												
1318	**Gamma Statistics on Detected Data Only**											
1319				k hat (MLE)	4.533			k star (bias corrected MLE)	4.428			
1320				Theta hat (MLE)	0.24			Theta star (bias corrected MLE)	0.245			
1321				nu hat (MLE)	1115			nu star (bias corrected)	1089			
1322				Mean (detects)	1.087							
1323												
1324	**Gamma ROS Statistics using Imputed Non-Detects**											
1325	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1326	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1327	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1328	This is especially true when the sample size is small.											
1329	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1330				Minimum	0.01			Mean	0.867			
1331				Maximum	4.8			Median	0.802			
1332				SD	0.596			CV	0.687			
1333				k hat (MLE)	1.687			k star (bias corrected MLE)	1.667			
1334				Theta hat (MLE)	0.514			Theta star (bias corrected MLE)	0.52			
1335				nu hat (MLE)	749			nu star (bias corrected)	740.2			
1336				Adjusted Level of Significance (β)	0.0489							
1337				Approximate Chi Square Value (740.17, α)	678			Adjusted Chi Square Value (740.17, β)	677.7			
1338				95% Gamma Approximate UCL	0.947			95% Gamma Adjusted UCL	0.948			
1339												
1340	**Estimates of Gamma Parameters using KM Estimates**											
1341				Mean (KM)	0.893			SD (KM)	0.565			
1342				Variance (KM)	0.319			SE of Mean (KM)	0.0425			
1343				k hat (KM)	2.5			k star (KM)	2.469			
1344				nu hat (KM)	1110			nu star (KM)	1096			
1345				theta hat (KM)	0.357			theta star (KM)	0.362			
1346				80% gamma percentile (KM)	1.304			90% gamma percentile (KM)	1.655			
1347				95% gamma percentile (KM)	1.986			99% gamma percentile (KM)	2.71			
1348												
1349	**Gamma Kaplan-Meier (KM) Statistics**											
1350				Approximate Chi Square Value (N/A, α)	1020			Adjusted Chi Square Value (N/A, β)	1020			
1351				95% KM Approximate Gamma UCL	0.96			95% KM Adjusted Gamma UCL	0.96			
1352	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											

	A	B	C	D	E	F	G	H	I	J	K	L
1353												
1354	**Lognormal GOF Test on Detected Observations Only**											
1355	Shapiro Wilk Approximate Test Statistic					0.952	**Shapiro Wilk GOF Test**					
1356	10% Shapiro Wilk P Value					8.7141E-4	Detected Data Not Lognormal at 10% Significance Level					
1357	Lilliefors Test Statistic					0.0992	**Lilliefors GOF Test**					
1358	10% Lilliefors Critical Value					0.0734	Detected Data Not Lognormal at 10% Significance Level					
1359	**Detected Data Not Lognormal at 10% Significance Level**											
1360												
1361	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1362	Mean in Original Scale					0.898	Mean in Log Scale					-0.271
1363	SD in Original Scale					0.555	SD in Log Scale					0.579
1364	95% t UCL (assumes normality of ROS data)					0.959	95% Percentile Bootstrap UCL					0.959
1365	95% BCA Bootstrap UCL					0.966	95% Bootstrap t UCL					0.969
1366	95% H-UCL (Log ROS)					0.969						
1367												
1368	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1369	KM Mean (logged)					-0.298	KM Geo Mean					0.743
1370	KM SD (logged)					0.624	95% Critical H Value (KM-Log)					1.875
1371	KM Standard Error of Mean (logged)					0.0496	95% H-UCL (KM -Log)					0.976
1372	KM SD (logged)					0.624	95% Critical H Value (KM-Log)					1.875
1373	KM Standard Error of Mean (logged)					0.0496						
1374	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1375												
1376	**DL/2 Statistics**											
1377	**DL/2 Normal**						**DL/2 Log-Transformed**					
1378	Mean in Original Scale					1.017	Mean in Log Scale					-0.207
1379	SD in Original Scale					0.597	SD in Log Scale					0.761
1380	95% t UCL (Assumes normality)					1.083	95% H-Stat UCL					1.201
1381	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1382												
1383	**Nonparametric Distribution Free UCL Statistics**											
1384	**Data do not follow a Discernible Distribution**											
1385												
1386	**Suggested UCL to Use**											
1387	95% KM (t) UCL					0.964						
1388												
1389	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1390	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1391	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1392												
1393	**Ag**											
1394												
1395	**General Statistics**											
1396	Total Number of Observations					222	Number of Distinct Observations					67
1397							Number of Missing Observations					226
1398	Number of Detects					93	Number of Non-Detects					129
1399	Number of Distinct Detects					61	Number of Distinct Non-Detects					11
1400	Minimum Detect					0.05	Minimum Non-Detect					0.25
1401	Maximum Detect					5.6	Maximum Non-Detect					2.5
1402	Variance Detects					0.396	Percent Non-Detects					58.11%
1403	Mean Detects					0.653	SD Detects					0.629
1404	Median Detects					0.63	CV Detects					0.964

1405					Skewness Detects	5.499					Kurtosis Detects	41.74
1406					Mean of Logged Detects	-0.705					SD of Logged Detects	0.776
1407												
1408					**Normal GOF Test on Detects Only**							
1409					Shapiro Wilk Test Statistic	0.595	**Normal GOF Test on Detected Observations Only**					
1410					1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level					
1411					Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**					
1412					1% Lilliefors Critical Value	0.106	Detected Data Not Normal at 1% Significance Level					
1413					**Detected Data Not Normal at 1% Significance Level**							
1414												
1415					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1416					KM Mean	0.529	KM Standard Error of Mean	0.0378				
1417					90KM SD	0.476	95% KM (BCA) UCL	0.593				
1418					95% KM (t) UCL	0.591	95% KM (Percentile Bootstrap) UCL	0.59				
1419					95% KM (z) UCL	0.591	95% KM Bootstrap t UCL	0.604				
1420					90% KM Chebyshev UCL	0.642	95% KM Chebyshev UCL	0.693				
1421					97.5% KM Chebyshev UCL	0.765	99% KM Chebyshev UCL	0.905				
1422					**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**							
1423												
1424					**Gamma GOF Tests on Detected Observations Only**							
1425					A-D Test Statistic	1.707	**Anderson-Darling GOF Test**					
1426					5% A-D Critical Value	0.766	Detected Data Not Gamma Distributed at 5% Significance Level					
1427					K-S Test Statistic	0.113	**Kolmogorov-Smirnov GOF**					
1428					5% K-S Critical Value	0.0941	Detected Data Not Gamma Distributed at 5% Significance Level					
1429					**Detected Data Not Gamma Distributed at 5% Significance Level**							
1430												
1431					**Gamma Statistics on Detected Data Only**							
1432					k hat (MLE)	1.942	k star (bias corrected MLE)	1.887				
1433					Theta hat (MLE)	0.336	Theta star (bias corrected MLE)	0.346				
1434					nu hat (MLE)	361.2	nu star (bias corrected)	350.9				
1435					Mean (detects)	0.653						
1436												
1437					**Gamma ROS Statistics using Imputed Non-Detects**							
1438					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1439					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1440					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1441					This is especially true when the sample size is small.							
1442					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1443					Minimum	0.01	Mean	0.516				
1444					Maximum	5.6	Median	0.426				
1445					SD	0.501	CV	0.971				
1446					k hat (MLE)	1.259	k star (bias corrected MLE)	1.245				
1447					Theta hat (MLE)	0.41	Theta star (bias corrected MLE)	0.414				
1448					nu hat (MLE)	559	nu star (bias corrected)	552.8				
1449					Adjusted Level of Significance (β)	0.0489						
1450					Approximate Chi Square Value (552.77, α)	499.2	Adjusted Chi Square Value (552.77, β)	498.9				
1451					95% Gamma Approximate UCL	0.571	95% Gamma Adjusted UCL	0.571				
1452												
1453					**Estimates of Gamma Parameters using KM Estimates**							
1454					Mean (KM)	0.529	SD (KM)	0.476				
1455					Variance (KM)	0.227	SE of Mean (KM)	0.0378				
1456					k hat (KM)	1.233	k star (KM)	1.219				

1457					nu hat (KM)	547.4				nu star (KM)	541.3	
1458					theta hat (KM)	0.429				theta star (KM)	0.434	
1459					80% gamma percentile (KM)	0.836				90% gamma percentile (KM)	1.159	
1460					95% gamma percentile (KM)	1.478				99% gamma percentile (KM)	2.207	
1461												
1462	**Gamma Kaplan-Meier (KM) Statistics**											
1463					Approximate Chi Square Value (541.35, α)	488.4				Adjusted Chi Square Value (541.35, β)	488.1	
1464					95% KM Approximate Gamma UCL	0.586				95% KM Adjusted Gamma UCL	0.586	
1465	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1466												
1467	**Lognormal GOF Test on Detected Observations Only**											
1468					Shapiro Wilk Approximate Test Statistic	0.944				**Shapiro Wilk GOF Test**		
1469					10% Shapiro Wilk P Value	0.0012				Detected Data Not Lognormal at 10% Significance Level		
1470					Lilliefors Test Statistic	0.163				**Lilliefors GOF Test**		
1471					10% Lilliefors Critical Value	0.0843				Detected Data Not Lognormal at 10% Significance Level		
1472	**Detected Data Not Lognormal at 10% Significance Level**											
1473												
1474	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1475					Mean in Original Scale	0.521				Mean in Log Scale	-0.908	
1476					SD in Original Scale	0.477				SD in Log Scale	0.716	
1477					95% t UCL (assumes normality of ROS data)	0.574				95% Percentile Bootstrap UCL	0.579	
1478					95% BCA Bootstrap UCL	0.59				95% Bootstrap t UCL	0.59	
1479					95% H-UCL (Log ROS)	0.572						
1480												
1481	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1482					KM Mean (logged)	-0.923				KM Geo Mean	0.397	
1483					KM SD (logged)	0.786				95% Critical H Value (KM-Log)	1.983	
1484					KM Standard Error of Mean (logged)	0.077				95% H-UCL (KM -Log)	0.601	
1485					KM SD (logged)	0.786				95% Critical H Value (KM-Log)	1.983	
1486					KM Standard Error of Mean (logged)	0.077						
1487	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1488												
1489	**DL/2 Statistics**											
1490					**DL/2 Normal**					**DL/2 Log-Transformed**		
1491					Mean in Original Scale	0.724				Mean in Log Scale	-0.549	
1492					SD in Original Scale	0.518				SD in Log Scale	0.719	
1493					95% t UCL (Assumes normality)	0.781				95% H-Stat UCL	0.821	
1494	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1495												
1496	**Nonparametric Distribution Free UCL Statistics**											
1497	**Data do not follow a Discernible Distribution**											
1498												
1499	**Suggested UCL to Use**											
1500					95% KM (t) UCL	0.591						
1501												
1502	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1503	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1504	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1505												
1506	**TI**											
1507												
1508	**General Statistics**											

1509	Total Number of Observations				138	Number of Distinct Observations						51
1510						Number of Missing Observations						310
1511	Number of Detects				70	Number of Non-Detects						68
1512	Number of Distinct Detects				32	Number of Distinct Non-Detects						31
1513	Minimum Detect				0.26	Minimum Non-Detect						0.08
1514	Maximum Detect				1.9	Maximum Non-Detect						4
1515	Variance Detects				0.156	Percent Non-Detects						49.28%
1516	Mean Detects				1.13	SD Detects						0.395
1517	Median Detects				1.1	CV Detects						0.35
1518	Skewness Detects				-0.102	Kurtosis Detects						-0.719
1519	Mean of Logged Detects				0.0467	SD of Logged Detects						0.421
1520												
1521	**Normal GOF Test on Detects Only**											
1522	Shapiro Wilk Test Statistic				0.962	**Normal GOF Test on Detected Observations Only**						
1523	1% Shapiro Wilk P Value				0.0883	Detected Data appear Normal at 1% Significance Level						
1524	Lilliefors Test Statistic				0.111	**Lilliefors GOF Test**						
1525	1% Lilliefors Critical Value				0.122	Detected Data appear Normal at 1% Significance Level						
1526	**Detected Data appear Normal at 1% Significance Level**											
1527												
1528	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1529	KM Mean				0.855	KM Standard Error of Mean						0.0505
1530	90KM SD				0.486	95% KM (BCA) UCL						0.944
1531	95% KM (t) UCL				0.939	95% KM (Percentile Bootstrap) UCL						0.944
1532	95% KM (z) UCL				0.938	95% KM Bootstrap t UCL						0.94
1533	90% KM Chebyshev UCL				1.007	95% KM Chebyshev UCL						1.076
1534	97.5% KM Chebyshev UCL				1.171	99% KM Chebyshev UCL						1.358
1535	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1536												
1537	**Gamma GOF Tests on Detected Observations Only**											
1538	A-D Test Statistic				0.909	**Anderson-Darling GOF Test**						
1539	5% A-D Critical Value				0.753	Detected Data Not Gamma Distributed at 5% Significance Level						
1540	K-S Test Statistic				0.102	**Kolmogorov-Smirnov GOF**						
1541	5% K-S Critical Value				0.107	Detected data appear Gamma Distributed at 5% Significance Level						
1542	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
1543												
1544	**Gamma Statistics on Detected Data Only**											
1545	k hat (MLE)				6.815	k star (bias corrected MLE)						6.533
1546	Theta hat (MLE)				0.166	Theta star (bias corrected MLE)						0.173
1547	nu hat (MLE)				954.1	nu star (bias corrected)						914.6
1548	Mean (detects)				1.13							
1549												
1550	**Gamma ROS Statistics using Imputed Non-Detects**											
1551	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1552	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1553	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1554	This is especially true when the sample size is small.											
1555	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1556	Minimum				0.207	Mean						0.898
1557	Maximum				1.9	Median						0.82
1558	SD				0.421	CV						0.469
1559	k hat (MLE)				4.48	k star (bias corrected MLE)						4.388
1560	Theta hat (MLE)				0.201	Theta star (bias corrected MLE)						0.205

1561					nu hat (MLE)	1237				nu star (bias corrected)		1211
1562					Adjusted Level of Significance (β)	0.0483						
1563					Approximate Chi Square Value (N/A, α)	1131				Adjusted Chi Square Value (N/A, β)		1130
1564					95% Gamma Approximate UCL	0.962				95% Gamma Adjusted UCL		0.963
1565												
1566	**Estimates of Gamma Parameters using KM Estimates**											
1567					Mean (KM)	0.855				SD (KM)		0.486
1568					Variance (KM)	0.236				SE of Mean (KM)		0.0505
1569					k hat (KM)	3.101				k star (KM)		3.038
1570					nu hat (KM)	855.8				nu star (KM)		838.5
1571					theta hat (KM)	0.276				theta star (KM)		0.282
1572					80% gamma percentile (KM)	1.218				90% gamma percentile (KM)		1.513
1573					95% gamma percentile (KM)	1.789				99% gamma percentile (KM)		2.385
1574												
1575	**Gamma Kaplan-Meier (KM) Statistics**											
1576					Approximate Chi Square Value (838.51, α)	772.3				Adjusted Chi Square Value (838.51, β)		771.6
1577					95% KM Approximate Gamma UCL	0.929				95% KM Adjusted Gamma UCL		0.929
1578	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1579												
1580	**Lognormal GOF Test on Detected Observations Only**											
1581					Shapiro Wilk Approximate Test Statistic	0.905				**Shapiro Wilk GOF Test**		
1582					10% Shapiro Wilk P Value	1.2920E-5				Detected Data Not Lognormal at 10% Significance Level		
1583					Lilliefors Test Statistic	0.099				**Lilliefors GOF Test**		
1584					10% Lilliefors Critical Value	0.0969				Detected Data Not Lognormal at 10% Significance Level		
1585	**Detected Data Not Lognormal at 10% Significance Level**											
1586												
1587	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1588					Mean in Original Scale	0.892				Mean in Log Scale		-0.229
1589					SD in Original Scale	0.426				SD in Log Scale		0.486
1590					95% t UCL (assumes normality of ROS data)	0.952				95% Percentile Bootstrap UCL		0.953
1591					95% BCA Bootstrap UCL	0.952				95% Bootstrap t UCL		0.957
1592					95% H-UCL (Log ROS)	0.965						
1593												
1594	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1595					KM Mean (logged)	-0.392				KM Geo Mean		0.676
1596					KM SD (logged)	0.79				95% Critical H Value (KM-Log)		2.02
1597					KM Standard Error of Mean (logged)	0.112				95% H-UCL (KM -Log)		1.058
1598					KM SD (logged)	0.79				95% Critical H Value (KM-Log)		2.02
1599					KM Standard Error of Mean (logged)	0.112						
1600												
1601	**DL/2 Statistics**											
1602	**DL/2 Normal**									**DL/2 Log-Transformed**		
1603					Mean in Original Scale	1.033				Mean in Log Scale		-0.187
1604					SD in Original Scale	0.612				SD in Log Scale		0.722
1605					95% t UCL (Assumes normality)	1.119				95% H-Stat UCL		1.216
1606	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1607												
1608	**Nonparametric Distribution Free UCL Statistics**											
1609	**Detected Data appear Normal Distributed at 1% Significance Level**											
1610												
1611	**Suggested UCL to Use**											
1612					95% KM (t) UCL	0.939						

	A	B	C	D	E	F	G	H	I	J	K	L
1613												
1614	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1615	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1616	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1617												
1618	V											
1619												
1620	**General Statistics**											
1621					Total Number of Observations	222			Number of Distinct Observations	175		
1622									Number of Missing Observations	226		
1623					Number of Detects	221			Number of Non-Detects	1		
1624					Number of Distinct Detects	174			Number of Distinct Non-Detects	1		
1625					Minimum Detect	1.7			Minimum Non-Detect	6		
1626					Maximum Detect	148			Maximum Non-Detect	6		
1627					Variance Detects	788.6			Percent Non-Detects	0.45%		
1628					Mean Detects	33.78			SD Detects	28.08		
1629					Median Detects	26.5			CV Detects	0.831		
1630					Skewness Detects	1.967			Kurtosis Detects	3.919		
1631					Mean of Logged Detects	3.211			SD of Logged Detects	0.841		
1632												
1633	**Normal GOF Test on Detects Only**											
1634					Shapiro Wilk Test Statistic	0.776			**Normal GOF Test on Detected Observations Only**			
1635					1% Shapiro Wilk P Value	0			Detected Data Not Normal at 1% Significance Level			
1636					Lilliefors Test Statistic	0.218			**Lilliefors GOF Test**			
1637					1% Lilliefors Critical Value	0.0694			Detected Data Not Normal at 1% Significance Level			
1638	**Detected Data Not Normal at 1% Significance Level**											
1639												
1640	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1641					KM Mean	33.64			KM Standard Error of Mean	1.885		
1642					90KM SD	28.03			95% KM (BCA) UCL	36.71		
1643					95% KM (t) UCL	36.76			95% KM (Percentile Bootstrap) UCL	36.76		
1644					95% KM (z) UCL	36.74			95% KM Bootstrap t UCL	36.99		
1645					90% KM Chebyshev UCL	39.3			95% KM Chebyshev UCL	41.86		
1646					97.5% KM Chebyshev UCL	45.42			99% KM Chebyshev UCL	52.4		
1647												
1648	**Gamma GOF Tests on Detected Observations Only**											
1649					A-D Test Statistic	3.565			**Anderson-Darling GOF Test**			
1650					5% A-D Critical Value	0.769			Detected Data Not Gamma Distributed at 5% Significance Level			
1651					K-S Test Statistic	0.117			**Kolmogorov-Smirnov GOF**			
1652					5% K-S Critical Value	0.0622			Detected Data Not Gamma Distributed at 5% Significance Level			
1653	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1654												
1655	**Gamma Statistics on Detected Data Only**											
1656					k hat (MLE)	1.766			k star (bias corrected MLE)	1.745		
1657					Theta hat (MLE)	19.13			Theta star (bias corrected MLE)	19.36		
1658					nu hat (MLE)	780.5			nu star (bias corrected)	771.3		
1659					Mean (detects)	33.78						
1660												
1661	**Gamma ROS Statistics using Imputed Non-Detects**											
1662	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1663	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1664	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

1665	This is especially true when the sample size is small.											
1666	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1667					Minimum	1.199			Mean	33.63		
1668					Maximum	148			Median	26.25		
1669					SD	28.1			CV	0.836		
1670					k hat (MLE)	1.718			k star (bias corrected MLE)	1.698		
1671					Theta hat (MLE)	19.57			Theta star (bias corrected MLE)	19.81		
1672					nu hat (MLE)	762.9			nu star (bias corrected)	753.9		
1673					Adjusted Level of Significance (β)	0.0489						
1674					Approximate Chi Square Value (753.90, α)	691.2			Adjusted Chi Square Value (753.90, β)	690.8		
1675					95% Gamma Approximate UCL	36.68			95% Gamma Adjusted UCL	36.7		
1676												
1677	**Estimates of Gamma Parameters using KM Estimates**											
1678					Mean (KM)	33.64			SD (KM)	28.03		
1679					Variance (KM)	785.5			SE of Mean (KM)	1.885		
1680					k hat (KM)	1.441			k star (KM)	1.424		
1681					nu hat (KM)	639.7			nu star (KM)	632.4		
1682					theta hat (KM)	23.35			theta star (KM)	23.62		
1683					80% gamma percentile (KM)	52.34			90% gamma percentile (KM)	70.99		
1684					95% gamma percentile (KM)	89.17			99% gamma percentile (KM)	130.4		
1685												
1686	**Gamma Kaplan-Meier (KM) Statistics**											
1687					Approximate Chi Square Value (632.38, α)	575			Adjusted Chi Square Value (632.38, β)	574.7		
1688					95% KM Approximate Gamma UCL	37			95% KM Adjusted Gamma UCL	37.02		
1689												
1690	**Lognormal GOF Test on Detected Observations Only**											
1691					Shapiro Wilk Approximate Test Statistic	0.939			**Shapiro Wilk GOF Test**			
1692					10% Shapiro Wilk P Value	5.525E-11			Detected Data Not Lognormal at 10% Significance Level			
1693					Lilliefors Test Statistic	0.128			**Lilliefors GOF Test**			
1694					10% Lilliefors Critical Value	0.0549			Detected Data Not Lognormal at 10% Significance Level			
1695	**Detected Data Not Lognormal at 10% Significance Level**											
1696												
1697	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1698					Mean in Original Scale	33.65			Mean in Log Scale	3.204		
1699					SD in Original Scale	28.08			SD in Log Scale	0.845		
1700					95% t UCL (assumes normality of ROS data)	36.76			95% Percentile Bootstrap UCL	37.01		
1701					95% BCA Bootstrap UCL	36.99			95% Bootstrap t UCL	37.1		
1702					95% H-UCL (Log ROS)	39.48						
1703												
1704	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1705					KM Mean (logged)	3.202			KM Geo Mean	24.58		
1706					KM SD (logged)	0.847			95% Critical H Value (KM-Log)	2.028		
1707					KM Standard Error of Mean (logged)	0.057			95% H-UCL (KM -Log)	39.51		
1708					KM SD (logged)	0.847			95% Critical H Value (KM-Log)	2.028		
1709					KM Standard Error of Mean (logged)	0.057						
1710												
1711	**DL/2 Statistics**											
1712	**DL/2 Normal**								**DL/2 Log-Transformed**			
1713					Mean in Original Scale	33.64			Mean in Log Scale	3.201		
1714					SD in Original Scale	28.09			SD in Log Scale	0.851		
1715					95% t UCL (Assumes normality)	36.75			95% H-Stat UCL	39.62		
1716	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											

1717												
1718	**Nonparametric Distribution Free UCL Statistics**											
1719	**Data do not follow a Discernible Distribution**											
1720												
1721	**Suggested UCL to Use**											
1722				95% KM (t) UCL	36.76							
1723												
1724	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1725	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1726	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1727												
1728												
1729	**Zn**											
1730												
1731	**General Statistics**											
1732				Total Number of Observations	222			Number of Distinct Observations	180			
1733								Number of Missing Observations	226			
1734				Minimum	14			Mean	66.83			
1735				Maximum	307			Median	61.85			
1736				SD	28.12			Std. Error of Mean	1.888			
1737				Coefficient of Variation	0.421			Skewness	3.508			
1738												
1739	**Normal GOF Test**											
1740				Shapiro Wilk Test Statistic	0.792			**Shapiro Wilk GOF Test**				
1741				1% Shapiro Wilk P Value	0			Data Not Normal at 1% Significance Level				
1742				Lilliefors Test Statistic	0.152			**Lilliefors GOF Test**				
1743				1% Lilliefors Critical Value	0.0693			Data Not Normal at 1% Significance Level				
1744	**Data Not Normal at 1% Significance Level**											
1745												
1746	**Assuming Normal Distribution**											
1747				**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**				
1748				95% Student's-t UCL	69.95			95% Adjusted-CLT UCL (Chen-1995)	70.41			
1749								95% Modified-t UCL (Johnson-1978)	70.02			
1750												
1751	**Gamma GOF Test**											
1752				A-D Test Statistic	4.244			**Anderson-Darling Gamma GOF Test**				
1753				5% A-D Critical Value	0.754			Data Not Gamma Distributed at 5% Significance Level				
1754				K-S Test Statistic	0.105			**Kolmogorov-Smirnov Gamma GOF Test**				
1755				5% K-S Critical Value	0.0612			Data Not Gamma Distributed at 5% Significance Level				
1756	**Data Not Gamma Distributed at 5% Significance Level**											
1757												
1758	**Gamma Statistics**											
1759				k hat (MLE)	7.272			k star (bias corrected MLE)	7.177			
1760				Theta hat (MLE)	9.191			Theta star (bias corrected MLE)	9.313			
1761				nu hat (MLE)	3229			nu star (bias corrected)	3186			
1762				MLE Mean (bias corrected)	66.83			MLE Sd (bias corrected)	24.95			
1763								Approximate Chi Square Value (0.05)	3056			
1764				Adjusted Level of Significance	0.0489			Adjusted Chi Square Value	3055			
1765												
1766	**Assuming Gamma Distribution**											
1767				95% Approximate Gamma UCL	69.68			95% Adjusted Gamma UCL	69.7			
1768												

1769	**Lognormal GOF Test**											
1770				Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk Lognormal GOF Test**						
1771				10% Shapiro Wilk P Value	6.020E-12	Data Not Lognormal at 10% Significance Level						
1772				Lilliefors Test Statistic	0.121	**Lilliefors Lognormal GOF Test**						
1773				10% Lilliefors Critical Value	0.0548	Data Not Lognormal at 10% Significance Level						
1774	**Data Not Lognormal at 10% Significance Level**											
1775												
1776	**Lognormal Statistics**											
1777				Minimum of Logged Data	2.639	Mean of logged Data	4.132					
1778				Maximum of Logged Data	5.727	SD of logged Data	0.379					
1779												
1780	**Assuming Lognormal Distribution**											
1781				95% H-UCL	69.99	90% Chebyshev (MVUE) UCL	72.19					
1782				95% Chebyshev (MVUE) UCL	74.59	97.5% Chebyshev (MVUE) UCL	77.91					
1783				99% Chebyshev (MVUE) UCL	84.43							
1784												
1785	**Nonparametric Distribution Free UCL Statistics**											
1786	**Data do not follow a Discernible Distribution**											
1787												
1788	**Nonparametric Distribution Free UCLs**											
1789				95% CLT UCL	69.94	95% BCA Bootstrap UCL	70.51					
1790				95% Standard Bootstrap UCL	69.89	95% Bootstrap-t UCL	70.26					
1791				95% Hall's Bootstrap UCL	70.71	95% Percentile Bootstrap UCL	70.08					
1792				90% Chebyshev(Mean, Sd) UCL	72.5	95% Chebyshev(Mean, Sd) UCL	75.06					
1793				97.5% Chebyshev(Mean, Sd) UCL	78.62	99% Chebyshev(Mean, Sd) UCL	85.61					
1794												
1795	**Suggested UCL to Use**											
1796				95% Student's-t UCL	69.95							
1797												
1798	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1799	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1800	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1801												
1802	**CrVI**											
1803												
1804	**General Statistics**											
1805				Total Number of Observations	9	Number of Distinct Observations	1					
1806						Number of Missing Observations	128					
1807				Number of Detects	0	Number of Non-Detects	9					
1808				Number of Distinct Detects	0	Number of Distinct Non-Detects	1					
1809												
1810	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1811	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1812	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1813												
1814	**The data set for variable CrVI was not processed!**											
1815												
1816												
1817	**CN**											
1818												
1819	**General Statistics**											
1820				Total Number of Observations	167	Number of Distinct Observations	21					

1821										Number of Missing Observations		82
1822					Number of Detects	6				Number of Non-Detects		161
1823					Number of Distinct Detects	6				Number of Distinct Non-Detects		15
1824					Minimum Detect	0.75				Minimum Non-Detect		0.5
1825					Maximum Detect	21.9				Maximum Non-Detect		5
1826					Variance Detects	79.28				Percent Non-Detects		96.41%
1827					Mean Detects	6.438				SD Detects		8.904
1828					Median Detects	1.2				CV Detects		1.383
1829					Skewness Detects	1.402				Kurtosis Detects		0.676
1830					Mean of Logged Detects	0.928				SD of Logged Detects		1.483
1831												
1832					**Normal GOF Test on Detects Only**							
1833					Shapiro Wilk Test Statistic	0.724				**Shapiro Wilk GOF Test**		
1834					1% Shapiro Wilk Critical Value	0.713				Detected Data appear Normal at 1% Significance Level		
1835					Lilliefors Test Statistic	0.385				**Lilliefors GOF Test**		
1836					1% Lilliefors Critical Value	0.373				Detected Data Not Normal at 1% Significance Level		
1837					**Detected Data appear Approximate Normal at 1% Significance Level**							
1838					**Note GOF tests may be unreliable for small sample sizes**							
1839												
1840					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1841					KM Mean	0.801				KM Standard Error of Mean		0.169
1842					90KM SD	1.898				95% KM (BCA) UCL		1.09
1843					95% KM (t) UCL	1.081				95% KM (Percentile Bootstrap) UCL		1.086
1844					95% KM (z) UCL	1.079				95% KM Bootstrap t UCL		1.363
1845					90% KM Chebyshev UCL	1.308				95% KM Chebyshev UCL		1.537
1846					97.5% KM Chebyshev UCL	1.855				99% KM Chebyshev UCL		2.48
1847					**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**							
1848												
1849					**Gamma GOF Tests on Detected Observations Only**							
1850					A-D Test Statistic	0.822				**Anderson-Darling GOF Test**		
1851					5% A-D Critical Value	0.727				Detected Data Not Gamma Distributed at 5% Significance Level		
1852					K-S Test Statistic	0.386				**Kolmogorov-Smirnov GOF**		
1853					5% K-S Critical Value	0.345				Detected Data Not Gamma Distributed at 5% Significance Level		
1854					**Detected Data Not Gamma Distributed at 5% Significance Level**							
1855												
1856					**Gamma Statistics on Detected Data Only**							
1857					k hat (MLE)	0.653				k star (bias corrected MLE)		0.438
1858					Theta hat (MLE)	9.853				Theta star (bias corrected MLE)		14.7
1859					nu hat (MLE)	7.841				nu star (bias corrected)		5.254
1860					Mean (detects)	6.438						
1861												
1862					**Gamma ROS Statistics using Imputed Non-Detects**							
1863					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1864					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1865					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1866					This is especially true when the sample size is small.							
1867					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1868					Minimum	0.01				Mean		0.473
1869					Maximum	21.9				Median		0.01
1870					SD	2.175				CV		4.602
1871					k hat (MLE)	0.223				k star (bias corrected MLE)		0.223
1872					Theta hat (MLE)	2.121				Theta star (bias corrected MLE)		2.121

1873					nu hat (MLE)	74.43				nu star (bias corrected)		74.43
1874					Adjusted Level of Significance (β)	0.0486						
1875					Approximate Chi Square Value (74.43, α)	55.56				Adjusted Chi Square Value (74.43, β)		55.42
1876					95% Gamma Approximate UCL	0.633				95% Gamma Adjusted UCL		0.635
1877												
1878	**Estimates of Gamma Parameters using KM Estimates**											
1879					Mean (KM)	0.801				SD (KM)		1.898
1880					Variance (KM)	3.602				SE of Mean (KM)		0.169
1881					k hat (KM)	0.178				k star (KM)		0.179
1882					nu hat (KM)	59.56				nu star (KM)		59.82
1883					theta hat (KM)	4.495				theta star (KM)		4.475
1884					80% gamma percentile (KM)	0.991				90% gamma percentile (KM)		2.417
1885					95% gamma percentile (KM)	4.245				99% gamma percentile (KM)		9.374
1886												
1887	**Gamma Kaplan-Meier (KM) Statistics**											
1888					Approximate Chi Square Value (59.82, α)	43.04				Adjusted Chi Square Value (59.82, β)		42.92
1889					95% KM Approximate Gamma UCL	1.114				95% KM Adjusted Gamma UCL		1.117
1890	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1891												
1892	**Lognormal GOF Test on Detected Observations Only**											
1893					Shapiro Wilk Test Statistic	0.783				**Shapiro Wilk GOF Test**		
1894					10% Shapiro Wilk Critical Value	0.826				Detected Data Not Lognormal at 10% Significance Level		
1895					Lilliefors Test Statistic	0.34				**Lilliefors GOF Test**		
1896					10% Lilliefors Critical Value	0.298				Detected Data Not Lognormal at 10% Significance Level		
1897	**Detected Data Not Lognormal at 10% Significance Level**											
1898												
1899	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1900					Mean in Original Scale	0.478				Mean in Log Scale		-2.559
1901					SD in Original Scale	1.995				SD in Log Scale		1.848
1902					95% t UCL (assumes normality of ROS data)	0.734				95% Percentile Bootstrap UCL		0.759
1903					95% BCA Bootstrap UCL	0.893				95% Bootstrap t UCL		1.329
1904					95% H-UCL (Log ROS)	0.658						
1905												
1906	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1907					KM Mean (logged)	-0.517				KM Geo Mean		0.596
1908					KM SD (logged)	0.466				95% Critical H Value (KM-Log)		1.793
1909					KM Standard Error of Mean (logged)	0.0762				95% H-UCL (KM -Log)		0.709
1910					KM SD (logged)	0.466				95% Critical H Value (KM-Log)		1.793
1911					KM Standard Error of Mean (logged)	0.0762						
1912	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1913												
1914	**DL/2 Statistics**											
1915	**DL/2 Normal**									**DL/2 Log-Transformed**		
1916					Mean in Original Scale	1.691				Mean in Log Scale		0.304
1917					SD in Original Scale	1.901				SD in Log Scale		0.663
1918					95% t UCL (Assumes normality)	1.934				95% H-Stat UCL		1.862
1919	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1920												
1921	**Nonparametric Distribution Free UCL Statistics**											
1922	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
1923												
1924	**Suggested UCL to Use**											

1925					95% KM (t) UCL	1.081						
1926												
1927	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1928	**Please verify the data were collected from random locations.**											
1929	**If the data were collected using judgmental or other non-random methods,**											
1930	**then contact a statistician to correctly calculate UCLs.**											
1931												
1932	When a data set follows an approximate distribution passing only one of the GOF tests,											
1933	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
1934												
1935	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1936	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1937	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1938												
1939	**RCN**											
1940												
1941	**General Statistics**											
1942	Total Number of Observations					57	Number of Distinct Observations					1
1943							Number of Missing Observations					71
1944	Number of Detects					0	Number of Non-Detects					57
1945	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
1946												
1947	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1948	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1949	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1950												
1951	**The data set for variable RCN was not processed!**											
1952												
1953												
1954	**S2-**											
1955												
1956	**General Statistics**											
1957	Total Number of Observations					7	Number of Distinct Observations					1
1958							Number of Missing Observations					102
1959	Number of Detects					0	Number of Non-Detects					7
1960	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
1961												
1962	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1963	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1964	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1965												
1966	**The data set for variable S2- was not processed!**											
1967												
1968												
1969	**RS2-**											
1970												
1971	**General Statistics**											
1972	Total Number of Observations					40	Number of Distinct Observations					2
1973							Number of Missing Observations					88
1974	Number of Detects					0	Number of Non-Detects					40
1975	Number of Distinct Detects					0	Number of Distinct Non-Detects					2
1976												

1977	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1978	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1979	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1980												
1981	**The data set for variable RS2- was not processed!**											
1982												
1983												
1984												
1985	**S**											
1986												
1987	**General Statistics**											
1988					Total Number of Observations	22			Number of Distinct Observations	21		
1989									Number of Missing Observations	426		
1990					Minimum	7.8			Mean	472.6		
1991					Maximum	4600			Median	77		
1992					SD	991.8			Std. Error of Mean	211.5		
1993					Coefficient of Variation	2.099			Skewness	3.755		
1994												
1995	**Normal GOF Test**											
1996					Shapiro Wilk Test Statistic	0.487			**Shapiro Wilk GOF Test**			
1997					1% Shapiro Wilk Critical Value	0.878			Data Not Normal at 1% Significance Level			
1998					Lilliefors Test Statistic	0.32			**Lilliefors GOF Test**			
1999					1% Lilliefors Critical Value	0.214			Data Not Normal at 1% Significance Level			
2000	**Data Not Normal at 1% Significance Level**											
2001												
2002	**Assuming Normal Distribution**											
2003					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
2004					95% Student's-t UCL	836.5			95% Adjusted-CLT UCL (Chen-1995)	1001		
2005									95% Modified-t UCL (Johnson-1978)	864.7		
2006												
2007	**Gamma GOF Test**											
2008					A-D Test Statistic	1.276			**Anderson-Darling Gamma GOF Test**			
2009					5% A-D Critical Value	0.807			Data Not Gamma Distributed at 5% Significance Level			
2010					K-S Test Statistic	0.224			**Kolmogorov-Smirnov Gamma GOF Test**			
2011					5% K-S Critical Value	0.196			Data Not Gamma Distributed at 5% Significance Level			
2012	**Data Not Gamma Distributed at 5% Significance Level**											
2013												
2014	**Gamma Statistics**											
2015					k hat (MLE)	0.489			k star (bias corrected MLE)	0.453		
2016					Theta hat (MLE)	966.3			Theta star (bias corrected MLE)	1044		
2017					nu hat (MLE)	21.52			nu star (bias corrected)	19.92		
2018					MLE Mean (bias corrected)	472.6			MLE Sd (bias corrected)	702.5		
2019									Approximate Chi Square Value (0.05)	10.79		
2020					Adjusted Level of Significance	0.0386			Adjusted Chi Square Value	10.29		
2021												
2022	**Assuming Gamma Distribution**											
2023					95% Approximate Gamma UCL	872.4			95% Adjusted Gamma UCL	914.8		
2024												
2025	**Lognormal GOF Test**											
2026					Shapiro Wilk Test Statistic	0.951			**Shapiro Wilk Lognormal GOF Test**			
2027					10% Shapiro Wilk Critical Value	0.926			Data appear Lognormal at 10% Significance Level			
2028					Lilliefors Test Statistic	0.166			**Lilliefors Lognormal GOF Test**			

2029	10% Lilliefors Critical Value					0.169	Data appear Lognormal at 10% Significance Level					
2030	**Data appear Lognormal at 10% Significance Level**											
2031												
2032	**Lognormal Statistics**											
2033	Minimum of Logged Data					2.054	Mean of logged Data					4.855
2034	Maximum of Logged Data					8.434	SD of logged Data					1.627
2035												
2036	**Assuming Lognormal Distribution**											
2037	95% H-UCL					1703	90% Chebyshev (MVUE) UCL					973.9
2038	95% Chebyshev (MVUE) UCL					1222	97.5% Chebyshev (MVUE) UCL					1565
2039	99% Chebyshev (MVUE) UCL					2240						
2040												
2041	**Nonparametric Distribution Free UCL Statistics**											
2042	**Data appear to follow a Discernible Distribution**											
2043												
2044	**Nonparametric Distribution Free UCLs**											
2045	95% CLT UCL					820.4	95% BCA Bootstrap UCL					1035
2046	95% Standard Bootstrap UCL					823.1	95% Bootstrap-t UCL					1419
2047	95% Hall's Bootstrap UCL					2006	95% Percentile Bootstrap UCL					860.7
2048	90% Chebyshev(Mean, Sd) UCL					1107	95% Chebyshev(Mean, Sd) UCL					1394
2049	97.5% Chebyshev(Mean, Sd) UCL					1793	99% Chebyshev(Mean, Sd) UCL					2577
2050												
2051	**Suggested UCL to Use**											
2052	95% Student's-t UCL					836.5						
2053												
2054	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
2055	**Please verify the data were collected from random locations.**											
2056	**If the data were collected using judgmental or other non-random methods,**											
2057	**then contact a statistician to correctly calculate UCLs.**											
2058												
2059	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2060	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2061	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2062												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/15/2023 4:03:38 PM
From File	04 Lakebed Area.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sb

General Statistics

Total Number of Observations	35	Number of Distinct Observations	13
		Number of Missing Observations	29
Number of Detects	0	Number of Non-Detects	35
Number of Distinct Detects	0	Number of Distinct Non-Detects	13

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Sb was not processed!

As

General Statistics

Total Number of Observations	65	Number of Distinct Observations	55
		Number of Missing Observations	0
Minimum	4	Mean	107.5
Maximum	320	Median	88
SD	83.04	Std. Error of Mean	10.3
Coefficient of Variation	0.772	Skewness	0.827

Normal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	3.9037E-5	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.11	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.127	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	124.7	95% Adjusted-CLT UCL (Chen-1995)	125.6
		95% Modified-t UCL (Johnson-1978)	124.9

Gamma GOF Test

A-D Test Statistic	0.379	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0648	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Detected data appear Gamma Distributed at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
53	**Detected data appear Gamma Distributed at 5% Significance Level**											
54												
55	**Gamma Statistics**											
56					k hat (MLE)	1.367			k star (bias corrected MLE)	1.314		
57					Theta hat (MLE)	78.64			Theta star (bias corrected MLE)	81.8		
58					nu hat (MLE)	177.7			nu star (bias corrected)	170.9		
59					MLE Mean (bias corrected)	107.5			MLE Sd (bias corrected)	93.78		
60									Approximate Chi Square Value (0.05)	141.6		
61					Adjusted Level of Significance	0.0463			Adjusted Chi Square Value	141		
62												
63	**Assuming Gamma Distribution**											
64					95% Approximate Gamma UCL	129.7			95% Adjusted Gamma UCL	130.3		
65												
66	**Lognormal GOF Test**											
67					Shapiro Wilk Test Statistic	0.923			**Shapiro Wilk Lognormal GOF Test**			
68					10% Shapiro Wilk P Value	4.4586E-4			Data Not Lognormal at 10% Significance Level			
69					Lilliefors Test Statistic	0.123			**Lilliefors Lognormal GOF Test**			
70					10% Lilliefors Critical Value	0.1			Data Not Lognormal at 10% Significance Level			
71	**Data Not Lognormal at 10% Significance Level**											
72												
73	**Lognormal Statistics**											
74					Minimum of Logged Data	1.386			Mean of logged Data	4.269		
75					Maximum of Logged Data	5.768			SD of logged Data	1.055		
76												
77	**Assuming Lognormal Distribution**											
78					95% H-UCL	168			90% Chebyshev (MVUE) UCL	181.2		
79					95% Chebyshev (MVUE) UCL	207.5			97.5% Chebyshev (MVUE) UCL	244.1		
80					99% Chebyshev (MVUE) UCL	315.9						
81												
82	**Nonparametric Distribution Free UCL Statistics**											
83	**Data appear to follow a Discernible Distribution**											
84												
85	**Nonparametric Distribution Free UCLs**											
86					95% CLT UCL	124.5			95% BCA Bootstrap UCL	123.7		
87					95% Standard Bootstrap UCL	123.8			95% Bootstrap-t UCL	125.9		
88					95% Hall's Bootstrap UCL	125.5			95% Percentile Bootstrap UCL	123.8		
89					90% Chebyshev(Mean, Sd) UCL	138.4			95% Chebyshev(Mean, Sd) UCL	152.4		
90					97.5% Chebyshev(Mean, Sd) UCL	171.8			99% Chebyshev(Mean, Sd) UCL	210		
91												
92	**Suggested UCL to Use**											
93					95% Student's-t UCL	124.7						
94												
95	When a data set follows an approximate distribution passing only one of the GOF tests,											
96	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
97												
98	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
99	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
100	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
101												
102												
103	**Ba**											
104												

105	**General Statistics**											
106					Total Number of Observations	35			Number of Distinct Observations			30
107									Number of Missing Observations			29
108					Minimum	23.9			Mean			92.32
109					Maximum	178			Median			96.6
110					SD	46.42			Std. Error of Mean			7.846
111					Coefficient of Variation	0.503			Skewness			0.132
112												
113	**Normal GOF Test**											
114					Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk GOF Test**					
115					1% Shapiro Wilk Critical Value	0.91	Data appear Normal at 1% Significance Level					
116					Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**					
117					1% Lilliefors Critical Value	0.172	Data appear Normal at 1% Significance Level					
118	**Data appear Normal at 1% Significance Level**											
119												
120	**Assuming Normal Distribution**											
121	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
122					95% Student's-t UCL	105.6			95% Adjusted-CLT UCL (Chen-1995)			105.4
123									95% Modified-t UCL (Johnson-1978)			105.6
124												
125	**Gamma GOF Test**											
126					A-D Test Statistic	1.099	**Anderson-Darling Gamma GOF Test**					
127					5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level					
128					K-S Test Statistic	0.156	**Kolmogorov-Smirnov Gamma GOF Test**					
129					5% K-S Critical Value	0.15	Data Not Gamma Distributed at 5% Significance Level					
130	**Data Not Gamma Distributed at 5% Significance Level**											
131												
132	**Gamma Statistics**											
133					k hat (MLE)	3.426			k star (bias corrected MLE)			3.151
134					Theta hat (MLE)	26.95			Theta star (bias corrected MLE)			29.3
135					nu hat (MLE)	239.8			nu star (bias corrected)			220.6
136					MLE Mean (bias corrected)	92.32			MLE Sd (bias corrected)			52.01
137									Approximate Chi Square Value (0.05)			187.2
138					Adjusted Level of Significance	0.0425			Adjusted Chi Square Value			185.8
139												
140	**Assuming Gamma Distribution**											
141					95% Approximate Gamma UCL	108.8			95% Adjusted Gamma UCL			109.6
142												
143	**Lognormal GOF Test**											
144					Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk Lognormal GOF Test**					
145					10% Shapiro Wilk Critical Value	0.944	Data Not Lognormal at 10% Significance Level					
146					Lilliefors Test Statistic	0.184	**Lilliefors Lognormal GOF Test**					
147					10% Lilliefors Critical Value	0.136	Data Not Lognormal at 10% Significance Level					
148	**Data Not Lognormal at 10% Significance Level**											
149												
150	**Lognormal Statistics**											
151					Minimum of Logged Data	3.174			Mean of logged Data			4.372
152					Maximum of Logged Data	5.182			SD of logged Data			0.598
153												
154	**Assuming Lognormal Distribution**											
155					95% H-UCL	116.6			90% Chebyshev (MVUE) UCL			124.5
156					95% Chebyshev (MVUE) UCL	138.3			97.5% Chebyshev (MVUE) UCL			157.4

157				99% Chebyshev (MVUE) UCL	194.9							
158												
159					**Nonparametric Distribution Free UCL Statistics**							
160					**Data appear to follow a Discernible Distribution**							
161												
162					**Nonparametric Distribution Free UCLs**							
163				95% CLT UCL	105.2			95% BCA Bootstrap UCL	105.3			
164				95% Standard Bootstrap UCL	105			95% Bootstrap-t UCL	105.3			
165				95% Hall's Bootstrap UCL	105			95% Percentile Bootstrap UCL	105.3			
166				90% Chebyshev(Mean, Sd) UCL	115.9			95% Chebyshev(Mean, Sd) UCL	126.5			
167				97.5% Chebyshev(Mean, Sd) UCL	141.3			99% Chebyshev(Mean, Sd) UCL	170.4			
168												
169					**Suggested UCL to Use**							
170				95% Student's-t UCL	105.6							
171												
172					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
173					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
174					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
175												
176	**Be**											
177												
178					**General Statistics**							
179				Total Number of Observations	35			Number of Distinct Observations	22			
180								Number of Missing Observations	29			
181				Number of Detects	18			Number of Non-Detects	17			
182				Number of Distinct Detects	15			Number of Distinct Non-Detects	9			
183				Minimum Detect	0.011			Minimum Non-Detect	0.2			
184				Maximum Detect	1.3			Maximum Non-Detect	1			
185				Variance Detects	0.153			Percent Non-Detects	48.57%			
186				Mean Detects	0.415			SD Detects	0.391			
187				Median Detects	0.295			CV Detects	0.942			
188				Skewness Detects	1.431			Kurtosis Detects	1.028			
189				Mean of Logged Detects	-1.376			SD of Logged Detects	1.198			
190												
191					**Normal GOF Test on Detects Only**							
192				Shapiro Wilk Test Statistic	0.783			**Shapiro Wilk GOF Test**				
193				1% Shapiro Wilk Critical Value	0.858			Detected Data Not Normal at 1% Significance Level				
194				Lilliefors Test Statistic	0.293			**Lilliefors GOF Test**				
195				1% Lilliefors Critical Value	0.235			Detected Data Not Normal at 1% Significance Level				
196					**Detected Data Not Normal at 1% Significance Level**							
197												
198					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
199				KM Mean	0.276			KM Standard Error of Mean	0.0581			
200				90KM SD	0.319			95% KM (BCA) UCL	0.377			
201				95% KM (t) UCL	0.374			95% KM (Percentile Bootstrap) UCL	0.374			
202				95% KM (z) UCL	0.371			95% KM Bootstrap t UCL	0.401			
203				90% KM Chebyshev UCL	0.45			95% KM Chebyshev UCL	0.529			
204				97.5% KM Chebyshev UCL	0.638			99% KM Chebyshev UCL	0.854			
205												
206					**Gamma GOF Tests on Detected Observations Only**							
207				A-D Test Statistic	0.672			**Anderson-Darling GOF Test**				
208				5% A-D Critical Value	0.764			Detected data appear Gamma Distributed at 5% Significance Level				

209					K-S Test Statistic	0.194	**Kolmogorov-Smirnov GOF**					
210					5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level					
211	**Detected data appear Gamma Distributed at 5% Significance Level**											
212												
213	**Gamma Statistics on Detected Data Only**											
214					k hat (MLE)	1.144	k star (bias corrected MLE)	0.99				
215					Theta hat (MLE)	0.363	Theta star (bias corrected MLE)	0.419				
216					nu hat (MLE)	41.18	nu star (bias corrected)	35.65				
217					Mean (detects)	0.415						
218												
219	**Gamma ROS Statistics using Imputed Non-Detects**											
220	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
221	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
222	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
223	This is especially true when the sample size is small.											
224	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
225					Minimum	0.01	Mean	0.259				
226					Maximum	1.3	Median	0.189				
227					SD	0.331	CV	1.275				
228					k hat (MLE)	0.668	k star (bias corrected MLE)	0.63				
229					Theta hat (MLE)	0.388	Theta star (bias corrected MLE)	0.412				
230					nu hat (MLE)	46.76	nu star (bias corrected)	44.08				
231					Adjusted Level of Significance (β)	0.0425						
232					Approximate Chi Square Value (44.08, α)	29.86	Adjusted Chi Square Value (44.08, β)	29.3				
233					95% Gamma Approximate UCL	0.383	95% Gamma Adjusted UCL	0.39				
234												
235	**Estimates of Gamma Parameters using KM Estimates**											
236					Mean (KM)	0.276	SD (KM)	0.319				
237					Variance (KM)	0.102	SE of Mean (KM)	0.0581				
238					k hat (KM)	0.744	k star (KM)	0.7				
239					nu hat (KM)	52.1	nu star (KM)	48.97				
240					theta hat (KM)	0.37	theta star (KM)	0.394				
241					80% gamma percentile (KM)	0.453	90% gamma percentile (KM)	0.692				
242					95% gamma percentile (KM)	0.938	99% gamma percentile (KM)	1.526				
243												
244	**Gamma Kaplan-Meier (KM) Statistics**											
245					Approximate Chi Square Value (48.97, α)	33.91	Adjusted Chi Square Value (48.97, β)	33.31				
246					95% KM Approximate Gamma UCL	0.398	95% KM Adjusted Gamma UCL	0.405				
247												
248	**Lognormal GOF Test on Detected Observations Only**											
249					Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**					
250					10% Shapiro Wilk Critical Value	0.914	Detected Data Not Lognormal at 10% Significance Level					
251					Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**					
252					10% Lilliefors Critical Value	0.185	Detected Data Not Lognormal at 10% Significance Level					
253	**Detected Data Not Lognormal at 10% Significance Level**											
254												
255	**Lognormal ROS Statistics Using Imputed Non-Detects**											
256					Mean in Original Scale	0.264	Mean in Log Scale	-1.905				
257					SD in Original Scale	0.322	SD in Log Scale	1.096				
258					95% t UCL (assumes normality of ROS data)	0.356	95% Percentile Bootstrap UCL	0.356				
259					95% BCA Bootstrap UCL	0.373	95% Bootstrap t UCL	0.39				
260					95% H-UCL (Log ROS)	0.44						

261											
262	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**										
263				KM Mean (logged)	-1.963			KM Geo Mean	0.14		
264				KM SD (logged)	1.292			95% Critical H Value (KM-Log)	2.838		
265				KM Standard Error of Mean (logged)	0.301			95% H-UCL (KM -Log)	0.606		
266				KM SD (logged)	1.292			95% Critical H Value (KM-Log)	2.838		
267				KM Standard Error of Mean (logged)	0.301						
268											
269	**DL/2 Statistics**										
270				**DL/2 Normal**				**DL/2 Log-Transformed**			
271				Mean in Original Scale	0.326			Mean in Log Scale	-1.491		
272				SD in Original Scale	0.307			SD in Log Scale	0.936		
273				95% t UCL (Assumes normality)	0.414			95% H-Stat UCL	0.511		
274	**DL/2 is not a recommended method, provided for comparisons and historical reasons**										
275											
276	**Nonparametric Distribution Free UCL Statistics**										
277	**Detected Data appear Gamma Distributed at 5% Significance Level**										
278											
279	**Suggested UCL to Use**										
280				95% KM Adjusted Gamma UCL	0.405						
281											
282	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
283	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.										
284	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
285											
286	**Cd**										
287											
288	**General Statistics**										
289				Total Number of Observations	35			Number of Distinct Observations	25		
290								Number of Missing Observations	29		
291				Number of Detects	16			Number of Non-Detects	19		
292				Number of Distinct Detects	14			Number of Distinct Non-Detects	15		
293				Minimum Detect	0.39			Minimum Non-Detect	0.13		
294				Maximum Detect	2.5			Maximum Non-Detect	2.6		
295				Variance Detects	0.41			Percent Non-Detects	54.29%		
296				Mean Detects	1.049			SD Detects	0.64		
297				Median Detects	0.84			CV Detects	0.611		
298				Skewness Detects	1.404			Kurtosis Detects	1.244		
299				Mean of Logged Detects	-0.101			SD of Logged Detects	0.547		
300											
301	**Normal GOF Test on Detects Only**										
302				Shapiro Wilk Test Statistic	0.827			**Shapiro Wilk GOF Test**			
303				1% Shapiro Wilk Critical Value	0.844			Detected Data Not Normal at 1% Significance Level			
304				Lilliefors Test Statistic	0.218			**Lilliefors GOF Test**			
305				1% Lilliefors Critical Value	0.248			Detected Data appear Normal at 1% Significance Level			
306	**Detected Data appear Approximate Normal at 1% Significance Level**										
307											
308	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
309				KM Mean	0.64			KM Standard Error of Mean	0.118		
310				90KM SD	0.625			95% KM (BCA) UCL	0.889		
311				95% KM (t) UCL	0.84			95% KM (Percentile Bootstrap) UCL	0.858		
312				95% KM (z) UCL	0.834			95% KM Bootstrap t UCL	0.873		

313				90% KM Chebyshev UCL		0.994				95% KM Chebyshev UCL		1.155
314				97.5% KM Chebyshev UCL		1.378				99% KM Chebyshev UCL		1.816
315												
316	**Gamma GOF Tests on Detected Observations Only**											
317				A-D Test Statistic		0.511	**Anderson-Darling GOF Test**					
318				5% A-D Critical Value		0.743	Detected data appear Gamma Distributed at 5% Significance Level					
319				K-S Test Statistic		0.151	**Kolmogorov-Smirnov GOF**					
320				5% K-S Critical Value		0.216	Detected data appear Gamma Distributed at 5% Significance Level					
321	**Detected data appear Gamma Distributed at 5% Significance Level**											
322												
323	**Gamma Statistics on Detected Data Only**											
324				k hat (MLE)		3.521	k star (bias corrected MLE)					2.902
325				Theta hat (MLE)		0.298	Theta star (bias corrected MLE)					0.361
326				nu hat (MLE)		112.7	nu star (bias corrected)					92.88
327				Mean (detects)		1.049						
328												
329	**Gamma ROS Statistics using Imputed Non-Detects**											
330	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
331	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
332	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
333	This is especially true when the sample size is small.											
334	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
335				Minimum		0.01	Mean					0.559
336				Maximum		2.5	Median					0.408
337				SD		0.654	CV					1.168
338				k hat (MLE)		0.472	k star (bias corrected MLE)					0.451
339				Theta hat (MLE)		1.184	Theta star (bias corrected MLE)					1.241
340				nu hat (MLE)		33.07	nu star (bias corrected)					31.56
341				Adjusted Level of Significance (β)		0.0425						
342				Approximate Chi Square Value (31.56, α)		19.73	Adjusted Chi Square Value (31.56, β)					19.28
343				95% Gamma Approximate UCL		0.895	95% Gamma Adjusted UCL					0.916
344												
345	**Estimates of Gamma Parameters using KM Estimates**											
346				Mean (KM)		0.64	SD (KM)					0.625
347				Variance (KM)		0.391	SE of Mean (KM)					0.118
348				k hat (KM)		1.048	k star (KM)					0.977
349				nu hat (KM)		73.35	nu star (KM)					68.4
350				theta hat (KM)		0.61	theta star (KM)					0.655
351				80% gamma percentile (KM)		1.031	90% gamma percentile (KM)					1.481
352				95% gamma percentile (KM)		1.932	99% gamma percentile (KM)					2.981
353												
354	**Gamma Kaplan-Meier (KM) Statistics**											
355				Approximate Chi Square Value (68.40, α)		50.36	Adjusted Chi Square Value (68.40, β)					49.63
356				95% KM Approximate Gamma UCL		0.869	95% KM Adjusted Gamma UCL					0.882
357												
358	**Lognormal GOF Test on Detected Observations Only**											
359				Shapiro Wilk Test Statistic		0.949	**Shapiro Wilk GOF Test**					
360				10% Shapiro Wilk Critical Value		0.906	Detected Data appear Lognormal at 10% Significance Level					
361				Lilliefors Test Statistic		0.13	**Lilliefors GOF Test**					
362				10% Lilliefors Critical Value		0.196	Detected Data appear Lognormal at 10% Significance Level					
363	**Detected Data appear Lognormal at 10% Significance Level**											
364												

365	**Lognormal ROS Statistics Using Imputed Non-Detects**											
366					Mean in Original Scale	0.664				Mean in Log Scale	-0.679	
367					SD in Original Scale	0.571				SD in Log Scale	0.708	
368					95% t UCL (assumes normality of ROS data)	0.827				95% Percentile Bootstrap UCL	0.83	
369					95% BCA Bootstrap UCL	0.86				95% Bootstrap t UCL	0.888	
370					95% H-UCL (Log ROS)	0.844						
371												
372	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
373					KM Mean (logged)	-0.922				KM Geo Mean	0.398	
374					KM SD (logged)	1.003				95% Critical H Value (KM-Log)	2.458	
375					KM Standard Error of Mean (logged)	0.202				95% H-UCL (KM -Log)	1.004	
376					KM SD (logged)	1.003				95% Critical H Value (KM-Log)	2.458	
377					KM Standard Error of Mean (logged)	0.202						
378												
379	**DL/2 Statistics**											
380					**DL/2 Normal**					**DL/2 Log-Transformed**		
381					Mean in Original Scale	0.769				Mean in Log Scale	-0.624	
382					SD in Original Scale	0.619				SD in Log Scale	0.926	
383					95% t UCL (Assumes normality)	0.946				95% H-Stat UCL	1.199	
384	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
385												
386	**Nonparametric Distribution Free UCL Statistics**											
387	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
388												
389	**Suggested UCL to Use**											
390					95% KM (t) UCL	0.84						
391												
392	When a data set follows an approximate distribution passing only one of the GOF tests,											
393	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
394												
395	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
396	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
397	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
398												
399	**Cr**											
400												
401	**General Statistics**											
402					Total Number of Observations	49				Number of Distinct Observations	44	
403										Number of Missing Observations	26	
404					Number of Detects	48				Number of Non-Detects	1	
405					Number of Distinct Detects	43				Number of Distinct Non-Detects	1	
406					Minimum Detect	1.8				Minimum Non-Detect	0.98	
407					Maximum Detect	92.4				Maximum Non-Detect	0.98	
408					Variance Detects	632.2				Percent Non-Detects	2.041%	
409					Mean Detects	26.47				SD Detects	25.14	
410					Median Detects	16.5				CV Detects	0.95	
411					Skewness Detects	0.984				Kurtosis Detects	-0.00576	
412					Mean of Logged Detects	2.717				SD of Logged Detects	1.156	
413												
414	**Normal GOF Test on Detects Only**											
415					Shapiro Wilk Test Statistic	0.847				**Shapiro Wilk GOF Test**		
416					1% Shapiro Wilk Critical Value	0.929				Detected Data Not Normal at 1% Significance Level		

417				Lilliefors Test Statistic		0.19	**Lilliefors GOF Test**					
418				1% Lilliefors Critical Value		0.148	Detected Data Not Normal at 1% Significance Level					
419	**Detected Data Not Normal at 1% Significance Level**											
420												
421	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
422				KM Mean		25.95	KM Standard Error of Mean					3.593
423				90KM SD		24.89	95% KM (BCA) UCL					32.54
424				95% KM (t) UCL		31.97	95% KM (Percentile Bootstrap) UCL					32.27
425				95% KM (z) UCL		31.86	95% KM Bootstrap t UCL					32.69
426				90% KM Chebyshev UCL		36.73	95% KM Chebyshev UCL					41.61
427				97.5% KM Chebyshev UCL		48.39	99% KM Chebyshev UCL					61.7
428												
429	**Gamma GOF Tests on Detected Observations Only**											
430				A-D Test Statistic		1.255	**Anderson-Darling GOF Test**					
431				5% A-D Critical Value		0.778	Detected Data Not Gamma Distributed at 5% Significance Level					
432				K-S Test Statistic		0.14	**Kolmogorov-Smirnov GOF**					
433				5% K-S Critical Value		0.132	Detected Data Not Gamma Distributed at 5% Significance Level					
434	**Detected Data Not Gamma Distributed at 5% Significance Level**											
435												
436	**Gamma Statistics on Detected Data Only**											
437				k hat (MLE)		1.029	k star (bias corrected MLE)					0.979
438				Theta hat (MLE)		25.72	Theta star (bias corrected MLE)					27.05
439				nu hat (MLE)		98.78	nu star (bias corrected)					93.94
440				Mean (detects)		26.47						
441												
442	**Gamma ROS Statistics using Imputed Non-Detects**											
443	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
444	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
445	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
446	This is especially true when the sample size is small.											
447	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
448				Minimum		0.01	Mean					25.93
449				Maximum		92.4	Median					14
450				SD		25.17	CV					0.971
451				k hat (MLE)		0.855	k star (bias corrected MLE)					0.817
452				Theta hat (MLE)		30.32	Theta star (bias corrected MLE)					31.76
453				nu hat (MLE)		83.82	nu star (bias corrected)					80.02
454				Adjusted Level of Significance (β)		0.0451						
455				Approximate Chi Square Value (80.02, α)		60.41	Adjusted Chi Square Value (80.02, β)					59.89
456				95% Gamma Approximate UCL		34.35	95% Gamma Adjusted UCL					34.64
457												
458	**Estimates of Gamma Parameters using KM Estimates**											
459				Mean (KM)		25.95	SD (KM)					24.89
460				Variance (KM)		619.4	SE of Mean (KM)					3.593
461				k hat (KM)		1.087	k star (KM)					1.034
462				nu hat (KM)		106.5	nu star (KM)					101.3
463				theta hat (KM)		23.87	theta star (KM)					25.09
464				80% gamma percentile (KM)		41.65	90% gamma percentile (KM)					59.26
465				95% gamma percentile (KM)		76.82	99% gamma percentile (KM)					117.5
466												
467	**Gamma Kaplan-Meier (KM) Statistics**											
468				Approximate Chi Square Value (101.34, α)		79.12	Adjusted Chi Square Value (101.34, β)					78.52

469			95% KM Approximate Gamma UCL			33.24			95% KM Adjusted Gamma UCL			33.49
470												
471					Lognormal GOF Test on Detected Observations Only							
472			Shapiro Wilk Test Statistic			0.915			Shapiro Wilk GOF Test			
473			10% Shapiro Wilk Critical Value			0.954			Detected Data Not Lognormal at 10% Significance Level			
474			Lilliefors Test Statistic			0.136			Lilliefors GOF Test			
475			10% Lilliefors Critical Value			0.117			Detected Data Not Lognormal at 10% Significance Level			
476					Detected Data Not Lognormal at 10% Significance Level							
477												
478					Lognormal ROS Statistics Using Imputed Non-Detects							
479			Mean in Original Scale			25.94			Mean in Log Scale			2.657
480			SD in Original Scale			25.15			SD in Log Scale			1.219
481			95% t UCL (assumes normality of ROS data)			31.97			95% Percentile Bootstrap UCL			32.04
482			95% BCA Bootstrap UCL			32.44			95% Bootstrap t UCL			32.97
483			95% H-UCL (Log ROS)			47.19						
484												
485					Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution							
486			KM Mean (logged)			2.661			KM Geo Mean			14.31
487			KM SD (logged)			1.196			95% Critical H Value (KM-Log)			2.56
488			KM Standard Error of Mean (logged)			0.173			95% H-UCL (KM -Log)			45.53
489			KM SD (logged)			1.196			95% Critical H Value (KM-Log)			2.56
490			KM Standard Error of Mean (logged)			0.173						
491												
492					DL/2 Statistics							
493			DL/2 Normal						DL/2 Log-Transformed			
494			Mean in Original Scale			25.94			Mean in Log Scale			2.647
495			SD in Original Scale			25.16			SD in Log Scale			1.244
496			95% t UCL (Assumes normality)			31.97			95% H-Stat UCL			48.94
497					DL/2 is not a recommended method, provided for comparisons and historical reasons							
498												
499					Nonparametric Distribution Free UCL Statistics							
500					Data do not follow a Discernible Distribution							
501												
502					Suggested UCL to Use							
503			95% KM (t) UCL			31.97						
504												
505					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
506					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
507					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
508												
509	Co											
510												
511					General Statistics							
512			Total Number of Observations			35			Number of Distinct Observations			30
513									Number of Missing Observations			29
514			Number of Detects			31			Number of Non-Detects			4
515			Number of Distinct Detects			28			Number of Distinct Non-Detects			3
516			Minimum Detect			2.5			Minimum Non-Detect			3.8
517			Maximum Detect			34			Maximum Non-Detect			5.1
518			Variance Detects			57.1			Percent Non-Detects			11.43%
519			Mean Detects			11.22			SD Detects			7.556
520			Median Detects			9.6			CV Detects			0.674

521					Skewness Detects	1.652					Kurtosis Detects	2.862
522					Mean of Logged Detects	2.229					SD of Logged Detects	0.621
523												
524					**Normal GOF Test on Detects Only**							
525					Shapiro Wilk Test Statistic	0.835				**Shapiro Wilk GOF Test**		
526					1% Shapiro Wilk Critical Value	0.902				Detected Data Not Normal at 1% Significance Level		
527					Lilliefors Test Statistic	0.173				**Lilliefors GOF Test**		
528					1% Lilliefors Critical Value	0.182				Detected Data appear Normal at 1% Significance Level		
529					**Detected Data appear Approximate Normal at 1% Significance Level**							
530												
531					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
532					KM Mean	10.33				KM Standard Error of Mean		1.277
533					90KM SD	7.428				95% KM (BCA) UCL		12.62
534					95% KM (t) UCL	12.49				95% KM (Percentile Bootstrap) UCL		12.48
535					95% KM (z) UCL	12.43				95% KM Bootstrap t UCL		13.03
536					90% KM Chebyshev UCL	14.16				95% KM Chebyshev UCL		15.9
537					97.5% KM Chebyshev UCL	18.31				99% KM Chebyshev UCL		23.04
538												
539					**Gamma GOF Tests on Detected Observations Only**							
540					A-D Test Statistic	0.386				**Anderson-Darling GOF Test**		
541					5% A-D Critical Value	0.754				Detected data appear Gamma Distributed at 5% Significance Level		
542					K-S Test Statistic	0.0956				**Kolmogorov-Smirnov GOF**		
543					5% K-S Critical Value	0.159				Detected data appear Gamma Distributed at 5% Significance Level		
544					**Detected data appear Gamma Distributed at 5% Significance Level**							
545												
546					**Gamma Statistics on Detected Data Only**							
547					k hat (MLE)	2.8				k star (bias corrected MLE)		2.551
548					Theta hat (MLE)	4.007				Theta star (bias corrected MLE)		4.399
549					nu hat (MLE)	173.6				nu star (bias corrected)		158.1
550					Mean (detects)	11.22						
551												
552					**Gamma ROS Statistics using Imputed Non-Detects**							
553					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
554					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
555					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
556					This is especially true when the sample size is small.							
557					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
558					Minimum	0.01				Mean		10.13
559					Maximum	34				Median		8.8
560					SD	7.749				CV		0.765
561					k hat (MLE)	1.36				k star (bias corrected MLE)		1.262
562					Theta hat (MLE)	7.449				Theta star (bias corrected MLE)		8.024
563					nu hat (MLE)	95.17				nu star (bias corrected)		88.35
564					Adjusted Level of Significance (β)	0.0425						
565					Approximate Chi Square Value (88.35, α)	67.68				Adjusted Chi Square Value (88.35, β)		66.82
566					95% Gamma Approximate UCL	13.22				95% Gamma Adjusted UCL		13.39
567												
568					**Estimates of Gamma Parameters using KM Estimates**							
569					Mean (KM)	10.33				SD (KM)		7.428
570					Variance (KM)	55.17				SE of Mean (KM)		1.277
571					k hat (KM)	1.934				k star (KM)		1.787
572					nu hat (KM)	135.4				nu star (KM)		125.1

573	theta hat (KM)					5.341	theta star (KM)					5.78
574	80% gamma percentile (KM)					15.67	90% gamma percentile (KM)					20.63
575	95% gamma percentile (KM)					25.4	99% gamma percentile (KM)					36.04
576												
577	**Gamma Kaplan-Meier (KM) Statistics**											
578	Approximate Chi Square Value (125.10, α)					100.3	Adjusted Chi Square Value (125.10, β)					99.22
579	95% KM Approximate Gamma UCL					12.89	95% KM Adjusted Gamma UCL					13.02
580												
581	**Lognormal GOF Test on Detected Observations Only**											
582	Shapiro Wilk Test Statistic					0.983	**Shapiro Wilk GOF Test**					
583	10% Shapiro Wilk Critical Value					0.94	Detected Data appear Lognormal at 10% Significance Level					
584	Lilliefors Test Statistic					0.0684	**Lilliefors GOF Test**					
585	10% Lilliefors Critical Value					0.143	Detected Data appear Lognormal at 10% Significance Level					
586	**Detected Data appear Lognormal at 10% Significance Level**											
587												
588	**Lognormal ROS Statistics Using Imputed Non-Detects**											
589	Mean in Original Scale					10.33	Mean in Log Scale					2.112
590	SD in Original Scale					7.533	SD in Log Scale					0.675
591	95% t UCL (assumes normality of ROS data)					12.48	95% Percentile Bootstrap UCL					12.51
592	95% BCA Bootstrap UCL					12.79	95% Bootstrap t UCL					12.92
593	95% H-UCL (Log ROS)					13.23						
594												
595	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
596	KM Mean (logged)					2.111	KM Geo Mean					8.255
597	KM SD (logged)					0.668	95% Critical H Value (KM-Log)					2.092
598	KM Standard Error of Mean (logged)					0.116	95% H-UCL (KM -Log)					13.12
599	KM SD (logged)					0.668	95% Critical H Value (KM-Log)					2.092
600	KM Standard Error of Mean (logged)					0.116						
601												
602	**DL/2 Statistics**											
603	**DL/2 Normal**						**DL/2 Log-Transformed**					
604	Mean in Original Scale					10.2	Mean in Log Scale					2.07
605	SD in Original Scale					7.656	SD in Log Scale					0.737
606	95% t UCL (Assumes normality)					12.39	95% H-Stat UCL					13.66
607	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
608												
609	**Nonparametric Distribution Free UCL Statistics**											
610	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
611												
612	**Suggested UCL to Use**											
613	95% KM (t) UCL					12.49						
614												
615	When a data set follows an approximate distribution passing only one of the GOF tests,											
616	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
617												
618	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
619	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
620	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
621												
622												
623	**Cu**											
624												

625	**General Statistics**											
626					Total Number of Observations	35			Number of Distinct Observations		34	
627									Number of Missing Observations		29	
628					Minimum	11			Mean		46.03	
629					Maximum	90.9			Median		50.3	
630					SD	21.46			Std. Error of Mean		3.628	
631					Coefficient of Variation	0.466			Skewness		-0.0632	
632												
633	**Normal GOF Test**											
634					Shapiro Wilk Test Statistic	0.948		**Shapiro Wilk GOF Test**				
635					1% Shapiro Wilk Critical Value	0.91		Data appear Normal at 1% Significance Level				
636					Lilliefors Test Statistic	0.129		**Lilliefors GOF Test**				
637					1% Lilliefors Critical Value	0.172		Data appear Normal at 1% Significance Level				
638	**Data appear Normal at 1% Significance Level**											
639												
640	**Assuming Normal Distribution**											
641				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
642					95% Student's-t UCL	52.17			95% Adjusted-CLT UCL (Chen-1995)		51.96	
643									95% Modified-t UCL (Johnson-1978)		52.16	
644												
645	**Gamma GOF Test**											
646					A-D Test Statistic	1.017		**Anderson-Darling Gamma GOF Test**				
647					5% A-D Critical Value	0.753		Data Not Gamma Distributed at 5% Significance Level				
648					K-S Test Statistic	0.172		**Kolmogorov-Smirnov Gamma GOF Test**				
649					5% K-S Critical Value	0.149		Data Not Gamma Distributed at 5% Significance Level				
650	**Data Not Gamma Distributed at 5% Significance Level**											
651												
652	**Gamma Statistics**											
653					k hat (MLE)	3.734			k star (bias corrected MLE)		3.433	
654					Theta hat (MLE)	12.33			Theta star (bias corrected MLE)		13.41	
655					nu hat (MLE)	261.4			nu star (bias corrected)		240.3	
656					MLE Mean (bias corrected)	46.03			MLE Sd (bias corrected)		24.85	
657									Approximate Chi Square Value (0.05)		205.4	
658					Adjusted Level of Significance	0.0425			Adjusted Chi Square Value		203.9	
659												
660	**Assuming Gamma Distribution**											
661					95% Approximate Gamma UCL	53.85			95% Adjusted Gamma UCL		54.26	
662												
663	**Lognormal GOF Test**											
664					Shapiro Wilk Test Statistic	0.897		**Shapiro Wilk Lognormal GOF Test**				
665					10% Shapiro Wilk Critical Value	0.944		Data Not Lognormal at 10% Significance Level				
666					Lilliefors Test Statistic	0.181		**Lilliefors Lognormal GOF Test**				
667					10% Lilliefors Critical Value	0.136		Data Not Lognormal at 10% Significance Level				
668	**Data Not Lognormal at 10% Significance Level**											
669												
670	**Lognormal Statistics**											
671					Minimum of Logged Data	2.398			Mean of logged Data		3.69	
672					Maximum of Logged Data	4.51			SD of logged Data		0.582	
673												
674	**Assuming Lognormal Distribution**											
675					95% H-UCL	57.98			90% Chebyshev (MVUE) UCL		61.95	
676					95% Chebyshev (MVUE) UCL	68.64			97.5% Chebyshev (MVUE) UCL		77.94	

677				99% Chebyshev (MVUE) UCL		96.2						
678												
679	**Nonparametric Distribution Free UCL Statistics**											
680	**Data appear to follow a Discernible Distribution**											
681												
682	**Nonparametric Distribution Free UCLs**											
683				95% CLT UCL		52			95% BCA Bootstrap UCL		51.8	
684				95% Standard Bootstrap UCL		51.88			95% Bootstrap-t UCL		51.82	
685				95% Hall's Bootstrap UCL		51.68			95% Percentile Bootstrap UCL		52.05	
686				90% Chebyshev(Mean, Sd) UCL		56.92			95% Chebyshev(Mean, Sd) UCL		61.85	
687				97.5% Chebyshev(Mean, Sd) UCL		68.69			99% Chebyshev(Mean, Sd) UCL		82.13	
688												
689	**Suggested UCL to Use**											
690				95% Student's-t UCL		52.17						
691												
692	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
693	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
694	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
695												
696	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
697	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
698												
699	**Pb**											
700												
701	**General Statistics**											
702				Total Number of Observations		46			Number of Distinct Observations		39	
703									Number of Missing Observations		18	
704				Number of Detects		44			Number of Non-Detects		2	
705				Number of Distinct Detects		37			Number of Distinct Non-Detects		2	
706				Minimum Detect		4.9			Minimum Non-Detect		7.4	
707				Maximum Detect		102			Maximum Non-Detect		7.5	
708				Variance Detects		518			Percent Non-Detects		4.348%	
709				Mean Detects		26.87			SD Detects		22.76	
710				Median Detects		18.9			CV Detects		0.847	
711				Skewness Detects		1.664			Kurtosis Detects		2.877	
712				Mean of Logged Detects		2.983			SD of Logged Detects		0.792	
713												
714	**Normal GOF Test on Detects Only**											
715				Shapiro Wilk Test Statistic		0.813			**Shapiro Wilk GOF Test**			
716				1% Shapiro Wilk Critical Value		0.924			Detected Data Not Normal at 1% Significance Level			
717				Lilliefors Test Statistic		0.176			**Lilliefors GOF Test**			
718				1% Lilliefors Critical Value		0.154			Detected Data Not Normal at 1% Significance Level			
719	**Detected Data Not Normal at 1% Significance Level**											
720												
721	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
722				KM Mean		25.97			KM Standard Error of Mean		3.342	
723				90KM SD		22.41			95% KM (BCA) UCL		31.99	
724				95% KM (t) UCL		31.58			95% KM (Percentile Bootstrap) UCL		31.41	
725				95% KM (z) UCL		31.47			95% KM Bootstrap t UCL		32.5	
726				90% KM Chebyshev UCL		36			95% KM Chebyshev UCL		40.54	
727				97.5% KM Chebyshev UCL		46.84			99% KM Chebyshev UCL		59.23	
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Gamma GOF Tests on Detected Observations Only**											
730					A-D Test Statistic	0.782	**Anderson-Darling GOF Test**					
731					5% A-D Critical Value	0.764	Detected Data Not Gamma Distributed at 5% Significance Level					
732					K-S Test Statistic	0.147	**Kolmogorov-Smirnov GOF**					
733					5% K-S Critical Value	0.135	Detected Data Not Gamma Distributed at 5% Significance Level					
734	**Detected Data Not Gamma Distributed at 5% Significance Level**											
735												
736	**Gamma Statistics on Detected Data Only**											
737					k hat (MLE)	1.77	k star (bias corrected MLE)	1.664				
738					Theta hat (MLE)	15.18	Theta star (bias corrected MLE)	16.15				
739					nu hat (MLE)	155.7	nu star (bias corrected)	146.4				
740					Mean (detects)	26.87						
741												
742	**Gamma ROS Statistics using Imputed Non-Detects**											
743	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
744	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
745	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
746	This is especially true when the sample size is small.											
747	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
748					Minimum	0.0517	Mean	25.71				
749					Maximum	102	Median	16.7				
750					SD	22.93	CV	0.892				
751					k hat (MLE)	1.093	k star (bias corrected MLE)	1.037				
752					Theta hat (MLE)	23.51	Theta star (bias corrected MLE)	24.8				
753					nu hat (MLE)	100.6	nu star (bias corrected)	95.37				
754					Adjusted Level of Significance (β)	0.0448						
755					Approximate Chi Square Value (95.37, α)	73.85	Adjusted Chi Square Value (95.37, β)	73.24				
756					95% Gamma Approximate UCL	33.2	95% Gamma Adjusted UCL	33.48				
757												
758	**Estimates of Gamma Parameters using KM Estimates**											
759					Mean (KM)	25.97	SD (KM)	22.41				
760					Variance (KM)	502.2	SE of Mean (KM)	3.342				
761					k hat (KM)	1.343	k star (KM)	1.27				
762					nu hat (KM)	123.6	nu star (KM)	116.9				
763					theta hat (KM)	19.33	theta star (KM)	20.45				
764					80% gamma percentile (KM)	40.89	90% gamma percentile (KM)	56.37				
765					95% gamma percentile (KM)	71.58	99% gamma percentile (KM)	106.3				
766												
767	**Gamma Kaplan-Meier (KM) Statistics**											
768					Approximate Chi Square Value (116.85, α)	92.89	Adjusted Chi Square Value (116.85, β)	92.2				
769					95% KM Approximate Gamma UCL	32.67	95% KM Adjusted Gamma UCL	32.91				
770												
771	**Lognormal GOF Test on Detected Observations Only**											
772					Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**					
773					10% Shapiro Wilk Critical Value	0.952	Detected Data appear Lognormal at 10% Significance Level					
774					Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**					
775					10% Lilliefors Critical Value	0.122	Detected Data appear Lognormal at 10% Significance Level					
776	**Detected Data appear Lognormal at 10% Significance Level**											
777												
778	**Lognormal ROS Statistics Using Imputed Non-Detects**											
779					Mean in Original Scale	25.94	Mean in Log Scale	2.927				
780					SD in Original Scale	22.68	SD in Log Scale	0.818				

781				95% t UCL (assumes normality of ROS data)		31.56				95% Percentile Bootstrap UCL		31.53
782				95% BCA Bootstrap UCL		32.17				95% Bootstrap t UCL		32.67
783				95% H-UCL (Log ROS)		33.9						
784												
785	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
786				KM Mean (logged)		2.932				KM Geo Mean		18.76
787				KM SD (logged)		0.803				95% Critical H Value (KM-Log)		2.13
788				KM Standard Error of Mean (logged)		0.12				95% H-UCL (KM -Log)		33.41
789				KM SD (logged)		0.803				95% Critical H Value (KM-Log)		2.13
790				KM Standard Error of Mean (logged)		0.12						
791												
792	**DL/2 Statistics**											
793				**DL/2 Normal**						**DL/2 Log-Transformed**		
794				Mean in Original Scale		25.87				Mean in Log Scale		2.91
795				SD in Original Scale		22.75				SD in Log Scale		0.847
796				95% t UCL (Assumes normality)		31.5				95% H-Stat UCL		34.58
797	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
798												
799	**Nonparametric Distribution Free UCL Statistics**											
800	**Detected Data appear Lognormal Distributed at 10% Significance Level**											
801												
802	**Suggested UCL to Use**											
803				KM H-UCL		33.41						
804												
805	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
806	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
807	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
808												
809	**Mo**											
810												
811	**General Statistics**											
812				Total Number of Observations		17				Number of Distinct Observations		11
813										Number of Missing Observations		47
814				Number of Detects		6				Number of Non-Detects		11
815				Number of Distinct Detects		6				Number of Distinct Non-Detects		5
816				Minimum Detect		1.5				Minimum Non-Detect		0.98
817				Maximum Detect		3.9				Maximum Non-Detect		10
818				Variance Detects		0.624				Percent Non-Detects		64.71%
819				Mean Detects		2.6				SD Detects		0.79
820				Median Detects		2.6				CV Detects		0.304
821				Skewness Detects		0.493				Kurtosis Detects		1.566
822				Mean of Logged Detects		0.916				SD of Logged Detects		0.314
823												
824	**Normal GOF Test on Detects Only**											
825				Shapiro Wilk Test Statistic		0.958				**Shapiro Wilk GOF Test**		
826				1% Shapiro Wilk Critical Value		0.713				Detected Data appear Normal at 1% Significance Level		
827				Lilliefors Test Statistic		0.233				**Lilliefors GOF Test**		
828				1% Lilliefors Critical Value		0.373				Detected Data appear Normal at 1% Significance Level		
829	**Detected Data appear Normal at 1% Significance Level**											
830	**Note GOF tests may be unreliable for small sample sizes**											
831												
832	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											

833	KM Mean				1.952	KM Standard Error of Mean						0.336
834	90KM SD				0.97	95% KM (BCA) UCL						2.526
835	95% KM (t) UCL				2.539	95% KM (Percentile Bootstrap) UCL						2.504
836	95% KM (z) UCL				2.505	95% KM Bootstrap t UCL						2.478
837	90% KM Chebyshev UCL				2.961	95% KM Chebyshev UCL						3.417
838	97.5% KM Chebyshev UCL				4.051	99% KM Chebyshev UCL						5.297
839	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
840												
841	**Gamma GOF Tests on Detected Observations Only**											
842	A-D Test Statistic				0.253	**Anderson-Darling GOF Test**						
843	5% A-D Critical Value				0.698	Detected data appear Gamma Distributed at 5% Significance Level						
844	K-S Test Statistic				0.193	**Kolmogorov-Smirnov GOF**						
845	5% K-S Critical Value				0.332	Detected data appear Gamma Distributed at 5% Significance Level						
846	**Detected data appear Gamma Distributed at 5% Significance Level**											
847	**Note GOF tests may be unreliable for small sample sizes**											
848												
849	**Gamma Statistics on Detected Data Only**											
850	k hat (MLE)				12.72	k star (bias corrected MLE)						6.469
851	Theta hat (MLE)				0.204	Theta star (bias corrected MLE)						0.402
852	nu hat (MLE)				152.6	nu star (bias corrected)						77.63
853	Mean (detects)				2.6							
854												
855	**Gamma ROS Statistics using Imputed Non-Detects**											
856	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
857	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
858	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
859	This is especially true when the sample size is small.											
860	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
861	Minimum				0.292	Mean						1.83
862	Maximum				3.9	Median						1.765
863	SD				0.973	CV						0.532
864	k hat (MLE)				3.063	k star (bias corrected MLE)						2.561
865	Theta hat (MLE)				0.598	Theta star (bias corrected MLE)						0.714
866	nu hat (MLE)				104.1	nu star (bias corrected)						87.09
867	Adjusted Level of Significance (β)				0.0346							
868	Approximate Chi Square Value (87.09, α)				66.57	Adjusted Chi Square Value (87.09, β)						64.69
869	95% Gamma Approximate UCL				2.394	95% Gamma Adjusted UCL						2.463
870												
871	**Estimates of Gamma Parameters using KM Estimates**											
872	Mean (KM)				1.952	SD (KM)						0.97
873	Variance (KM)				0.942	SE of Mean (KM)						0.336
874	k hat (KM)				4.046	k star (KM)						3.371
875	nu hat (KM)				137.5	nu star (KM)						114.6
876	theta hat (KM)				0.483	theta star (KM)						0.579
877	80% gamma percentile (KM)				2.746	90% gamma percentile (KM)						3.378
878	95% gamma percentile (KM)				3.964	99% gamma percentile (KM)						5.226
879												
880	**Gamma Kaplan-Meier (KM) Statistics**											
881	Approximate Chi Square Value (114.61, α)				90.89	Adjusted Chi Square Value (114.61, β)						88.68
882	95% KM Approximate Gamma UCL				2.461	95% KM Adjusted Gamma UCL						2.523
883	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
884												

	A	B	C	D	E	F	G	H	I	J	K	L
885	**Lognormal GOF Test on Detected Observations Only**											
886					Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**					
887					10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level					
888					Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**					
889					10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level					
890	**Detected Data appear Lognormal at 10% Significance Level**											
891	**Note GOF tests may be unreliable for small sample sizes**											
892												
893	**Lognormal ROS Statistics Using Imputed Non-Detects**											
894					Mean in Original Scale	1.944				Mean in Log Scale	0.58	
895					SD in Original Scale	0.826				SD in Log Scale	0.426	
896					95% t UCL (assumes normality of ROS data)	2.294				95% Percentile Bootstrap UCL	2.282	
897					95% BCA Bootstrap UCL	2.288				95% Bootstrap t UCL	2.372	
898					95% H-UCL (Log ROS)	2.411						
899												
900	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
901					KM Mean (logged)	0.541				KM Geo Mean	1.718	
902					KM SD (logged)	0.509				95% Critical H Value (KM-Log)	2.045	
903					KM Standard Error of Mean (logged)	0.176				95% H-UCL (KM -Log)	2.538	
904					KM SD (logged)	0.509				95% Critical H Value (KM-Log)	2.045	
905					KM Standard Error of Mean (logged)	0.176						
906	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
907												
908	**DL/2 Statistics**											
909	**DL/2 Normal**						**DL/2 Log-Transformed**					
910					Mean in Original Scale	3.07				Mean in Log Scale	0.817	
911					SD in Original Scale	1.862				SD in Log Scale	0.936	
912					95% t UCL (Assumes normality)	3.858				95% H-Stat UCL	6.407	
913	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
914												
915	**Nonparametric Distribution Free UCL Statistics**											
916	**Detected Data appear Normal Distributed at 1% Significance Level**											
917												
918	**Suggested UCL to Use**											
919					95% KM (t) UCL	2.539						
920												
921	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
922	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
923	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
924												
925												
926	**Ni**											
927												
928	**General Statistics**											
929					Total Number of Observations	46				Number of Distinct Observations	41	
930										Number of Missing Observations	18	
931					Minimum	12				Mean	29.51	
932					Maximum	67				Median	26.3	
933					SD	13.01				Std. Error of Mean	1.918	
934					Coefficient of Variation	0.441				Skewness	0.727	
935												
936	**Normal GOF Test**											

937				Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**						
938				1% Shapiro Wilk Critical Value	0.927	Data appear Normal at 1% Significance Level						
939				Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**						
940				1% Lilliefors Critical Value	0.151	Data appear Normal at 1% Significance Level						
941	**Data appear Normal at 1% Significance Level**											
942												
943	**Assuming Normal Distribution**											
944	**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**						
945				95% Student's-t UCL	32.73	95% Adjusted-CLT UCL (Chen-1995)					32.89	
946						95% Modified-t UCL (Johnson-1978)					32.77	
947												
948	**Gamma GOF Test**											
949				A-D Test Statistic	0.482	**Anderson-Darling Gamma GOF Test**						
950				5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level						
951				K-S Test Statistic	0.0965	**Kolmogorov-Smirnov Gamma GOF Test**						
952				5% K-S Critical Value	0.131	Detected data appear Gamma Distributed at 5% Significance Level						
953	**Detected data appear Gamma Distributed at 5% Significance Level**											
954												
955	**Gamma Statistics**											
956				k hat (MLE)	5.423	k star (bias corrected MLE)					5.084	
957				Theta hat (MLE)	5.442	Theta star (bias corrected MLE)					5.805	
958				nu hat (MLE)	498.9	nu star (bias corrected)					467.7	
959				MLE Mean (bias corrected)	29.51	MLE Sd (bias corrected)					13.09	
960						Approximate Chi Square Value (0.05)					418.5	
961				Adjusted Level of Significance	0.0448	Adjusted Chi Square Value					417	
962												
963	**Assuming Gamma Distribution**											
964				95% Approximate Gamma UCL	32.98	95% Adjusted Gamma UCL					33.09	
965												
966	**Lognormal GOF Test**											
967				Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**						
968				10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level						
969				Lilliefors Test Statistic	0.0994	**Lilliefors Lognormal GOF Test**						
970				10% Lilliefors Critical Value	0.119	Data appear Lognormal at 10% Significance Level						
971	**Data appear Lognormal at 10% Significance Level**											
972												
973	**Lognormal Statistics**											
974				Minimum of Logged Data	2.485	Mean of logged Data					3.29	
975				Maximum of Logged Data	4.205	SD of logged Data					0.445	
976												
977	**Assuming Lognormal Distribution**											
978				95% H-UCL	33.48	90% Chebyshev (MVUE) UCL					35.6	
979				95% Chebyshev (MVUE) UCL	38.33	97.5% Chebyshev (MVUE) UCL					42.13	
980				99% Chebyshev (MVUE) UCL	49.6							
981												
982	**Nonparametric Distribution Free UCL Statistics**											
983	**Data appear to follow a Discernible Distribution**											
984												
985	**Nonparametric Distribution Free UCLs**											
986				95% CLT UCL	32.67	95% BCA Bootstrap UCL					32.85	
987				95% Standard Bootstrap UCL	32.62	95% Bootstrap-t UCL					32.89	
988				95% Hall's Bootstrap UCL	32.8	95% Percentile Bootstrap UCL					32.7	

989				90% Chebyshev(Mean, Sd) UCL	35.27				95% Chebyshev(Mean, Sd) UCL	37.87		
990				97.5% Chebyshev(Mean, Sd) UCL	41.49				99% Chebyshev(Mean, Sd) UCL	48.6		
991												
992					**Suggested UCL to Use**							
993				95% Student's-t UCL	32.73							
994												
995					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
996					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
997					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
998												
999	**Se**											
1000												
1001					**General Statistics**							
1002				Total Number of Observations	35				Number of Distinct Observations	18		
1003									Number of Missing Observations	29		
1004				Number of Detects	20				Number of Non-Detects	15		
1005				Number of Distinct Detects	15				Number of Distinct Non-Detects	4		
1006				Minimum Detect	0.66				Minimum Non-Detect	0.3		
1007				Maximum Detect	4				Maximum Non-Detect	3		
1008				Variance Detects	0.535				Percent Non-Detects	42.86%		
1009				Mean Detects	1.246				SD Detects	0.731		
1010				Median Detects	1.1				CV Detects	0.587		
1011				Skewness Detects	3.109				Kurtosis Detects	11.24		
1012				Mean of Logged Detects	0.121				SD of Logged Detects	0.413		
1013												
1014					**Normal GOF Test on Detects Only**							
1015				Shapiro Wilk Test Statistic	0.639				**Shapiro Wilk GOF Test**			
1016				1% Shapiro Wilk Critical Value	0.868				Detected Data Not Normal at 1% Significance Level			
1017				Lilliefors Test Statistic	0.275				**Lilliefors GOF Test**			
1018				1% Lilliefors Critical Value	0.223				Detected Data Not Normal at 1% Significance Level			
1019					**Detected Data Not Normal at 1% Significance Level**							
1020												
1021					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1022				KM Mean	1.052				KM Standard Error of Mean	0.123		
1023				90KM SD	0.651				95% KM (BCA) UCL	1.258		
1024				95% KM (t) UCL	1.26				95% KM (Percentile Bootstrap) UCL	1.247		
1025				95% KM (z) UCL	1.254				95% KM Bootstrap t UCL	1.346		
1026				90% KM Chebyshev UCL	1.42				95% KM Chebyshev UCL	1.587		
1027				97.5% KM Chebyshev UCL	1.819				99% KM Chebyshev UCL	2.274		
1028												
1029					**Gamma GOF Tests on Detected Observations Only**							
1030				A-D Test Statistic	1.157				**Anderson-Darling GOF Test**			
1031				5% A-D Critical Value	0.745				Detected Data Not Gamma Distributed at 5% Significance Level			
1032				K-S Test Statistic	0.225				**Kolmogorov-Smirnov GOF**			
1033				5% K-S Critical Value	0.194				Detected Data Not Gamma Distributed at 5% Significance Level			
1034					**Detected Data Not Gamma Distributed at 5% Significance Level**							
1035												
1036					**Gamma Statistics on Detected Data Only**							
1037				k hat (MLE)	5.192				k star (bias corrected MLE)	4.446		
1038				Theta hat (MLE)	0.24				Theta star (bias corrected MLE)	0.28		
1039				nu hat (MLE)	207.7				nu star (bias corrected)	177.9		
1040				Mean (detects)	1.246							

	A	B	C	D	E	F	G	H	I	J	K	L
1041												
1042	**Gamma ROS Statistics using Imputed Non-Detects**											
1043	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1044	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1045	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1046	This is especially true when the sample size is small.											
1047	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1048					Minimum	0.01				Mean	1.025	
1049					Maximum	4				Median	0.99	
1050					SD	0.689				CV	0.672	
1051					k hat (MLE)	1.967				k star (bias corrected MLE)	1.818	
1052					Theta hat (MLE)	0.521				Theta star (bias corrected MLE)	0.564	
1053					nu hat (MLE)	137.7				nu star (bias corrected)	127.3	
1054					Adjusted Level of Significance (β)	0.0425						
1055					Approximate Chi Square Value (127.25, α)	102.2				Adjusted Chi Square Value (127.25, β)	101.1	
1056					95% Gamma Approximate UCL	1.276				95% Gamma Adjusted UCL	1.289	
1057												
1058	**Estimates of Gamma Parameters using KM Estimates**											
1059					Mean (KM)	1.052				SD (KM)	0.651	
1060					Variance (KM)	0.423				SE of Mean (KM)	0.123	
1061					k hat (KM)	2.615				k star (KM)	2.41	
1062					nu hat (KM)	183.1				nu star (KM)	168.7	
1063					theta hat (KM)	0.402				theta star (KM)	0.437	
1064					80% gamma percentile (KM)	1.541				90% gamma percentile (KM)	1.96	
1065					95% gamma percentile (KM)	2.355				99% gamma percentile (KM)	3.223	
1066												
1067	**Gamma Kaplan-Meier (KM) Statistics**											
1068					Approximate Chi Square Value (168.70, α)	139.7				Adjusted Chi Square Value (168.70, β)	138.4	
1069					95% KM Approximate Gamma UCL	1.271				95% KM Adjusted Gamma UCL	1.282	
1070												
1071	**Lognormal GOF Test on Detected Observations Only**											
1072					Shapiro Wilk Test Statistic	0.874				**Shapiro Wilk GOF Test**		
1073					10% Shapiro Wilk Critical Value	0.92				Detected Data Not Lognormal at 10% Significance Level		
1074					Lilliefors Test Statistic	0.191				**Lilliefors GOF Test**		
1075					10% Lilliefors Critical Value	0.176				Detected Data Not Lognormal at 10% Significance Level		
1076	**Detected Data Not Lognormal at 10% Significance Level**											
1077												
1078	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1079					Mean in Original Scale	1.073				Mean in Log Scale	-0.0368	
1080					SD in Original Scale	0.623				SD in Log Scale	0.443	
1081					95% t UCL (assumes normality of ROS data)	1.251				95% Percentile Bootstrap UCL	1.258	
1082					95% BCA Bootstrap UCL	1.305				95% Bootstrap t UCL	1.369	
1083					95% H-UCL (Log ROS)	1.228						
1084												
1085	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1086					KM Mean (logged)	-0.104				KM Geo Mean	0.901	
1087					KM SD (logged)	0.566				95% Critical H Value (KM-Log)	1.998	
1088					KM Standard Error of Mean (logged)	0.117				95% H-UCL (KM -Log)	1.284	
1089					KM SD (logged)	0.566				95% Critical H Value (KM-Log)	1.998	
1090					KM Standard Error of Mean (logged)	0.117						
1091												
1092	**DL/2 Statistics**											

1093	**DL/2 Normal**						**DL/2 Log-Transformed**					
1094				Mean in Original Scale	1.153					Mean in Log Scale	-0.0383	
1095				SD in Original Scale	0.663					SD in Log Scale	0.695	
1096				95% t UCL (Assumes normality)	1.343					95% H-Stat UCL	1.577	
1097	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1098												
1099	**Nonparametric Distribution Free UCL Statistics**											
1100	**Data do not follow a Discernible Distribution**											
1101												
1102	**Suggested UCL to Use**											
1103				95% KM (t) UCL	1.26							
1104												
1105	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1106	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1107	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1108												
1109	Ag											
1110												
1111	**General Statistics**											
1112				Total Number of Observations	35					Number of Distinct Observations	20	
1113										Number of Missing Observations	29	
1114				Number of Detects	17					Number of Non-Detects	18	
1115				Number of Distinct Detects	15					Number of Distinct Non-Detects	6	
1116				Minimum Detect	0.09					Minimum Non-Detect	0.49	
1117				Maximum Detect	1					Maximum Non-Detect	2.5	
1118				Variance Detects	0.102					Percent Non-Detects	51.43%	
1119				Mean Detects	0.393					SD Detects	0.319	
1120				Median Detects	0.21					CV Detects	0.813	
1121				Skewness Detects	0.863					Kurtosis Detects	-0.965	
1122				Mean of Logged Detects	-1.248					SD of Logged Detects	0.816	
1123												
1124	**Normal GOF Test on Detects Only**											
1125				Shapiro Wilk Test Statistic	0.795		**Shapiro Wilk GOF Test**					
1126				1% Shapiro Wilk Critical Value	0.851		Detected Data Not Normal at 1% Significance Level					
1127				Lilliefors Test Statistic	0.342		**Lilliefors GOF Test**					
1128				1% Lilliefors Critical Value	0.241		Detected Data Not Normal at 1% Significance Level					
1129	**Detected Data Not Normal at 1% Significance Level**											
1130												
1131	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1132				KM Mean	0.352					KM Standard Error of Mean	0.0658	
1133				90KM SD	0.29					95% KM (BCA) UCL	0.46	
1134				95% KM (t) UCL	0.464					95% KM (Percentile Bootstrap) UCL	0.462	
1135				95% KM (z) UCL	0.461					95% KM Bootstrap t UCL	0.488	
1136				90% KM Chebyshev UCL	0.55					95% KM Chebyshev UCL	0.639	
1137				97.5% KM Chebyshev UCL	0.763					99% KM Chebyshev UCL	1.007	
1138	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1139												
1140	**Gamma GOF Tests on Detected Observations Only**											
1141				A-D Test Statistic	1.183		**Anderson-Darling GOF Test**					
1142				5% A-D Critical Value	0.753		Detected Data Not Gamma Distributed at 5% Significance Level					
1143				K-S Test Statistic	0.297		**Kolmogorov-Smirnov GOF**					
1144				5% K-S Critical Value	0.212		Detected Data Not Gamma Distributed at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
1145	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1146												
1147	**Gamma Statistics on Detected Data Only**											
1148					k hat (MLE)	1.74			k star (bias corrected MLE)	1.473		
1149					Theta hat (MLE)	0.226			Theta star (bias corrected MLE)	0.267		
1150					nu hat (MLE)	59.18			nu star (bias corrected)	50.07		
1151					Mean (detects)	0.393						
1152												
1153	**Gamma ROS Statistics using Imputed Non-Detects**											
1154	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1155	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1156	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1157	This is especially true when the sample size is small.											
1158	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1159					Minimum	0.0878			Mean	0.343		
1160					Maximum	1			Median	0.23		
1161					SD	0.253			CV	0.736		
1162					k hat (MLE)	2.239			k star (bias corrected MLE)	2.066		
1163					Theta hat (MLE)	0.153			Theta star (bias corrected MLE)	0.166		
1164					nu hat (MLE)	156.7			nu star (bias corrected)	144.6		
1165					Adjusted Level of Significance (β)	0.0425						
1166					Approximate Chi Square Value (144.60, α)	117.8			Adjusted Chi Square Value (144.60, β)	116.7		
1167					95% Gamma Approximate UCL	0.421			95% Gamma Adjusted UCL	0.425		
1168												
1169	**Estimates of Gamma Parameters using KM Estimates**											
1170					Mean (KM)	0.352			SD (KM)	0.29		
1171					Variance (KM)	0.0841			SE of Mean (KM)	0.0658		
1172					k hat (KM)	1.477			k star (KM)	1.369		
1173					nu hat (KM)	103.4			nu star (KM)	95.85		
1174					theta hat (KM)	0.239			theta star (KM)	0.257		
1175					80% gamma percentile (KM)	0.551			90% gamma percentile (KM)	0.751		
1176					95% gamma percentile (KM)	0.947			99% gamma percentile (KM)	1.391		
1177												
1178	**Gamma Kaplan-Meier (KM) Statistics**											
1179					Approximate Chi Square Value (95.85, α)	74.27			Adjusted Chi Square Value (95.85, β)	73.37		
1180					95% KM Approximate Gamma UCL	0.455			95% KM Adjusted Gamma UCL	0.46		
1181	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1182												
1183	**Lognormal GOF Test on Detected Observations Only**											
1184					Shapiro Wilk Test Statistic	0.881			**Shapiro Wilk GOF Test**			
1185					10% Shapiro Wilk Critical Value	0.91			Detected Data Not Lognormal at 10% Significance Level			
1186					Lilliefors Test Statistic	0.254			**Lilliefors GOF Test**			
1187					10% Lilliefors Critical Value	0.19			Detected Data Not Lognormal at 10% Significance Level			
1188	**Detected Data Not Lognormal at 10% Significance Level**											
1189												
1190	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1191					Mean in Original Scale	0.331			Mean in Log Scale	-1.336		
1192					SD in Original Scale	0.248			SD in Log Scale	0.667		
1193					95% t UCL (assumes normality of ROS data)	0.402			95% Percentile Bootstrap UCL	0.4		
1194					95% BCA Bootstrap UCL	0.409			95% Bootstrap t UCL	0.414		
1195					95% H-UCL (Log ROS)	0.417						
1196												

1197	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1198					KM Mean (logged)	-1.346				KM Geo Mean	0.26	
1199					KM SD (logged)	0.756				95% Critical H Value (KM-Log)	2.181	
1200					KM Standard Error of Mean (logged)	0.176				95% H-UCL (KM -Log)	0.46	
1201					KM SD (logged)	0.756				95% Critical H Value (KM-Log)	2.181	
1202					KM Standard Error of Mean (logged)	0.176						
1203	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1204												
1205	**DL/2 Statistics**											
1206	**DL/2 Normal**						**DL/2 Log-Transformed**					
1207					Mean in Original Scale	0.578				Mean in Log Scale	-0.836	
1208					SD in Original Scale	0.409				SD in Log Scale	0.813	
1209					95% t UCL (Assumes normality)	0.695				95% H-Stat UCL	0.825	
1210	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1211												
1212	**Nonparametric Distribution Free UCL Statistics**											
1213	**Data do not follow a Discernible Distribution**											
1214												
1215	**Suggested UCL to Use**											
1216					95% KM (t) UCL	0.464						
1217												
1218	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1219	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1220	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1221												
1222	**TI**											
1223												
1224	**General Statistics**											
1225					Total Number of Observations	22				Number of Distinct Observations	18	
1226										Number of Missing Observations	37	
1227					Number of Detects	3				Number of Non-Detects	19	
1228					Number of Distinct Detects	3				Number of Distinct Non-Detects	15	
1229					Minimum Detect	0.75				Minimum Non-Detect	0.08	
1230					Maximum Detect	1.6				Maximum Non-Detect	4	
1231					Variance Detects	0.225				Percent Non-Detects	86.36%	
1232					Mean Detects	1.053				SD Detects	0.474	
1233					Median Detects	0.81				CV Detects	0.45	
1234					Skewness Detects	1.701				Kurtosis Detects	N/A	
1235					Mean of Logged Detects	-0.00947				SD of Logged Detects	0.417	
1236												
1237	**Warning: Data set has only 3 Detected Values.**											
1238	**This is not enough to compute meaningful or reliable statistics and estimates.**											
1239												
1240												
1241	**Normal GOF Test on Detects Only**											
1242					Shapiro Wilk Test Statistic	0.803				**Shapiro Wilk GOF Test**		
1243					1% Shapiro Wilk Critical Value	0.753				Detected Data appear Normal at 1% Significance Level		
1244					Lilliefors Test Statistic	0.363				**Lilliefors GOF Test**		
1245					1% Lilliefors Critical Value	0.429				Detected Data appear Normal at 1% Significance Level		
1246	**Detected Data appear Normal at 1% Significance Level**											
1247	**Note GOF tests may be unreliable for small sample sizes**											
1248												

	A	B	C	D	E	F	G	H	I	J	K	L
1249	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1250					KM Mean	0.305			KM Standard Error of Mean			0.141
1251					90KM SD	0.419			95% KM (BCA) UCL			N/A
1252					95% KM (t) UCL	0.547			95% KM (Percentile Bootstrap) UCL			N/A
1253					95% KM (z) UCL	0.537			95% KM Bootstrap t UCL			N/A
1254					90% KM Chebyshev UCL	0.728			95% KM Chebyshev UCL			0.92
1255					97.5% KM Chebyshev UCL	1.186			99% KM Chebyshev UCL			1.708
1256												
1257	**Gamma GOF Tests on Detected Observations Only**											
1258					A-D Test Statistic	0.514			**Anderson-Darling GOF Test**			
1259					5% A-D Critical Value	0.636			Detected data appear Gamma Distributed at 5% Significance Level			
1260					K-S Test Statistic	0.395			**Kolmogorov-Smirnov GOF**			
1261					5% K-S Critical Value	0.433			Detected data appear Gamma Distributed at 5% Significance Level			
1262	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1263												
1264	**Gamma Statistics on Detected Data Only**											
1265					k hat (MLE)	8.303			k star (bias corrected MLE)			N/A
1266					Theta hat (MLE)	0.127			Theta star (bias corrected MLE)			N/A
1267					nu hat (MLE)	49.82			nu star (bias corrected)			N/A
1268					Mean (detects)	1.053						
1269												
1270	**Gamma ROS Statistics using Imputed Non-Detects**											
1271	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1272	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1273	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1274	This is especially true when the sample size is small.											
1275	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1276					Minimum	0.01			Mean			0.212
1277					Maximum	1.6			Median			0.0259
1278					SD	0.401			CV			1.887
1279					k hat (MLE)	0.407			k star (bias corrected MLE)			0.381
1280					Theta hat (MLE)	0.522			Theta star (bias corrected MLE)			0.557
1281					nu hat (MLE)	17.89			nu star (bias corrected)			16.78
1282					Adjusted Level of Significance (β)	0.0386						
1283					Approximate Chi Square Value (16.78, α)	8.518			Adjusted Chi Square Value (16.78, β)			8.08
1284					95% Gamma Approximate UCL	0.418			95% Gamma Adjusted UCL			N/A
1285												
1286	**Estimates of Gamma Parameters using KM Estimates**											
1287					Mean (KM)	0.305			SD (KM)			0.419
1288					Variance (KM)	0.176			SE of Mean (KM)			0.141
1289					k hat (KM)	0.527			k star (KM)			0.486
1290					nu hat (KM)	23.2			nu star (KM)			21.37
1291					theta hat (KM)	0.578			theta star (KM)			0.627
1292					80% gamma percentile (KM)	0.5			90% gamma percentile (KM)			0.829
1293					95% gamma percentile (KM)	1.182			99% gamma percentile (KM)			2.053
1294												
1295	**Gamma Kaplan-Meier (KM) Statistics**											
1296					Approximate Chi Square Value (21.37, α)	11.87			Adjusted Chi Square Value (21.37, β)			11.34
1297					95% KM Approximate Gamma UCL	0.548			95% KM Adjusted Gamma UCL			0.574
1298												
1299	**Lognormal GOF Test on Detected Observations Only**											
1300					Shapiro Wilk Test Statistic	0.825			**Shapiro Wilk GOF Test**			

1301				10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level						
1302				Lilliefors Test Statistic	0.352	**Lilliefors GOF Test**						
1303				10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level						
1304	**Detected Data appear Lognormal at 10% Significance Level**											
1305	**Note GOF tests may be unreliable for small sample sizes**											
1306												
1307	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1308				Mean in Original Scale	0.443	Mean in Log Scale	-0.946					
1309				SD in Original Scale	0.304	SD in Log Scale	0.467					
1310				95% t UCL (assumes normality of ROS data)	0.554	95% Percentile Bootstrap UCL	0.556					
1311				95% BCA Bootstrap UCL	0.592	95% Bootstrap t UCL	0.673					
1312				95% H-UCL (Log ROS)	0.529							
1313												
1314	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1315				KM Mean (logged)	-1.903	KM Geo Mean	0.149					
1316				KM SD (logged)	1.072	95% Critical H Value (KM-Log)	2.684					
1317				KM Standard Error of Mean (logged)	0.389	95% H-UCL (KM -Log)	0.496					
1318				KM SD (logged)	1.072	95% Critical H Value (KM-Log)	2.684					
1319				KM Standard Error of Mean (logged)	0.389							
1320	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1321												
1322	**DL/2 Statistics**											
1323	**DL/2 Normal**					**DL/2 Log-Transformed**						
1324				Mean in Original Scale	0.753	Mean in Log Scale	-0.648					
1325				SD in Original Scale	0.671	SD in Log Scale	0.919					
1326				95% t UCL (Assumes normality)	0.999	95% H-Stat UCL	1.311					
1327	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1328												
1329	**Nonparametric Distribution Free UCL Statistics**											
1330	**Detected Data appear Normal Distributed at 1% Significance Level**											
1331												
1332	**Suggested UCL to Use**											
1333				95% KM (t) UCL	0.547							
1334												
1335	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1336	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1337	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1338												
1339												
1340	V											
1341												
1342	**General Statistics**											
1343				Total Number of Observations	35	Number of Distinct Observations	34					
1344						Number of Missing Observations	29					
1345				Minimum	2.3	Mean	25.44					
1346				Maximum	121	Median	22.3					
1347				SD	24.24	Std. Error of Mean	4.097					
1348				Coefficient of Variation	0.953	Skewness	2.288					
1349												
1350	**Normal GOF Test**											
1351				Shapiro Wilk Test Statistic	0.779	**Shapiro Wilk GOF Test**						
1352				1% Shapiro Wilk Critical Value	0.91	Data Not Normal at 1% Significance Level						

1353				Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**						
1354				1% Lilliefors Critical Value	0.172	Data appear Normal at 1% Significance Level						
1355	**Data appear Approximate Normal at 1% Significance Level**											
1356												
1357	**Assuming Normal Distribution**											
1358	**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**						
1359				95% Student's-t UCL	32.37	95% Adjusted-CLT UCL (Chen-1995)						33.87
1360						95% Modified-t UCL (Johnson-1978)						32.63
1361												
1362	**Gamma GOF Test**											
1363				A-D Test Statistic	0.48	**Anderson-Darling Gamma GOF Test**						
1364				5% A-D Critical Value	0.769	Detected data appear Gamma Distributed at 5% Significance Level						
1365				K-S Test Statistic	0.117	**Kolmogorov-Smirnov Gamma GOF Test**						
1366				5% K-S Critical Value	0.152	Detected data appear Gamma Distributed at 5% Significance Level						
1367	**Detected data appear Gamma Distributed at 5% Significance Level**											
1368												
1369	**Gamma Statistics**											
1370				k hat (MLE)	1.369	k star (bias corrected MLE)						1.27
1371				Theta hat (MLE)	18.58	Theta star (bias corrected MLE)						20.02
1372				nu hat (MLE)	95.81	nu star (bias corrected)						88.93
1373				MLE Mean (bias corrected)	25.44	MLE Sd (bias corrected)						22.57
1374						Approximate Chi Square Value (0.05)						68.19
1375				Adjusted Level of Significance	0.0425	Adjusted Chi Square Value						67.33
1376												
1377	**Assuming Gamma Distribution**											
1378				95% Approximate Gamma UCL	33.17	95% Adjusted Gamma UCL						33.6
1379												
1380	**Lognormal GOF Test**											
1381				Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**						
1382				10% Shapiro Wilk Critical Value	0.944	Data appear Lognormal at 10% Significance Level						
1383				Lilliefors Test Statistic	0.154	**Lilliefors Lognormal GOF Test**						
1384				10% Lilliefors Critical Value	0.136	Data Not Lognormal at 10% Significance Level						
1385	**Data appear Approximate Lognormal at 10% Significance Level**											
1386												
1387	**Lognormal Statistics**											
1388				Minimum of Logged Data	0.833	Mean of logged Data						2.828
1389				Maximum of Logged Data	4.796	SD of logged Data						0.971
1390												
1391	**Assuming Lognormal Distribution**											
1392				95% H-UCL	40.55	90% Chebyshev (MVUE) UCL						41.65
1393				95% Chebyshev (MVUE) UCL	48.47	97.5% Chebyshev (MVUE) UCL						57.95
1394				99% Chebyshev (MVUE) UCL	76.55							
1395												
1396	**Nonparametric Distribution Free UCL Statistics**											
1397	**Data appear to follow a Discernible Distribution**											
1398												
1399	**Nonparametric Distribution Free UCLs**											
1400				95% CLT UCL	32.18	95% BCA Bootstrap UCL						33.92
1401				95% Standard Bootstrap UCL	32.03	95% Bootstrap-t UCL						35.06
1402				95% Hall's Bootstrap UCL	39.38	95% Percentile Bootstrap UCL						32.62
1403				90% Chebyshev(Mean, Sd) UCL	37.73	95% Chebyshev(Mean, Sd) UCL						43.3
1404				97.5% Chebyshev(Mean, Sd) UCL	51.02	99% Chebyshev(Mean, Sd) UCL						66.2

1405												
1406					**Suggested UCL to Use**							
1407					95% Student's-t UCL	32.37						
1408												
1409					When a data set follows an approximate distribution passing only one of the GOF tests,							
1410					it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL							
1411												
1412					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1413					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
1414					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
1415												
1416												
1417	**Zn**											
1418												
1419					**General Statistics**							
1420					Total Number of Observations	35				Number of Distinct Observations	34	
1421										Number of Missing Observations	29	
1422					Minimum	31				Mean	65.03	
1423					Maximum	307				Median	58.5	
1424					SD	43.68				Std. Error of Mean	7.383	
1425					Coefficient of Variation	0.672				Skewness	5.263	
1426												
1427					**Normal GOF Test**							
1428					Shapiro Wilk Test Statistic	0.41				**Shapiro Wilk GOF Test**		
1429					1% Shapiro Wilk Critical Value	0.91				Data Not Normal at 1% Significance Level		
1430					Lilliefors Test Statistic	0.347				**Lilliefors GOF Test**		
1431					1% Lilliefors Critical Value	0.172				Data Not Normal at 1% Significance Level		
1432					**Data Not Normal at 1% Significance Level**							
1433												
1434					**Assuming Normal Distribution**							
1435					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1436					95% Student's-t UCL	77.51				95% Adjusted-CLT UCL (Chen-1995)	84.19	
1437										95% Modified-t UCL (Johnson-1978)	78.6	
1438												
1439					**Gamma GOF Test**							
1440					A-D Test Statistic	3.255				**Anderson-Darling Gamma GOF Test**		
1441					5% A-D Critical Value	0.749				Data Not Gamma Distributed at 5% Significance Level		
1442					K-S Test Statistic	0.248				**Kolmogorov-Smirnov Gamma GOF Test**		
1443					5% K-S Critical Value	0.149				Data Not Gamma Distributed at 5% Significance Level		
1444					**Data Not Gamma Distributed at 5% Significance Level**							
1445												
1446					**Gamma Statistics**							
1447					k hat (MLE)	5.777				k star (bias corrected MLE)	5.301	
1448					Theta hat (MLE)	11.26				Theta star (bias corrected MLE)	12.27	
1449					nu hat (MLE)	404.4				nu star (bias corrected)	371.1	
1450					MLE Mean (bias corrected)	65.03				MLE Sd (bias corrected)	28.24	
1451										Approximate Chi Square Value (0.05)	327.4	
1452					Adjusted Level of Significance	0.0425				Adjusted Chi Square Value	325.5	
1453												
1454					**Assuming Gamma Distribution**							
1455					95% Approximate Gamma UCL	73.69				95% Adjusted Gamma UCL	74.13	
1456												

	A	B	C	D	E	F	G	H	I	J	K	L
1457	**Lognormal GOF Test**											
1458	Shapiro Wilk Test Statistic					0.759	**Shapiro Wilk Lognormal GOF Test**					
1459	10% Shapiro Wilk Critical Value					0.944	Data Not Lognormal at 10% Significance Level					
1460	Lilliefors Test Statistic					0.193	**Lilliefors Lognormal GOF Test**					
1461	10% Lilliefors Critical Value					0.136	Data Not Lognormal at 10% Significance Level					
1462	**Data Not Lognormal at 10% Significance Level**											
1463												
1464	**Lognormal Statistics**											
1465	Minimum of Logged Data					3.434	Mean of logged Data					4.086
1466	Maximum of Logged Data					5.727	SD of logged Data					0.355
1467												
1468	**Assuming Lognormal Distribution**											
1469	95% H-UCL					70.85	90% Chebyshev (MVUE) UCL					74.9
1470	95% Chebyshev (MVUE) UCL					80.18	97.5% Chebyshev (MVUE) UCL					87.51
1471	99% Chebyshev (MVUE) UCL					101.9						
1472												
1473	**Nonparametric Distribution Free UCL Statistics**											
1474	**Data do not follow a Discernible Distribution**											
1475												
1476	**Nonparametric Distribution Free UCLs**											
1477	95% CLT UCL					77.17	95% BCA Bootstrap UCL					86.84
1478	95% Standard Bootstrap UCL					77.01	95% Bootstrap-t UCL					100.5
1479	95% Hall's Bootstrap UCL					127.4	95% Percentile Bootstrap UCL					79.35
1480	90% Chebyshev(Mean, Sd) UCL					87.17	95% Chebyshev(Mean, Sd) UCL					97.21
1481	97.5% Chebyshev(Mean, Sd) UCL					111.1	99% Chebyshev(Mean, Sd) UCL					138.5
1482												
1483	**Suggested UCL to Use**											
1484	95% Student's-t UCL					77.51						
1485												
1486	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1487	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1488	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1489												
1490	**CN**											
1491												
1492	**General Statistics**											
1493	Total Number of Observations					29	Number of Distinct Observations					7
1494							Number of Missing Observations					35
1495	Number of Detects					0	Number of Non-Detects					29
1496	Number of Distinct Detects					0	Number of Distinct Non-Detects					7
1497												
1498	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1499	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1500	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1501												
1502	**The data set for variable CN was not processed!**											
1503												
1504												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/11/2023 11:27:21 AM
From File	05 Tailings Pile.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sb

General Statistics

Total Number of Observations	37	Number of Distinct Observations	8
		Number of Missing Observations	17
Number of Detects	1	Number of Non-Detects	36
Number of Distinct Detects	1	Number of Distinct Non-Detects	7

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Sb was not processed!

As

General Statistics

Total Number of Observations	67	Number of Distinct Observations	58
		Number of Missing Observations	2
Minimum	3	Mean	101.1
Maximum	263	Median	93
SD	80.74	Std. Error of Mean	9.864
Coefficient of Variation	0.799	Skewness	0.408

Normal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	4.2078E-6	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.125	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	117.5	95% Adjusted-CLT UCL (Chen-1995)	117.8
		95% Modified-t UCL (Johnson-1978)	117.6

Gamma GOF Test

A-D Test Statistic	1.428	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.11	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics		
k hat (MLE)	1.029	k star (bias corrected MLE) 0.993
Theta hat (MLE)	98.24	Theta star (bias corrected MLE) 101.8
nu hat (MLE)	137.9	nu star (bias corrected) 133
MLE Mean (bias corrected)	101.1	MLE Sd (bias corrected) 101.4
		Approximate Chi Square Value (0.05) 107.4
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value 106.9
Assuming Gamma Distribution		
95% Approximate Gamma UCL	125.2	95% Adjusted Gamma UCL 125.8
Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	2.9188E-7	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.155	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.099	Data Not Lognormal at 10% Significance Level
Data Not Lognormal at 10% Significance Level		
Lognormal Statistics		
Minimum of Logged Data	1.099	Mean of logged Data 4.057
Maximum of Logged Data	5.572	SD of logged Data 1.288
Assuming Lognormal Distribution		
95% H-UCL	186.3	90% Chebyshev (MVUE) UCL 208.2
95% Chebyshev (MVUE) UCL	243.7	97.5% Chebyshev (MVUE) UCL 293.1
99% Chebyshev (MVUE) UCL	390.1	
Nonparametric Distribution Free UCL Statistics		
Data appear to follow a Discernible Distribution		
Nonparametric Distribution Free UCLs		
95% CLT UCL	117.3	95% BCA Bootstrap UCL 118.1
95% Standard Bootstrap UCL	117.4	95% Bootstrap-t UCL 118.5
95% Hall's Bootstrap UCL	118	95% Percentile Bootstrap UCL 117.9
90% Chebyshev(Mean, Sd) UCL	130.7	95% Chebyshev(Mean, Sd) UCL 144.1
97.5% Chebyshev(Mean, Sd) UCL	162.7	99% Chebyshev(Mean, Sd) UCL 199.2
Suggested UCL to Use		
95% Approximate Gamma UCL	125.2	

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Ba

General Statistics

105					Total Number of Observations	37				Number of Distinct Observations		36
106										Number of Missing Observations		17
107					Minimum	6.2				Mean		81.62
108					Maximum	226				Median		65
109					SD	58.29				Std. Error of Mean		9.584
110					Coefficient of Variation	0.714				Skewness		1.38
111												
112					**Normal GOF Test**							
113					Shapiro Wilk Test Statistic	0.815				**Shapiro Wilk GOF Test**		
114					1% Shapiro Wilk Critical Value	0.814				Data appear Normal at 1% Significance Level		
115					Lilliefors Test Statistic	0.207				**Lilliefors GOF Test**		
116					1% Lilliefors Critical Value	0.168				Data Not Normal at 1% Significance Level		
117					**Data appear Approximate Normal at 1% Significance Level**							
118												
119					**Assuming Normal Distribution**							
120					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
121					95% Student's-t UCL	97.8				95% Adjusted-CLT UCL (Chen-1995)		99.71
122										95% Modified-t UCL (Johnson-1978)		98.16
123												
124					**Gamma GOF Test**							
125					A-D Test Statistic	0.85				**Anderson-Darling Gamma GOF Test**		
126					5% A-D Critical Value	0.758				Data Not Gamma Distributed at 5% Significance Level		
127					K-S Test Statistic	0.118				**Kolmogorov-Smirnov Gamma GOF Test**		
128					5% K-S Critical Value	0.147				Detected data appear Gamma Distributed at 5% Significance Level		
129					**Detected data follow Appr. Gamma Distribution at 5% Significance Level**							
130												
131					**Gamma Statistics**							
132					k hat (MLE)	2.285				k star (bias corrected MLE)		2.118
133					Theta hat (MLE)	35.72				Theta star (bias corrected MLE)		38.55
134					nu hat (MLE)	169.1				nu star (bias corrected)		156.7
135					MLE Mean (bias corrected)	81.62				MLE Sd (bias corrected)		56.09
136										Approximate Chi Square Value (0.05)		128.8
137					Adjusted Level of Significance	0.0431				Adjusted Chi Square Value		127.7
138												
139					**Assuming Gamma Distribution**							
140					95% Approximate Gamma UCL	99.33				95% Adjusted Gamma UCL		100.2
141												
142					**Lognormal GOF Test**							
143					Shapiro Wilk Test Statistic	0.945				**Shapiro Wilk Lognormal GOF Test**		
144					10% Shapiro Wilk Critical Value	0.946				Data Not Lognormal at 10% Significance Level		
145					Lilliefors Test Statistic	0.0996				**Lilliefors Lognormal GOF Test**		
146					10% Lilliefors Critical Value	0.132				Data appear Lognormal at 10% Significance Level		
147					**Data appear Approximate Lognormal at 10% Significance Level**							
148												
149					**Lognormal Statistics**							
150					Minimum of Logged Data	1.825				Mean of logged Data		4.168
151					Maximum of Logged Data	5.421				SD of logged Data		0.727
152												
153					**Assuming Lognormal Distribution**							
154					95% H-UCL	108.5				90% Chebyshev (MVUE) UCL		116.1
155					95% Chebyshev (MVUE) UCL	130.9				97.5% Chebyshev (MVUE) UCL		151.4
156					99% Chebyshev (MVUE) UCL	191.8						

157												
158	**Nonparametric Distribution Free UCL Statistics**											
159	**Data appear to follow a Discernible Distribution**											
160												
161	**Nonparametric Distribution Free UCLs**											
162				95% CLT UCL	97.39			95% BCA Bootstrap UCL	99.1			
163				95% Standard Bootstrap UCL	97.34			95% Bootstrap-t UCL	102.2			
164				95% Hall's Bootstrap UCL	99.91			95% Percentile Bootstrap UCL	97.71			
165				90% Chebyshev(Mean, Sd) UCL	110.4			95% Chebyshev(Mean, Sd) UCL	123.4			
166				97.5% Chebyshev(Mean, Sd) UCL	141.5			99% Chebyshev(Mean, Sd) UCL	177			
167												
168	**Suggested UCL to Use**											
169				95% Student's-t UCL	97.8							
170												
171	When a data set follows an approximate distribution passing only one of the GOF tests,											
172	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
173												
174	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
175	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
176	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
177												
178	**Be**											
179												
180	**General Statistics**											
181				Total Number of Observations	37			Number of Distinct Observations	15			
182								Number of Missing Observations	17			
183				Number of Detects	14			Number of Non-Detects	23			
184				Number of Distinct Detects	14			Number of Distinct Non-Detects	5			
185				Minimum Detect	0.16			Minimum Non-Detect	0.25			
186				Maximum Detect	1.4			Maximum Non-Detect	1			
187				Variance Detects	0.116			Percent Non-Detects	62.16%			
188				Mean Detects	0.569			SD Detects	0.341			
189				Median Detects	0.495			CV Detects	0.599			
190				Skewness Detects	1.115			Kurtosis Detects	1.306			
191				Mean of Logged Detects	-0.731			SD of Logged Detects	0.611			
192												
193	**Normal GOF Test on Detects Only**											
194				Shapiro Wilk Test Statistic	0.912			**Shapiro Wilk GOF Test**				
195				1% Shapiro Wilk Critical Value	0.825			Detected Data appear Normal at 1% Significance Level				
196				Lilliefors Test Statistic	0.188			**Lilliefors GOF Test**				
197				1% Lilliefors Critical Value	0.263			Detected Data appear Normal at 1% Significance Level				
198	**Detected Data appear Normal at 1% Significance Level**											
199												
200	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
201				KM Mean	0.381			KM Standard Error of Mean	0.0501			
202				90KM SD	0.264			95% KM (BCA) UCL	0.47			
203				95% KM (t) UCL	0.466			95% KM (Percentile Bootstrap) UCL	0.464			
204				95% KM (z) UCL	0.463			95% KM Bootstrap t UCL	0.484			
205				90% KM Chebyshev UCL	0.531			95% KM Chebyshev UCL	0.599			
206				97.5% KM Chebyshev UCL	0.694			99% KM Chebyshev UCL	0.879			
207												
208	**Gamma GOF Tests on Detected Observations Only**											

209				A-D Test Statistic	0.192	**Anderson-Darling GOF Test**						
210				5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level						
211				K-S Test Statistic	0.116	**Kolmogorov-Smirnov GOF**						
212				5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level						
213	**Detected data appear Gamma Distributed at 5% Significance Level**											
214												
215	**Gamma Statistics on Detected Data Only**											
216				k hat (MLE)	3.158	k star (bias corrected MLE)	2.529					
217				Theta hat (MLE)	0.18	Theta star (bias corrected MLE)	0.225					
218				nu hat (MLE)	88.44	nu star (bias corrected)	70.82					
219				Mean (detects)	0.569							
220												
221	**Gamma ROS Statistics using Imputed Non-Detects**											
222	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
223	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
224	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
225	This is especially true when the sample size is small.											
226	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
227				Minimum	0.01	Mean	0.352					
228				Maximum	1.4	Median	0.283					
229				SD	0.289	CV	0.82					
230				k hat (MLE)	1.43	k star (bias corrected MLE)	1.332					
231				Theta hat (MLE)	0.246	Theta star (bias corrected MLE)	0.264					
232				nu hat (MLE)	105.8	nu star (bias corrected)	98.6					
233				Adjusted Level of Significance (β)	0.0431							
234				Approximate Chi Square Value (98.60, α)	76.69	Adjusted Chi Square Value (98.60, β)	75.85					
235				95% Gamma Approximate UCL	0.453	95% Gamma Adjusted UCL	0.458					
236												
237	**Estimates of Gamma Parameters using KM Estimates**											
238				Mean (KM)	0.381	SD (KM)	0.264					
239				Variance (KM)	0.0697	SE of Mean (KM)	0.0501					
240				k hat (KM)	2.082	k star (KM)	1.931					
241				nu hat (KM)	154.1	nu star (KM)	142.9					
242				theta hat (KM)	0.183	theta star (KM)	0.197					
243				80% gamma percentile (KM)	0.573	90% gamma percentile (KM)	0.747					
244				95% gamma percentile (KM)	0.914	99% gamma percentile (KM)	1.284					
245												
246	**Gamma Kaplan-Meier (KM) Statistics**											
247				Approximate Chi Square Value (142.92, α)	116.3	Adjusted Chi Square Value (142.92, β)	115.3					
248				95% KM Approximate Gamma UCL	0.468	95% KM Adjusted Gamma UCL	0.472					
249												
250	**Lognormal GOF Test on Detected Observations Only**											
251				Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk GOF Test**						
252				10% Shapiro Wilk Critical Value	0.895	Detected Data appear Lognormal at 10% Significance Level						
253				Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**						
254				10% Lilliefors Critical Value	0.208	Detected Data appear Lognormal at 10% Significance Level						
255	**Detected Data appear Lognormal at 10% Significance Level**											
256												
257	**Lognormal ROS Statistics Using Imputed Non-Detects**											
258				Mean in Original Scale	0.379	Mean in Log Scale	-1.146					
259				SD in Original Scale	0.265	SD in Log Scale	0.572					
260				95% t UCL (assumes normality of ROS data)	0.452	95% Percentile Bootstrap UCL	0.453					

261				95% BCA Bootstrap UCL	0.462				95% Bootstrap t UCL		0.482
262				95% H-UCL (Log ROS)	0.452						
263											
264	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**										
265				KM Mean (logged)	-1.138				KM Geo Mean		0.32
266				KM SD (logged)	0.553				95% Critical H Value (KM-Log)		1.953
267				KM Standard Error of Mean (logged)	0.126				95% H-UCL (KM -Log)		0.447
268				KM SD (logged)	0.553				95% Critical H Value (KM-Log)		1.953
269				KM Standard Error of Mean (logged)	0.126						
270											
271	**DL/2 Statistics**										
272			**DL/2 Normal**						**DL/2 Log-Transformed**		
273				Mean in Original Scale	0.384				Mean in Log Scale		-1.114
274				SD in Original Scale	0.262				SD in Log Scale		0.528
275				95% t UCL (Assumes normality)	0.457				95% H-Stat UCL		0.448
276	**DL/2 is not a recommended method, provided for comparisons and historical reasons**										
277											
278	**Nonparametric Distribution Free UCL Statistics**										
279	**Detected Data appear Normal Distributed at 1% Significance Level**										
280											
281	**Suggested UCL to Use**										
282				95% KM (t) UCL	0.466						
283											
284	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
285	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.										
286	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
287											
288	**Cd**										
289											
290	**General Statistics**										
291				Total Number of Observations	37				Number of Distinct Observations		26
292									Number of Missing Observations		17
293				Number of Detects	25				Number of Non-Detects		12
294				Number of Distinct Detects	23				Number of Distinct Non-Detects		3
295				Minimum Detect	0.34				Minimum Non-Detect		0.24
296				Maximum Detect	4.4				Maximum Non-Detect		2.5
297				Variance Detects	1.849				Percent Non-Detects		32.43%
298				Mean Detects	1.413				SD Detects		1.36
299				Median Detects	0.89				CV Detects		0.962
300				Skewness Detects	1.281				Kurtosis Detects		0.0494
301				Mean of Logged Detects	-0.0396				SD of Logged Detects		0.861
302											
303	**Normal GOF Test on Detects Only**										
304				Shapiro Wilk Test Statistic	0.73				**Shapiro Wilk GOF Test**		
305				1% Shapiro Wilk Critical Value	0.886				Detected Data Not Normal at 1% Significance Level		
306				Lilliefors Test Statistic	0.299				**Lilliefors GOF Test**		
307				1% Lilliefors Critical Value	0.201				Detected Data Not Normal at 1% Significance Level		
308	**Detected Data Not Normal at 1% Significance Level**										
309											
310	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
311				KM Mean	1.04				KM Standard Error of Mean		0.205
312				90KM SD	1.222				95% KM (BCA) UCL		1.423

313				95% KM (t) UCL	1.387			95% KM (Percentile Bootstrap) UCL				1.401
314				95% KM (z) UCL	1.378			95% KM Bootstrap t UCL				1.472
315				90% KM Chebyshev UCL	1.656			95% KM Chebyshev UCL				1.935
316				97.5% KM Chebyshev UCL	2.322			99% KM Chebyshev UCL				3.083
317												
318				**Gamma GOF Tests on Detected Observations Only**								
319				A-D Test Statistic	1.713	**Anderson-Darling GOF Test**						
320				5% A-D Critical Value	0.763	Detected Data Not Gamma Distributed at 5% Significance Level						
321				K-S Test Statistic	0.222	**Kolmogorov-Smirnov GOF**						
322				5% K-S Critical Value	0.178	Detected Data Not Gamma Distributed at 5% Significance Level						
323				**Detected Data Not Gamma Distributed at 5% Significance Level**								
324												
325				**Gamma Statistics on Detected Data Only**								
326				k hat (MLE)	1.441	k star (bias corrected MLE)						1.295
327				Theta hat (MLE)	0.981	Theta star (bias corrected MLE)						1.091
328				nu hat (MLE)	72.06	nu star (bias corrected)						64.75
329				Mean (detects)	1.413							
330												
331				**Gamma ROS Statistics using Imputed Non-Detects**								
332				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
333				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
334				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
335				This is especially true when the sample size is small.								
336				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
337				Minimum	0.01	Mean						0.964
338				Maximum	4.4	Median						0.44
339				SD	1.291	CV						1.34
340				k hat (MLE)	0.459	k star (bias corrected MLE)						0.44
341				Theta hat (MLE)	2.097	Theta star (bias corrected MLE)						2.189
342				nu hat (MLE)	34	nu star (bias corrected)						32.58
343				Adjusted Level of Significance (β)	0.0431							
344				Approximate Chi Square Value (32.58, α)	20.53	Adjusted Chi Square Value (32.58, β)						20.11
345				95% Gamma Approximate UCL	1.529	95% Gamma Adjusted UCL						1.561
346												
347				**Estimates of Gamma Parameters using KM Estimates**								
348				Mean (KM)	1.04	SD (KM)						1.222
349				Variance (KM)	1.494	SE of Mean (KM)						0.205
350				k hat (KM)	0.725	k star (KM)						0.684
351				nu hat (KM)	53.63	nu star (KM)						50.62
352				theta hat (KM)	1.436	theta star (KM)						1.521
353				80% gamma percentile (KM)	1.711	90% gamma percentile (KM)						2.626
354				95% gamma percentile (KM)	3.571	99% gamma percentile (KM)						5.831
355												
356				**Gamma Kaplan-Meier (KM) Statistics**								
357				Approximate Chi Square Value (50.62, α)	35.28	Adjusted Chi Square Value (50.62, β)						34.72
358				95% KM Approximate Gamma UCL	1.493	95% KM Adjusted Gamma UCL						1.517
359												
360				**Lognormal GOF Test on Detected Observations Only**								
361				Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**						
362				10% Shapiro Wilk Critical Value	0.931	Detected Data Not Lognormal at 10% Significance Level						
363				Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**						
364				10% Lilliefors Critical Value	0.159	Detected Data Not Lognormal at 10% Significance Level						

365	**Detected Data Not Lognormal at 10% Significance Level**											
366												
367	**Lognormal ROS Statistics Using Imputed Non-Detects**											
368						Mean in Original Scale	1.008			Mean in Log Scale	-0.658	
369						SD in Original Scale	1.26			SD in Log Scale	1.186	
370						95% t UCL (assumes normality of ROS data)	1.358			95% Percentile Bootstrap UCL	1.347	
371						95% BCA Bootstrap UCL	1.371			95% Bootstrap t UCL	1.475	
372						95% H-UCL (Log ROS)	1.752					
373												
374	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
375						KM Mean (logged)	-0.473			KM Geo Mean	0.623	
376						KM SD (logged)	0.944			95% Critical H Value (KM-Log)	2.326	
377						KM Standard Error of Mean (logged)	0.159			95% H-UCL (KM -Log)	1.403	
378						KM SD (logged)	0.944			95% Critical H Value (KM-Log)	2.326	
379						KM Standard Error of Mean (logged)	0.159					
380												
381	**DL/2 Statistics**											
382					**DL/2 Normal**					**DL/2 Log-Transformed**		
383						Mean in Original Scale	1.025			Mean in Log Scale	-0.646	
384						SD in Original Scale	1.26			SD in Log Scale	1.191	
385						95% t UCL (Assumes normality)	1.375			95% H-Stat UCL	1.792	
386	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
387												
388	**Nonparametric Distribution Free UCL Statistics**											
389	**Data do not follow a Discernible Distribution**											
390												
391	**Suggested UCL to Use**											
392						95% KM (t) UCL	1.387					
393												
394	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
395	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
396	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
397												
398	**Cr**											
399												
400	**General Statistics**											
401						Total Number of Observations	57			Number of Distinct Observations	46	
402										Number of Missing Observations	9	
403						Number of Detects	52			Number of Non-Detects	5	
404						Number of Distinct Detects	44			Number of Distinct Non-Detects	3	
405						Minimum Detect	1.5			Minimum Non-Detect	0.98	
406						Maximum Detect	54			Maximum Non-Detect	2.5	
407						Variance Detects	134.9			Percent Non-Detects	8.772%	
408						Mean Detects	12.62			SD Detects	11.62	
409						Median Detects	7.3			CV Detects	0.92	
410						Skewness Detects	1.657			Kurtosis Detects	2.857	
411						Mean of Logged Detects	2.152			SD of Logged Detects	0.894	
412												
413	**Normal GOF Test on Detects Only**											
414						Shapiro Wilk Test Statistic	0.814			**Normal GOF Test on Detected Observations Only**		
415						1% Shapiro Wilk P Value	1.8057E-8			Detected Data Not Normal at 1% Significance Level		
416						Lilliefors Test Statistic	0.19			**Lilliefors GOF Test**		

417				1% Lilliefors Critical Value		0.141	Detected Data Not Normal at 1% Significance Level					
418	**Detected Data Not Normal at 1% Significance Level**											
419												
420	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
421				KM Mean		11.61	KM Standard Error of Mean					1.533
422				90KM SD		11.46	95% KM (BCA) UCL					14.37
423				95% KM (t) UCL		14.17	95% KM (Percentile Bootstrap) UCL					14.32
424				95% KM (z) UCL		14.13	95% KM Bootstrap t UCL					14.64
425				90% KM Chebyshev UCL		16.21	95% KM Chebyshev UCL					18.29
426				97.5% KM Chebyshev UCL		21.18	99% KM Chebyshev UCL					26.86
427												
428	**Gamma GOF Tests on Detected Observations Only**											
429				A-D Test Statistic		0.955	**Anderson-Darling GOF Test**					
430				5% A-D Critical Value		0.769	Detected Data Not Gamma Distributed at 5% Significance Level					
431				K-S Test Statistic		0.134	**Kolmogorov-Smirnov GOF**					
432				5% K-S Critical Value		0.125	Detected Data Not Gamma Distributed at 5% Significance Level					
433	**Detected Data Not Gamma Distributed at 5% Significance Level**											
434												
435	**Gamma Statistics on Detected Data Only**											
436				k hat (MLE)		1.45	k star (bias corrected MLE)					1.379
437				Theta hat (MLE)		8.705	Theta star (bias corrected MLE)					9.152
438				nu hat (MLE)		150.8	nu star (bias corrected)					143.4
439				Mean (detects)		12.62						
440												
441	**Gamma ROS Statistics using Imputed Non-Detects**											
442	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
443	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
444	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
445	This is especially true when the sample size is small.											
446	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
447				Minimum		0.01	Mean					11.51
448				Maximum		54	Median					7
449				SD		11.65	CV					1.012
450				k hat (MLE)		0.686	k star (bias corrected MLE)					0.661
451				Theta hat (MLE)		16.79	Theta star (bias corrected MLE)					17.41
452				nu hat (MLE)		78.16	nu star (bias corrected)					75.38
453				Adjusted Level of Significance (β)		0.0458						
454				Approximate Chi Square Value (75.38, α)		56.38	Adjusted Chi Square Value (75.38, β)					55.96
455				95% Gamma Approximate UCL		15.39	95% Gamma Adjusted UCL					15.51
456												
457	**Estimates of Gamma Parameters using KM Estimates**											
458				Mean (KM)		11.61	SD (KM)					11.46
459				Variance (KM)		131.3	SE of Mean (KM)					1.533
460				k hat (KM)		1.026	k star (KM)					0.984
461				nu hat (KM)		117	nu star (KM)					112.2
462				theta hat (KM)		11.31	theta star (KM)					11.8
463				80% gamma percentile (KM)		18.71	90% gamma percentile (KM)					26.84
464				95% gamma percentile (KM)		34.98	99% gamma percentile (KM)					53.9
465												
466	**Gamma Kaplan-Meier (KM) Statistics**											
467				Approximate Chi Square Value (112.18, α)		88.73	Adjusted Chi Square Value (112.18, β)					88.19
468				95% KM Approximate Gamma UCL		14.68	95% KM Adjusted Gamma UCL					14.77

469												
470	**Lognormal GOF Test on Detected Observations Only**											
471					Shapiro Wilk Approximate Test Statistic	0.96	**Shapiro Wilk GOF Test**					
472					10% Shapiro Wilk P Value	0.138	Detected Data appear Lognormal at 10% Significance Level					
473					Lilliefors Test Statistic	0.0967	**Lilliefors GOF Test**					
474					10% Lilliefors Critical Value	0.112	Detected Data appear Lognormal at 10% Significance Level					
475	**Detected Data appear Lognormal at 10% Significance Level**											
476												
477	**Lognormal ROS Statistics Using Imputed Non-Detects**											
478					Mean in Original Scale	11.62	Mean in Log Scale	1.976				
479					SD in Original Scale	11.56	SD in Log Scale	1.031				
480					95% t UCL (assumes normality of ROS data)	14.18	95% Percentile Bootstrap UCL	14.11				
481					95% BCA Bootstrap UCL	14.32	95% Bootstrap t UCL	14.74				
482					95% H-UCL (Log ROS)	17.03						
483												
484	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
485					KM Mean (logged)	1.97	KM Geo Mean	7.171				
486					KM SD (logged)	1.032	95% Critical H Value (KM-Log)	2.382				
487					KM Standard Error of Mean (logged)	0.138	95% H-UCL (KM -Log)	16.97				
488					KM SD (logged)	1.032	95% Critical H Value (KM-Log)	2.382				
489					KM Standard Error of Mean (logged)	0.138						
490												
491	**DL/2 Statistics**											
492					**DL/2 Normal**		**DL/2 Log-Transformed**					
493					Mean in Original Scale	11.58	Mean in Log Scale	1.933				
494					SD in Original Scale	11.59	SD in Log Scale	1.12				
495					95% t UCL (Assumes normality)	14.15	95% H-Stat UCL	18.87				
496	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
497												
498	**Nonparametric Distribution Free UCL Statistics**											
499	**Detected Data appear Lognormal Distributed at 10% Significance Level**											
500												
501	**Suggested UCL to Use**											
502					KM H-UCL	16.97						
503												
504	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
505	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
506	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
507												
508	**Co**											
509												
510	**General Statistics**											
511					Total Number of Observations	37	Number of Distinct Observations	33				
512							Number of Missing Observations	17				
513					Number of Detects	35	Number of Non-Detects	2				
514					Number of Distinct Detects	32	Number of Distinct Non-Detects	1				
515					Minimum Detect	1	Minimum Non-Detect	0.98				
516					Maximum Detect	29	Maximum Non-Detect	0.98				
517					Variance Detects	47.75	Percent Non-Detects	5.405%				
518					Mean Detects	9.214	SD Detects	6.91				
519					Median Detects	6.9	CV Detects	0.75				
520					Skewness Detects	1.551	Kurtosis Detects	1.741				

521				Mean of Logged Detects	1.976					SD of Logged Detects	0.728	
522												
523				**Normal GOF Test on Detects Only**								
524				Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk GOF Test**						
525				1% Shapiro Wilk Critical Value	0.91	Detected Data Not Normal at 1% Significance Level						
526				Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**						
527				1% Lilliefors Critical Value	0.172	Detected Data Not Normal at 1% Significance Level						
528				**Detected Data Not Normal at 1% Significance Level**								
529												
530				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**								
531				KM Mean	8.769	KM Standard Error of Mean	1.148					
532				90KM SD	6.881	95% KM (BCA) UCL	10.73					
533				95% KM (t) UCL	10.71	95% KM (Percentile Bootstrap) UCL	10.7					
534				95% KM (z) UCL	10.66	95% KM Bootstrap t UCL	11.11					
535				90% KM Chebyshev UCL	12.21	95% KM Chebyshev UCL	13.77					
536				97.5% KM Chebyshev UCL	15.94	99% KM Chebyshev UCL	20.19					
537												
538				**Gamma GOF Tests on Detected Observations Only**								
539				A-D Test Statistic	0.893	**Anderson-Darling GOF Test**						
540				5% A-D Critical Value	0.759	Detected Data Not Gamma Distributed at 5% Significance Level						
541				K-S Test Statistic	0.164	**Kolmogorov-Smirnov GOF**						
542				5% K-S Critical Value	0.15	Detected Data Not Gamma Distributed at 5% Significance Level						
543				**Detected Data Not Gamma Distributed at 5% Significance Level**								
544												
545				**Gamma Statistics on Detected Data Only**								
546				k hat (MLE)	2.191	k star (bias corrected MLE)	2.023					
547				Theta hat (MLE)	4.205	Theta star (bias corrected MLE)	4.556					
548				nu hat (MLE)	153.4	nu star (bias corrected)	141.6					
549				Mean (detects)	9.214							
550												
551				**Gamma ROS Statistics using Imputed Non-Detects**								
552				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
553				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
554				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
555				This is especially true when the sample size is small.								
556				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
557				Minimum	0.01	Mean	8.717					
558				Maximum	29	Median	6.8					
559				SD	7.039	CV	0.808					
560				k hat (MLE)	1.052	k star (bias corrected MLE)	0.985					
561				Theta hat (MLE)	8.285	Theta star (bias corrected MLE)	8.851					
562				nu hat (MLE)	77.86	nu star (bias corrected)	72.88					
563				Adjusted Level of Significance (β)	0.0431							
564				Approximate Chi Square Value (72.88, α)	54.22	Adjusted Chi Square Value (72.88, β)	53.52					
565				95% Gamma Approximate UCL	11.72	95% Gamma Adjusted UCL	11.87					
566												
567				**Estimates of Gamma Parameters using KM Estimates**								
568				Mean (KM)	8.769	SD (KM)	6.881					
569				Variance (KM)	47.35	SE of Mean (KM)	1.148					
570				k hat (KM)	1.624	k star (KM)	1.51					
571				nu hat (KM)	120.2	nu star (KM)	111.8					
572				theta hat (KM)	5.399	theta star (KM)	5.806					

573				80% gamma percentile (KM)		13.56			90% gamma percentile (KM)			18.24
574				95% gamma percentile (KM)		22.79			99% gamma percentile (KM)			33.05
575												
576						**Gamma Kaplan-Meier (KM) Statistics**							
577				Approximate Chi Square Value (111.77, α)		88.37			Adjusted Chi Square Value (111.77, β)			87.47
578				95% KM Approximate Gamma UCL		11.09			95% KM Adjusted Gamma UCL			11.21
579												
580						**Lognormal GOF Test on Detected Observations Only**							
581				Shapiro Wilk Test Statistic		0.96			**Shapiro Wilk GOF Test**			
582				10% Shapiro Wilk Critical Value		0.944			Detected Data appear Lognormal at 10% Significance Level			
583				Lilliefors Test Statistic		0.126			**Lilliefors GOF Test**			
584				10% Lilliefors Critical Value		0.136			Detected Data appear Lognormal at 10% Significance Level			
585						**Detected Data appear Lognormal at 10% Significance Level**							
586												
587						**Lognormal ROS Statistics Using Imputed Non-Detects**							
588				Mean in Original Scale		8.787			Mean in Log Scale			1.883
589				SD in Original Scale		6.956			SD in Log Scale			0.809
590				95% t UCL (assumes normality of ROS data)		10.72			95% Percentile Bootstrap UCL			10.69
591				95% BCA Bootstrap UCL		10.77			95% Bootstrap t UCL			11.24
592				95% H-UCL (Log ROS)		12.25						
593												
594						**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
595				KM Mean (logged)		1.868			KM Geo Mean			6.473
596				KM SD (logged)		0.831			95% Critical H Value (KM-Log)			2.207
597				KM Standard Error of Mean (logged)		0.139			95% H-UCL (KM -Log)			12.41
598				KM SD (logged)		0.831			95% Critical H Value (KM-Log)			2.207
599				KM Standard Error of Mean (logged)		0.139						
600												
601						**DL/2 Statistics**							
602				**DL/2 Normal**					**DL/2 Log-Transformed**			
603				Mean in Original Scale		8.743			Mean in Log Scale			1.83
604				SD in Original Scale		7.007			SD in Log Scale			0.938
605				95% t UCL (Assumes normality)		10.69			95% H-Stat UCL			13.92
606						**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
607												
608						**Nonparametric Distribution Free UCL Statistics**							
609						**Detected Data appear Lognormal Distributed at 10% Significance Level**							
610												
611						**Suggested UCL to Use**							
612				KM H-UCL		12.41						
613												
614						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
615						Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
616						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
617												
618												
619	**Cu**											
620												
621						**General Statistics**							
622				Total Number of Observations		37			Number of Distinct Observations			33
623									Number of Missing Observations			17
624				Minimum		3.5			Mean			36.5

625					Maximum	97.3				Median		29.3
626					SD	25.48				Std. Error of Mean		4.189
627					Coefficient of Variation	0.698				Skewness		1.303
628												
629					**Normal GOF Test**							
630					Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk GOF Test**					
631					1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level					
632					Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**					
633					1% Lilliefors Critical Value	0.168	Data Not Normal at 1% Significance Level					
634					**Data appear Approximate Normal at 1% Significance Level**							
635												
636					**Assuming Normal Distribution**							
637					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
638					95% Student's-t UCL	43.58	95% Adjusted-CLT UCL (Chen-1995)					44.35
639							95% Modified-t UCL (Johnson-1978)					43.72
640												
641					**Gamma GOF Test**							
642					A-D Test Statistic	1.045	**Anderson-Darling Gamma GOF Test**					
643					5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level					
644					K-S Test Statistic	0.177	**Kolmogorov-Smirnov Gamma GOF Test**					
645					5% K-S Critical Value	0.147	Data Not Gamma Distributed at 5% Significance Level					
646					**Data Not Gamma Distributed at 5% Significance Level**							
647												
648					**Gamma Statistics**							
649					k hat (MLE)	2.288	k star (bias corrected MLE)					2.12
650					Theta hat (MLE)	15.96	Theta star (bias corrected MLE)					17.22
651					nu hat (MLE)	169.3	nu star (bias corrected)					156.9
652					MLE Mean (bias corrected)	36.5	MLE Sd (bias corrected)					25.07
653							Approximate Chi Square Value (0.05)					128.9
654					Adjusted Level of Significance	0.0431	Adjusted Chi Square Value					127.8
655												
656					**Assuming Gamma Distribution**							
657					95% Approximate Gamma UCL	44.42	95% Adjusted Gamma UCL					44.8
658												
659					**Lognormal GOF Test**							
660					Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk Lognormal GOF Test**					
661					10% Shapiro Wilk Critical Value	0.946	Data Not Lognormal at 10% Significance Level					
662					Lilliefors Test Statistic	0.166	**Lilliefors Lognormal GOF Test**					
663					10% Lilliefors Critical Value	0.132	Data Not Lognormal at 10% Significance Level					
664					**Data Not Lognormal at 10% Significance Level**							
665												
666					**Lognormal Statistics**							
667					Minimum of Logged Data	1.253	Mean of logged Data					3.363
668					Maximum of Logged Data	4.578	SD of logged Data					0.734
669												
670					**Assuming Lognormal Distribution**							
671					95% H-UCL	48.94	90% Chebyshev (MVUE) UCL					52.31
672					95% Chebyshev (MVUE) UCL	59.04	97.5% Chebyshev (MVUE) UCL					68.37
673					99% Chebyshev (MVUE) UCL	86.71						
674												
675					**Nonparametric Distribution Free UCL Statistics**							
676					**Data appear to follow a Discernible Distribution**							

677											
678	**Nonparametric Distribution Free UCLs**										
679				95% CLT UCL	43.39			95% BCA Bootstrap UCL	43.97		
680				95% Standard Bootstrap UCL	43.45			95% Bootstrap-t UCL	44.93		
681				95% Hall's Bootstrap UCL	44.29			95% Percentile Bootstrap UCL	43.47		
682				90% Chebyshev(Mean, Sd) UCL	49.07			95% Chebyshev(Mean, Sd) UCL	54.76		
683				97.5% Chebyshev(Mean, Sd) UCL	62.66			99% Chebyshev(Mean, Sd) UCL	78.18		
684											
685	**Suggested UCL to Use**										
686				95% Student's-t UCL	43.58						
687											
688	When a data set follows an approximate distribution passing only one of the GOF tests,										
689	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL										
690											
691	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
692	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.										
693	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
694											
695	**Pb**										
696											
697	**General Statistics**										
698				Total Number of Observations	55			Number of Distinct Observations	42		
699				Number of Detects	51			Number of Non-Detects	4		
700				Number of Distinct Detects	40			Number of Distinct Non-Detects	2		
701				Minimum Detect	7.2			Minimum Non-Detect	7.4		
702				Maximum Detect	400			Maximum Non-Detect	7.5		
703				Variance Detects	3077			Percent Non-Detects	7.273%		
704				Mean Detects	36.29			SD Detects	55.47		
705				Median Detects	23			CV Detects	1.529		
706				Skewness Detects	5.853			Kurtosis Detects	38.54		
707				Mean of Logged Detects	3.189			SD of Logged Detects	0.805		
708											
709	**Normal GOF Test on Detects Only**										
710				Shapiro Wilk Test Statistic	0.426			**Normal GOF Test on Detected Observations Only**			
711				1% Shapiro Wilk P Value	0			Detected Data Not Normal at 1% Significance Level			
712				Lilliefors Test Statistic	0.3			**Lilliefors GOF Test**			
713				1% Lilliefors Critical Value	0.143			Detected Data Not Normal at 1% Significance Level			
714	**Detected Data Not Normal at 1% Significance Level**										
715											
716	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
717				KM Mean	34.17			KM Standard Error of Mean	7.275		
718				90KM SD	53.42			95% KM (BCA) UCL	48.31		
719				95% KM (t) UCL	46.35			95% KM (Percentile Bootstrap) UCL	47.31		
720				95% KM (z) UCL	46.14			95% KM Bootstrap t UCL	62.5		
721				90% KM Chebyshev UCL	56			95% KM Chebyshev UCL	65.89		
722				97.5% KM Chebyshev UCL	79.61			99% KM Chebyshev UCL	106.6		
723											
724	**Gamma GOF Tests on Detected Observations Only**										
725				A-D Test Statistic	1.721			**Anderson-Darling GOF Test**			
726				5% A-D Critical Value	0.77			Detected Data Not Gamma Distributed at 5% Significance Level			
727				K-S Test Statistic	0.121			**Kolmogorov-Smirnov GOF**			
728				5% K-S Critical Value	0.127			Detected data appear Gamma Distributed at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
730												
731	**Gamma Statistics on Detected Data Only**											
732					k hat (MLE)	1.386			k star (bias corrected MLE)	1.317		
733					Theta hat (MLE)	26.18			Theta star (bias corrected MLE)	27.54		
734					nu hat (MLE)	141.4			nu star (bias corrected)	134.4		
735					Mean (detects)	36.29						
736												
737	**Gamma ROS Statistics using Imputed Non-Detects**											
738	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
739	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
740	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
741	This is especially true when the sample size is small.											
742	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
743					Minimum	0.01			Mean	33.65		
744					Maximum	400			Median	23		
745					SD	54.21			CV	1.611		
746					k hat (MLE)	0.679			k star (bias corrected MLE)	0.654		
747					Theta hat (MLE)	49.55			Theta star (bias corrected MLE)	51.44		
748					nu hat (MLE)	74.7			nu star (bias corrected)	71.96		
749					Adjusted Level of Significance (β)	0.0456						
750					Approximate Chi Square Value (71.96, α)	53.43			Adjusted Chi Square Value (71.96, β)	53		
751					95% Gamma Approximate UCL	45.32			95% Gamma Adjusted UCL	45.69		
752												
753	**Estimates of Gamma Parameters using KM Estimates**											
754					Mean (KM)	34.17			SD (KM)	53.42		
755					Variance (KM)	2854			SE of Mean (KM)	7.275		
756					k hat (KM)	0.409			k star (KM)	0.399		
757					nu hat (KM)	45.01			nu star (KM)	43.89		
758					theta hat (KM)	83.52			theta star (KM)	85.65		
759					80% gamma percentile (KM)	55.14			90% gamma percentile (KM)	96.57		
760					95% gamma percentile (KM)	142.1			99% gamma percentile (KM)	256.7		
761												
762	**Gamma Kaplan-Meier (KM) Statistics**											
763					Approximate Chi Square Value (43.89, α)	29.69			Adjusted Chi Square Value (43.89, β)	29.38		
764					95% KM Approximate Gamma UCL	50.51			95% KM Adjusted Gamma UCL	51.05		
765												
766	**Lognormal GOF Test on Detected Observations Only**											
767					Shapiro Wilk Approximate Test Statistic	0.928			**Shapiro Wilk GOF Test**			
768					10% Shapiro Wilk P Value	0.00489			Detected Data Not Lognormal at 10% Significance Level			
769					Lilliefors Test Statistic	0.103			**Lilliefors GOF Test**			
770					10% Lilliefors Critical Value	0.113			Detected Data appear Lognormal at 10% Significance Level			
771	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
772												
773	**Lognormal ROS Statistics Using Imputed Non-Detects**											
774					Mean in Original Scale	33.98			Mean in Log Scale	3.066		
775					SD in Original Scale	54.02			SD in Log Scale	0.894		
776					95% t UCL (assumes normality of ROS data)	46.17			95% Percentile Bootstrap UCL	47.32		
777					95% BCA Bootstrap UCL	52.86			95% Bootstrap t UCL	62.36		
778					95% H-UCL (Log ROS)	41.87						
779												
780	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											

781				KM Mean (logged)	3.101				KM Geo Mean		22.22
782				KM SD (logged)	0.83				95% Critical H Value (KM-Log)		2.15
783				KM Standard Error of Mean (logged)	0.113				95% H-UCL (KM -Log)		39.97
784				KM SD (logged)	0.83				95% Critical H Value (KM-Log)		2.15
785				KM Standard Error of Mean (logged)	0.113						
786											
787					**DL/2 Statistics**						
788				**DL/2 Normal**					**DL/2 Log-Transformed**		
789				Mean in Original Scale	33.92				Mean in Log Scale		3.053
790				SD in Original Scale	54.05				SD in Log Scale		0.917
791				95% t UCL (Assumes normality)	46.12				95% H-Stat UCL		42.64
792					**DL/2 is not a recommended method, provided for comparisons and historical reasons**						
793											
794					**Nonparametric Distribution Free UCL Statistics**						
795					**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**						
796											
797					**Suggested UCL to Use**						
798				95% KM Approximate Gamma UCL	50.51				95% GROS Approximate Gamma UCL		45.32
799											
800					**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**						
801					**Please verify the data were collected from random locations.**						
802					**If the data were collected using judgmental or other non-random methods,**						
803					**then contact a statistician to correctly calculate UCLs.**						
804											
805					When a data set follows an approximate distribution passing only one of the GOF tests,						
806					it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL						
807											
808					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
809					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.						
810					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
811											
812	**Hg**										
813											
814					**General Statistics**						
815				Total Number of Observations	55				Number of Distinct Observations		33
816				Number of Detects	45				Number of Non-Detects		10
817				Number of Distinct Detects	32				Number of Distinct Non-Detects		2
818				Minimum Detect	0.099				Minimum Non-Detect		0.1
819				Maximum Detect	15				Maximum Non-Detect		0.2
820				Variance Detects	9.563				Percent Non-Detects		18.18%
821				Mean Detects	2.839				SD Detects		3.092
822				Median Detects	2				CV Detects		1.089
823				Skewness Detects	1.911				Kurtosis Detects		4.498
824				Mean of Logged Detects	0.427				SD of Logged Detects		1.229
825											
826					**Normal GOF Test on Detects Only**						
827				Shapiro Wilk Test Statistic	0.799				**Shapiro Wilk GOF Test**		
828				1% Shapiro Wilk Critical Value	0.926				Detected Data Not Normal at 1% Significance Level		
829				Lilliefors Test Statistic	0.188				**Lilliefors GOF Test**		
830				1% Lilliefors Critical Value	0.153				Detected Data Not Normal at 1% Significance Level		
831					**Detected Data Not Normal at 1% Significance Level**						
832											

	A	B	C	D	E	F	G	H	I	J	K	L
833	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
834					KM Mean	2.341			KM Standard Error of Mean			0.404
835					90KM SD	2.961			95% KM (BCA) UCL			3.071
836					95% KM (t) UCL	3.017			95% KM (Percentile Bootstrap) UCL			3.035
837					95% KM (z) UCL	3.006			95% KM Bootstrap t UCL			3.197
838					90% KM Chebyshev UCL	3.553			95% KM Chebyshev UCL			4.101
839					97.5% KM Chebyshev UCL	4.863			99% KM Chebyshev UCL			6.359
840												
841	**Gamma GOF Tests on Detected Observations Only**											
842					A-D Test Statistic	0.347	**Anderson-Darling GOF Test**					
843					5% A-D Critical Value	0.78	Detected data appear Gamma Distributed at 5% Significance Level					
844					K-S Test Statistic	0.108	**Kolmogorov-Smirnov GOF**					
845					5% K-S Critical Value	0.136	Detected data appear Gamma Distributed at 5% Significance Level					
846	**Detected data appear Gamma Distributed at 5% Significance Level**											
847												
848	**Gamma Statistics on Detected Data Only**											
849					k hat (MLE)	0.942			k star (bias corrected MLE)			0.894
850					Theta hat (MLE)	3.014			Theta star (bias corrected MLE)			3.175
851					nu hat (MLE)	84.79			nu star (bias corrected)			80.47
852					Mean (detects)	2.839						
853												
854	**Gamma ROS Statistics using Imputed Non-Detects**											
855	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
856	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
857	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
858	This is especially true when the sample size is small.											
859	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
860					Minimum	0.01			Mean			2.325
861					Maximum	15			Median			1.2
862					SD	3.001			CV			1.291
863					k hat (MLE)	0.48			k star (bias corrected MLE)			0.466
864					Theta hat (MLE)	4.844			Theta star (bias corrected MLE)			4.991
865					nu hat (MLE)	52.79			nu star (bias corrected)			51.24
866					Adjusted Level of Significance (β)	0.0456						
867					Approximate Chi Square Value (51.24, α)	35.8			Adjusted Chi Square Value (51.24, β)			35.46
868					95% Gamma Approximate UCL	3.327			95% Gamma Adjusted UCL			3.36
869												
870	**Estimates of Gamma Parameters using KM Estimates**											
871					Mean (KM)	2.341			SD (KM)			2.961
872					Variance (KM)	8.766			SE of Mean (KM)			0.404
873					k hat (KM)	0.625			k star (KM)			0.603
874					nu hat (KM)	68.8			nu star (KM)			66.38
875					theta hat (KM)	3.744			theta star (KM)			3.88
876					80% gamma percentile (KM)	3.859			90% gamma percentile (KM)			6.082
877					95% gamma percentile (KM)	8.408			99% gamma percentile (KM)			14.03
878												
879	**Gamma Kaplan-Meier (KM) Statistics**											
880					Approximate Chi Square Value (66.38, α)	48.63			Adjusted Chi Square Value (66.38, β)			48.22
881					95% KM Approximate Gamma UCL	3.196			95% KM Adjusted Gamma UCL			3.223
882												
883	**Lognormal GOF Test on Detected Observations Only**											
884					Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**					

885				10% Shapiro Wilk Critical Value	0.953	Detected Data appear Lognormal at 10% Significance Level						
886				Lilliefors Test Statistic	0.097	**Lilliefors GOF Test**						
887				10% Lilliefors Critical Value	0.12	Detected Data appear Lognormal at 10% Significance Level						
888	**Detected Data appear Lognormal at 10% Significance Level**											
889												
890	**Lognormal ROS Statistics Using Imputed Non-Detects**											
891				Mean in Original Scale	2.347	Mean in Log Scale	-0.0434					
892				SD in Original Scale	2.984	SD in Log Scale	1.512					
893				95% t UCL (assumes normality of ROS data)	3.02	95% Percentile Bootstrap UCL	3.036					
894				95% BCA Bootstrap UCL	3.088	95% Bootstrap t UCL	3.203					
895				95% H-UCL (Log ROS)	5.611							
896												
897	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
898				KM Mean (logged)	-0.068	KM Geo Mean	0.934					
899				KM SD (logged)	1.52	95% Critical H Value (KM-Log)	3.044					
900				KM Standard Error of Mean (logged)	0.207	95% H-UCL (KM -Log)	5.564					
901				KM SD (logged)	1.52	95% Critical H Value (KM-Log)	3.044					
902				KM Standard Error of Mean (logged)	0.207							
903												
904	**DL/2 Statistics**											
905	**DL/2 Normal**					**DL/2 Log-Transformed**						
906				Mean in Original Scale	2.337	Mean in Log Scale	-0.133					
907				SD in Original Scale	2.992	SD in Log Scale	1.639					
908				95% t UCL (Assumes normality)	3.012	95% H-Stat UCL	6.85					
909	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
910												
911	**Nonparametric Distribution Free UCL Statistics**											
912	**Detected Data appear Gamma Distributed at 5% Significance Level**											
913												
914	**Suggested UCL to Use**											
915				95% KM Approximate Gamma UCL	3.196							
916												
917	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
918	**Please verify the data were collected from random locations.**											
919	**If the data were collected using judgmental or other non-random methods,**											
920	**then contact a statistician to correctly calculate UCLs.**											
921												
922	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
923	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
924	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
925												
926	**Mo**											
927												
928	**General Statistics**											
929				Total Number of Observations	37	Number of Distinct Observations	26					
930						Number of Missing Observations	17					
931				Number of Detects	24	Number of Non-Detects	13					
932				Number of Distinct Detects	20	Number of Distinct Non-Detects	6					
933				Minimum Detect	0.27	Minimum Non-Detect	0.25					
934				Maximum Detect	5.5	Maximum Non-Detect	10					
935				Variance Detects	1.748	Percent Non-Detects	35.14%					
936				Mean Detects	2.226	SD Detects	1.322					

937				Median Detects	1.75					CV Detects	0.594	
938				Skewness Detects	0.636					Kurtosis Detects	-0.174	
939				Mean of Logged Detects	0.596					SD of Logged Detects	0.71	
940												
941				**Normal GOF Test on Detects Only**								
942				Shapiro Wilk Test Statistic	0.936			**Shapiro Wilk GOF Test**				
943				1% Shapiro Wilk Critical Value	0.884			Detected Data appear Normal at 1% Significance Level				
944				Lilliefors Test Statistic	0.182			**Lilliefors GOF Test**				
945				1% Lilliefors Critical Value	0.205			Detected Data appear Normal at 1% Significance Level				
946				**Detected Data appear Normal at 1% Significance Level**								
947												
948				**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**								
949				KM Mean	1.846			KM Standard Error of Mean	0.259			
950				90KM SD	1.388			95% KM (BCA) UCL	2.269			
951				95% KM (t) UCL	2.283			95% KM (Percentile Bootstrap) UCL	2.278			
952				95% KM (z) UCL	2.272			95% KM Bootstrap t UCL	2.336			
953				90% KM Chebyshev UCL	2.623			95% KM Chebyshev UCL	2.976			
954				97.5% KM Chebyshev UCL	3.465			99% KM Chebyshev UCL	4.425			
955				**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**								
956												
957				**Gamma GOF Tests on Detected Observations Only**								
958				A-D Test Statistic	0.404			**Anderson-Darling GOF Test**				
959				5% A-D Critical Value	0.753			Detected data appear Gamma Distributed at 5% Significance Level				
960				K-S Test Statistic	0.117			**Kolmogorov-Smirnov GOF**				
961				5% K-S Critical Value	0.18			Detected data appear Gamma Distributed at 5% Significance Level				
962				**Detected data appear Gamma Distributed at 5% Significance Level**								
963												
964				**Gamma Statistics on Detected Data Only**								
965				k hat (MLE)	2.604			k star (bias corrected MLE)	2.306			
966				Theta hat (MLE)	0.855			Theta star (bias corrected MLE)	0.965			
967				nu hat (MLE)	125			nu star (bias corrected)	110.7			
968				Mean (detects)	2.226							
969												
970				**Gamma ROS Statistics using Imputed Non-Detects**								
971				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
972				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
973				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
974				This is especially true when the sample size is small.								
975				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
976				Minimum	0.01			Mean	1.791			
977				Maximum	5.5			Median	1.5			
978				SD	1.331			CV	0.743			
979				k hat (MLE)	1.227			k star (bias corrected MLE)	1.145			
980				Theta hat (MLE)	1.46			Theta star (bias corrected MLE)	1.564			
981				nu hat (MLE)	90.77			nu star (bias corrected)	84.75			
982				Adjusted Level of Significance (β)	0.0431							
983				Approximate Chi Square Value (84.75, α)	64.53			Adjusted Chi Square Value (84.75, β)	63.76			
984				95% Gamma Approximate UCL	2.352			95% Gamma Adjusted UCL	2.38			
985												
986				**Estimates of Gamma Parameters using KM Estimates**								
987				Mean (KM)	1.846			SD (KM)	1.388			
988				Variance (KM)	1.925			SE of Mean (KM)	0.259			

989					k hat (KM)	1.769					k star (KM)	1.644
990					nu hat (KM)	130.9					nu star (KM)	121.6
991					theta hat (KM)	1.043					theta star (KM)	1.123
992					80% gamma percentile (KM)	2.827					90% gamma percentile (KM)	3.761
993					95% gamma percentile (KM)	4.664					99% gamma percentile (KM)	6.69
994												
995					**Gamma Kaplan-Meier (KM) Statistics**							
996					Approximate Chi Square Value (121.64, α)	97.17					Adjusted Chi Square Value (121.64, β)	96.22
997					95% KM Approximate Gamma UCL	2.31					95% KM Adjusted Gamma UCL	2.333
998					**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**							
999												
1000					**Lognormal GOF Test on Detected Observations Only**							
1001					Shapiro Wilk Test Statistic	0.94					**Shapiro Wilk GOF Test**	
1002					10% Shapiro Wilk Critical Value	0.93					Detected Data appear Lognormal at 10% Significance Level	
1003					Lilliefors Test Statistic	0.129					**Lilliefors GOF Test**	
1004					10% Lilliefors Critical Value	0.162					Detected Data appear Lognormal at 10% Significance Level	
1005					**Detected Data appear Lognormal at 10% Significance Level**							
1006												
1007					**Lognormal ROS Statistics Using Imputed Non-Detects**							
1008					Mean in Original Scale	1.8					Mean in Log Scale	0.304
1009					SD in Original Scale	1.288					SD in Log Scale	0.814
1010					95% t UCL (assumes normality of ROS data)	2.158					95% Percentile Bootstrap UCL	2.142
1011					95% BCA Bootstrap UCL	2.162					95% Bootstrap t UCL	2.19
1012					95% H-UCL (Log ROS)	2.54						
1013												
1014					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1015					KM Mean (logged)	0.234					KM Geo Mean	1.263
1016					KM SD (logged)	0.97					95% Critical H Value (KM-Log)	2.355
1017					KM Standard Error of Mean (logged)	0.184					95% H-UCL (KM -Log)	2.958
1018					KM SD (logged)	0.97					95% Critical H Value (KM-Log)	2.355
1019					KM Standard Error of Mean (logged)	0.184						
1020												
1021					**DL/2 Statistics**							
1022					**DL/2 Normal**						**DL/2 Log-Transformed**	
1023					Mean in Original Scale	2.431					Mean in Log Scale	0.463
1024					SD in Original Scale	1.771					SD in Log Scale	1.113
1025					95% t UCL (Assumes normality)	2.922					95% H-Stat UCL	4.711
1026					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
1027												
1028					**Nonparametric Distribution Free UCL Statistics**							
1029					**Detected Data appear Normal Distributed at 1% Significance Level**							
1030												
1031					**Suggested UCL to Use**							
1032					95% KM (t) UCL	2.283						
1033												
1034					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1035					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
1036					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
1037												
1038												
1039	**Ni**											
1040												

1041	**General Statistics**											
1042					Total Number of Observations	55			Number of Distinct Observations			31
1043									Number of Missing Observations			0
1044					Minimum	7			Mean			21.91
1045					Maximum	126			Median			20
1046					SD	16.28			Std. Error of Mean			2.195
1047					Coefficient of Variation	0.743			Skewness			4.982
1048												
1049	**Normal GOF Test**											
1050					Shapiro Wilk Test Statistic	0.572	**Shapiro Wilk GOF Test**					
1051					1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level					
1052					Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**					
1053					1% Lilliefors Critical Value	0.138	Data Not Normal at 1% Significance Level					
1054	**Data Not Normal at 1% Significance Level**											
1055												
1056	**Assuming Normal Distribution**											
1057	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1058					95% Student's-t UCL	25.59			95% Adjusted-CLT UCL (Chen-1995)			27.1
1059									95% Modified-t UCL (Johnson-1978)			25.83
1060												
1061	**Gamma GOF Test**											
1062					A-D Test Statistic	1.201	**Anderson-Darling Gamma GOF Test**					
1063					5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level					
1064					K-S Test Statistic	0.145	**Kolmogorov-Smirnov Gamma GOF Test**					
1065					5% K-S Critical Value	0.121	Data Not Gamma Distributed at 5% Significance Level					
1066	**Data Not Gamma Distributed at 5% Significance Level**											
1067												
1068	**Gamma Statistics**											
1069					k hat (MLE)	3.692			k star (bias corrected MLE)			3.503
1070					Theta hat (MLE)	5.936			Theta star (bias corrected MLE)			6.257
1071					nu hat (MLE)	406.1			nu star (bias corrected)			385.3
1072					MLE Mean (bias corrected)	21.91			MLE Sd (bias corrected)			11.71
1073									Approximate Chi Square Value (0.05)			340.8
1074					Adjusted Level of Significance	0.0456			Adjusted Chi Square Value			339.7
1075												
1076	**Assuming Gamma Distribution**											
1077					95% Approximate Gamma UCL	24.78			95% Adjusted Gamma UCL			24.86
1078												
1079	**Lognormal GOF Test**											
1080					Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**					
1081					10% Shapiro Wilk P Value	0.0158	Data Not Lognormal at 10% Significance Level					
1082					Lilliefors Test Statistic	0.111	**Lilliefors Lognormal GOF Test**					
1083					10% Lilliefors Critical Value	0.109	Data Not Lognormal at 10% Significance Level					
1084	**Data Not Lognormal at 10% Significance Level**											
1085												
1086	**Lognormal Statistics**											
1087					Minimum of Logged Data	1.946			Mean of logged Data			2.946
1088					Maximum of Logged Data	4.836			SD of logged Data			0.501
1089												
1090	**Assuming Lognormal Distribution**											
1091					95% H-UCL	24.51			90% Chebyshev (MVUE) UCL			26.08
1092					95% Chebyshev (MVUE) UCL	28.16			97.5% Chebyshev (MVUE) UCL			31.04

1093				99% Chebyshev (MVUE) UCL		36.69						
1094												
1095	**Nonparametric Distribution Free UCL Statistics**											
1096	**Data do not follow a Discernible Distribution**											
1097												
1098	**Nonparametric Distribution Free UCLs**											
1099				95% CLT UCL		25.52			95% BCA Bootstrap UCL			27.85
1100				95% Standard Bootstrap UCL		25.49			95% Bootstrap-t UCL			28.8
1101				95% Hall's Bootstrap UCL		41.84			95% Percentile Bootstrap UCL			25.72
1102				90% Chebyshev(Mean, Sd) UCL		28.5			95% Chebyshev(Mean, Sd) UCL			31.48
1103				97.5% Chebyshev(Mean, Sd) UCL		35.62			99% Chebyshev(Mean, Sd) UCL			43.75
1104												
1105	**Suggested UCL to Use**											
1106				95% Student's-t UCL		25.59						
1107												
1108	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1109	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1110	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1111												
1112	**Se**											
1113												
1114	**General Statistics**											
1115				Total Number of Observations		37			Number of Distinct Observations			4
1116									Number of Missing Observations			17
1117				Number of Detects		1			Number of Non-Detects			36
1118				Number of Distinct Detects		1			Number of Distinct Non-Detects			4
1119												
1120	**Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!**											
1121	**It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).**											
1122												
1123	**The data set for variable Se was not processed!**											
1124												
1125												
1126	**Ag**											
1127												
1128	**General Statistics**											
1129				Total Number of Observations		37			Number of Distinct Observations			15
1130									Number of Missing Observations			17
1131				Number of Detects		9			Number of Non-Detects			28
1132				Number of Distinct Detects		9			Number of Distinct Non-Detects			6
1133				Minimum Detect		0.4			Minimum Non-Detect			0.25
1134				Maximum Detect		1.2			Maximum Non-Detect			2.5
1135				Variance Detects		0.0477			Percent Non-Detects			75.68%
1136				Mean Detects		0.708			SD Detects			0.218
1137				Median Detects		0.67			CV Detects			0.309
1138				Skewness Detects		1.401			Kurtosis Detects			3.46
1139				Mean of Logged Detects		-0.384			SD of Logged Detects			0.292
1140												
1141	**Normal GOF Test on Detects Only**											
1142				Shapiro Wilk Test Statistic		0.85			**Shapiro Wilk GOF Test**			
1143				1% Shapiro Wilk Critical Value		0.764			Detected Data appear Normal at 1% Significance Level			
1144				Lilliefors Test Statistic		0.292			**Lilliefors GOF Test**			

1145				1% Lilliefors Critical Value		0.316	Detected Data appear Normal at 1% Significance Level					
1146	**Detected Data appear Normal at 1% Significance Level**											
1147	**Note GOF tests may be unreliable for small sample sizes**											
1148												
1149	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1150				KM Mean		0.412	KM Standard Error of Mean					0.0497
1151				90KM SD		0.238	95% KM (BCA) UCL					0.496
1152				95% KM (t) UCL		0.496	95% KM (Percentile Bootstrap) UCL					0.495
1153				95% KM (z) UCL		0.493	95% KM Bootstrap t UCL					0.5
1154				90% KM Chebyshev UCL		0.561	95% KM Chebyshev UCL					0.628
1155				97.5% KM Chebyshev UCL		0.722	99% KM Chebyshev UCL					0.906
1156	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1157												
1158	**Gamma GOF Tests on Detected Observations Only**											
1159				A-D Test Statistic		0.577	**Anderson-Darling GOF Test**					
1160				5% A-D Critical Value		0.722	Detected data appear Gamma Distributed at 5% Significance Level					
1161				K-S Test Statistic		0.257	**Kolmogorov-Smirnov GOF**					
1162				5% K-S Critical Value		0.279	Detected data appear Gamma Distributed at 5% Significance Level					
1163	**Detected data appear Gamma Distributed at 5% Significance Level**											
1164	**Note GOF tests may be unreliable for small sample sizes**											
1165												
1166	**Gamma Statistics on Detected Data Only**											
1167				k hat (MLE)		13.1	k star (bias corrected MLE)					8.809
1168				Theta hat (MLE)		0.054	Theta star (bias corrected MLE)					0.0803
1169				nu hat (MLE)		235.8	nu star (bias corrected)					158.6
1170				Mean (detects)		0.708						
1171												
1172	**Gamma ROS Statistics using Imputed Non-Detects**											
1173	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1174	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1175	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1176	This is especially true when the sample size is small.											
1177	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1178				Minimum		0.01	Mean					0.35
1179				Maximum		1.2	Median					0.308
1180				SD		0.279	CV					0.799
1181				k hat (MLE)		1.122	k star (bias corrected MLE)					1.049
1182				Theta hat (MLE)		0.312	Theta star (bias corrected MLE)					0.333
1183				nu hat (MLE)		83.01	nu star (bias corrected)					77.62
1184				Adjusted Level of Significance (β)		0.0431						
1185				Approximate Chi Square Value (77.62, α)		58.32	Adjusted Chi Square Value (77.62, β)					57.59
1186				95% Gamma Approximate UCL		0.465	95% Gamma Adjusted UCL					0.471
1187												
1188	**Estimates of Gamma Parameters using KM Estimates**											
1189				Mean (KM)		0.412	SD (KM)					0.238
1190				Variance (KM)		0.0565	SE of Mean (KM)					0.0497
1191				k hat (KM)		2.997	k star (KM)					2.772
1192				nu hat (KM)		221.7	nu star (KM)					205.1
1193				theta hat (KM)		0.137	theta star (KM)					0.149
1194				80% gamma percentile (KM)		0.593	90% gamma percentile (KM)					0.743
1195				95% gamma percentile (KM)		0.884	99% gamma percentile (KM)					1.19
1196												

1197	**Gamma Kaplan-Meier (KM) Statistics**											
1198					Approximate Chi Square Value (205.10, α)	173			Adjusted Chi Square Value (205.10, β)		171.7	
1199					95% KM Approximate Gamma UCL	0.488			95% KM Adjusted Gamma UCL		0.492	
1200	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1201												
1202	**Lognormal GOF Test on Detected Observations Only**											
1203					Shapiro Wilk Test Statistic	0.909			**Shapiro Wilk GOF Test**			
1204					10% Shapiro Wilk Critical Value	0.859			Detected Data appear Lognormal at 10% Significance Level			
1205					Lilliefors Test Statistic	0.24			**Lilliefors GOF Test**			
1206					10% Lilliefors Critical Value	0.252			Detected Data appear Lognormal at 10% Significance Level			
1207	**Detected Data appear Lognormal at 10% Significance Level**											
1208	**Note GOF tests may be unreliable for small sample sizes**											
1209												
1210	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1211					Mean in Original Scale	0.432			Mean in Log Scale		-0.941	
1212					SD in Original Scale	0.215			SD in Log Scale		0.448	
1213					95% t UCL (assumes normality of ROS data)	0.492			95% Percentile Bootstrap UCL		0.491	
1214					95% BCA Bootstrap UCL	0.497			95% Bootstrap t UCL		0.503	
1215					95% H-UCL (Log ROS)	0.496						
1216												
1217	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1218					KM Mean (logged)	-1.019			KM Geo Mean		0.361	
1219					KM SD (logged)	0.485			95% Critical H Value (KM-Log)		1.901	
1220					KM Standard Error of Mean (logged)	0.108			95% H-UCL (KM -Log)		0.473	
1221					KM SD (logged)	0.485			95% Critical H Value (KM-Log)		1.901	
1222					KM Standard Error of Mean (logged)	0.108						
1223	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
1224												
1225	**DL/2 Statistics**											
1226					**DL/2 Normal**				**DL/2 Log-Transformed**			
1227					Mean in Original Scale	0.552			Mean in Log Scale		-0.885	
1228					SD in Original Scale	0.414			SD in Log Scale		0.789	
1229					95% t UCL (Assumes normality)	0.667			95% H-Stat UCL		0.749	
1230	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1231												
1232	**Nonparametric Distribution Free UCL Statistics**											
1233	**Detected Data appear Normal Distributed at 1% Significance Level**											
1234												
1235	**Suggested UCL to Use**											
1236					95% KM (t) UCL	0.496						
1237												
1238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1239	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1240	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1241												
1242	**TI**											
1243												
1244	**General Statistics**											
1245					Total Number of Observations	9			Number of Distinct Observations		2	
1246									Number of Missing Observations		43	
1247					Number of Detects	0			Number of Non-Detects		9	
1248					Number of Distinct Detects	0			Number of Distinct Non-Detects		2	

1249												
1250	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1251	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1252	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1253												
1254	**The data set for variable Tl was not processed!**											
1255												
1256												
1257												
1258	V											
1259												
1260	**General Statistics**											
1261	Total Number of Observations			37		Number of Distinct Observations				35		
1262						Number of Missing Observations				17		
1263	Minimum			1.7		Mean				35.82		
1264	Maximum			148		Median				15		
1265	SD			41.95		Std. Error of Mean				6.896		
1266	Coefficient of Variation			1.171		Skewness				1.427		
1267												
1268	**Normal GOF Test**											
1269	Shapiro Wilk Test Statistic			0.768		**Shapiro Wilk GOF Test**						
1270	1% Shapiro Wilk Critical Value			0.814		Data Not Normal at 1% Significance Level						
1271	Lilliefors Test Statistic			0.208		**Lilliefors GOF Test**						
1272	1% Lilliefors Critical Value			0.168		Data Not Normal at 1% Significance Level						
1273	**Data Not Normal at 1% Significance Level**											
1274												
1275	**Assuming Normal Distribution**											
1276	**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**						
1277	95% Student's-t UCL			47.47		95% Adjusted-CLT UCL (Chen-1995)				48.9		
1278						95% Modified-t UCL (Johnson-1978)				47.74		
1279												
1280	**Gamma GOF Test**											
1281	A-D Test Statistic			1.034		**Anderson-Darling Gamma GOF Test**						
1282	5% A-D Critical Value			0.786		Data Not Gamma Distributed at 5% Significance Level						
1283	K-S Test Statistic			0.188		**Kolmogorov-Smirnov Gamma GOF Test**						
1284	5% K-S Critical Value			0.15		Data Not Gamma Distributed at 5% Significance Level						
1285	**Data Not Gamma Distributed at 5% Significance Level**											
1286												
1287	**Gamma Statistics**											
1288	k hat (MLE)			0.795		k star (bias corrected MLE)				0.748		
1289	Theta hat (MLE)			45.09		Theta star (bias corrected MLE)				47.88		
1290	nu hat (MLE)			58.8		nu star (bias corrected)				55.36		
1291	MLE Mean (bias corrected)			35.82		MLE Sd (bias corrected)				41.42		
1292						Approximate Chi Square Value (0.05)				39.26		
1293	Adjusted Level of Significance			0.0431		Adjusted Chi Square Value				38.67		
1294												
1295	**Assuming Gamma Distribution**											
1296	95% Approximate Gamma UCL			50.51		95% Adjusted Gamma UCL				51.28		
1297												
1298	**Lognormal GOF Test**											
1299	Shapiro Wilk Test Statistic			0.939		**Shapiro Wilk Lognormal GOF Test**						
1300	10% Shapiro Wilk Critical Value			0.946		Data Not Lognormal at 10% Significance Level						

1301				Lilliefors Test Statistic	0.147	**Lilliefors Lognormal GOF Test**						
1302				10% Lilliefors Critical Value	0.132	Data Not Lognormal at 10% Significance Level						
1303	**Data Not Lognormal at 10% Significance Level**											
1304												
1305	**Lognormal Statistics**											
1306				Minimum of Logged Data	0.531	Mean of logged Data	2.831					
1307				Maximum of Logged Data	4.997	SD of logged Data	1.318					
1308												
1309	**Assuming Lognormal Distribution**											
1310				95% H-UCL	74.37	90% Chebyshev (MVUE) UCL	70.17					
1311				95% Chebyshev (MVUE) UCL	84.39	97.5% Chebyshev (MVUE) UCL	104.1					
1312				99% Chebyshev (MVUE) UCL	142.9							
1313												
1314	**Nonparametric Distribution Free UCL Statistics**											
1315	**Data do not follow a Discernible Distribution**											
1316												
1317	**Nonparametric Distribution Free UCLs**											
1318				95% CLT UCL	47.17	95% BCA Bootstrap UCL	48.61					
1319				95% Standard Bootstrap UCL	47.21	95% Bootstrap-t UCL	50.09					
1320				95% Hall's Bootstrap UCL	48.87	95% Percentile Bootstrap UCL	47.37					
1321				90% Chebyshev(Mean, Sd) UCL	56.51	95% Chebyshev(Mean, Sd) UCL	65.88					
1322				97.5% Chebyshev(Mean, Sd) UCL	78.89	99% Chebyshev(Mean, Sd) UCL	104.4					
1323												
1324	**Suggested UCL to Use**											
1325				95% Student's-t UCL	47.47							
1326												
1327	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1328	**Please verify the data were collected from random locations.**											
1329	**If the data were collected using judgmental or other non-random methods,**											
1330	**then contact a statistician to correctly calculate UCLs.**											
1331												
1332	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1333	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1334	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1335												
1336												
1337	**Zn**											
1338												
1339	**General Statistics**											
1340				Total Number of Observations	37	Number of Distinct Observations	35					
1341						Number of Missing Observations	17					
1342				Minimum	15.3	Mean	63.92					
1343				Maximum	156	Median	62.8					
1344				SD	23.85	Std. Error of Mean	3.921					
1345				Coefficient of Variation	0.373	Skewness	1.458					
1346												
1347	**Normal GOF Test**											
1348				Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**						
1349				1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level						
1350				Lilliefors Test Statistic	0.135	**Lilliefors GOF Test**						
1351				1% Lilliefors Critical Value	0.168	Data appear Normal at 1% Significance Level						
1352	**Data appear Normal at 1% Significance Level**											

1353												
1354	**Assuming Normal Distribution**											
1355	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1356				95% Student's-t UCL		70.54				95% Adjusted-CLT UCL (Chen-1995)		71.37
1357										95% Modified-t UCL (Johnson-1978)		70.7
1358												
1359	**Gamma GOF Test**											
1360				A-D Test Statistic		0.661	**Anderson-Darling Gamma GOF Test**					
1361				5% A-D Critical Value		0.749	Detected data appear Gamma Distributed at 5% Significance Level					
1362				K-S Test Statistic		0.127	**Kolmogorov-Smirnov Gamma GOF Test**					
1363				5% K-S Critical Value		0.145	Detected data appear Gamma Distributed at 5% Significance Level					
1364	**Detected data appear Gamma Distributed at 5% Significance Level**											
1365												
1366	**Gamma Statistics**											
1367				k hat (MLE)		7.514	k star (bias corrected MLE)					6.923
1368				Theta hat (MLE)		8.507	Theta star (bias corrected MLE)					9.233
1369				nu hat (MLE)		556.1	nu star (bias corrected)					512.3
1370				MLE Mean (bias corrected)		63.92	MLE Sd (bias corrected)					24.29
1371							Approximate Chi Square Value (0.05)					460.8
1372				Adjusted Level of Significance		0.0431	Adjusted Chi Square Value					458.7
1373												
1374	**Assuming Gamma Distribution**											
1375				95% Approximate Gamma UCL		71.06	95% Adjusted Gamma UCL					71.39
1376												
1377	**Lognormal GOF Test**											
1378				Shapiro Wilk Test Statistic		0.931	**Shapiro Wilk Lognormal GOF Test**					
1379				10% Shapiro Wilk Critical Value		0.946	Data Not Lognormal at 10% Significance Level					
1380				Lilliefors Test Statistic		0.153	**Lilliefors Lognormal GOF Test**					
1381				10% Lilliefors Critical Value		0.132	Data Not Lognormal at 10% Significance Level					
1382	**Data Not Lognormal at 10% Significance Level**											
1383												
1384	**Lognormal Statistics**											
1385				Minimum of Logged Data		2.728	Mean of logged Data					4.09
1386				Maximum of Logged Data		5.05	SD of logged Data					0.39
1387												
1388	**Assuming Lognormal Distribution**											
1389				95% H-UCL		72.63	90% Chebyshev (MVUE) UCL					77.05
1390				95% Chebyshev (MVUE) UCL		82.83	97.5% Chebyshev (MVUE) UCL					90.84
1391				99% Chebyshev (MVUE) UCL		106.6						
1392												
1393	**Nonparametric Distribution Free UCL Statistics**											
1394	**Data appear to follow a Discernible Distribution**											
1395												
1396	**Nonparametric Distribution Free UCLs**											
1397				95% CLT UCL		70.37	95% BCA Bootstrap UCL					71.04
1398				95% Standard Bootstrap UCL		70.24	95% Bootstrap-t UCL					71.54
1399				95% Hall's Bootstrap UCL		73.56	95% Percentile Bootstrap UCL					70.46
1400				90% Chebyshev(Mean, Sd) UCL		75.68	95% Chebyshev(Mean, Sd) UCL					81.01
1401				97.5% Chebyshev(Mean, Sd) UCL		88.41	99% Chebyshev(Mean, Sd) UCL					102.9
1402												
1403	**Suggested UCL to Use**											
1404				95% Student's-t UCL		70.54						

	A	B	C	D	E	F	G	H	I	J	K	L
1405												
1406	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1407	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1408	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1409												
1410	**CN**											
1411												
1412	**General Statistics**											
1413					Total Number of Observations	22			Number of Distinct Observations	8		
1414									Number of Missing Observations	32		
1415					Number of Detects	6			Number of Non-Detects	16		
1416					Number of Distinct Detects	6			Number of Distinct Non-Detects	2		
1417					Minimum Detect	0.75			Minimum Non-Detect	0.5		
1418					Maximum Detect	21.9			Maximum Non-Detect	5		
1419					Variance Detects	79.28			Percent Non-Detects	72.73%		
1420					Mean Detects	6.438			SD Detects	8.904		
1421					Median Detects	1.2			CV Detects	1.383		
1422					Skewness Detects	1.402			Kurtosis Detects	0.676		
1423					Mean of Logged Detects	0.928			SD of Logged Detects	1.483		
1424												
1425	**Normal GOF Test on Detects Only**											
1426					Shapiro Wilk Test Statistic	0.724			**Shapiro Wilk GOF Test**			
1427					1% Shapiro Wilk Critical Value	0.713			Detected Data appear Normal at 1% Significance Level			
1428					Lilliefors Test Statistic	0.385			**Lilliefors GOF Test**			
1429					1% Lilliefors Critical Value	0.373			Detected Data Not Normal at 1% Significance Level			
1430	**Detected Data appear Approximate Normal at 1% Significance Level**											
1431	**Note GOF tests may be unreliable for small sample sizes**											
1432												
1433	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1434					KM Mean	2.13			KM Standard Error of Mean	1.168		
1435					90KM SD	4.999			95% KM (BCA) UCL	4.185		
1436					95% KM (t) UCL	4.139			95% KM (Percentile Bootstrap) UCL	4.106		
1437					95% KM (z) UCL	4.05			95% KM Bootstrap t UCL	29.31		
1438					90% KM Chebyshev UCL	5.632			95% KM Chebyshev UCL	7.219		
1439					97.5% KM Chebyshev UCL	9.421			99% KM Chebyshev UCL	13.75		
1440												
1441	**Gamma GOF Tests on Detected Observations Only**											
1442					A-D Test Statistic	0.822			**Anderson-Darling GOF Test**			
1443					5% A-D Critical Value	0.727			Detected Data Not Gamma Distributed at 5% Significance Level			
1444					K-S Test Statistic	0.386			**Kolmogorov-Smirnov GOF**			
1445					5% K-S Critical Value	0.345			Detected Data Not Gamma Distributed at 5% Significance Level			
1446	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1447												
1448	**Gamma Statistics on Detected Data Only**											
1449					k hat (MLE)	0.653			k star (bias corrected MLE)	0.438		
1450					Theta hat (MLE)	9.853			Theta star (bias corrected MLE)	14.7		
1451					nu hat (MLE)	7.841			nu star (bias corrected)	5.254		
1452					Mean (detects)	6.438						
1453												
1454	**Gamma ROS Statistics using Imputed Non-Detects**											
1455	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1456	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

	A	B	C	D	E	F	G	H	I	J	K	L
1457	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1458	This is especially true when the sample size is small.											
1459	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1460					Minimum	0.01				Mean	1.763	
1461					Maximum	21.9				Median	0.01	
1462					SD	5.241				CV	2.972	
1463					k hat (MLE)	0.201				k star (bias corrected MLE)	0.204	
1464					Theta hat (MLE)	8.782				Theta star (bias corrected MLE)	8.656	
1465					nu hat (MLE)	8.834				nu star (bias corrected)	8.963	
1466					Adjusted Level of Significance (β)	0.0386						
1467					Approximate Chi Square Value (8.96, α)	3.305				Adjusted Chi Square Value (8.96, β)	3.052	
1468					95% Gamma Approximate UCL	4.782				95% Gamma Adjusted UCL	5.178	
1469												
1470	**Estimates of Gamma Parameters using KM Estimates**											
1471					Mean (KM)	2.13				SD (KM)	4.999	
1472					Variance (KM)	24.99				SE of Mean (KM)	1.168	
1473					k hat (KM)	0.182				k star (KM)	0.187	
1474					nu hat (KM)	7.988				nu star (KM)	8.232	
1475					theta hat (KM)	11.73				theta star (KM)	11.38	
1476					80% gamma percentile (KM)	2.705				90% gamma percentile (KM)	6.433	
1477					95% gamma percentile (KM)	11.16				99% gamma percentile (KM)	24.33	
1478												
1479	**Gamma Kaplan-Meier (KM) Statistics**											
1480					Approximate Chi Square Value (8.23, α)	2.87				Adjusted Chi Square Value (8.23, β)	2.638	
1481					95% KM Approximate Gamma UCL	6.109				95% KM Adjusted Gamma UCL	6.645	
1482												
1483	**Lognormal GOF Test on Detected Observations Only**											
1484					Shapiro Wilk Test Statistic	0.783				**Shapiro Wilk GOF Test**		
1485					10% Shapiro Wilk Critical Value	0.826				Detected Data Not Lognormal at 10% Significance Level		
1486					Lilliefors Test Statistic	0.34				**Lilliefors GOF Test**		
1487					10% Lilliefors Critical Value	0.298				Detected Data Not Lognormal at 10% Significance Level		
1488	**Detected Data Not Lognormal at 10% Significance Level**											
1489												
1490	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1491					Mean in Original Scale	1.799				Mean in Log Scale	-2.609	
1492					SD in Original Scale	5.228				SD in Log Scale	2.823	
1493					95% t UCL (assumes normality of ROS data)	3.718				95% Percentile Bootstrap UCL	3.828	
1494					95% BCA Bootstrap UCL	4.712				95% Bootstrap t UCL	22.87	
1495					95% H-UCL (Log ROS)	129						
1496												
1497	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1498					KM Mean (logged)	-0.237				KM Geo Mean	0.789	
1499					KM SD (logged)	1.009				95% Critical H Value (KM-Log)	2.596	
1500					KM Standard Error of Mean (logged)	0.237				95% H-UCL (KM -Log)	2.326	
1501					KM SD (logged)	1.009				95% Critical H Value (KM-Log)	2.596	
1502					KM Standard Error of Mean (logged)	0.237						
1503												
1504	**DL/2 Statistics**											
1505	**DL/2 Normal**						**DL/2 Log-Transformed**					
1506					Mean in Original Scale	2.142				Mean in Log Scale	-0.546	
1507					SD in Original Scale	5.153				SD in Log Scale	1.349	
1508					95% t UCL (Assumes normality)	4.033				95% H-Stat UCL	3.583	

	A	B	C	D	E	F	G	H	I	J	K	L
1509	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1510												
1511	**Nonparametric Distribution Free UCL Statistics**											
1512	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
1513												
1514	**Suggested UCL to Use**											
1515	95% KM (t) UCL					4.139						
1516												
1517	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1518	**Please verify the data were collected from random locations.**											
1519	**If the data were collected using judgmental or other non-random methods,**											
1520	**then contact a statistician to correctly calculate UCLs.**											
1521												
1522	When a data set follows an approximate distribution passing only one of the GOF tests,											
1523	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
1524												
1525	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1526	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1527	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1528												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/15/2023 4:47:56 PM
From File	06 Cyanide Process Area.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Sb

General Statistics

Total Number of Observations	8	Number of Distinct Observations	4
		Number of Missing Observations	4
Number of Detects	1	Number of Non-Detects	7
Number of Distinct Detects	1	Number of Distinct Non-Detects	3

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Sb was not processed!

As

General Statistics

Total Number of Observations	28	Number of Distinct Observations	25
		Number of Missing Observations	4
Minimum	4	Mean	125.2
Maximum	450	Median	75.5
SD	124.7	Std. Error of Mean	23.56
Coefficient of Variation	0.996	Skewness	1.229

Normal GOF Test

Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.896	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.191	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	165.3	95% Adjusted-CLT UCL (Chen-1995)	169.8
		95% Modified-t UCL (Johnson-1978)	166.2

Gamma GOF Test

A-D Test Statistic	0.307	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.12	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.17	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

53											
54	**Gamma Statistics**										
55					k hat (MLE)	0.962		k star (bias corrected MLE)			0.883
56					Theta hat (MLE)	130.1		Theta star (bias corrected MLE)			141.8
57					nu hat (MLE)	53.89		nu star (bias corrected)			49.45
58					MLE Mean (bias corrected)	125.2		MLE Sd (bias corrected)			133.2
59								Approximate Chi Square Value (0.05)			34.3
60					Adjusted Level of Significance	0.0404		Adjusted Chi Square Value			33.52
61											
62	**Assuming Gamma Distribution**										
63					95% Approximate Gamma UCL	180.5		95% Adjusted Gamma UCL			184.7
64											
65	**Lognormal GOF Test**										
66					Shapiro Wilk Test Statistic	0.954		**Shapiro Wilk Lognormal GOF Test**			
67					10% Shapiro Wilk Critical Value	0.936		Data appear Lognormal at 10% Significance Level			
68					Lilliefors Test Statistic	0.102		**Lilliefors Lognormal GOF Test**			
69					10% Lilliefors Critical Value	0.151		Data appear Lognormal at 10% Significance Level			
70	**Data appear Lognormal at 10% Significance Level**										
71											
72	**Lognormal Statistics**										
73					Minimum of Logged Data	1.386		Mean of logged Data			4.227
74					Maximum of Logged Data	6.109		SD of logged Data			1.264
75											
76	**Assuming Lognormal Distribution**										
77					95% H-UCL	300.9		90% Chebyshev (MVUE) UCL			270.5
78					95% Chebyshev (MVUE) UCL	327.2		97.5% Chebyshev (MVUE) UCL			405.9
79					99% Chebyshev (MVUE) UCL	560.6					
80											
81	**Nonparametric Distribution Free UCL Statistics**										
82	**Data appear to follow a Discernible Distribution**										
83											
84	**Nonparametric Distribution Free UCLs**										
85					95% CLT UCL	163.9		95% BCA Bootstrap UCL			165
86					95% Standard Bootstrap UCL	162.7		95% Bootstrap-t UCL			174.6
87					95% Hall's Bootstrap UCL	170.3		95% Percentile Bootstrap UCL			163.5
88					90% Chebyshev(Mean, Sd) UCL	195.9		95% Chebyshev(Mean, Sd) UCL			227.9
89					97.5% Chebyshev(Mean, Sd) UCL	272.3		99% Chebyshev(Mean, Sd) UCL			359.6
90											
91	**Suggested UCL to Use**										
92					95% Adjusted Gamma UCL	184.7					
93											
94	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
95	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.										
96	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
97											
98											
99	**Ba**										
100											
101	**General Statistics**										
102					Total Number of Observations	8		Number of Distinct Observations			8
103								Number of Missing Observations			4
104					Minimum	11		Mean			70.29

105					Maximum	158				Median		65.45
106					SD	44.11				Std. Error of Mean		15.59
107					Coefficient of Variation	0.627				Skewness		0.996
108												
109	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
110	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
111	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
112	**The Chebyshev UCL often results in gross overestimates of the mean.**											
113	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
114												
115	**Normal GOF Test**											
116					Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**					
117					1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level					
118					Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**					
119					1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level					
120	**Data appear Normal at 1% Significance Level**											
121	**Note GOF tests may be unreliable for small sample sizes**											
122												
123	**Assuming Normal Distribution**											
124	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
125					95% Student's-t UCL	99.83	95% Adjusted-CLT UCL (Chen-1995)					101.8
126							95% Modified-t UCL (Johnson-1978)					100.7
127												
128	**Gamma GOF Test**											
129					A-D Test Statistic	0.256	**Anderson-Darling Gamma GOF Test**					
130					5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level					
131					K-S Test Statistic	0.159	**Kolmogorov-Smirnov Gamma GOF Test**					
132					5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level					
133	**Detected data appear Gamma Distributed at 5% Significance Level**											
134	**Note GOF tests may be unreliable for small sample sizes**											
135												
136	**Gamma Statistics**											
137					k hat (MLE)	2.455	k star (bias corrected MLE)					1.617
138					Theta hat (MLE)	28.64	Theta star (bias corrected MLE)					43.46
139					nu hat (MLE)	39.27	nu star (bias corrected)					25.88
140					MLE Mean (bias corrected)	70.29	MLE Sd (bias corrected)					55.27
141							Approximate Chi Square Value (0.05)					15.29
142					Adjusted Level of Significance	0.0195	Adjusted Chi Square Value					13.27
143												
144	**Assuming Gamma Distribution**											
145					95% Approximate Gamma UCL	119	95% Adjusted Gamma UCL					137.1
146												
147	**Lognormal GOF Test**											
148					Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**					
149					10% Shapiro Wilk Critical Value	0.851	Data appear Lognormal at 10% Significance Level					
150					Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**					
151					10% Lilliefors Critical Value	0.265	Data appear Lognormal at 10% Significance Level					
152	**Data appear Lognormal at 10% Significance Level**											
153	**Note GOF tests may be unreliable for small sample sizes**											
154												
155	**Lognormal Statistics**											
156					Minimum of Logged Data	2.398					Mean of logged Data	4.035

157				Maximum of Logged Data	5.063					SD of logged Data	0.79	
158												
159				**Assuming Lognormal Distribution**								
160				95% H-UCL	185.3					90% Chebyshev (MVUE) UCL	136.6	
161				95% Chebyshev (MVUE) UCL	165.1					97.5% Chebyshev (MVUE) UCL	204.7	
162				99% Chebyshev (MVUE) UCL	282.4							
163												
164				**Nonparametric Distribution Free UCL Statistics**								
165				**Data appear to follow a Discernible Distribution**								
166												
167				**Nonparametric Distribution Free UCLs**								
168				95% CLT UCL	95.94					95% BCA Bootstrap UCL	99.2	
169				95% Standard Bootstrap UCL	94.54					95% Bootstrap-t UCL	110.2	
170				95% Hall's Bootstrap UCL	266					95% Percentile Bootstrap UCL	96.61	
171				90% Chebyshev(Mean, Sd) UCL	117.1					95% Chebyshev(Mean, Sd) UCL	138.3	
172				97.5% Chebyshev(Mean, Sd) UCL	167.7					99% Chebyshev(Mean, Sd) UCL	225.4	
173												
174				**Suggested UCL to Use**								
175				95% Student's-t UCL	99.83							
176												
177				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
178				Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.								
179				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
180												
181	**Be**											
182												
183				**General Statistics**								
184				Total Number of Observations	8					Number of Distinct Observations	6	
185										Number of Missing Observations	4	
186				Number of Detects	5					Number of Non-Detects	3	
187				Number of Distinct Detects	5					Number of Distinct Non-Detects	1	
188				Minimum Detect	0.56					Minimum Non-Detect	1	
189				Maximum Detect	1.4					Maximum Non-Detect	1	
190				Variance Detects	0.115					Percent Non-Detects	37.5%	
191				Mean Detects	0.842					SD Detects	0.339	
192				Median Detects	0.74					CV Detects	0.402	
193				Skewness Detects	1.481					Kurtosis Detects	2.113	
194				Mean of Logged Detects	-0.229					SD of Logged Detects	0.365	
195												
196				**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**								
197				**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**								
198				**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**								
199				**The Chebyshev UCL often results in gross overestimates of the mean.**								
200				**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**								
201												
202				**Normal GOF Test on Detects Only**								
203				Shapiro Wilk Test Statistic	0.861					**Shapiro Wilk GOF Test**		
204				1% Shapiro Wilk Critical Value	0.686					Detected Data appear Normal at 1% Significance Level		
205				Lilliefors Test Statistic	0.232					**Lilliefors GOF Test**		
206				1% Lilliefors Critical Value	0.396					Detected Data appear Normal at 1% Significance Level		
207				**Detected Data appear Normal at 1% Significance Level**								
208				**Note GOF tests may be unreliable for small sample sizes**								

209												
210	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
211				KM Mean	0.79			KM Standard Error of Mean	0.112			
212				90KM SD	0.261			95% KM (BCA) UCL	0.971			
213				95% KM (t) UCL	1.001			95% KM (Percentile Bootstrap) UCL	0.981			
214				95% KM (z) UCL	0.973			95% KM Bootstrap t UCL	1.177			
215				90% KM Chebyshev UCL	1.125			95% KM Chebyshev UCL	1.276			
216				97.5% KM Chebyshev UCL	1.487			99% KM Chebyshev UCL	1.9			
217												
218	**Gamma GOF Tests on Detected Observations Only**											
219				A-D Test Statistic	0.34			**Anderson-Darling GOF Test**				
220				5% A-D Critical Value	0.679			Detected data appear Gamma Distributed at 5% Significance Level				
221				K-S Test Statistic	0.205			**Kolmogorov-Smirnov GOF**				
222				5% K-S Critical Value	0.358			Detected data appear Gamma Distributed at 5% Significance Level				
223	**Detected data appear Gamma Distributed at 5% Significance Level**											
224	**Note GOF tests may be unreliable for small sample sizes**											
225												
226	**Gamma Statistics on Detected Data Only**											
227				k hat (MLE)	8.959			k star (bias corrected MLE)	3.717			
228				Theta hat (MLE)	0.094			Theta star (bias corrected MLE)	0.227			
229				nu hat (MLE)	89.59			nu star (bias corrected)	37.17			
230				Mean (detects)	0.842							
231												
232	**Gamma ROS Statistics using Imputed Non-Detects**											
233	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
234	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
235	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
236	This is especially true when the sample size is small.											
237	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
238				Minimum	0.528			Mean	0.794			
239				Maximum	1.4			Median	0.725			
240				SD	0.283			CV	0.356			
241				k hat (MLE)	10.7			k star (bias corrected MLE)	6.768			
242				Theta hat (MLE)	0.0742			Theta star (bias corrected MLE)	0.117			
243				nu hat (MLE)	171.1			nu star (bias corrected)	108.3			
244				Adjusted Level of Significance (β)	0.0195							
245				Approximate Chi Square Value (108.29, α)	85.27			Adjusted Chi Square Value (108.29, β)	80.11			
246				95% Gamma Approximate UCL	1.008			95% Gamma Adjusted UCL	1.073			
247												
248	**Estimates of Gamma Parameters using KM Estimates**											
249				Mean (KM)	0.79			SD (KM)	0.261			
250				Variance (KM)	0.0684			SE of Mean (KM)	0.112			
251				k hat (KM)	9.122			k star (KM)	5.784			
252				nu hat (KM)	145.9			nu star (KM)	92.55			
253				theta hat (KM)	0.0866			theta star (KM)	0.137			
254				80% gamma percentile (KM)	1.045			90% gamma percentile (KM)	1.229			
255				95% gamma percentile (KM)	1.396			99% gamma percentile (KM)	1.746			
256												
257	**Gamma Kaplan-Meier (KM) Statistics**											
258				Approximate Chi Square Value (92.55, α)	71.36			Adjusted Chi Square Value (92.55, β)	66.67			
259				95% KM Approximate Gamma UCL	1.024			95% KM Adjusted Gamma UCL	1.096			
260												

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Lognormal GOF Test on Detected Observations Only**											
262					Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**					
263					10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level					
264					Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**					
265					10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level					
266	**Detected Data appear Lognormal at 10% Significance Level**											
267	**Note GOF tests may be unreliable for small sample sizes**											
268												
269	**Lognormal ROS Statistics Using Imputed Non-Detects**											
270					Mean in Original Scale	0.793	Mean in Log Scale	-0.278				
271					SD in Original Scale	0.278	SD in Log Scale	0.309				
272					95% t UCL (assumes normality of ROS data)	0.979	95% Percentile Bootstrap UCL	0.959				
273					95% BCA Bootstrap UCL	0.996	95% Bootstrap t UCL	1.115				
274					95% H-UCL (Log ROS)	1.012						
275												
276	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
277					KM Mean (logged)	-0.282	KM Geo Mean	0.754				
278					KM SD (logged)	0.29	95% Critical H Value (KM-Log)	2.045				
279					KM Standard Error of Mean (logged)	0.129	95% H-UCL (KM -Log)	0.984				
280					KM SD (logged)	0.29	95% Critical H Value (KM-Log)	2.045				
281					KM Standard Error of Mean (logged)	0.129						
282												
283	**DL/2 Statistics**											
284				**DL/2 Normal**			**DL/2 Log-Transformed**					
285					Mean in Original Scale	0.714	Mean in Log Scale	-0.403				
286					SD in Original Scale	0.311	SD in Log Scale	0.366				
287					95% t UCL (Assumes normality)	0.922	95% H-Stat UCL	0.962				
288	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
289												
290	**Nonparametric Distribution Free UCL Statistics**											
291	**Detected Data appear Normal Distributed at 1% Significance Level**											
292												
293	**Suggested UCL to Use**											
294					95% KM (t) UCL	1.001						
295												
296	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
297	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
298	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
299												
300	**Cd**											
301												
302	**General Statistics**											
303					Total Number of Observations	8	Number of Distinct Observations	8				
304							Number of Missing Observations	4				
305					Number of Detects	7	Number of Non-Detects	1				
306					Number of Distinct Detects	7	Number of Distinct Non-Detects	1				
307					Minimum Detect	1.1	Minimum Non-Detect	1				
308					Maximum Detect	2.7	Maximum Non-Detect	1				
309					Variance Detects	0.281	Percent Non-Detects	12.5%				
310					Mean Detects	1.886	SD Detects	0.53				
311					Median Detects	1.8	CV Detects	0.281				
312					Skewness Detects	0.112	Kurtosis Detects	-0.24				

313				Mean of Logged Detects		0.598				SD of Logged Detects		0.296
314												
315	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
316	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
317	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
318	**The Chebyshev UCL often results in gross overestimates of the mean.**											
319	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
320												
321	**Normal GOF Test on Detects Only**											
322				Shapiro Wilk Test Statistic		0.994		**Shapiro Wilk GOF Test**				
323				1% Shapiro Wilk Critical Value		0.73		Detected Data appear Normal at 1% Significance Level				
324				Lilliefors Test Statistic		0.136		**Lilliefors GOF Test**				
325				1% Lilliefors Critical Value		0.35		Detected Data appear Normal at 1% Significance Level				
326	**Detected Data appear Normal at 1% Significance Level**											
327	**Note GOF tests may be unreliable for small sample sizes**											
328												
329	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
330				KM Mean		1.775				KM Standard Error of Mean		0.208
331				90KM SD		0.545				95% KM (BCA) UCL		2.1
332				95% KM (t) UCL		2.169				95% KM (Percentile Bootstrap) UCL		2.113
333				95% KM (z) UCL		2.117				95% KM Bootstrap t UCL		2.142
334				90% KM Chebyshev UCL		2.399				95% KM Chebyshev UCL		2.682
335				97.5% KM Chebyshev UCL		3.074				99% KM Chebyshev UCL		3.845
336												
337	**Gamma GOF Tests on Detected Observations Only**											
338				A-D Test Statistic		0.146		**Anderson-Darling GOF Test**				
339				5% A-D Critical Value		0.708		Detected data appear Gamma Distributed at 5% Significance Level				
340				K-S Test Statistic		0.12		**Kolmogorov-Smirnov GOF**				
341				5% K-S Critical Value		0.312		Detected data appear Gamma Distributed at 5% Significance Level				
342	**Detected data appear Gamma Distributed at 5% Significance Level**											
343	**Note GOF tests may be unreliable for small sample sizes**											
344												
345	**Gamma Statistics on Detected Data Only**											
346				k hat (MLE)		14.01				k star (bias corrected MLE)		8.099
347				Theta hat (MLE)		0.135				Theta star (bias corrected MLE)		0.233
348				nu hat (MLE)		196.1				nu star (bias corrected)		113.4
349				Mean (detects)		1.886						
350												
351	**Gamma ROS Statistics using Imputed Non-Detects**											
352	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
353	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
354	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
355	This is especially true when the sample size is small.											
356	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
357				Minimum		0.731				Mean		1.741
358				Maximum		2.7				Median		1.75
359				SD		0.639				CV		0.367
360				k hat (MLE)		7.259				k star (bias corrected MLE)		4.62
361				Theta hat (MLE)		0.24				Theta star (bias corrected MLE)		0.377
362				nu hat (MLE)		116.1				nu star (bias corrected)		73.92
363				Adjusted Level of Significance (β)		0.0195						
364				Approximate Chi Square Value (73.92, α)		55.12				Adjusted Chi Square Value (73.92, β)		51.04

365				95% Gamma Approximate UCL		2.335				95% Gamma Adjusted UCL		2.522
366												
367						**Estimates of Gamma Parameters using KM Estimates**							
368				Mean (KM)		1.775				SD (KM)		0.545
369				Variance (KM)		0.297				SE of Mean (KM)		0.208
370				k hat (KM)		10.61				k star (KM)		6.716
371				nu hat (KM)		169.8				nu star (KM)		107.5
372				theta hat (KM)		0.167				theta star (KM)		0.264
373				80% gamma percentile (KM)		2.311				90% gamma percentile (KM)		2.69
374				95% gamma percentile (KM)		3.031				99% gamma percentile (KM)		3.742
375												
376						**Gamma Kaplan-Meier (KM) Statistics**							
377				Approximate Chi Square Value (107.46, α)		84.54				Adjusted Chi Square Value (107.46, β)		79.4
378				95% KM Approximate Gamma UCL		2.256				95% KM Adjusted Gamma UCL		2.402
379												
380						**Lognormal GOF Test on Detected Observations Only**							
381				Shapiro Wilk Test Statistic		0.981				**Shapiro Wilk GOF Test**		
382				10% Shapiro Wilk Critical Value		0.838				Detected Data appear Lognormal at 10% Significance Level		
383				Lilliefors Test Statistic		0.124				**Lilliefors GOF Test**		
384				10% Lilliefors Critical Value		0.28				Detected Data appear Lognormal at 10% Significance Level		
385						**Detected Data appear Lognormal at 10% Significance Level**							
386						**Note GOF tests may be unreliable for small sample sizes**							
387												
388						**Lognormal ROS Statistics Using Imputed Non-Detects**							
389				Mean in Original Scale		1.759				Mean in Log Scale		0.506
390				SD in Original Scale		0.608				SD in Log Scale		0.378
391				95% t UCL (assumes normality of ROS data)		2.166				95% Percentile Bootstrap UCL		2.088
392				95% BCA Bootstrap UCL		2.084				95% Bootstrap t UCL		2.19
393				95% H-UCL (Log ROS)		2.427						
394												
395						**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
396				KM Mean (logged)		0.523				KM Geo Mean		1.688
397				KM SD (logged)		0.324				95% Critical H Value (KM-Log)		2.089
398				KM Standard Error of Mean (logged)		0.124				95% H-UCL (KM -Log)		2.297
399				KM SD (logged)		0.324				95% Critical H Value (KM-Log)		2.089
400				KM Standard Error of Mean (logged)		0.124						
401												
402						**DL/2 Statistics**							
403				**DL/2 Normal**						**DL/2 Log-Transformed**		
404				Mean in Original Scale		1.713				Mean in Log Scale		0.437
405				SD in Original Scale		0.694				SD in Log Scale		0.533
406				95% t UCL (Assumes normality)		2.177				95% H-Stat UCL		2.897
407						**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
408												
409						**Nonparametric Distribution Free UCL Statistics**							
410						**Detected Data appear Normal Distributed at 1% Significance Level**							
411												
412						**Suggested UCL to Use**							
413				95% KM (t) UCL		2.169						
414												
415						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
416						Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							

	A	B	C	D	E	F	G	H	I	J	K	L
417	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
418												
419												
420	Cr											
421												
422	**General Statistics**											
423					Total Number of Observations	18			Number of Distinct Observations	18		
424									Number of Missing Observations	13		
425					Minimum	10			Mean	245.5		
426					Maximum	1690			Median	119.2		
427					SD	394			Std. Error of Mean	92.87		
428					Coefficient of Variation	1.605			Skewness	3.215		
429												
430	**Normal GOF Test**											
431					Shapiro Wilk Test Statistic	0.593			**Shapiro Wilk GOF Test**			
432					1% Shapiro Wilk Critical Value	0.858			Data Not Normal at 1% Significance Level			
433					Lilliefors Test Statistic	0.275			**Lilliefors GOF Test**			
434					1% Lilliefors Critical Value	0.235			Data Not Normal at 1% Significance Level			
435	**Data Not Normal at 1% Significance Level**											
436												
437	**Assuming Normal Distribution**											
438					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
439					95% Student's-t UCL	407.1			95% Adjusted-CLT UCL (Chen-1995)	473.5		
440									95% Modified-t UCL (Johnson-1978)	418.8		
441												
442	**Gamma GOF Test**											
443					A-D Test Statistic	0.402			**Anderson-Darling Gamma GOF Test**			
444					5% A-D Critical Value	0.786			Detected data appear Gamma Distributed at 5% Significance Level			
445					K-S Test Statistic	0.112			**Kolmogorov-Smirnov Gamma GOF Test**			
446					5% K-S Critical Value	0.213			Detected data appear Gamma Distributed at 5% Significance Level			
447	**Detected data appear Gamma Distributed at 5% Significance Level**											
448												
449	**Gamma Statistics**											
450					k hat (MLE)	0.664			k star (bias corrected MLE)	0.59		
451					Theta hat (MLE)	370			Theta star (bias corrected MLE)	416.1		
452					nu hat (MLE)	23.89			nu star (bias corrected)	21.24		
453					MLE Mean (bias corrected)	245.5			MLE Sd (bias corrected)	319.6		
454									Approximate Chi Square Value (0.05)	11.77		
455					Adjusted Level of Significance	0.0357			Adjusted Chi Square Value	11.1		
456												
457	**Assuming Gamma Distribution**											
458					95% Approximate Gamma UCL	443.1			95% Adjusted Gamma UCL	470		
459												
460	**Lognormal GOF Test**											
461					Shapiro Wilk Test Statistic	0.955			**Shapiro Wilk Lognormal GOF Test**			
462					10% Shapiro Wilk Critical Value	0.914			Data appear Lognormal at 10% Significance Level			
463					Lilliefors Test Statistic	0.128			**Lilliefors Lognormal GOF Test**			
464					10% Lilliefors Critical Value	0.185			Data appear Lognormal at 10% Significance Level			
465	**Data appear Lognormal at 10% Significance Level**											
466												
467	**Lognormal Statistics**											
468					Minimum of Logged Data	2.303			Mean of logged Data	4.586		

469				Maximum of Logged Data	7.432					SD of logged Data	1.48	
470												
471				**Assuming Lognormal Distribution**								
472				95% H-UCL	993					90% Chebyshev (MVUE) UCL	584.8	
473				95% Chebyshev (MVUE) UCL	730.8					97.5% Chebyshev (MVUE) UCL	933.5	
474				99% Chebyshev (MVUE) UCL	1332							
475												
476				**Nonparametric Distribution Free UCL Statistics**								
477				**Data appear to follow a Discernible Distribution**								
478												
479				**Nonparametric Distribution Free UCLs**								
480				95% CLT UCL	398.3					95% BCA Bootstrap UCL	504	
481				95% Standard Bootstrap UCL	397.1					95% Bootstrap-t UCL	640.5	
482				95% Hall's Bootstrap UCL	1008					95% Percentile Bootstrap UCL	418.6	
483				90% Chebyshev(Mean, Sd) UCL	524.1					95% Chebyshev(Mean, Sd) UCL	650.3	
484				97.5% Chebyshev(Mean, Sd) UCL	825.5					99% Chebyshev(Mean, Sd) UCL	1170	
485												
486				**Suggested UCL to Use**								
487				95% Adjusted Gamma UCL	470							
488												
489				**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**								
490				**Please verify the data were collected from random locations.**								
491				**If the data were collected using judgmental or other non-random methods,**								
492				**then contact a statistician to correctly calculate UCLs.**								
493												
494				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
495				Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.								
496				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
497												
498												
499	**Co**											
500												
501				**General Statistics**								
502				Total Number of Observations	8					Number of Distinct Observations	8	
503										Number of Missing Observations	4	
504				Minimum	1					Mean	23.56	
505				Maximum	85.8					Median	16.65	
506				SD	27.13					Std. Error of Mean	9.591	
507				Coefficient of Variation	1.151					Skewness	2.081	
508												
509				**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**								
510				**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**								
511				**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**								
512				**The Chebyshev UCL often results in gross overestimates of the mean.**								
513				**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**								
514												
515				**Normal GOF Test**								
516				Shapiro Wilk Test Statistic	0.766					**Shapiro Wilk GOF Test**		
517				1% Shapiro Wilk Critical Value	0.749					Data appear Normal at 1% Significance Level		
518				Lilliefors Test Statistic	0.271					**Lilliefors GOF Test**		
519				1% Lilliefors Critical Value	0.333					Data appear Normal at 1% Significance Level		
520				**Data appear Normal at 1% Significance Level**								

521	**Note GOF tests may be unreliable for small sample sizes**											
522												
523	**Assuming Normal Distribution**											
524	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
525				95% Student's-t UCL		41.73				95% Adjusted-CLT UCL (Chen-1995)		46.88
526										95% Modified-t UCL (Johnson-1978)		42.91
527												
528	**Gamma GOF Test**											
529				A-D Test Statistic		0.193	**Anderson-Darling Gamma GOF Test**					
530				5% A-D Critical Value		0.739	Detected data appear Gamma Distributed at 5% Significance Level					
531				K-S Test Statistic		0.146	**Kolmogorov-Smirnov Gamma GOF Test**					
532				5% K-S Critical Value		0.302	Detected data appear Gamma Distributed at 5% Significance Level					
533	**Detected data appear Gamma Distributed at 5% Significance Level**											
534	**Note GOF tests may be unreliable for small sample sizes**											
535												
536	**Gamma Statistics**											
537				k hat (MLE)		0.92				k star (bias corrected MLE)		0.658
538				Theta hat (MLE)		25.61				Theta star (bias corrected MLE)		35.78
539				nu hat (MLE)		14.72				nu star (bias corrected)		10.54
540				MLE Mean (bias corrected)		23.56				MLE Sd (bias corrected)		29.04
541										Approximate Chi Square Value (0.05)		4.279
542				Adjusted Level of Significance		0.0195				Adjusted Chi Square Value		3.33
543												
544	**Assuming Gamma Distribution**											
545				95% Approximate Gamma UCL		58.01				95% Adjusted Gamma UCL		74.55
546												
547	**Lognormal GOF Test**											
548				Shapiro Wilk Test Statistic		0.958	**Shapiro Wilk Lognormal GOF Test**					
549				10% Shapiro Wilk Critical Value		0.851	Data appear Lognormal at 10% Significance Level					
550				Lilliefors Test Statistic		0.185	**Lilliefors Lognormal GOF Test**					
551				10% Lilliefors Critical Value		0.265	Data appear Lognormal at 10% Significance Level					
552	**Data appear Lognormal at 10% Significance Level**											
553	**Note GOF tests may be unreliable for small sample sizes**											
554												
555	**Lognormal Statistics**											
556				Minimum of Logged Data		0				Mean of logged Data		2.526
557				Maximum of Logged Data		4.452				SD of logged Data		1.37
558												
559	**Assuming Lognormal Distribution**											
560				95% H-UCL		310.1				90% Chebyshev (MVUE) UCL		66.01
561				95% Chebyshev (MVUE) UCL		83.81				97.5% Chebyshev (MVUE) UCL		108.5
562				99% Chebyshev (MVUE) UCL		157.1						
563												
564	**Nonparametric Distribution Free UCL Statistics**											
565	**Data appear to follow a Discernible Distribution**											
566												
567	**Nonparametric Distribution Free UCLs**											
568				95% CLT UCL		39.34				95% BCA Bootstrap UCL		45.35
569				95% Standard Bootstrap UCL		38.08				95% Bootstrap-t UCL		58.43
570				95% Hall's Bootstrap UCL		105.7				95% Percentile Bootstrap UCL		39.68
571				90% Chebyshev(Mean, Sd) UCL		52.33				95% Chebyshev(Mean, Sd) UCL		65.37
572				97.5% Chebyshev(Mean, Sd) UCL		83.46				99% Chebyshev(Mean, Sd) UCL		119

	A	B	C	D	E	F	G	H	I	J	K	L
573												
574	**Suggested UCL to Use**											
575					95% Student's-t UCL	41.73						
576												
577	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
578	**Please verify the data were collected from random locations.**											
579	**If the data were collected using judgmental or other non-random methods,**											
580	**then contact a statistician to correctly calculate UCLs.**											
581												
582	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
583	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
584	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
585												
586												
587	**Cu**											
588												
589	**General Statistics**											
590					Total Number of Observations	8			Number of Distinct Observations	8		
591									Number of Missing Observations	4		
592					Minimum	7.2			Mean	58.56		
593					Maximum	92.9			Median	60.95		
594					SD	26.71			Std. Error of Mean	9.443		
595					Coefficient of Variation	0.456			Skewness	-0.761		
596												
597	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
598	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
599	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
600	**The Chebyshev UCL often results in gross overestimates of the mean.**											
601	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
602												
603	**Normal GOF Test**											
604					Shapiro Wilk Test Statistic	0.942			**Shapiro Wilk GOF Test**			
605					1% Shapiro Wilk Critical Value	0.749			Data appear Normal at 1% Significance Level			
606					Lilliefors Test Statistic	0.168			**Lilliefors GOF Test**			
607					1% Lilliefors Critical Value	0.333			Data appear Normal at 1% Significance Level			
608	**Data appear Normal at 1% Significance Level**											
609	**Note GOF tests may be unreliable for small sample sizes**											
610												
611	**Assuming Normal Distribution**											
612					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
613					95% Student's-t UCL	76.45			95% Adjusted-CLT UCL (Chen-1995)	71.38		
614									95% Modified-t UCL (Johnson-1978)	76.03		
615												
616	**Gamma GOF Test**											
617					A-D Test Statistic	0.735			**Anderson-Darling Gamma GOF Test**			
618					5% A-D Critical Value	0.722			Data Not Gamma Distributed at 5% Significance Level			
619					K-S Test Statistic	0.274			**Kolmogorov-Smirnov Gamma GOF Test**			
620					5% K-S Critical Value	0.296			Detected data appear Gamma Distributed at 5% Significance Level			
621	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
622	**Note GOF tests may be unreliable for small sample sizes**											
623												
624	**Gamma Statistics**											

625					k hat (MLE)	2.831				k star (bias corrected MLE)		1.853
626					Theta hat (MLE)	20.69				Theta star (bias corrected MLE)		31.61
627					nu hat (MLE)	45.3				nu star (bias corrected)		29.64
628					MLE Mean (bias corrected)	58.56				MLE Sd (bias corrected)		43.02
629										Approximate Chi Square Value (0.05)		18.21
630					Adjusted Level of Significance	0.0195				Adjusted Chi Square Value		15.99
631												
632					**Assuming Gamma Distribution**							
633					95% Approximate Gamma UCL	95.32				95% Adjusted Gamma UCL		108.6
634												
635					**Lognormal GOF Test**							
636					Shapiro Wilk Test Statistic	0.716				**Shapiro Wilk Lognormal GOF Test**		
637					10% Shapiro Wilk Critical Value	0.851				Data Not Lognormal at 10% Significance Level		
638					Lilliefors Test Statistic	0.326				**Lilliefors Lognormal GOF Test**		
639					10% Lilliefors Critical Value	0.265				Data Not Lognormal at 10% Significance Level		
640					**Data Not Lognormal at 10% Significance Level**							
641												
642					**Lognormal Statistics**							
643					Minimum of Logged Data	1.974				Mean of logged Data		3.883
644					Maximum of Logged Data	4.532				SD of logged Data		0.812
645												
646					**Assuming Lognormal Distribution**							
647					95% H-UCL	168.5				90% Chebyshev (MVUE) UCL		120.7
648					95% Chebyshev (MVUE) UCL	146.2				97.5% Chebyshev (MVUE) UCL		181.7
649					99% Chebyshev (MVUE) UCL	251.3						
650												
651					**Nonparametric Distribution Free UCL Statistics**							
652					**Data appear to follow a Discernible Distribution**							
653												
654					**Nonparametric Distribution Free UCLs**							
655					95% CLT UCL	74.09				95% BCA Bootstrap UCL		71.26
656					95% Standard Bootstrap UCL	72.86				95% Bootstrap-t UCL		73.69
657					95% Hall's Bootstrap UCL	72.79				95% Percentile Bootstrap UCL		72.93
658					90% Chebyshev(Mean, Sd) UCL	86.89				95% Chebyshev(Mean, Sd) UCL		99.72
659					97.5% Chebyshev(Mean, Sd) UCL	117.5				99% Chebyshev(Mean, Sd) UCL		152.5
660												
661					**Suggested UCL to Use**							
662					95% Student's-t UCL	76.45						
663												
664					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
665					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
666					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
667												
668					**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**							
669					**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**							
670												
671	**Pb**											
672												
673					**General Statistics**							
674					Total Number of Observations	16				Number of Distinct Observations		16
675					Number of Detects	12				Number of Non-Detects		4
676					Number of Distinct Detects	12				Number of Distinct Non-Detects		4

677				Minimum Detect	7.2					Minimum Non-Detect	2.4	
678				Maximum Detect	72					Maximum Non-Detect	7.5	
679				Variance Detects	538.2					Percent Non-Detects	25%	
680				Mean Detects	29.12					SD Detects	23.2	
681				Median Detects	20					CV Detects	0.797	
682				Skewness Detects	1.088					Kurtosis Detects	-0.0362	
683				Mean of Logged Detects	3.081					SD of Logged Detects	0.805	
684												
685	**Normal GOF Test on Detects Only**											
686				Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**						
687				1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level						
688				Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**						
689				1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level						
690	**Detected Data appear Normal at 1% Significance Level**											
691												
692	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
693				KM Mean	22.89	KM Standard Error of Mean	5.783					
694				90KM SD	22.09	95% KM (BCA) UCL	33.66					
695				95% KM (t) UCL	33.03	95% KM (Percentile Bootstrap) UCL	32.64					
696				95% KM (z) UCL	32.4	95% KM Bootstrap t UCL	36.09					
697				90% KM Chebyshev UCL	40.24	95% KM Chebyshev UCL	48.09					
698				97.5% KM Chebyshev UCL	59	99% KM Chebyshev UCL	80.43					
699												
700	**Gamma GOF Tests on Detected Observations Only**											
701				A-D Test Statistic	0.399	**Anderson-Darling GOF Test**						
702				5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level						
703				K-S Test Statistic	0.148	**Kolmogorov-Smirnov GOF**						
704				5% K-S Critical Value	0.249	Detected data appear Gamma Distributed at 5% Significance Level						
705	**Detected data appear Gamma Distributed at 5% Significance Level**											
706												
707	**Gamma Statistics on Detected Data Only**											
708				k hat (MLE)	1.869	k star (bias corrected MLE)	1.457					
709				Theta hat (MLE)	15.58	Theta star (bias corrected MLE)	19.98					
710				nu hat (MLE)	44.85	nu star (bias corrected)	34.97					
711				Mean (detects)	29.12							
712												
713	**Gamma ROS Statistics using Imputed Non-Detects**											
714	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
715	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
716	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
717	This is especially true when the sample size is small.											
718	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
719				Minimum	0.01	Mean	21.84					
720				Maximum	72	Median	15.5					
721				SD	23.75	CV	1.088					
722				k hat (MLE)	0.349	k star (bias corrected MLE)	0.326					
723				Theta hat (MLE)	62.49	Theta star (bias corrected MLE)	67.07					
724				nu hat (MLE)	11.18	nu star (bias corrected)	10.42					
725				Adjusted Level of Significance (β)	0.0335							
726				Approximate Chi Square Value (10.42, α)	4.206	Adjusted Chi Square Value (10.42, β)	3.766					
727				95% Gamma Approximate UCL	54.11	95% Gamma Adjusted UCL	60.42					
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Estimates of Gamma Parameters using KM Estimates**											
730					Mean (KM)	22.89				SD (KM)		22.09
731					Variance (KM)	487.8				SE of Mean (KM)		5.783
732					k hat (KM)	1.074				k star (KM)		0.914
733					nu hat (KM)	34.37				nu star (KM)		29.26
734					theta hat (KM)	21.31				theta star (KM)		25.03
735					80% gamma percentile (KM)	37.09				90% gamma percentile (KM)		53.87
736					95% gamma percentile (KM)	70.78				99% gamma percentile (KM)		110.3
737												
738	**Gamma Kaplan-Meier (KM) Statistics**											
739					Approximate Chi Square Value (29.26, α)	17.91				Adjusted Chi Square Value (29.26, β)		16.9
740					95% KM Approximate Gamma UCL	37.39				95% KM Adjusted Gamma UCL		39.61
741												
742	**Lognormal GOF Test on Detected Observations Only**											
743					Shapiro Wilk Test Statistic	0.936				**Shapiro Wilk GOF Test**		
744					10% Shapiro Wilk Critical Value	0.883				Detected Data appear Lognormal at 10% Significance Level		
745					Lilliefors Test Statistic	0.126				**Lilliefors GOF Test**		
746					10% Lilliefors Critical Value	0.223				Detected Data appear Lognormal at 10% Significance Level		
747	**Detected Data appear Lognormal at 10% Significance Level**											
748												
749	**Lognormal ROS Statistics Using Imputed Non-Detects**											
750					Mean in Original Scale	22.8				Mean in Log Scale		2.641
751					SD in Original Scale	22.86				SD in Log Scale		1.051
752					95% t UCL (assumes normality of ROS data)	32.82				95% Percentile Bootstrap UCL		31.99
753					95% BCA Bootstrap UCL	33.97				95% Bootstrap t UCL		36.99
754					95% H-UCL (Log ROS)	51.85						
755												
756	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
757					KM Mean (logged)	2.632				KM Geo Mean		13.91
758					KM SD (logged)	1.058				95% Critical H Value (KM-Log)		2.794
759					KM Standard Error of Mean (logged)	0.293				95% H-UCL (KM -Log)		52.2
760					KM SD (logged)	1.058				95% Critical H Value (KM-Log)		2.794
761					KM Standard Error of Mean (logged)	0.293						
762												
763	**DL/2 Statistics**											
764	**DL/2 Normal**									**DL/2 Log-Transformed**		
765					Mean in Original Scale	22.61				Mean in Log Scale		2.567
766					SD in Original Scale	23.04				SD in Log Scale		1.176
767					95% t UCL (Assumes normality)	32.7				95% H-Stat UCL		64.35
768	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
769												
770	**Nonparametric Distribution Free UCL Statistics**											
771	**Detected Data appear Normal Distributed at 1% Significance Level**											
772												
773	**Suggested UCL to Use**											
774					95% KM (t) UCL	33.03						
775												
776	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
777	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
778	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
779												
780	**Hg**											

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782	**General Statistics**											
783	Total Number of Observations					15	Number of Distinct Observations					10
784	Number of Detects					10	Number of Non-Detects					5
785	Number of Distinct Detects					9	Number of Distinct Non-Detects					2
786	Minimum Detect					0.2	Minimum Non-Detect					0.1
787	Maximum Detect					1	Maximum Non-Detect					0.2
788	Variance Detects					0.0573	Percent Non-Detects					33.33%
789	Mean Detects					0.411	SD Detects					0.239
790	Median Detects					0.37	CV Detects					0.582
791	Skewness Detects					1.81	Kurtosis Detects					4.025
792	Mean of Logged Detects					-1.013	SD of Logged Detects					0.505
793												
794	**Normal GOF Test on Detects Only**											
795	Shapiro Wilk Test Statistic					0.796	**Shapiro Wilk GOF Test**					
796	1% Shapiro Wilk Critical Value					0.781	Detected Data appear Normal at 1% Significance Level					
797	Lilliefors Test Statistic					0.255	**Lilliefors GOF Test**					
798	1% Lilliefors Critical Value					0.304	Detected Data appear Normal at 1% Significance Level					
799	**Detected Data appear Normal at 1% Significance Level**											
800												
801	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
802	KM Mean					0.307	KM Standard Error of Mean					0.0643
803	90KM SD					0.236	95% KM (BCA) UCL					0.417
804	95% KM (t) UCL					0.421	95% KM (Percentile Bootstrap) UCL					0.409
805	95% KM (z) UCL					0.413	95% KM Bootstrap t UCL					0.467
806	90% KM Chebyshev UCL					0.5	95% KM Chebyshev UCL					0.588
807	97.5% KM Chebyshev UCL					0.709	99% KM Chebyshev UCL					0.947
808												
809	**Gamma GOF Tests on Detected Observations Only**											
810	A-D Test Statistic					0.478	**Anderson-Darling GOF Test**					
811	5% A-D Critical Value					0.729	Detected data appear Gamma Distributed at 5% Significance Level					
812	K-S Test Statistic					0.182	**Kolmogorov-Smirnov GOF**					
813	5% K-S Critical Value					0.268	Detected data appear Gamma Distributed at 5% Significance Level					
814	**Detected data appear Gamma Distributed at 5% Significance Level**											
815												
816	**Gamma Statistics on Detected Data Only**											
817	k hat (MLE)					4.19	k star (bias corrected MLE)					3
818	Theta hat (MLE)					0.0981	Theta star (bias corrected MLE)					0.137
819	nu hat (MLE)					83.81	nu star (bias corrected)					60
820	Mean (detects)					0.411						
821												
822	**Gamma ROS Statistics using Imputed Non-Detects**											
823	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
824	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
825	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
826	This is especially true when the sample size is small.											
827	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
828	Minimum					0.01	Mean					0.28
829	Maximum					1	Median					0.24
830	SD					0.272	CV					0.971
831	k hat (MLE)					0.721	k star (bias corrected MLE)					0.621
832	Theta hat (MLE)					0.388	Theta star (bias corrected MLE)					0.45

833					nu hat (MLE)	21.62				nu star (bias corrected)		18.63
834					Adjusted Level of Significance (β)	0.0324						
835					Approximate Chi Square Value (18.63, α)	9.846				Adjusted Chi Square Value (18.63, β)		9.068
836					95% Gamma Approximate UCL	0.529				95% Gamma Adjusted UCL		0.575
837												
838					**Estimates of Gamma Parameters using KM Estimates**							
839					Mean (KM)	0.307				SD (KM)		0.236
840					Variance (KM)	0.0558				SE of Mean (KM)		0.0643
841					k hat (KM)	1.691				k star (KM)		1.397
842					nu hat (KM)	50.74				nu star (KM)		41.92
843					theta hat (KM)	0.182				theta star (KM)		0.22
844					80% gamma percentile (KM)	0.479				90% gamma percentile (KM)		0.652
845					95% gamma percentile (KM)	0.82				99% gamma percentile (KM)		1.202
846												
847					**Gamma Kaplan-Meier (KM) Statistics**							
848					Approximate Chi Square Value (41.92, α)	28.08				Adjusted Chi Square Value (41.92, β)		26.69
849					95% KM Approximate Gamma UCL	0.459				95% KM Adjusted Gamma UCL		0.483
850												
851					**Lognormal GOF Test on Detected Observations Only**							
852					Shapiro Wilk Test Statistic	0.916				**Shapiro Wilk GOF Test**		
853					10% Shapiro Wilk Critical Value	0.869				Detected Data appear Lognormal at 10% Significance Level		
854					Lilliefors Test Statistic	0.163				**Lilliefors GOF Test**		
855					10% Lilliefors Critical Value	0.241				Detected Data appear Lognormal at 10% Significance Level		
856					**Detected Data appear Lognormal at 10% Significance Level**							
857												
858					**Lognormal ROS Statistics Using Imputed Non-Detects**							
859					Mean in Original Scale	0.309				Mean in Log Scale		-1.438
860					SD in Original Scale	0.244				SD in Log Scale		0.757
861					95% t UCL (assumes normality of ROS data)	0.42				95% Percentile Bootstrap UCL		0.412
862					95% BCA Bootstrap UCL	0.441				95% Bootstrap t UCL		0.469
863					95% H-UCL (Log ROS)	0.512						
864												
865					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
866					KM Mean (logged)	-1.443				KM Geo Mean		0.236
867					KM SD (logged)	0.723				95% Critical H Value (KM-Log)		2.336
868					KM Standard Error of Mean (logged)	0.197				95% H-UCL (KM -Log)		0.482
869					KM SD (logged)	0.723				95% Critical H Value (KM-Log)		2.336
870					KM Standard Error of Mean (logged)	0.197						
871												
872					**DL/2 Statistics**							
873					**DL/2 Normal**					**DL/2 Log-Transformed**		
874					Mean in Original Scale	0.294				Mean in Log Scale		-1.628
875					SD in Original Scale	0.257				SD in Log Scale		1.001
876					95% t UCL (Assumes normality)	0.411				95% H-Stat UCL		0.675
877					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
878												
879					**Nonparametric Distribution Free UCL Statistics**							
880					**Detected Data appear Normal Distributed at 1% Significance Level**							
881												
882					**Suggested UCL to Use**							
883					95% KM (t) UCL	0.421						
884												

	A	B	C	D	E	F	G	H	I	J	K	L
885	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
886	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
887	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
888												
889	**Mo**											
890												
891	**General Statistics**											
892						Total Number of Observations	8			Number of Distinct Observations	6	
893										Number of Missing Observations	4	
894						Number of Detects	3			Number of Non-Detects	5	
895						Number of Distinct Detects	3			Number of Distinct Non-Detects	3	
896						Minimum Detect	2.3			Minimum Non-Detect	0.96	
897						Maximum Detect	13.1			Maximum Non-Detect	1	
898						Variance Detects	30.24			Percent Non-Detects	62.5%	
899						Mean Detects	7.1			SD Detects	5.499	
900						Median Detects	5.9			CV Detects	0.775	
901						Skewness Detects	0.935			Kurtosis Detects	N/A	
902						Mean of Logged Detects	1.727			SD of Logged Detects	0.871	
903												
904	**Warning: Data set has only 3 Detected Values.**											
905	**This is not enough to compute meaningful or reliable statistics and estimates.**											
906												
907												
908	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
909	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
910	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
911	**The Chebyshev UCL often results in gross overestimates of the mean.**											
912	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
913												
914	**Normal GOF Test on Detects Only**											
915						Shapiro Wilk Test Statistic	0.964			**Shapiro Wilk GOF Test**		
916						1% Shapiro Wilk Critical Value	0.753			Detected Data appear Normal at 1% Significance Level		
917						Lilliefors Test Statistic	0.253			**Lilliefors GOF Test**		
918						1% Lilliefors Critical Value	0.429			Detected Data appear Normal at 1% Significance Level		
919	**Detected Data appear Normal at 1% Significance Level**											
920	**Note GOF tests may be unreliable for small sample sizes**											
921												
922	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
923						KM Mean	3.263			KM Standard Error of Mean	1.753	
924						90KM SD	4.049			95% KM (BCA) UCL	N/A	
925						95% KM (t) UCL	6.584			95% KM (Percentile Bootstrap) UCL	N/A	
926						95% KM (z) UCL	6.146			95% KM Bootstrap t UCL	N/A	
927						90% KM Chebyshev UCL	8.523			95% KM Chebyshev UCL	10.91	
928						97.5% KM Chebyshev UCL	14.21			99% KM Chebyshev UCL	20.71	
929												
930	**Gamma GOF Tests on Detected Observations Only**											
931						A-D Test Statistic	0.246			**Anderson-Darling GOF Test**		
932						5% A-D Critical Value	0.637			Detected data appear Gamma Distributed at 5% Significance Level		
933						K-S Test Statistic	0.226			**Kolmogorov-Smirnov GOF**		
934						5% K-S Critical Value	0.435			Detected data appear Gamma Distributed at 5% Significance Level		
935	**Detected Data Not Gamma Distributed at 5% Significance Level**											
936												

937	**Gamma Statistics on Detected Data Only**											
938					k hat (MLE)	2.296			k star (bias corrected MLE)	N/A		
939					Theta hat (MLE)	3.092			Theta star (bias corrected MLE)	N/A		
940					nu hat (MLE)	13.78			nu star (bias corrected)	N/A		
941					Mean (detects)	7.1						
942												
943	**Gamma ROS Statistics using Imputed Non-Detects**											
944	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
945	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
946	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
947	This is especially true when the sample size is small.											
948	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
949					Minimum	0.01			Mean	2.669		
950					Maximum	13.1			Median	0.01		
951					SD	4.702			CV	1.762		
952					k hat (MLE)	0.225			k star (bias corrected MLE)	0.224		
953					Theta hat (MLE)	11.87			Theta star (bias corrected MLE)	11.92		
954					nu hat (MLE)	3.598			nu star (bias corrected)	3.582		
955					Adjusted Level of Significance (β)	0.0195						
956					Approximate Chi Square Value (3.58, α)	0.564			Adjusted Chi Square Value (3.58, β)	0.335		
957					95% Gamma Approximate UCL	16.95			95% Gamma Adjusted UCL	N/A		
958												
959	**Estimates of Gamma Parameters using KM Estimates**											
960					Mean (KM)	3.263			SD (KM)	4.049		
961					Variance (KM)	16.4			SE of Mean (KM)	1.753		
962					k hat (KM)	0.649			k star (KM)	0.489		
963					nu hat (KM)	10.39			nu star (KM)	7.825		
964					theta hat (KM)	5.026			theta star (KM)	6.671		
965					80% gamma percentile (KM)	5.353			90% gamma percentile (KM)	8.867		
966					95% gamma percentile (KM)	12.63			99% gamma percentile (KM)	21.91		
967												
968	**Gamma Kaplan-Meier (KM) Statistics**											
969					Approximate Chi Square Value (7.83, α)	2.634			Adjusted Chi Square Value (7.83, β)	1.936		
970					95% KM Approximate Gamma UCL	9.692			95% KM Adjusted Gamma UCL	13.19		
971												
972	**Lognormal GOF Test on Detected Observations Only**											
973					Shapiro Wilk Test Statistic	0.998			**Shapiro Wilk GOF Test**			
974					10% Shapiro Wilk Critical Value	0.789			Detected Data appear Lognormal at 10% Significance Level			
975					Lilliefors Test Statistic	0.189			**Lilliefors GOF Test**			
976					10% Lilliefors Critical Value	0.389			Detected Data appear Lognormal at 10% Significance Level			
977	**Detected Data appear Lognormal at 10% Significance Level**											
978	**Note GOF tests may be unreliable for small sample sizes**											
979												
980	**Lognormal ROS Statistics Using Imputed Non-Detects**											
981					Mean in Original Scale	2.817			Mean in Log Scale	-0.362		
982					SD in Original Scale	4.609			SD in Log Scale	1.883		
983					95% t UCL (assumes normality of ROS data)	5.904			95% Percentile Bootstrap UCL	5.631		
984					95% BCA Bootstrap UCL	6.678			95% Bootstrap t UCL	17.16		
985					95% H-UCL (Log ROS)	255						
986												
987	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
988					KM Mean (logged)	0.622			KM Geo Mean	1.863		

989				KM SD (logged)		0.96			95% Critical H Value (KM-Log)			3.328
990				KM Standard Error of Mean (logged)		0.416			95% H-UCL (KM -Log)			9.884
991				KM SD (logged)		0.96			95% Critical H Value (KM-Log)			3.328
992				KM Standard Error of Mean (logged)		0.416						
993												
994						**DL/2 Statistics**						
995				**DL/2 Normal**					**DL/2 Log-Transformed**			
996				Mean in Original Scale		2.971			Mean in Log Scale			0.205
997				SD in Original Scale		4.509			SD in Log Scale			1.343
998				95% t UCL (Assumes normality)		5.991			95% H-Stat UCL			27.06
999						**DL/2 is not a recommended method, provided for comparisons and historical reasons**						
1000												
1001						**Nonparametric Distribution Free UCL Statistics**						
1002						**Detected Data appear Normal Distributed at 1% Significance Level**						
1003												
1004						**Suggested UCL to Use**						
1005				95% KM (t) UCL		6.584						
1006												
1007						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
1008						Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.						
1009						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
1010												
1011												
1012	**Ni**											
1013												
1014						**General Statistics**						
1015				Total Number of Observations		16			Number of Distinct Observations			16
1016									Number of Missing Observations			0
1017				Minimum		9.1			Mean			248.2
1018				Maximum		1340			Median			85.85
1019				SD		378.8			Std. Error of Mean			94.71
1020				Coefficient of Variation		1.526			Skewness			2.202
1021												
1022						**Normal GOF Test**						
1023				Shapiro Wilk Test Statistic		0.65			**Shapiro Wilk GOF Test**			
1024				1% Shapiro Wilk Critical Value		0.844			Data Not Normal at 1% Significance Level			
1025				Lilliefors Test Statistic		0.341			**Lilliefors GOF Test**			
1026				1% Lilliefors Critical Value		0.248			Data Not Normal at 1% Significance Level			
1027						**Data Not Normal at 1% Significance Level**						
1028												
1029						**Assuming Normal Distribution**						
1030				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
1031				95% Student's-t UCL		414.2			95% Adjusted-CLT UCL (Chen-1995)			459.7
1032									95% Modified-t UCL (Johnson-1978)			422.9
1033												
1034						**Gamma GOF Test**						
1035				A-D Test Statistic		0.63			**Anderson-Darling Gamma GOF Test**			
1036				5% A-D Critical Value		0.783			Detected data appear Gamma Distributed at 5% Significance Level			
1037				K-S Test Statistic		0.184			**Kolmogorov-Smirnov Gamma GOF Test**			
1038				5% K-S Critical Value		0.225			Detected data appear Gamma Distributed at 5% Significance Level			
1039						**Detected data appear Gamma Distributed at 5% Significance Level**						
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041	**Gamma Statistics**											
1042					k hat (MLE)	0.657			k star (bias corrected MLE)			0.576
1043					Theta hat (MLE)	377.6			Theta star (bias corrected MLE)			431.1
1044					nu hat (MLE)	21.03			nu star (bias corrected)			18.42
1045					MLE Mean (bias corrected)	248.2			MLE Sd (bias corrected)			327.1
1046									Approximate Chi Square Value (0.05)			9.695
1047					Adjusted Level of Significance	0.0335			Adjusted Chi Square Value			8.981
1048												
1049	**Assuming Gamma Distribution**											
1050					95% Approximate Gamma UCL	471.5			95% Adjusted Gamma UCL			509
1051												
1052	**Lognormal GOF Test**											
1053					Shapiro Wilk Test Statistic	0.974			**Shapiro Wilk Lognormal GOF Test**			
1054					10% Shapiro Wilk Critical Value	0.906			Data appear Lognormal at 10% Significance Level			
1055					Lilliefors Test Statistic	0.0983			**Lilliefors Lognormal GOF Test**			
1056					10% Lilliefors Critical Value	0.196			Data appear Lognormal at 10% Significance Level			
1057	**Data appear Lognormal at 10% Significance Level**											
1058												
1059	**Lognormal Statistics**											
1060					Minimum of Logged Data	2.208			Mean of logged Data			4.586
1061					Maximum of Logged Data	7.2			SD of logged Data			1.435
1062												
1063	**Assuming Lognormal Distribution**											
1064					95% H-UCL	978.2			90% Chebyshev (MVUE) UCL			548.8
1065					95% Chebyshev (MVUE) UCL	686.2			97.5% Chebyshev (MVUE) UCL			876.9
1066					99% Chebyshev (MVUE) UCL	1252						
1067												
1068	**Nonparametric Distribution Free UCL Statistics**											
1069	**Data appear to follow a Discernible Distribution**											
1070												
1071	**Nonparametric Distribution Free UCLs**											
1072					95% CLT UCL	404			95% BCA Bootstrap UCL			454.7
1073					95% Standard Bootstrap UCL	400.1			95% Bootstrap-t UCL			619.6
1074					95% Hall's Bootstrap UCL	511.2			95% Percentile Bootstrap UCL			409.7
1075					90% Chebyshev(Mean, Sd) UCL	532.3			95% Chebyshev(Mean, Sd) UCL			661
1076					97.5% Chebyshev(Mean, Sd) UCL	839.6			99% Chebyshev(Mean, Sd) UCL			1191
1077												
1078	**Suggested UCL to Use**											
1079					95% Adjusted Gamma UCL	509						
1080												
1081	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1082	**Please verify the data were collected from random locations.**											
1083	**If the data were collected using judgmental or other non-random methods,**											
1084	**then contact a statistician to correctly calculate UCLs.**											
1085												
1086	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1087	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1088	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1089												
1090	**Se**											
1091												
1092	**General Statistics**											

1093				Total Number of Observations		8				Number of Distinct Observations		2
1094										Number of Missing Observations		4
1095				Number of Detects		0				Number of Non-Detects		8
1096				Number of Distinct Detects		0				Number of Distinct Non-Detects		2
1097												
1098	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1099	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1100	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1101												
1102	**The data set for variable Se was not processed!**											
1103												
1104												
1105	**Ag**											
1106												
1107	**General Statistics**											
1108				Total Number of Observations		8				Number of Distinct Observations		5
1109										Number of Missing Observations		4
1110				Number of Detects		5				Number of Non-Detects		3
1111				Number of Distinct Detects		4				Number of Distinct Non-Detects		2
1112				Minimum Detect		0.99				Minimum Non-Detect		0.48
1113				Maximum Detect		2.1				Maximum Non-Detect		1
1114				Variance Detects		0.265				Percent Non-Detects		37.5%
1115				Mean Detects		1.358				SD Detects		0.515
1116				Median Detects		1				CV Detects		0.379
1117				Skewness Detects		0.938				Kurtosis Detects		-1.441
1118				Mean of Logged Detects		0.253				SD of Logged Detects		0.358
1119												
1120	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
1121	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
1122	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
1123	**The Chebyshev UCL often results in gross overestimates of the mean.**											
1124	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
1125												
1126	**Normal GOF Test on Detects Only**											
1127				Shapiro Wilk Test Statistic		0.776				**Shapiro Wilk GOF Test**		
1128				1% Shapiro Wilk Critical Value		0.686				Detected Data appear Normal at 1% Significance Level		
1129				Lilliefors Test Statistic		0.357				**Lilliefors GOF Test**		
1130				1% Lilliefors Critical Value		0.396				Detected Data appear Normal at 1% Significance Level		
1131	**Detected Data appear Normal at 1% Significance Level**											
1132	**Note GOF tests may be unreliable for small sample sizes**											
1133												
1134	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1135				KM Mean		1.093				KM Standard Error of Mean		0.218
1136				90KM SD		0.521				95% KM (BCA) UCL		N/A
1137				95% KM (t) UCL		1.505				95% KM (Percentile Bootstrap) UCL		N/A
1138				95% KM (z) UCL		1.451				95% KM Bootstrap t UCL		N/A
1139				90% KM Chebyshev UCL		1.746				95% KM Chebyshev UCL		2.043
1140				97.5% KM Chebyshev UCL		2.454				99% KM Chebyshev UCL		3.261
1141												
1142	**Gamma GOF Tests on Detected Observations Only**											
1143				A-D Test Statistic		0.717				**Anderson-Darling GOF Test**		
1144				5% A-D Critical Value		0.679				Detected Data Not Gamma Distributed at 5% Significance Level		

1145					K-S Test Statistic	0.384	**Kolmogorov-Smirnov GOF**					
1146					5% K-S Critical Value	0.358	Detected Data Not Gamma Distributed at 5% Significance Level					
1147	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1148												
1149	**Gamma Statistics on Detected Data Only**											
1150					k hat (MLE)	9.508	k star (bias corrected MLE)					3.936
1151					Theta hat (MLE)	0.143	Theta star (bias corrected MLE)					0.345
1152					nu hat (MLE)	95.08	nu star (bias corrected)					39.36
1153					Mean (detects)	1.358						
1154												
1155	**Gamma ROS Statistics using Imputed Non-Detects**											
1156	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1157	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1158	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1159	This is especially true when the sample size is small.											
1160	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1161					Minimum	0.273	Mean					1.015
1162					Maximum	2.1	Median					0.995
1163					SD	0.624	CV					0.615
1164					k hat (MLE)	2.779	k star (bias corrected MLE)					1.82
1165					Theta hat (MLE)	0.365	Theta star (bias corrected MLE)					0.557
1166					nu hat (MLE)	44.47	nu star (bias corrected)					29.13
1167					Adjusted Level of Significance (β)	0.0195						
1168					Approximate Chi Square Value (29.13, α)	17.81	Adjusted Chi Square Value (29.13, β)					15.61
1169					95% Gamma Approximate UCL	1.659	95% Gamma Adjusted UCL					1.893
1170												
1171	**Estimates of Gamma Parameters using KM Estimates**											
1172					Mean (KM)	1.093	SD (KM)					0.521
1173					Variance (KM)	0.272	SE of Mean (KM)					0.218
1174					k hat (KM)	4.395	k star (KM)					2.83
1175					nu hat (KM)	70.32	nu star (KM)					45.28
1176					theta hat (KM)	0.249	theta star (KM)					0.386
1177					80% gamma percentile (KM)	1.569	90% gamma percentile (KM)					1.963
1178					95% gamma percentile (KM)	2.332	99% gamma percentile (KM)					3.133
1179												
1180	**Gamma Kaplan-Meier (KM) Statistics**											
1181					Approximate Chi Square Value (45.28, α)	30.85	Adjusted Chi Square Value (45.28, β)					27.87
1182					95% KM Approximate Gamma UCL	1.604	95% KM Adjusted Gamma UCL					1.775
1183												
1184	**Lognormal GOF Test on Detected Observations Only**											
1185					Shapiro Wilk Test Statistic	0.768	**Shapiro Wilk GOF Test**					
1186					10% Shapiro Wilk Critical Value	0.806	Detected Data Not Lognormal at 10% Significance Level					
1187					Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**					
1188					10% Lilliefors Critical Value	0.319	Detected Data Not Lognormal at 10% Significance Level					
1189	**Detected Data Not Lognormal at 10% Significance Level**											
1190												
1191	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1192					Mean in Original Scale	1.091	Mean in Log Scale					-0.0105
1193					SD in Original Scale	0.54	SD in Log Scale					0.464
1194					95% t UCL (assumes normality of ROS data)	1.453	95% Percentile Bootstrap UCL					1.399
1195					95% BCA Bootstrap UCL	1.471	95% Bootstrap t UCL					1.817
1196					95% H-UCL (Log ROS)	1.649						

1197												
1198	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1199					KM Mean (logged)	-0.0269				KM Geo Mean	0.973	
1200					KM SD (logged)	0.488				95% Critical H Value (KM-Log)	2.333	
1201					KM Standard Error of Mean (logged)	0.218				95% H-UCL (KM -Log)	1.686	
1202					KM SD (logged)	0.488				95% Critical H Value (KM-Log)	2.333	
1203					KM Standard Error of Mean (logged)	0.218						
1204												
1205	**DL/2 Statistics**											
1206				**DL/2 Normal**						**DL/2 Log-Transformed**		
1207					Mean in Original Scale	1.004				Mean in Log Scale	-0.194	
1208					SD in Original Scale	0.63				SD in Log Scale	0.71	
1209					95% t UCL (Assumes normality)	1.426				95% H-Stat UCL	2.221	
1210	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1211												
1212	**Nonparametric Distribution Free UCL Statistics**											
1213	**Detected Data appear Normal Distributed at 1% Significance Level**											
1214												
1215	**Suggested UCL to Use**											
1216					95% KM (t) UCL	1.505						
1217												
1218	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1219	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1220	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1221												
1222	**TI**											
1223												
1224	**General Statistics**											
1225					Total Number of Observations	4				Number of Distinct Observations	1	
1226										Number of Missing Observations	8	
1227					Number of Detects	0				Number of Non-Detects	4	
1228					Number of Distinct Detects	0				Number of Distinct Non-Detects	1	
1229												
1230	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1231	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1232	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1233												
1234	**The data set for variable TI was not processed!**											
1235												
1236												
1237												
1238	**V**											
1239												
1240	**General Statistics**											
1241					Total Number of Observations	8				Number of Distinct Observations	8	
1242										Number of Missing Observations	4	
1243					Minimum	3.3				Mean	44.26	
1244					Maximum	86.6				Median	45.8	
1245					SD	29.53				Std. Error of Mean	10.44	
1246					Coefficient of Variation	0.667				Skewness	0.0447	
1247												
1248	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											

	A	B	C	D	E	F	G	H	I	J	K	L
1249	refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,											
1250	but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).											
1251	The Chebyshev UCL often results in gross overestimates of the mean.											
1252	Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.											
1253												
1254	**Normal GOF Test**											
1255					Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**					
1256					1% Shapiro Wilk Critical Value	0.749	Data appear Normal at 1% Significance Level					
1257					Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**					
1258					1% Lilliefors Critical Value	0.333	Data appear Normal at 1% Significance Level					
1259	**Data appear Normal at 1% Significance Level**											
1260	**Note GOF tests may be unreliable for small sample sizes**											
1261												
1262	**Assuming Normal Distribution**											
1263	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1264					95% Student's-t UCL	64.04	95% Adjusted-CLT UCL (Chen-1995)					61.61
1265							95% Modified-t UCL (Johnson-1978)					64.07
1266												
1267	**Gamma GOF Test**											
1268					A-D Test Statistic	0.328	**Anderson-Darling Gamma GOF Test**					
1269					5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level					
1270					K-S Test Statistic	0.187	**Kolmogorov-Smirnov Gamma GOF Test**					
1271					5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level					
1272	**Detected data appear Gamma Distributed at 5% Significance Level**											
1273	**Note GOF tests may be unreliable for small sample sizes**											
1274												
1275	**Gamma Statistics**											
1276					k hat (MLE)	1.581	k star (bias corrected MLE)					1.071
1277					Theta hat (MLE)	28	Theta star (bias corrected MLE)					41.32
1278					nu hat (MLE)	25.29	nu star (bias corrected)					17.14
1279					MLE Mean (bias corrected)	44.26	MLE Sd (bias corrected)					42.77
1280							Approximate Chi Square Value (0.05)					8.772
1281					Adjusted Level of Significance	0.0195	Adjusted Chi Square Value					7.31
1282												
1283	**Assuming Gamma Distribution**											
1284					95% Approximate Gamma UCL	86.48	95% Adjusted Gamma UCL					103.8
1285												
1286	**Lognormal GOF Test**											
1287					Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk Lognormal GOF Test**					
1288					10% Shapiro Wilk Critical Value	0.851	Data appear Lognormal at 10% Significance Level					
1289					Lilliefors Test Statistic	0.206	**Lilliefors Lognormal GOF Test**					
1290					10% Lilliefors Critical Value	0.265	Data appear Lognormal at 10% Significance Level					
1291	**Data appear Lognormal at 10% Significance Level**											
1292	**Note GOF tests may be unreliable for small sample sizes**											
1293												
1294	**Lognormal Statistics**											
1295					Minimum of Logged Data	1.194	Mean of logged Data					3.442
1296					Maximum of Logged Data	4.461	SD of logged Data					1.082
1297												
1298	**Assuming Lognormal Distribution**											
1299					95% H-UCL	247.2	90% Chebyshev (MVUE) UCL					110.2
1300					95% Chebyshev (MVUE) UCL	137.2	97.5% Chebyshev (MVUE) UCL					174.6

1301				99% Chebyshev (MVUE) UCL		248						
1302												
1303	**Nonparametric Distribution Free UCL Statistics**											
1304	**Data appear to follow a Discernible Distribution**											
1305												
1306	**Nonparametric Distribution Free UCLs**											
1307				95% CLT UCL		61.44			95% BCA Bootstrap UCL			59.73
1308				95% Standard Bootstrap UCL		60.06			95% Bootstrap-t UCL			64.16
1309				95% Hall's Bootstrap UCL		61.36			95% Percentile Bootstrap UCL			60.04
1310				90% Chebyshev(Mean, Sd) UCL		75.59			95% Chebyshev(Mean, Sd) UCL			89.78
1311				97.5% Chebyshev(Mean, Sd) UCL		109.5			99% Chebyshev(Mean, Sd) UCL			148.2
1312												
1313	**Suggested UCL to Use**											
1314				95% Student's-t UCL		64.04						
1315												
1316	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1317	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1318	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1319												
1320												
1321	**Zn**											
1322												
1323	**General Statistics**											
1324				Total Number of Observations		8			Number of Distinct Observations			8
1325									Number of Missing Observations			4
1326				Minimum		15			Mean			72.49
1327				Maximum		111			Median			74
1328				SD		29.27			Std. Error of Mean			10.35
1329				Coefficient of Variation		0.404			Skewness			-0.863
1330												
1331	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
1332	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
1333	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
1334	**The Chebyshev UCL often results in gross overestimates of the mean.**											
1335	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
1336												
1337	**Normal GOF Test**											
1338				Shapiro Wilk Test Statistic		0.944			**Shapiro Wilk GOF Test**			
1339				1% Shapiro Wilk Critical Value		0.749			Data appear Normal at 1% Significance Level			
1340				Lilliefors Test Statistic		0.201			**Lilliefors GOF Test**			
1341				1% Lilliefors Critical Value		0.333			Data appear Normal at 1% Significance Level			
1342	**Data appear Normal at 1% Significance Level**											
1343	**Note GOF tests may be unreliable for small sample sizes**											
1344												
1345	**Assuming Normal Distribution**											
1346	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
1347				95% Student's-t UCL		92.1			95% Adjusted-CLT UCL (Chen-1995)			86.14
1348									95% Modified-t UCL (Johnson-1978)			91.57
1349												
1350	**Gamma GOF Test**											
1351				A-D Test Statistic		0.645			**Anderson-Darling Gamma GOF Test**			
1352				5% A-D Critical Value		0.719			Detected data appear Gamma Distributed at 5% Significance Level			

1353					K-S Test Statistic	0.283	**Kolmogorov-Smirnov Gamma GOF Test**					
1354					5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level					
1355	**Detected data appear Gamma Distributed at 5% Significance Level**											
1356	**Note GOF tests may be unreliable for small sample sizes**											
1357												
1358	**Gamma Statistics**											
1359					k hat (MLE)	4.198	k star (bias corrected MLE)	2.707				
1360					Theta hat (MLE)	17.27	Theta star (bias corrected MLE)	26.78				
1361					nu hat (MLE)	67.17	nu star (bias corrected)	43.32				
1362					MLE Mean (bias corrected)	72.49	MLE Sd (bias corrected)	44.06				
1363							Approximate Chi Square Value (0.05)	29.22				
1364					Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	26.33				
1365												
1366	**Assuming Gamma Distribution**											
1367					95% Approximate Gamma UCL	107.4	95% Adjusted Gamma UCL	119.2				
1368												
1369	**Lognormal GOF Test**											
1370					Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk Lognormal GOF Test**					
1371					10% Shapiro Wilk Critical Value	0.851	Data Not Lognormal at 10% Significance Level					
1372					Lilliefors Test Statistic	0.326	**Lilliefors Lognormal GOF Test**					
1373					10% Lilliefors Critical Value	0.265	Data Not Lognormal at 10% Significance Level					
1374	**Data Not Lognormal at 10% Significance Level**											
1375												
1376	**Lognormal Statistics**											
1377					Minimum of Logged Data	2.708	Mean of logged Data	4.16				
1378					Maximum of Logged Data	4.71	SD of logged Data	0.625				
1379												
1380	**Assuming Lognormal Distribution**											
1381					95% H-UCL	143.4	90% Chebyshev (MVUE) UCL	126.7				
1382					95% Chebyshev (MVUE) UCL	149.8	97.5% Chebyshev (MVUE) UCL	181.8				
1383					99% Chebyshev (MVUE) UCL	244.7						
1384												
1385	**Nonparametric Distribution Free UCL Statistics**											
1386	**Data appear to follow a Discernible Distribution**											
1387												
1388	**Nonparametric Distribution Free UCLs**											
1389					95% CLT UCL	89.51	95% BCA Bootstrap UCL	86.34				
1390					95% Standard Bootstrap UCL	88.58	95% Bootstrap-t UCL	89.32				
1391					95% Hall's Bootstrap UCL	88.44	95% Percentile Bootstrap UCL	88.51				
1392					90% Chebyshev(Mean, Sd) UCL	103.5	95% Chebyshev(Mean, Sd) UCL	117.6				
1393					97.5% Chebyshev(Mean, Sd) UCL	137.1	99% Chebyshev(Mean, Sd) UCL	175.5				
1394												
1395	**Suggested UCL to Use**											
1396					95% Student's-t UCL	92.1						
1397												
1398	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1399	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1400	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1401												
1402	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
1403	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
1404												

	A	B	C	D	E	F	G	H	I	J	K	L
1405	**CN**											
1406												
1407	**General Statistics**											
1408					Total Number of Observations	6			Number of Distinct Observations			1
1409									Number of Missing Observations			3
1410					Number of Detects	0			Number of Non-Detects			6
1411					Number of Distinct Detects	0			Number of Distinct Non-Detects			1
1412												
1413	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1414	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1415	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1416												
1417	**The data set for variable CN was not processed!**											
1418												
1419												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/11/2023 3:44:41 PM
From File	07 Bellweather Mine Waste Rock.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

As

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	5	Mean	48.29
Maximum	139	Median	12
SD	56.46	Std. Error of Mean	21.34
Coefficient of Variation	1.169	Skewness	1.016

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	89.75	95% Adjusted-CLT UCL (Chen-1995)	92.14
		95% Modified-t UCL (Johnson-1978)	91.12

Gamma GOF Test

A-D Test Statistic	0.581	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.297	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.322	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	0.787	k star (bias corrected MLE)	0.545
Theta hat (MLE)	61.36	Theta star (bias corrected MLE)	88.62
nu hat (MLE)	11.02	nu star (bias corrected)	7.628
MLE Mean (bias corrected)	48.29	MLE Sd (bias corrected)	65.41

53							Approximate Chi Square Value (0.05)					2.522
54				Adjusted Level of Significance		0.0158				Adjusted Chi Square Value		1.727
55												
56	**Assuming Gamma Distribution**											
57				95% Approximate Gamma UCL		146.1				95% Adjusted Gamma UCL		213.3
58												
59	**Lognormal GOF Test**											
60				Shapiro Wilk Test Statistic		0.87	**Shapiro Wilk Lognormal GOF Test**					
61				10% Shapiro Wilk Critical Value		0.838	Data appear Lognormal at 10% Significance Level					
62				Lilliefors Test Statistic		0.248	**Lilliefors Lognormal GOF Test**					
63				10% Lilliefors Critical Value		0.28	Data appear Lognormal at 10% Significance Level					
64	**Data appear Lognormal at 10% Significance Level**											
65	**Note GOF tests may be unreliable for small sample sizes**											
66												
67	**Lognormal Statistics**											
68				Minimum of Logged Data		1.609				Mean of logged Data		3.121
69				Maximum of Logged Data		4.934				SD of logged Data		1.385
70												
71	**Assuming Lognormal Distribution**											
72				95% H-UCL		908.2				90% Chebyshev (MVUE) UCL		122.5
73				95% Chebyshev (MVUE) UCL		156.2				97.5% Chebyshev (MVUE) UCL		203
74				99% Chebyshev (MVUE) UCL		295						
75												
76	**Nonparametric Distribution Free UCL Statistics**											
77	**Data appear to follow a Discernible Distribution**											
78												
79	**Nonparametric Distribution Free UCLs**											
80				95% CLT UCL		83.39				95% BCA Bootstrap UCL		88.86
81				95% Standard Bootstrap UCL		80.82				95% Bootstrap-t UCL		164.9
82				95% Hall's Bootstrap UCL		111.4				95% Percentile Bootstrap UCL		82.43
83				90% Chebyshev(Mean, Sd) UCL		112.3				95% Chebyshev(Mean, Sd) UCL		141.3
84				97.5% Chebyshev(Mean, Sd) UCL		181.5				99% Chebyshev(Mean, Sd) UCL		260.6
85												
86	**Suggested UCL to Use**											
87				95% Student's-t UCL		89.75						
88												
89	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
90	**Please verify the data were collected from random locations.**											
91	**If the data were collected using judgmental or other non-random methods,**											
92	**then contact a statistician to correctly calculate UCLs.**											
93												
94	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
95	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
96	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
97												
98												
99	**Pb**											
100												
101	**General Statistics**											
102				Total Number of Observations		7				Number of Distinct Observations		6
103										Number of Missing Observations		0
104				Minimum		9.1				Mean		13.44

105				Maximum	21					Median	12	
106				SD	4.14					Std. Error of Mean	1.565	
107				Coefficient of Variation	0.308					Skewness	1.192	
108												
109	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
110	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
111	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
112	**The Chebyshev UCL often results in gross overestimates of the mean.**											
113	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
114												
115	**Normal GOF Test**											
116				Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk GOF Test**						
117				1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level						
118				Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**						
119				1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level						
120	**Data appear Normal at 1% Significance Level**											
121	**Note GOF tests may be unreliable for small sample sizes**											
122												
123	**Assuming Normal Distribution**											
124	**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**						
125				95% Student's-t UCL	16.48	95% Adjusted-CLT UCL (Chen-1995)					16.77	
126						95% Modified-t UCL (Johnson-1978)					16.6	
127												
128	**Gamma GOF Test**											
129				A-D Test Statistic	0.394	**Anderson-Darling Gamma GOF Test**						
130				5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level						
131				K-S Test Statistic	0.228	**Kolmogorov-Smirnov Gamma GOF Test**						
132				5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level						
133	**Detected data appear Gamma Distributed at 5% Significance Level**											
134	**Note GOF tests may be unreliable for small sample sizes**											
135												
136	**Gamma Statistics**											
137				k hat (MLE)	13.76	k star (bias corrected MLE)					7.957	
138				Theta hat (MLE)	0.977	Theta star (bias corrected MLE)					1.689	
139				nu hat (MLE)	192.6	nu star (bias corrected)					111.4	
140				MLE Mean (bias corrected)	13.44	MLE Sd (bias corrected)					4.766	
141						Approximate Chi Square Value (0.05)					88.03	
142				Adjusted Level of Significance	0.0158	Adjusted Chi Square Value					81.77	
143												
144	**Assuming Gamma Distribution**											
145				95% Approximate Gamma UCL	17.01	95% Adjusted Gamma UCL					18.31	
146												
147	**Lognormal GOF Test**											
148				Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**						
149				10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level						
150				Lilliefors Test Statistic	0.21	**Lilliefors Lognormal GOF Test**						
151				10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level						
152	**Data appear Lognormal at 10% Significance Level**											
153	**Note GOF tests may be unreliable for small sample sizes**											
154												
155	**Lognormal Statistics**											
156				Minimum of Logged Data	2.208	Mean of logged Data					2.562	

157				Maximum of Logged Data	3.045					SD of logged Data	0.286	
158												
159				**Assuming Lognormal Distribution**								
160				95% H-UCL	17.41					90% Chebyshev (MVUE) UCL	17.78	
161				95% Chebyshev (MVUE) UCL	19.76					97.5% Chebyshev (MVUE) UCL	22.5	
162				99% Chebyshev (MVUE) UCL	27.89							
163												
164				**Nonparametric Distribution Free UCL Statistics**								
165				**Data appear to follow a Discernible Distribution**								
166												
167				**Nonparametric Distribution Free UCLs**								
168				95% CLT UCL	16.02					95% BCA Bootstrap UCL	16.44	
169				95% Standard Bootstrap UCL	15.83					95% Bootstrap-t UCL	20.74	
170				95% Hall's Bootstrap UCL	35.05					95% Percentile Bootstrap UCL	16	
171				90% Chebyshev(Mean, Sd) UCL	18.14					95% Chebyshev(Mean, Sd) UCL	20.26	
172				97.5% Chebyshev(Mean, Sd) UCL	23.21					99% Chebyshev(Mean, Sd) UCL	29.01	
173												
174				**Suggested UCL to Use**								
175				95% Student's-t UCL	16.48							
176												
177				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
178				Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.								
179				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
180												
181	**Hg**											
182												
183				**General Statistics**								
184				Total Number of Observations	7					Number of Distinct Observations	6	
185				Number of Detects	5					Number of Non-Detects	2	
186				Number of Distinct Detects	5					Number of Distinct Non-Detects	1	
187				Minimum Detect	0.018					Minimum Non-Detect	0.2	
188				Maximum Detect	0.32					Maximum Non-Detect	0.2	
189				Variance Detects	0.0207					Percent Non-Detects	28.57%	
190				Mean Detects	0.174					SD Detects	0.144	
191				Median Detects	0.24					CV Detects	0.829	
192				Skewness Detects	-0.428					Kurtosis Detects	-3.034	
193				Mean of Logged Detects	-2.361					SD of Logged Detects	1.468	
194												
195				**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**								
196				**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**								
197				**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**								
198				**The Chebyshev UCL often results in gross overestimates of the mean.**								
199				**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**								
200												
201				**Normal GOF Test on Detects Only**								
202				Shapiro Wilk Test Statistic	0.822					**Shapiro Wilk GOF Test**		
203				1% Shapiro Wilk Critical Value	0.686					Detected Data appear Normal at 1% Significance Level		
204				Lilliefors Test Statistic	0.278					**Lilliefors GOF Test**		
205				1% Lilliefors Critical Value	0.396					Detected Data appear Normal at 1% Significance Level		
206				**Detected Data appear Normal at 1% Significance Level**								
207				**Note GOF tests may be unreliable for small sample sizes**								
208												

209	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
210					KM Mean	0.129				KM Standard Error of Mean	0.0547	
211					90KM SD	0.129				95% KM (BCA) UCL	0.25	
212					95% KM (t) UCL	0.236				95% KM (Percentile Bootstrap) UCL	0.246	
213					95% KM (z) UCL	0.219				95% KM Bootstrap t UCL	0.239	
214					90% KM Chebyshev UCL	0.293				95% KM Chebyshev UCL	0.368	
215					97.5% KM Chebyshev UCL	0.471				99% KM Chebyshev UCL	0.673	
216												
217	**Gamma GOF Tests on Detected Observations Only**											
218					A-D Test Statistic	0.725	**Anderson-Darling GOF Test**					
219					5% A-D Critical Value	0.693	Detected Data Not Gamma Distributed at 5% Significance Level					
220					K-S Test Statistic	0.349	**Kolmogorov-Smirnov GOF**					
221					5% K-S Critical Value	0.365	Detected data appear Gamma Distributed at 5% Significance Level					
222	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
223	**Note GOF tests may be unreliable for small sample sizes**											
224												
225	**Gamma Statistics on Detected Data Only**											
226					k hat (MLE)	0.952				k star (bias corrected MLE)	0.514	
227					Theta hat (MLE)	0.182				Theta star (bias corrected MLE)	0.338	
228					nu hat (MLE)	9.518				nu star (bias corrected)	5.14	
229					Mean (detects)	0.174						
230												
231	**Gamma ROS Statistics using Imputed Non-Detects**											
232	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
233	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
234	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
235	This is especially true when the sample size is small.											
236	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
237					Minimum	0.018				Mean	0.137	
238					Maximum	0.32				Median	0.0662	
239					SD	0.134				CV	0.981	
240					k hat (MLE)	0.93				k star (bias corrected MLE)	0.627	
241					Theta hat (MLE)	0.147				Theta star (bias corrected MLE)	0.218	
242					nu hat (MLE)	13.02				nu star (bias corrected)	8.774	
243					Adjusted Level of Significance (β)	0.0158						
244					Approximate Chi Square Value (8.77, α)	3.191				Adjusted Chi Square Value (8.77, β)	2.264	
245					95% Gamma Approximate UCL	0.376				95% Gamma Adjusted UCL	0.53	
246												
247	**Estimates of Gamma Parameters using KM Estimates**											
248					Mean (KM)	0.129				SD (KM)	0.129	
249					Variance (KM)	0.0167				SE of Mean (KM)	0.0547	
250					k hat (KM)	1.002				k star (KM)	0.668	
251					nu hat (KM)	14.02				nu star (KM)	9.345	
252					theta hat (KM)	0.129				theta star (KM)	0.194	
253					80% gamma percentile (KM)	0.213				90% gamma percentile (KM)	0.329	
254					95% gamma percentile (KM)	0.448				99% gamma percentile (KM)	0.735	
255												
256	**Gamma Kaplan-Meier (KM) Statistics**											
257					Approximate Chi Square Value (9.35, α)	3.537				Adjusted Chi Square Value (9.35, β)	2.547	
258					95% KM Approximate Gamma UCL	0.342				95% KM Adjusted Gamma UCL	0.475	
259												
260	**Lognormal GOF Test on Detected Observations Only**											

261	Shapiro Wilk Test Statistic					0.749	**Shapiro Wilk GOF Test**					
262	10% Shapiro Wilk Critical Value					0.806	Detected Data Not Lognormal at 10% Significance Level					
263	Lilliefors Test Statistic					0.338	**Lilliefors GOF Test**					
264	10% Lilliefors Critical Value					0.319	Detected Data Not Lognormal at 10% Significance Level					
265	**Detected Data Not Lognormal at 10% Significance Level**											
266												
267	**Lognormal ROS Statistics Using Imputed Non-Detects**											
268	Mean in Original Scale					0.131	Mean in Log Scale					-2.757
269	SD in Original Scale					0.138	SD in Log Scale					1.402
270	95% t UCL (assumes normality of ROS data)					0.233	95% Percentile Bootstrap UCL					0.212
271	95% BCA Bootstrap UCL					0.213	95% Bootstrap t UCL					0.26
272	95% H-UCL (Log ROS)					2.778						
273												
274	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
275	KM Mean (logged)					-2.819	KM Geo Mean					0.0597
276	KM SD (logged)					1.326	95% Critical H Value (KM-Log)					4.652
277	KM Standard Error of Mean (logged)					0.56	95% H-UCL (KM -Log)					1.78
278	KM SD (logged)					1.326	95% Critical H Value (KM-Log)					4.652
279	KM Standard Error of Mean (logged)					0.56						
280												
281	**DL/2 Statistics**											
282	**DL/2 Normal**						**DL/2 Log-Transformed**					
283	Mean in Original Scale					0.153	Mean in Log Scale					-2.344
284	SD in Original Scale					0.123	SD in Log Scale					1.199
285	95% t UCL (Assumes normality)					0.243	95% H-Stat UCL					1.594
286	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
287												
288	**Nonparametric Distribution Free UCL Statistics**											
289	**Detected Data appear Normal Distributed at 1% Significance Level**											
290												
291	**Suggested UCL to Use**											
292	95% KM (t) UCL					0.236						
293												
294	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
295	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
296	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
297												

	General Statistics on Uncensored Data	
Date/Time of Computation	ProUCL 5.2 8/11/2023 11:46:40 AM	
User Selected Options		
From File	07 Bellweather Mine Waste Rock.xls	
Full Precision	OFF	

From File: 07 Bellweather Mine Waste Rock.xls

General Statistics for Censored Data Set (with NDs) using Kaplan Meier Method

Variable	NumObs	# Missing	Num Ds	NumNDs	% NDs	Min ND	Max ND	KM Mean	KM Var	KM SD	KM CV
Sb	7	0	0	7	100.00%	9.8	10	N/A	N/A	N/A	N/A
As	7	0	7	0	0.00%	N/A	N/A	48.29	3188	56.46	1.169
Ba	7	0	7	0	0.00%	N/A	N/A	100.2	659.8	25.69	0.256
Be	7	0	4	3	42.86%	0.25	0.25	0.493	0.0606	0.246	0.5
Cd	7	0	3	4	57.14%	2.4	2.5	3.057	0.96	0.98	0.32
Cr	7	0	7	0	0.00%	N/A	N/A	60.84	3844	62	1.019
Co	7	0	7	0	0.00%	N/A	N/A	23.37	168.8	12.99	0.556
Cu	7	0	7	0	0.00%	N/A	N/A	65.87	2850	53.39	0.81
Pb	7	0	7	0	0.00%	N/A	N/A	13.44	17.14	4.14	0.308
Hg	7	0	5	2	28.57%	0.2	0.2	0.129	0.0167	0.129	0.999
Mo	7	0	0	7	100.00%	9.8	10	N/A	N/A	N/A	N/A
Ni	7	0	7	0	0.00%	N/A	N/A	65.43	3353	57.9	0.885
Se	7	0	0	7	100.00%	0.3	1	N/A	N/A	N/A	N/A
Ag	7	0	0	7	100.00%	2.5	2.5	N/A	N/A	N/A	N/A
V	7	0	7	0	0.00%	N/A	N/A	47.93	470.2	21.68	0.452
Zn	7	0	7	0	0.00%	N/A	N/A	61.99	522.8	22.86	0.369
CN	5	2	0	5	100.00%	5	5	N/A	N/A	N/A	N/A

General Statistics for Raw Data Sets using Detected Data Only

Variable	NumObs	# Missing	Minimum	Maximum	Mean	Median	Var	SD	MAD/0.675	Skewness	CV
Sb	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
As	7	0	5	139	48.29	12	3188	56.46	10.38	1.016	1.169
Ba	7	0	67	131	100.2	110	659.8	25.69	31.13	-0.188	0.256
Be	4	0	0.46	0.86	0.675	0.69	0.0382	0.196	0.222	-0.185	0.29
Cd	3	0	2.7	5	3.933	4.1	1.343	1.159	1.334	-0.634	0.295
Cr	7	0	12	193	60.84	30	3844	62	26.69	2.047	1.019
Co	7	0	9.6	43	23.37	18	168.8	12.99	10.38	0.756	0.556
Cu	7	0	19	140	65.87	34.1	2850	53.39	22.39	0.485	0.81
Pb	7	0	9.1	21	13.44	12	17.14	4.14	1.483	1.192	0.308
Hg	5	0	0.018	0.32	0.174	0.24	0.0207	0.144	0.119	-0.428	0.829
Mo	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ni	7	0	23	174	65.43	27	3353	57.9	5.93	1.267	0.885
Se	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V	7	0	24	81	47.93	40.6	470.2	21.68	12.45	0.771	0.452
Zn	7	0	40.9	98	61.99	52.2	522.8	22.86	12.6	0.977	0.369
CN	0	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Percentiles using all Detects (Ds) and Non-Detects (NDs)

	A	B	C	D	E	F	G	H	I	J	K	L	M
53	**Variable**		**NumObs**	**# Missing**	**10%ile**	**20%ile**	**25%ile(Q1)**	**50%ile(Q2)**	**75%ile(Q3)**	**80%ile**	**90%ile**	**95%ile**	**99%ile**
54	Sb		7	0	9.8	9.8	9.8	9.8	9.9	9.9	9.94	9.97	9.994
55	As		7	0	6.2	7.4	8	12	83	102.2	124.6	131.8	137.6
56	Ba		7	0	70.3	74.8	78.25	110	118.5	123	128	129.5	130.7
57	Be		7	0	0.25	0.25	0.25	0.46	0.69	0.768	0.836	0.848	0.858
58	Cd		7	0	2.46	2.5	2.5	2.5	3.4	3.82	4.46	4.73	4.946
59	Cr		7	0	20.58	26.96	27.95	30	67.5	68.4	118.6	155.8	185.6
60	Co		7	0	11.64	13.6	14.5	18	32	36.2	40.6	41.8	42.76
61	Cu		7	0	20.2	21.2	21.5	34.1	112.5	117	128	134	138.8
62	Pb		7	0	10.24	11	11	12	15	16.2	18.6	19.8	20.76
63	Hg		7	0	0.0192	0.056	0.11	0.2	0.255	0.264	0.29	0.305	0.317
64	Mo		7	0	9.8	9.8	9.8	9.8	9.9	9.9	9.94	9.97	9.994
65	Ni		7	0	23.6	24	24	27	93	97.2	129.6	151.8	169.6
66	Se		7	0	0.3	0.3	0.3	0.3	1	1	1	1	1
67	Ag		7	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
68	V		7	0	29.28	33.06	33.45	40.6	61.5	69	76.8	78.9	80.58
69	Zn		7	0	43.06	45.12	46.05	52.2	75.35	84.14	93.2	95.6	97.52
70	CN		5	2	5	5	5	5	5	5	5	5	5

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/6/2023 2:03:53 PM
From File	Background, Non-Mineralized, Culled.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

As

General Statistics

Total Number of Observations	147	Number of Distinct Observations	77
		Number of Missing Observations	4
Number of Detects	128	Number of Non-Detects	19
Number of Distinct Detects	76	Number of Distinct Non-Detects	2
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	20.7	Maximum Non-Detect	2
Variance Detects	19.25	Percent Non-Detects	12.93%
Mean Detects	8.907	SD Detects	4.387
Median Detects	8.45	CV Detects	0.493
Skewness Detects	0.52	Kurtosis Detects	-0.085
Mean of Logged Detects	2.043	SD of Logged Detects	0.581

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.955	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0.00183	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.0693	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.091	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	7.887	KM Standard Error of Mean	0.403
90KM SD	4.862	95% KM (BCA) UCL	8.572
95% KM (t) UCL	8.553	95% KM (Percentile Bootstrap) UCL	8.565
95% KM (z) UCL	8.549	95% KM Bootstrap t UCL	8.508
90% KM Chebyshev UCL	9.095	95% KM Chebyshev UCL	9.642
97.5% KM Chebyshev UCL	10.4	99% KM Chebyshev UCL	11.89

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.662	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0654	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0826	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.63	k star (bias corrected MLE)	3.55
Theta hat (MLE)	2.454	Theta star (bias corrected MLE)	2.509
nu hat (MLE)	929.3	nu star (bias corrected)	908.8
Mean (detects)	8.907		

53	**Gamma ROS Statistics using Imputed Non-Detects**											
54	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
55	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
56	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
57	This is especially true when the sample size is small.											
58	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
59					Minimum	0.607			Mean	8.008		
60					Maximum	20.7			Median	7.5		
61					SD	4.721			CV	0.589		
62					k hat (MLE)	2.365			k star (bias corrected MLE)	2.321		
63					Theta hat (MLE)	3.387			Theta star (bias corrected MLE)	3.451		
64					nu hat (MLE)	695.2			nu star (bias corrected)	682.3		
65					Adjusted Level of Significance (β)	0.0484						
66					Approximate Chi Square Value (682.32, α)	622.7			Adjusted Chi Square Value (682.32, β)	622.2		
67					95% Gamma Approximate UCL	8.775			95% Gamma Adjusted UCL	8.783		
68												
69	**Estimates of Gamma Parameters using KM Estimates**											
70					Mean (KM)	7.887			SD (KM)	4.862		
71					Variance (KM)	23.64			SE of Mean (KM)	0.403		
72					k hat (KM)	2.631			k star (KM)	2.582		
73					nu hat (KM)	773.4			nu star (KM)	759		
74					theta hat (KM)	2.998			theta star (KM)	3.055		
75					80% gamma percentile (KM)	11.45			90% gamma percentile (KM)	14.46		
76					95% gamma percentile (KM)	17.29			99% gamma percentile (KM)	23.48		
77												
78	**Gamma Kaplan-Meier (KM) Statistics**											
79					Approximate Chi Square Value (758.98, α)	696			Adjusted Chi Square Value (758.98, β)	695.5		
80					95% KM Approximate Gamma UCL	8.6			95% KM Adjusted Gamma UCL	8.607		
81												
82	**Lognormal GOF Test on Detected Observations Only**											
83					Shapiro Wilk Approximate Test Statistic	0.939			**Shapiro Wilk GOF Test**			
84					10% Shapiro Wilk P Value	1.1527E-5			Detected Data Not Lognormal at 10% Significance Level			
85					Lilliefors Test Statistic	0.0985			**Lilliefors GOF Test**			
86					10% Lilliefors Critical Value	0.072			Detected Data Not Lognormal at 10% Significance Level			
87	**Detected Data Not Lognormal at 10% Significance Level**											
88												
89	**Lognormal ROS Statistics Using Imputed Non-Detects**											
90					Mean in Original Scale	8.05			Mean in Log Scale	1.882		
91					SD in Original Scale	4.665			SD in Log Scale	0.69		
92					95% t UCL (assumes normality of ROS data)	8.686			95% Percentile Bootstrap UCL	8.695		
93					95% BCA Bootstrap UCL	8.689			95% Bootstrap t UCL	8.732		
94					95% H-UCL (Log ROS)	9.311						
95												
96	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
97					KM Mean (logged)	1.78			KM Geo Mean	5.932		
98					KM SD (logged)	0.87			95% Critical H Value (KM-Log)	2.089		
99					KM Standard Error of Mean (logged)	0.072			95% H-UCL (KM -Log)	10.06		
100					KM SD (logged)	0.87			95% Critical H Value (KM-Log)	2.089		
101					KM Standard Error of Mean (logged)	0.072						
102												
103	**DL/2 Statistics**											
104	**DL/2 Normal**								**DL/2 Log-Transformed**			

105				Mean in Original Scale	7.858					Mean in Log Scale	1.741	
106				SD in Original Scale	4.921					SD in Log Scale	0.963	
107				95% t UCL (Assumes normality)	8.53					95% H-Stat UCL	10.77	
108	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
109												
110	**Nonparametric Distribution Free UCL Statistics**											
111	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
112												
113	**Suggested UCL to Use**											
114				95% KM (t) UCL	8.553							
115												
116	When a data set follows an approximate distribution passing only one of the GOF tests,											
117	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
118												
119	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
120	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
121	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
122												
123	**Pb**											
124												
125	**General Statistics**											
126				Total Number of Observations	87					Number of Distinct Observations	61	
127				Number of Detects	84					Number of Non-Detects	3	
128				Number of Distinct Detects	60					Number of Distinct Non-Detects	1	
129				Minimum Detect	2.7					Minimum Non-Detect	7.5	
130				Maximum Detect	26.3					Maximum Non-Detect	7.5	
131				Variance Detects	25.48					Percent Non-Detects	3.448%	
132				Mean Detects	14.38					SD Detects	5.048	
133				Median Detects	14.5					CV Detects	0.351	
134				Skewness Detects	0.11					Kurtosis Detects	-0.0956	
135				Mean of Logged Detects	2.591					SD of Logged Detects	0.424	
136												
137	**Normal GOF Test on Detects Only**											
138				Shapiro Wilk Test Statistic	0.979					**Normal GOF Test on Detected Observations Only**		
139				1% Shapiro Wilk P Value	0.538					Detected Data appear Normal at 1% Significance Level		
140				Lilliefors Test Statistic	0.0626					**Lilliefors GOF Test**		
141				1% Lilliefors Critical Value	0.112					Detected Data appear Normal at 1% Significance Level		
142	**Detected Data appear Normal at 1% Significance Level**											
143												
144	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
145				KM Mean	14.03					KM Standard Error of Mean	0.569	
146				90KM SD	5.27					95% KM (BCA) UCL	15.01	
147				95% KM (t) UCL	14.98					95% KM (Percentile Bootstrap) UCL	15	
148				95% KM (z) UCL	14.97					95% KM Bootstrap t UCL	14.99	
149				90% KM Chebyshev UCL	15.74					95% KM Chebyshev UCL	16.52	
150				97.5% KM Chebyshev UCL	17.59					99% KM Chebyshev UCL	19.7	
151												
152	**Gamma GOF Tests on Detected Observations Only**											
153				A-D Test Statistic	0.736					**Anderson-Darling GOF Test**		
154				5% A-D Critical Value	0.753					Detected data appear Gamma Distributed at 5% Significance Level		
155				K-S Test Statistic	0.0901					**Kolmogorov-Smirnov GOF**		
156				5% K-S Critical Value	0.0976					Detected data appear Gamma Distributed at 5% Significance Level		

157	**Detected data appear Gamma Distributed at 5% Significance Level**											
158												
159	**Gamma Statistics on Detected Data Only**											
160						k hat (MLE)	6.799			k star (bias corrected MLE)	6.564	
161						Theta hat (MLE)	2.115			Theta star (bias corrected MLE)	2.191	
162						nu hat (MLE)	1142			nu star (bias corrected)	1103	
163						Mean (detects)	14.38					
164												
165	**Gamma ROS Statistics using Imputed Non-Detects**											
166	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
167	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
168	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
169	This is especially true when the sample size is small.											
170	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
171						Minimum	2.7			Mean	14.11	
172						Maximum	26.3			Median	14.3	
173						SD	5.168			CV	0.366	
174						k hat (MLE)	6.314			k star (bias corrected MLE)	6.104	
175						Theta hat (MLE)	2.235			Theta star (bias corrected MLE)	2.312	
176						nu hat (MLE)	1099			nu star (bias corrected)	1062	
177						Adjusted Level of Significance (β)	0.0472					
178						Approximate Chi Square Value (N/A, α)	987.4			Adjusted Chi Square Value (N/A, β)	986.2	
179						95% Gamma Approximate UCL	15.18			95% Gamma Adjusted UCL	15.2	
180												
181	**Estimates of Gamma Parameters using KM Estimates**											
182						Mean (KM)	14.03			SD (KM)	5.27	
183						Variance (KM)	27.78			SE of Mean (KM)	0.569	
184						k hat (KM)	7.091			k star (KM)	6.854	
185						nu hat (KM)	1234			nu star (KM)	1193	
186						theta hat (KM)	1.979			theta star (KM)	2.048	
187						80% gamma percentile (KM)	18.23			90% gamma percentile (KM)	21.19	
188						95% gamma percentile (KM)	23.85			99% gamma percentile (KM)	29.4	
189												
190	**Gamma Kaplan-Meier (KM) Statistics**											
191						Approximate Chi Square Value (N/A, α)	1113			Adjusted Chi Square Value (N/A, β)	1112	
192						95% KM Approximate Gamma UCL	15.03			95% KM Adjusted Gamma UCL	15.05	
193												
194	**Lognormal GOF Test on Detected Observations Only**											
195						Shapiro Wilk Approximate Test Statistic	0.905			**Shapiro Wilk GOF Test**		
196						10% Shapiro Wilk P Value	7.9884E-7			Detected Data Not Lognormal at 10% Significance Level		
197						Lilliefors Test Statistic	0.111			**Lilliefors GOF Test**		
198						10% Lilliefors Critical Value	0.0886			Detected Data Not Lognormal at 10% Significance Level		
199	**Detected Data Not Lognormal at 10% Significance Level**											
200												
201	**Lognormal ROS Statistics Using Imputed Non-Detects**											
202						Mean in Original Scale	14.1			Mean in Log Scale	2.564	
203						SD in Original Scale	5.184			SD in Log Scale	0.441	
204						95% t UCL (assumes normality of ROS data)	15.02			95% Percentile Bootstrap UCL	15.03	
205						95% BCA Bootstrap UCL	15.03			95% Bootstrap t UCL	15.04	
206						95% H-UCL (Log ROS)	15.6					
207												
208	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											

209				KM Mean (logged)	2.55					KM Geo Mean	12.8
210				KM SD (logged)	0.471					95% Critical H Value (KM-Log)	1.829
211				KM Standard Error of Mean (logged)	0.0514					95% H-UCL (KM -Log)	15.7
212				KM SD (logged)	0.471					95% Critical H Value (KM-Log)	1.829
213				KM Standard Error of Mean (logged)	0.0514						
214											
215	**DL/2 Statistics**										
216	**DL/2 Normal**					**DL/2 Log-Transformed**					
217				Mean in Original Scale	14.02					Mean in Log Scale	2.547
218				SD in Original Scale	5.329					SD in Log Scale	0.478
219				95% t UCL (Assumes normality)	14.97					95% H-Stat UCL	15.73
220	**DL/2 is not a recommended method, provided for comparisons and historical reasons**										
221											
222	**Nonparametric Distribution Free UCL Statistics**										
223	**Detected Data appear Normal Distributed at 1% Significance Level**										
224											
225	**Suggested UCL to Use**										
226				95% KM (t) UCL	14.98						
227											
228	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
229	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.										
230	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
231											
232	**Hg**										
233											
234	**General Statistics**										
235				Total Number of Observations	87					Number of Distinct Observations	42
236				Number of Detects	42					Number of Non-Detects	45
237				Number of Distinct Detects	35					Number of Distinct Non-Detects	12
238				Minimum Detect	0.017					Minimum Non-Detect	0.01
239				Maximum Detect	0.23					Maximum Non-Detect	0.2
240				Variance Detects	0.00316					Percent Non-Detects	51.72%
241				Mean Detects	0.0697					SD Detects	0.0562
242				Median Detects	0.0465					CV Detects	0.807
243				Skewness Detects	1.538					Kurtosis Detects	1.615
244				Mean of Logged Detects	-2.926					SD of Logged Detects	0.71
245											
246	**Normal GOF Test on Detects Only**										
247				Shapiro Wilk Test Statistic	0.763	**Shapiro Wilk GOF Test**					
248				1% Shapiro Wilk Critical Value	0.922	Detected Data Not Normal at 1% Significance Level					
249				Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**					
250				1% Lilliefors Critical Value	0.157	Detected Data Not Normal at 1% Significance Level					
251	**Detected Data Not Normal at 1% Significance Level**										
252											
253	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
254				KM Mean	0.0519					KM Standard Error of Mean	0.00548
255				90KM SD	0.0461					95% KM (BCA) UCL	0.0616
256				95% KM (t) UCL	0.061					95% KM (Percentile Bootstrap) UCL	0.0612
257				95% KM (z) UCL	0.0609					95% KM Bootstrap t UCL	0.0623
258				90% KM Chebyshev UCL	0.0683					95% KM Chebyshev UCL	0.0757
259				97.5% KM Chebyshev UCL	0.0861					99% KM Chebyshev UCL	0.106
260	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**										

261												
262	**Gamma GOF Tests on Detected Observations Only**											
263					A-D Test Statistic	1.263	**Anderson-Darling GOF Test**					
264					5% A-D Critical Value	0.759	Detected Data Not Gamma Distributed at 5% Significance Level					
265					K-S Test Statistic	0.151	**Kolmogorov-Smirnov GOF**					
266					5% K-S Critical Value	0.138	Detected Data Not Gamma Distributed at 5% Significance Level					
267	**Detected Data Not Gamma Distributed at 5% Significance Level**											
268												
269	**Gamma Statistics on Detected Data Only**											
270					k hat (MLE)	2.054	k star (bias corrected MLE)	1.923				
271					Theta hat (MLE)	0.0339	Theta star (bias corrected MLE)	0.0362				
272					nu hat (MLE)	172.6	nu star (bias corrected)	161.6				
273					Mean (detects)	0.0697						
274												
275	**Gamma ROS Statistics using Imputed Non-Detects**											
276	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
277	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
278	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
279	This is especially true when the sample size is small.											
280	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
281					Minimum	0.01	Mean	0.0501				
282					Maximum	0.23	Median	0.035				
283					SD	0.0472	CV	0.943				
284					k hat (MLE)	1.533	k star (bias corrected MLE)	1.488				
285					Theta hat (MLE)	0.0327	Theta star (bias corrected MLE)	0.0337				
286					nu hat (MLE)	266.8	nu star (bias corrected)	258.9				
287					Adjusted Level of Significance (β)	0.0472						
288					Approximate Chi Square Value (258.92, α)	222.7	Adjusted Chi Square Value (258.92, β)	222.1				
289					95% Gamma Approximate UCL	0.0583	95% Gamma Adjusted UCL	0.0584				
290												
291	**Estimates of Gamma Parameters using KM Estimates**											
292					Mean (KM)	0.0519	SD (KM)	0.0461				
293					Variance (KM)	0.00213	SE of Mean (KM)	0.00548				
294					k hat (KM)	1.265	k star (KM)	1.229				
295					nu hat (KM)	220.1	nu star (KM)	213.9				
296					theta hat (KM)	0.041	theta star (KM)	0.0422				
297					80% gamma percentile (KM)	0.0819	90% gamma percentile (KM)	0.114				
298					95% gamma percentile (KM)	0.145	99% gamma percentile (KM)	0.216				
299												
300	**Gamma Kaplan-Meier (KM) Statistics**											
301					Approximate Chi Square Value (213.88, α)	181	Adjusted Chi Square Value (213.88, β)	180.5				
302					95% KM Approximate Gamma UCL	0.0613	95% KM Adjusted Gamma UCL	0.0615				
303	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
304												
305	**Lognormal GOF Test on Detected Observations Only**											
306					Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**					
307					10% Shapiro Wilk Critical Value	0.951	Detected Data Not Lognormal at 10% Significance Level					
308					Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**					
309					10% Lilliefors Critical Value	0.124	Detected Data Not Lognormal at 10% Significance Level					
310	**Detected Data Not Lognormal at 10% Significance Level**											
311												
312	**Lognormal ROS Statistics Using Imputed Non-Detects**											

313				Mean in Original Scale	0.0512					Mean in Log Scale	-3.249	
314				SD in Original Scale	0.0453					SD in Log Scale	0.715	
315				95% t UCL (assumes normality of ROS data)	0.0592					95% Percentile Bootstrap UCL	0.0594	
316				95% BCA Bootstrap UCL	0.0602					95% Bootstrap t UCL	0.0613	
317				95% H-UCL (Log ROS)	0.0586							
318												
319	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
320				KM Mean (logged)	-3.245					KM Geo Mean	0.039	
321				KM SD (logged)	0.725					95% Critical H Value (KM-Log)	2.025	
322				KM Standard Error of Mean (logged)	0.098					95% H-UCL (KM -Log)	0.0594	
323				KM SD (logged)	0.725					95% Critical H Value (KM-Log)	2.025	
324				KM Standard Error of Mean (logged)	0.098							
325	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
326												
327	**DL/2 Statistics**											
328	**DL/2 Normal**						**DL/2 Log-Transformed**					
329				Mean in Original Scale	0.0628					Mean in Log Scale	-3.034	
330				SD in Original Scale	0.0467					SD in Log Scale	0.764	
331				95% t UCL (Assumes normality)	0.0712					95% H-Stat UCL	0.0763	
332	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
333												
334	**Nonparametric Distribution Free UCL Statistics**											
335	**Data do not follow a Discernible Distribution**											
336												
337	**Suggested UCL to Use**											
338				95% KM (t) UCL	0.061							
339												
340	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
341	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
342	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
343												
344	**Se**											
345												
346	**General Statistics**											
347				Total Number of Observations	87					Number of Distinct Observations	25	
348				Number of Detects	68					Number of Non-Detects	19	
349				Number of Distinct Detects	24					Number of Distinct Non-Detects	3	
350				Minimum Detect	0.3					Minimum Non-Detect	0.3	
351				Maximum Detect	2					Maximum Non-Detect	2.5	
352				Variance Detects	0.168					Percent Non-Detects	21.84%	
353				Mean Detects	1.068					SD Detects	0.41	
354				Median Detects	1.15					CV Detects	0.384	
355				Skewness Detects	-0.319					Kurtosis Detects	-0.49	
356				Mean of Logged Detects	-0.0347					SD of Logged Detects	0.496	
357												
358	**Normal GOF Test on Detects Only**											
359				Shapiro Wilk Test Statistic	0.949		**Normal GOF Test on Detected Observations Only**					
360				1% Shapiro Wilk P Value	0.0164		Detected Data appear Normal at 1% Significance Level					
361				Lilliefors Test Statistic	0.127		**Lilliefors GOF Test**					
362				1% Lilliefors Critical Value	0.124		Detected Data Not Normal at 1% Significance Level					
363	**Detected Data appear Approximate Normal at 1% Significance Level**											
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
366					KM Mean	0.965				KM Standard Error of Mean		0.0505
367					90KM SD	0.445				95% KM (BCA) UCL		1.049
368					95% KM (t) UCL	1.049				95% KM (Percentile Bootstrap) UCL		1.048
369					95% KM (z) UCL	1.048				95% KM Bootstrap t UCL		1.042
370					90% KM Chebyshev UCL	1.117				95% KM Chebyshev UCL		1.185
371					97.5% KM Chebyshev UCL	1.281				99% KM Chebyshev UCL		1.468
372												
373	**Gamma GOF Tests on Detected Observations Only**											
374					A-D Test Statistic	2.418	**Anderson-Darling GOF Test**					
375					5% A-D Critical Value	0.754	Detected Data Not Gamma Distributed at 5% Significance Level					
376					K-S Test Statistic	0.162	**Kolmogorov-Smirnov GOF**					
377					5% K-S Critical Value	0.108	Detected Data Not Gamma Distributed at 5% Significance Level					
378	**Detected Data Not Gamma Distributed at 5% Significance Level**											
379												
380	**Gamma Statistics on Detected Data Only**											
381					k hat (MLE)	5.154				k star (bias corrected MLE)		4.936
382					Theta hat (MLE)	0.207				Theta star (bias corrected MLE)		0.216
383					nu hat (MLE)	700.9				nu star (bias corrected)		671.4
384					Mean (detects)	1.068						
385												
386	**Gamma ROS Statistics using Imputed Non-Detects**											
387	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
388	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
389	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
390	This is especially true when the sample size is small.											
391	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
392					Minimum	0.273				Mean		0.975
393					Maximum	2				Median		1
394					SD	0.423				CV		0.434
395					k hat (MLE)	4.411				k star (bias corrected MLE)		4.267
396					Theta hat (MLE)	0.221				Theta star (bias corrected MLE)		0.228
397					nu hat (MLE)	767.5				nu star (bias corrected)		742.4
398					Adjusted Level of Significance (β)	0.0472						
399					Approximate Chi Square Value (742.41, α)	680.2				Adjusted Chi Square Value (742.41, β)		679.2
400					95% Gamma Approximate UCL	1.064				95% Gamma Adjusted UCL		1.065
401												
402	**Estimates of Gamma Parameters using KM Estimates**											
403					Mean (KM)	0.965				SD (KM)		0.445
404					Variance (KM)	0.198				SE of Mean (KM)		0.0505
405					k hat (KM)	4.712				k star (KM)		4.557
406					nu hat (KM)	819.8				nu star (KM)		792.9
407					theta hat (KM)	0.205				theta star (KM)		0.212
408					80% gamma percentile (KM)	1.311				90% gamma percentile (KM)		1.571
409					95% gamma percentile (KM)	1.808				99% gamma percentile (KM)		2.313
410												
411	**Gamma Kaplan-Meier (KM) Statistics**											
412					Approximate Chi Square Value (792.89, α)	728.5				Adjusted Chi Square Value (792.89, β)		727.5
413					95% KM Approximate Gamma UCL	1.05				95% KM Adjusted Gamma UCL		1.052
414												
415	**Lognormal GOF Test on Detected Observations Only**											
416					Shapiro Wilk Approximate Test Statistic	0.847	**Shapiro Wilk GOF Test**					

417				10% Shapiro Wilk P Value	2.2148E-9	Detected Data Not Lognormal at 10% Significance Level						
418				Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**						
419				10% Lilliefors Critical Value	0.0982	Detected Data Not Lognormal at 10% Significance Level						
420	**Detected Data Not Lognormal at 10% Significance Level**											
421												
422	**Lognormal ROS Statistics Using Imputed Non-Detects**											
423				Mean in Original Scale	0.963	Mean in Log Scale	-0.166					
424				SD in Original Scale	0.434	SD in Log Scale	0.545					
425				95% t UCL (assumes normality of ROS data)	1.04	95% Percentile Bootstrap UCL	1.041					
426				95% BCA Bootstrap UCL	1.041	95% Bootstrap t UCL	1.042					
427				95% H-UCL (Log ROS)	1.098							
428												
429	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
430				KM Mean (logged)	-0.177	KM Geo Mean	0.838					
431				KM SD (logged)	0.578	95% Critical H Value (KM-Log)	1.895					
432				KM Standard Error of Mean (logged)	0.0671	95% H-UCL (KM -Log)	1.113					
433				KM SD (logged)	0.578	95% Critical H Value (KM-Log)	1.895					
434				KM Standard Error of Mean (logged)	0.0671							
435												
436	**DL/2 Statistics**											
437	**DL/2 Normal**					**DL/2 Log-Transformed**						
438				Mean in Original Scale	0.967	Mean in Log Scale	-0.195					
439				SD in Original Scale	0.453	SD in Log Scale	0.646					
440				95% t UCL (Assumes normality)	1.047	95% H-Stat UCL	1.161					
441	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
442												
443	**Nonparametric Distribution Free UCL Statistics**											
444	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
445												
446	**Suggested UCL to Use**											
447				95% KM (t) UCL	1.049							
448												
449	When a data set follows an approximate distribution passing only one of the GOF tests,											
450	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
451												
452	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
453	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
454	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
455												
456	Ag											
457												
458	**General Statistics**											
459				Total Number of Observations	87	Number of Distinct Observations	35					
460				Number of Detects	42	Number of Non-Detects	45					
461				Number of Distinct Detects	33	Number of Distinct Non-Detects	5					
462				Minimum Detect	0.13	Minimum Non-Detect	1					
463				Maximum Detect	1.3	Maximum Non-Detect	2.5					
464				Variance Detects	0.0633	Percent Non-Detects	51.72%					
465				Mean Detects	0.683	SD Detects	0.252					
466				Median Detects	0.695	CV Detects	0.369					
467				Skewness Detects	0.08	Kurtosis Detects	0.219					
468				Mean of Logged Detects	-0.468	SD of Logged Detects	0.466					

469												
470	**Normal GOF Test on Detects Only**											
471					Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**					
472					1% Shapiro Wilk Critical Value	0.922	Detected Data appear Normal at 1% Significance Level					
473					Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**					
474					1% Lilliefors Critical Value	0.157	Detected Data appear Normal at 1% Significance Level					
475	**Detected Data appear Normal at 1% Significance Level**											
476												
477	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
478					KM Mean	0.667	KM Standard Error of Mean	0.0357				
479					90KM SD	0.237	95% KM (BCA) UCL	0.733				
480					95% KM (t) UCL	0.726	95% KM (Percentile Bootstrap) UCL	0.724				
481					95% KM (z) UCL	0.726	95% KM Bootstrap t UCL	0.726				
482					90% KM Chebyshev UCL	0.774	95% KM Chebyshev UCL	0.822				
483					97.5% KM Chebyshev UCL	0.89	99% KM Chebyshev UCL	1.022				
484	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
485												
486	**Gamma GOF Tests on Detected Observations Only**											
487					A-D Test Statistic	0.738	**Anderson-Darling GOF Test**					
488					5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level					
489					K-S Test Statistic	0.123	**Kolmogorov-Smirnov GOF**					
490					5% K-S Critical Value	0.137	Detected data appear Gamma Distributed at 5% Significance Level					
491	**Detected data appear Gamma Distributed at 5% Significance Level**											
492												
493	**Gamma Statistics on Detected Data Only**											
494					k hat (MLE)	5.936	k star (bias corrected MLE)	5.528				
495					Theta hat (MLE)	0.115	Theta star (bias corrected MLE)	0.123				
496					nu hat (MLE)	498.7	nu star (bias corrected)	464.4				
497					Mean (detects)	0.683						
498												
499	**Gamma ROS Statistics using Imputed Non-Detects**											
500	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
501	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
502	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
503	This is especially true when the sample size is small.											
504	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
505					Minimum	0.13	Mean	0.663				
506					Maximum	1.3	Median	0.645				
507					SD	0.22	CV	0.332				
508					k hat (MLE)	8.021	k star (bias corrected MLE)	7.752				
509					Theta hat (MLE)	0.0826	Theta star (bias corrected MLE)	0.0855				
510					nu hat (MLE)	1396	nu star (bias corrected)	1349				
511					Adjusted Level of Significance (β)	0.0472						
512					Approximate Chi Square Value (N/A, α)	1265	Adjusted Chi Square Value (N/A, β)	1263				
513					95% Gamma Approximate UCL	0.707	95% Gamma Adjusted UCL	0.708				
514												
515	**Estimates of Gamma Parameters using KM Estimates**											
516					Mean (KM)	0.667	SD (KM)	0.237				
517					Variance (KM)	0.0563	SE of Mean (KM)	0.0357				
518					k hat (KM)	7.903	k star (KM)	7.638				
519					nu hat (KM)	1375	nu star (KM)	1329				
520					theta hat (KM)	0.0844	theta star (KM)	0.0873				

521				80% gamma percentile (KM)		0.857				90% gamma percentile (KM)		0.989
522				95% gamma percentile (KM)		1.107				99% gamma percentile (KM)		1.352
523												
524	**Gamma Kaplan-Meier (KM) Statistics**											
525				Approximate Chi Square Value (N/A, α)		1245				Adjusted Chi Square Value (N/A, β)		1244
526				95% KM Approximate Gamma UCL		0.712				95% KM Adjusted Gamma UCL		0.713
527	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
528												
529	**Lognormal GOF Test on Detected Observations Only**											
530				Shapiro Wilk Test Statistic		0.849	**Shapiro Wilk GOF Test**					
531				10% Shapiro Wilk Critical Value		0.951	Detected Data Not Lognormal at 10% Significance Level					
532				Lilliefors Test Statistic		0.154	**Lilliefors GOF Test**					
533				10% Lilliefors Critical Value		0.124	Detected Data Not Lognormal at 10% Significance Level					
534	**Detected Data Not Lognormal at 10% Significance Level**											
535												
536	**Lognormal ROS Statistics Using Imputed Non-Detects**											
537				Mean in Original Scale		0.656				Mean in Log Scale		-0.495
538				SD in Original Scale		0.237				SD in Log Scale		0.407
539				95% t UCL (assumes normality of ROS data)		0.698				95% Percentile Bootstrap UCL		0.7
540				95% BCA Bootstrap UCL		0.697				95% Bootstrap t UCL		0.699
541				95% H-UCL (Log ROS)		0.717						
542												
543	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
544				KM Mean (logged)		-0.489				KM Geo Mean		0.613
545				KM SD (logged)		0.455				95% Critical H Value (KM-Log)		1.82
546				KM Standard Error of Mean (logged)		0.0705				95% H-UCL (KM -Log)		0.744
547				KM SD (logged)		0.455				95% Critical H Value (KM-Log)		1.82
548				KM Standard Error of Mean (logged)		0.0705						
549	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
550												
551	**DL/2 Statistics**											
552	**DL/2 Normal**						**DL/2 Log-Transformed**					
553				Mean in Original Scale		0.824				Mean in Log Scale		-0.29
554				SD in Original Scale		0.335				SD in Log Scale		0.472
555				95% t UCL (Assumes normality)		0.884				95% H-Stat UCL		0.918
556	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
557												
558	**Nonparametric Distribution Free UCL Statistics**											
559	**Detected Data appear Normal Distributed at 1% Significance Level**											
560												
561	**Suggested UCL to Use**											
562				95% KM (t) UCL		0.726						
563												
564	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
565	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
566	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
567												

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3				User Selected Options								
4				Date/Time of Computation	ProUCL 5.2 8/6/2023 4:14:17 PM							
5				From File	Background, Mineralized, Culled.xls							
6				Full Precision	OFF							
7				Confidence Coefficient	95%							
8				Number of Bootstrap Operations	2000							
9												
10	**As**											
11												
12	**General Statistics**											
13					Total Number of Observations	47			Number of Distinct Observations	41		
14					Number of Detects	45			Number of Non-Detects	2		
15					Number of Distinct Detects	40			Number of Distinct Non-Detects	1		
16					Minimum Detect	5.4			Minimum Non-Detect	2		
17					Maximum Detect	120			Maximum Non-Detect	2		
18					Variance Detects	707.2			Percent Non-Detects	4.255%		
19					Mean Detects	48.18			SD Detects	26.59		
20					Median Detects	43			CV Detects	0.552		
21					Skewness Detects	0.625			Kurtosis Detects	-0.0788		
22					Mean of Logged Detects	3.695			SD of Logged Detects	0.66		
23												
24	**Normal GOF Test on Detects Only**											
25					Shapiro Wilk Test Statistic	0.957			**Shapiro Wilk GOF Test**			
26					1% Shapiro Wilk Critical Value	0.926			Detected Data appear Normal at 1% Significance Level			
27					Lilliefors Test Statistic	0.102			**Lilliefors GOF Test**			
28					1% Lilliefors Critical Value	0.153			Detected Data appear Normal at 1% Significance Level			
29	**Detected Data appear Normal at 1% Significance Level**											
30												
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
32					KM Mean	46.21			KM Standard Error of Mean	4.037		
33					90KM SD	27.37			95% KM (BCA) UCL	53.06		
34					95% KM (t) UCL	52.99			95% KM (Percentile Bootstrap) UCL	52.88		
35					95% KM (z) UCL	52.85			95% KM Bootstrap t UCL	53.28		
36					90% KM Chebyshev UCL	58.32			95% KM Chebyshev UCL	63.81		
37					97.5% KM Chebyshev UCL	71.42			99% KM Chebyshev UCL	86.38		
38												
39	**Gamma GOF Tests on Detected Observations Only**											
40					A-D Test Statistic	0.184			**Anderson-Darling GOF Test**			
41					5% A-D Critical Value	0.756			Detected data appear Gamma Distributed at 5% Significance Level			
42					K-S Test Statistic	0.0738			**Kolmogorov-Smirnov GOF**			
43					5% K-S Critical Value	0.133			Detected data appear Gamma Distributed at 5% Significance Level			
44	**Detected data appear Gamma Distributed at 5% Significance Level**											
45												
46	**Gamma Statistics on Detected Data Only**											
47					k hat (MLE)	2.943			k star (bias corrected MLE)	2.762		
48					Theta hat (MLE)	16.37			Theta star (bias corrected MLE)	17.44		
49					nu hat (MLE)	264.9			nu star (bias corrected)	248.6		
50					Mean (detects)	48.18						
51												
52	**Gamma ROS Statistics using Imputed Non-Detects**											

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	4.695				Mean	46.38	
59					Maximum	120				Median	42	
60					SD	27.4				CV	0.591	
61					k hat (MLE)	2.39				k star (bias corrected MLE)	2.251	
62					Theta hat (MLE)	19.41				Theta star (bias corrected MLE)	20.6	
63					nu hat (MLE)	224.6				nu star (bias corrected)	211.6	
64					Adjusted Level of Significance (β)	0.0449						
65					Approximate Chi Square Value (211.63, α)	179				Adjusted Chi Square Value (211.63, β)	178	
66					95% Gamma Approximate UCL	54.85				95% Gamma Adjusted UCL	55.14	
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	46.21				SD (KM)	27.37	
70					Variance (KM)	748.9				SE of Mean (KM)	4.037	
71					k hat (KM)	2.851				k star (KM)	2.683	
72					nu hat (KM)	268				nu star (KM)	252.2	
73					theta hat (KM)	16.21				theta star (KM)	17.22	
74					80% gamma percentile (KM)	66.8				90% gamma percentile (KM)	84.02	
75					95% gamma percentile (KM)	100.2				99% gamma percentile (KM)	135.4	
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (252.24, α)	216.5				Adjusted Chi Square Value (252.24, β)	215.4	
79					95% KM Approximate Gamma UCL	53.85				95% KM Adjusted Gamma UCL	54.11	
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.951				**Shapiro Wilk GOF Test**		
83					10% Shapiro Wilk Critical Value	0.953				Detected Data Not Lognormal at 10% Significance Level		
84					Lilliefors Test Statistic	0.0748				**Lilliefors GOF Test**		
85					10% Lilliefors Critical Value	0.12				Detected Data appear Lognormal at 10% Significance Level		
86	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	46.49				Mean in Log Scale	3.629	
90					SD in Original Scale	27.24				SD in Log Scale	0.72	
91					95% t UCL (assumes normality of ROS data)	53.16				95% Percentile Bootstrap UCL	52.98	
92					95% BCA Bootstrap UCL	53.15				95% Bootstrap t UCL	53.54	
93					95% H-UCL (Log ROS)	60.71						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	3.568				KM Geo Mean	35.44	
97					KM SD (logged)	0.88				95% Critical H Value (KM-Log)	2.208	
98					KM Standard Error of Mean (logged)	0.13				95% H-UCL (KM -Log)	69.55	
99					KM SD (logged)	0.88				95% Critical H Value (KM-Log)	2.208	
100					KM Standard Error of Mean (logged)	0.13						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	46.17				Mean in Log Scale	3.538	

105				SD in Original Scale	27.73					SD in Log Scale	0.993	
106				95% t UCL (Assumes normality)	52.96					95% H-Stat UCL	79.12	
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Normal Distributed at 1% Significance Level**											
111												
112	**Suggested UCL to Use**											
113				95% KM (t) UCL	52.99							
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
117	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
118												
119	**Pb**											
120												
121	**General Statistics**											
122				Total Number of Observations	13					Number of Distinct Observations	13	
123										Number of Missing Observations	26	
124				Number of Detects	10					Number of Non-Detects	3	
125				Number of Distinct Detects	10					Number of Distinct Non-Detects	3	
126				Minimum Detect	3.6					Minimum Non-Detect	2.5	
127				Maximum Detect	18.4					Maximum Non-Detect	7.5	
128				Variance Detects	22.9					Percent Non-Detects	23.08%	
129				Mean Detects	12.18					SD Detects	4.786	
130				Median Detects	12.85					CV Detects	0.393	
131				Skewness Detects	-0.514					Kurtosis Detects	-0.652	
132				Mean of Logged Detects	2.404					SD of Logged Detects	0.506	
133												
134	**Normal GOF Test on Detects Only**											
135				Shapiro Wilk Test Statistic	0.956					**Shapiro Wilk GOF Test**		
136				1% Shapiro Wilk Critical Value	0.781					Detected Data appear Normal at 1% Significance Level		
137				Lilliefors Test Statistic	0.143					**Lilliefors GOF Test**		
138				1% Lilliefors Critical Value	0.304					Detected Data appear Normal at 1% Significance Level		
139	**Detected Data appear Normal at 1% Significance Level**											
140												
141	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
142				KM Mean	10.22					KM Standard Error of Mean	1.605	
143				90KM SD	5.413					95% KM (BCA) UCL	12.9	
144				95% KM (t) UCL	13.08					95% KM (Percentile Bootstrap) UCL	12.84	
145				95% KM (z) UCL	12.86					95% KM Bootstrap t UCL	13.1	
146				90% KM Chebyshev UCL	15.04					95% KM Chebyshev UCL	17.22	
147				97.5% KM Chebyshev UCL	20.25					99% KM Chebyshev UCL	26.2	
148												
149	**Gamma GOF Tests on Detected Observations Only**											
150				A-D Test Statistic	0.403					**Anderson-Darling GOF Test**		
151				5% A-D Critical Value	0.729					Detected data appear Gamma Distributed at 5% Significance Level		
152				K-S Test Statistic	0.195					**Kolmogorov-Smirnov GOF**		
153				5% K-S Critical Value	0.267					Detected data appear Gamma Distributed at 5% Significance Level		
154	**Detected data appear Gamma Distributed at 5% Significance Level**											
155												
156	**Gamma Statistics on Detected Data Only**											

157					k hat (MLE)	5.383				k star (bias corrected MLE)		3.835
158					Theta hat (MLE)	2.263				Theta star (bias corrected MLE)		3.176
159					nu hat (MLE)	107.7				nu star (bias corrected)		76.69
160					Mean (detects)	12.18						
161												
162	**Gamma ROS Statistics using Imputed Non-Detects**											
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
166	This is especially true when the sample size is small.											
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
168					Minimum	2.79				Mean		10.41
169					Maximum	18.4				Median		10.9
170					SD	5.376				CV		0.517
171					k hat (MLE)	3.356				k star (bias corrected MLE)		2.633
172					Theta hat (MLE)	3.101				Theta star (bias corrected MLE)		3.953
173					nu hat (MLE)	87.25				nu star (bias corrected)		68.45
174					Adjusted Level of Significance (β)	0.0301						
175					Approximate Chi Square Value (68.45, α)	50.41				Adjusted Chi Square Value (68.45, β)		48.21
176					95% Gamma Approximate UCL	14.13				95% Gamma Adjusted UCL		14.78
177												
178	**Estimates of Gamma Parameters using KM Estimates**											
179					Mean (KM)	10.22				SD (KM)		5.413
180					Variance (KM)	29.3				SE of Mean (KM)		1.605
181					k hat (KM)	3.567				k star (KM)		2.795
182					nu hat (KM)	92.75				nu star (KM)		72.68
183					theta hat (KM)	2.866				theta star (KM)		3.657
184					80% gamma percentile (KM)	14.71				90% gamma percentile (KM)		18.42
185					95% gamma percentile (KM)	21.9				99% gamma percentile (KM)		29.47
186												
187	**Gamma Kaplan-Meier (KM) Statistics**											
188					Approximate Chi Square Value (72.68, α)	54.05				Adjusted Chi Square Value (72.68, β)		51.76
189					95% KM Approximate Gamma UCL	13.75				95% KM Adjusted Gamma UCL		14.35
190												
191	**Lognormal GOF Test on Detected Observations Only**											
192					Shapiro Wilk Test Statistic	0.875				**Shapiro Wilk GOF Test**		
193					10% Shapiro Wilk Critical Value	0.869				Detected Data appear Lognormal at 10% Significance Level		
194					Lilliefors Test Statistic	0.207				**Lilliefors GOF Test**		
195					10% Lilliefors Critical Value	0.241				Detected Data appear Lognormal at 10% Significance Level		
196	**Detected Data appear Lognormal at 10% Significance Level**											
197												
198	**Lognormal ROS Statistics Using Imputed Non-Detects**											
199					Mean in Original Scale	10.39				Mean in Log Scale		2.189
200					SD in Original Scale	5.373				SD in Log Scale		0.608
201					95% t UCL (assumes normality of ROS data)	13.05				95% Percentile Bootstrap UCL		12.82
202					95% BCA Bootstrap UCL	12.76				95% Bootstrap t UCL		13.04
203					95% H-UCL (Log ROS)	15.92						
204												
205	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
206					KM Mean (logged)	2.131				KM Geo Mean		8.421
207					KM SD (logged)	0.681				95% Critical H Value (KM-Log)		2.344
208					KM Standard Error of Mean (logged)	0.208				95% H-UCL (KM -Log)		16.82

209				KM SD (logged)	0.681				95% Critical H Value (KM-Log)		2.344	
210				KM Standard Error of Mean (logged)	0.208							
211												
212	**DL/2 Statistics**											
213	**DL/2 Normal**					**DL/2 Log-Transformed**						
214				Mean in Original Scale	10.04				Mean in Log Scale		2.069	
215				SD in Original Scale	5.838				SD in Log Scale		0.815	
216				95% t UCL (Assumes normality)	12.92				95% H-Stat UCL		20.07	
217	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Detected Data appear Normal Distributed at 1% Significance Level**											
221												
222	**Suggested UCL to Use**											
223				95% KM (t) UCL	13.08							
224												
225	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
226	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
227	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
228												
229	**Hg**											
230												
231	**General Statistics**											
232				Total Number of Observations	13				Number of Distinct Observations		9	
233									Number of Missing Observations		26	
234				Number of Detects	4				Number of Non-Detects		9	
235				Number of Distinct Detects	4				Number of Distinct Non-Detects		5	
236				Minimum Detect	0.21				Minimum Non-Detect		0.04	
237				Maximum Detect	0.3				Maximum Non-Detect		0.2	
238				Variance Detects	0.00167				Percent Non-Detects		69.23%	
239				Mean Detects	0.24				SD Detects		0.0408	
240				Median Detects	0.225				CV Detects		0.17	
241				Skewness Detects	1.764				Kurtosis Detects		3.228	
242				Mean of Logged Detects	-1.437				SD of Logged Detects		0.16	
243												
244	**Normal GOF Test on Detects Only**											
245				Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk GOF Test**						
246				1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level						
247				Lilliefors Test Statistic	0.347	**Lilliefors GOF Test**						
248				1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level						
249	**Detected Data appear Normal at 1% Significance Level**											
250	**Note GOF tests may be unreliable for small sample sizes**											
251												
252	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
253				KM Mean	0.102				KM Standard Error of Mean		0.0302	
254				90KM SD	0.0944				95% KM (BCA) UCL		N/A	
255				95% KM (t) UCL	0.155				95% KM (Percentile Bootstrap) UCL		N/A	
256				95% KM (z) UCL	0.151				95% KM Bootstrap t UCL		N/A	
257				90% KM Chebyshev UCL	0.192				95% KM Chebyshev UCL		0.233	
258				97.5% KM Chebyshev UCL	0.29				99% KM Chebyshev UCL		0.402	
259												
260	**Gamma GOF Tests on Detected Observations Only**											

	A	B	C	D	E	F	G	H	I	J	K	L
261					A-D Test Statistic	0.524	**Anderson-Darling GOF Test**					
262					5% A-D Critical Value	0.656	Detected data appear Gamma Distributed at 5% Significance Level					
263					K-S Test Statistic	0.35	**Kolmogorov-Smirnov GOF**					
264					5% K-S Critical Value	0.394	Detected data appear Gamma Distributed at 5% Significance Level					
265	**Detected data appear Gamma Distributed at 5% Significance Level**											
266	**Note GOF tests may be unreliable for small sample sizes**											
267												
268	**Gamma Statistics on Detected Data Only**											
269					k hat (MLE)	50.22	k star (bias corrected MLE)	12.72				
270					Theta hat (MLE)	0.00478	Theta star (bias corrected MLE)	0.0189				
271					nu hat (MLE)	401.7	nu star (bias corrected)	101.8				
272					Mean (detects)	0.24						
273												
274	**Gamma ROS Statistics using Imputed Non-Detects**											
275	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
276	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
277	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
278	This is especially true when the sample size is small.											
279	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
280					Minimum	0.0486	Mean	0.14				
281					Maximum	0.3	Median	0.124				
282					SD	0.0765	CV	0.547				
283					k hat (MLE)	3.81	k star (bias corrected MLE)	2.982				
284					Theta hat (MLE)	0.0367	Theta star (bias corrected MLE)	0.0469				
285					nu hat (MLE)	99.07	nu star (bias corrected)	77.54				
286					Adjusted Level of Significance (β)	0.0301						
287					Approximate Chi Square Value (77.54, α)	58.26	Adjusted Chi Square Value (77.54, β)	55.88				
288					95% Gamma Approximate UCL	0.186	95% Gamma Adjusted UCL	N/A				
289												
290	**Estimates of Gamma Parameters using KM Estimates**											
291					Mean (KM)	0.102	SD (KM)	0.0944				
292					Variance (KM)	0.00891	SE of Mean (KM)	0.0302				
293					k hat (KM)	1.158	k star (KM)	0.942				
294					nu hat (KM)	30.1	nu star (KM)	24.49				
295					theta hat (KM)	0.0877	theta star (KM)	0.108				
296					80% gamma percentile (KM)	0.164	90% gamma percentile (KM)	0.237				
297					95% gamma percentile (KM)	0.311	99% gamma percentile (KM)	0.482				
298												
299	**Gamma Kaplan-Meier (KM) Statistics**											
300					Approximate Chi Square Value (24.49, α)	14.22	Adjusted Chi Square Value (24.49, β)	13.12				
301					95% KM Approximate Gamma UCL	0.175	95% KM Adjusted Gamma UCL	0.19				
302												
303	**Lognormal GOF Test on Detected Observations Only**											
304					Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**					
305					10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level					
306					Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**					
307					10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level					
308	**Detected Data appear Lognormal at 10% Significance Level**											
309	**Note GOF tests may be unreliable for small sample sizes**											
310												
311	**Lognormal ROS Statistics Using Imputed Non-Detects**											
312					Mean in Original Scale	0.164	Mean in Log Scale	-1.861				

313				SD in Original Scale		0.0585				SD in Log Scale		0.325
314				95% t UCL (assumes normality of ROS data)		0.193				95% Percentile Bootstrap UCL		0.191
315				95% BCA Bootstrap UCL		0.195				95% Bootstrap t UCL		0.199
316				95% H-UCL (Log ROS)		0.197						
317												
318				**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**								
319				KM Mean (logged)		-2.671				KM Geo Mean		0.0692
320				KM SD (logged)		0.826				95% Critical H Value (KM-Log)		2.56
321				KM Standard Error of Mean (logged)		0.265				95% H-UCL (KM -Log)		0.179
322				KM SD (logged)		0.826				95% Critical H Value (KM-Log)		2.56
323				KM Standard Error of Mean (logged)		0.265						
324												
325				**DL/2 Statistics**								
326				**DL/2 Normal**						**DL/2 Log-Transformed**		
327				Mean in Original Scale		0.107				Mean in Log Scale		-2.682
328				SD in Original Scale		0.0982				SD in Log Scale		1.02
329				95% t UCL (Assumes normality)		0.155				95% H-Stat UCL		0.269
330				**DL/2 is not a recommended method, provided for comparisons and historical reasons**								
331												
332				**Nonparametric Distribution Free UCL Statistics**								
333				**Detected Data appear Normal Distributed at 1% Significance Level**								
334												
335				**Suggested UCL to Use**								
336				95% KM (t) UCL		0.155						
337												
338				Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.								
339				Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.								
340				However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.								
341												
342	**Se**											
343												
344				**General Statistics**								
345				Total Number of Observations		13				Number of Distinct Observations		10
346										Number of Missing Observations		26
347				Number of Detects		9				Number of Non-Detects		4
348				Number of Distinct Detects		8				Number of Distinct Non-Detects		2
349				Minimum Detect		0.54				Minimum Non-Detect		0.3
350				Maximum Detect		1.2				Maximum Non-Detect		2.5
351				Variance Detects		0.0357				Percent Non-Detects		30.77%
352				Mean Detects		0.764				SD Detects		0.189
353				Median Detects		0.73				CV Detects		0.247
354				Skewness Detects		1.586				Kurtosis Detects		3.664
355				Mean of Logged Detects		-0.293				SD of Logged Detects		0.226
356												
357				**Normal GOF Test on Detects Only**								
358				Shapiro Wilk Test Statistic		0.86				**Shapiro Wilk GOF Test**		
359				1% Shapiro Wilk Critical Value		0.764				Detected Data appear Normal at 1% Significance Level		
360				Lilliefors Test Statistic		0.273				**Lilliefors GOF Test**		
361				1% Lilliefors Critical Value		0.316				Detected Data appear Normal at 1% Significance Level		
362				**Detected Data appear Normal at 1% Significance Level**								
363				**Note GOF tests may be unreliable for small sample sizes**								
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
366					KM Mean	0.68				KM Standard Error of Mean		0.0771
367					90KM SD	0.241				95% KM (BCA) UCL		0.805
368					95% KM (t) UCL	0.817				95% KM (Percentile Bootstrap) UCL		0.806
369					95% KM (z) UCL	0.807				95% KM Bootstrap t UCL		0.824
370					90% KM Chebyshev UCL	0.911				95% KM Chebyshev UCL		1.016
371					97.5% KM Chebyshev UCL	1.161				99% KM Chebyshev UCL		1.447
372												
373	**Gamma GOF Tests on Detected Observations Only**											
374					A-D Test Statistic	0.382	**Anderson-Darling GOF Test**					
375					5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level					
376					K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**					
377					5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level					
378	**Detected data appear Gamma Distributed at 5% Significance Level**											
379	**Note GOF tests may be unreliable for small sample sizes**											
380												
381	**Gamma Statistics on Detected Data Only**											
382					k hat (MLE)	20.99				k star (bias corrected MLE)		14.07
383					Theta hat (MLE)	0.0364				Theta star (bias corrected MLE)		0.0543
384					nu hat (MLE)	377.9				nu star (bias corrected)		253.3
385					Mean (detects)	0.764						
386												
387	**Gamma ROS Statistics using Imputed Non-Detects**											
388	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
389	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
390	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
391	This is especially true when the sample size is small.											
392	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
393					Minimum	0.336				Mean		0.693
394					Maximum	1.2				Median		0.71
395					SD	0.216				CV		0.312
396					k hat (MLE)	10.85				k star (bias corrected MLE)		8.399
397					Theta hat (MLE)	0.0638				Theta star (bias corrected MLE)		0.0825
398					nu hat (MLE)	282.2				nu star (bias corrected)		218.4
399					Adjusted Level of Significance (β)	0.0301						
400					Approximate Chi Square Value (218.37, α)	185.2				Adjusted Chi Square Value (218.37, β)		180.8
401					95% Gamma Approximate UCL	0.817				95% Gamma Adjusted UCL		0.837
402												
403	**Estimates of Gamma Parameters using KM Estimates**											
404					Mean (KM)	0.68				SD (KM)		0.241
405					Variance (KM)	0.0581				SE of Mean (KM)		0.0771
406					k hat (KM)	7.962				k star (KM)		6.176
407					nu hat (KM)	207				nu star (KM)		160.6
408					theta hat (KM)	0.0854				theta star (KM)		0.11
409					80% gamma percentile (KM)	0.893				90% gamma percentile (KM)		1.046
410					95% gamma percentile (KM)	1.183				99% gamma percentile (KM)		1.472
411												
412	**Gamma Kaplan-Meier (KM) Statistics**											
413					Approximate Chi Square Value (160.58, α)	132.3				Adjusted Chi Square Value (160.58, β)		128.6
414					95% KM Approximate Gamma UCL	0.825				95% KM Adjusted Gamma UCL		0.849
415												
416	**Lognormal GOF Test on Detected Observations Only**											

417				Shapiro Wilk Test Statistic		0.935	**Shapiro Wilk GOF Test**					
418				10% Shapiro Wilk Critical Value		0.859	Detected Data appear Lognormal at 10% Significance Level					
419				Lilliefors Test Statistic		0.228	**Lilliefors GOF Test**					
420				10% Lilliefors Critical Value		0.252	Detected Data appear Lognormal at 10% Significance Level					
421	**Detected Data appear Lognormal at 10% Significance Level**											
422	**Note GOF tests may be unreliable for small sample sizes**											
423												
424	**Lognormal ROS Statistics Using Imputed Non-Detects**											
425				Mean in Original Scale		0.702	Mean in Log Scale					-0.39
426				SD in Original Scale		0.2	SD in Log Scale					0.279
427				95% t UCL (assumes normality of ROS data)		0.801	95% Percentile Bootstrap UCL					0.795
428				95% BCA Bootstrap UCL		0.805	95% Bootstrap t UCL					0.82
429				95% H-UCL (Log ROS)		0.82						
430												
431	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
432				KM Mean (logged)		-0.458	KM Geo Mean					0.632
433				KM SD (logged)		0.401	95% Critical H Value (KM-Log)					2.004
434				KM Standard Error of Mean (logged)		0.128	95% H-UCL (KM -Log)					0.864
435				KM SD (logged)		0.401	95% Critical H Value (KM-Log)					2.004
436				KM Standard Error of Mean (logged)		0.128						
437												
438	**DL/2 Statistics**											
439	**DL/2 Normal**						**DL/2 Log-Transformed**					
440				Mean in Original Scale		0.745	Mean in Log Scale					-0.46
441				SD in Original Scale		0.354	SD in Log Scale					0.691
442				95% t UCL (Assumes normality)		0.92	95% H-Stat UCL					1.282
443	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
444												
445	**Nonparametric Distribution Free UCL Statistics**											
446	**Detected Data appear Normal Distributed at 1% Significance Level**											
447												
448	**Suggested UCL to Use**											
449				95% KM (t) UCL		0.817						
450												
451	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
452	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
453	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
454												
455	**Ag**											
456												
457	**General Statistics**											
458				Total Number of Observations		13	Number of Distinct Observations					10
459							Number of Missing Observations					26
460				Number of Detects		8	Number of Non-Detects					5
461				Number of Distinct Detects		7	Number of Distinct Non-Detects					3
462				Minimum Detect		0.17	Minimum Non-Detect					1
463				Maximum Detect		0.71	Maximum Non-Detect					2.5
464				Variance Detects		0.056	Percent Non-Detects					38.46%
465				Mean Detects		0.421	SD Detects					0.237
466				Median Detects		0.39	CV Detects					0.562
467				Skewness Detects		0.115	Kurtosis Detects					-2.444
468				Mean of Logged Detects		-1.024	SD of Logged Detects					0.621

469												
470	**Normal GOF Test on Detects Only**											
471					Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**					
472					1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level					
473					Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**					
474					1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level					
475	**Detected Data appear Normal at 1% Significance Level**											
476	**Note GOF tests may be unreliable for small sample sizes**											
477												
478	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
479					KM Mean	0.421	KM Standard Error of Mean	0.0837				
480					90KM SD	0.221	95% KM (BCA) UCL	0.56				
481					95% KM (t) UCL	0.57	95% KM (Percentile Bootstrap) UCL	0.556				
482					95% KM (z) UCL	0.559	95% KM Bootstrap t UCL	0.588				
483					90% KM Chebyshev UCL	0.672	95% KM Chebyshev UCL	0.786				
484					97.5% KM Chebyshev UCL	0.944	99% KM Chebyshev UCL	1.254				
485	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
486												
487	**Gamma GOF Tests on Detected Observations Only**											
488					A-D Test Statistic	0.771	**Anderson-Darling GOF Test**					
489					5% A-D Critical Value	0.721	Detected Data Not Gamma Distributed at 5% Significance Level					
490					K-S Test Statistic	0.29	**Kolmogorov-Smirnov GOF**					
491					5% K-S Critical Value	0.296	Detected data appear Gamma Distributed at 5% Significance Level					
492	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
493	**Note GOF tests may be unreliable for small sample sizes**											
494												
495	**Gamma Statistics on Detected Data Only**											
496					k hat (MLE)	3.292	k star (bias corrected MLE)	2.141				
497					Theta hat (MLE)	0.128	Theta star (bias corrected MLE)	0.197				
498					nu hat (MLE)	52.67	nu star (bias corrected)	34.25				
499					Mean (detects)	0.421						
500												
501	**Gamma ROS Statistics using Imputed Non-Detects**											
502	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
503	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
504	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
505	This is especially true when the sample size is small.											
506	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
507					Minimum	0.17	Mean	0.413				
508					Maximum	0.71	Median	0.392				
509					SD	0.193	CV	0.467				
510					k hat (MLE)	4.638	k star (bias corrected MLE)	3.619				
511					Theta hat (MLE)	0.089	Theta star (bias corrected MLE)	0.114				
512					nu hat (MLE)	120.6	nu star (bias corrected)	94.09				
513					Adjusted Level of Significance (β)	0.0301						
514					Approximate Chi Square Value (94.09, α)	72.71	Adjusted Chi Square Value (94.09, β)	70.04				
515					95% Gamma Approximate UCL	0.534	95% Gamma Adjusted UCL	0.555				
516												
517	**Estimates of Gamma Parameters using KM Estimates**											
518					Mean (KM)	0.421	SD (KM)	0.221				
519					Variance (KM)	0.049	SE of Mean (KM)	0.0837				
520					k hat (KM)	3.619	k star (KM)	2.835				

521					nu hat (KM)	94.09					nu star (KM)	73.71
522					theta hat (KM)	0.116					theta star (KM)	0.149
523					80% gamma percentile (KM)	0.605					90% gamma percentile (KM)	0.757
524					95% gamma percentile (KM)	0.899					99% gamma percentile (KM)	1.207
525												
526					**Gamma Kaplan-Meier (KM) Statistics**							
527					Approximate Chi Square Value (73.71, α)	54.94					Adjusted Chi Square Value (73.71, β)	52.63
528					95% KM Approximate Gamma UCL	0.565					95% KM Adjusted Gamma UCL	0.59
529					**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**							
530												
531					**Lognormal GOF Test on Detected Observations Only**							
532					Shapiro Wilk Test Statistic	0.821					**Shapiro Wilk GOF Test**	
533					10% Shapiro Wilk Critical Value	0.851					Detected Data Not Lognormal at 10% Significance Level	
534					Lilliefors Test Statistic	0.264					**Lilliefors GOF Test**	
535					10% Lilliefors Critical Value	0.265					Detected Data appear Lognormal at 10% Significance Level	
536					**Detected Data appear Approximate Lognormal at 10% Significance Level**							
537					**Note GOF tests may be unreliable for small sample sizes**							
538												
539					**Lognormal ROS Statistics Using Imputed Non-Detects**							
540					Mean in Original Scale	0.403					Mean in Log Scale	-1.024
541					SD in Original Scale	0.194					SD in Log Scale	0.506
542					95% t UCL (assumes normality of ROS data)	0.498					95% Percentile Bootstrap UCL	0.489
543					95% BCA Bootstrap UCL	0.494					95% Bootstrap t UCL	0.51
544					95% H-UCL (Log ROS)	0.556						
545												
546					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
547					KM Mean (logged)	-1.024					KM Geo Mean	0.359
548					KM SD (logged)	0.581					95% Critical H Value (KM-Log)	2.21
549					KM Standard Error of Mean (logged)	0.219					95% H-UCL (KM -Log)	0.616
550					KM SD (logged)	0.581					95% Critical H Value (KM-Log)	2.21
551					KM Standard Error of Mean (logged)	0.219						
552												
553					**DL/2 Statistics**							
554					**DL/2 Normal**						**DL/2 Log-Transformed**	
555					Mean in Original Scale	0.571					Mean in Log Scale	-0.748
556					SD in Original Scale	0.354					SD in Log Scale	0.66
557					95% t UCL (Assumes normality)	0.746					95% H-Stat UCL	0.914
558					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
559												
560					**Nonparametric Distribution Free UCL Statistics**							
561					**Detected Data appear Normal Distributed at 1% Significance Level**							
562												
563					**Suggested UCL to Use**							
564					95% KM (t) UCL	0.57						
565												
566					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
567					Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.							
568					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
569												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/17/2024 4:50:46 PM
From File	16 Central Tendency Comparison, Background, Non-Mineralized, Locations HA-93, SOIL20, and SOIL26.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

As-All

General Statistics

Total Number of Observations	50	Number of Distinct Observations	35
Number of Detects	45	Number of Non-Detects	5
Number of Distinct Detects	34	Number of Distinct Non-Detects	2
Minimum Detect	2	Minimum Non-Detect	1
Maximum Detect	37.6	Maximum Non-Detect	2
Variance Detects	50.41	Percent Non-Detects	10%
Mean Detects	9.562	SD Detects	7.1
Median Detects	7.5	CV Detects	0.743
Skewness Detects	1.894	Kurtosis Detects	4.728
Mean of Logged Detects	2.021	SD of Logged Detects	0.706

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	8.706	KM Standard Error of Mean	1.021
90KM SD	7.139	95% KM (BCA) UCL	10.41
95% KM (t) UCL	10.42	95% KM (Percentile Bootstrap) UCL	10.45
95% KM (z) UCL	10.39	95% KM Bootstrap t UCL	10.81
90% KM Chebyshev UCL	11.77	95% KM Chebyshev UCL	13.16
97.5% KM Chebyshev UCL	15.08	99% KM Chebyshev UCL	18.86

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.325	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0739	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.133	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.267	k star (bias corrected MLE)	2.131
Theta hat (MLE)	4.218	Theta star (bias corrected MLE)	4.487
nu hat (MLE)	204	nu star (bias corrected)	191.8
Mean (detects)	9.562		

Gamma ROS Statistics using Imputed Non-Detects

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.01				Mean	8.607	
59					Maximum	37.6				Median	7.15	
60					SD	7.324				CV	0.851	
61					k hat (MLE)	0.754				k star (bias corrected MLE)	0.722	
62					Theta hat (MLE)	11.42				Theta star (bias corrected MLE)	11.93	
63					nu hat (MLE)	75.36				nu star (bias corrected)	72.17	
64					Adjusted Level of Significance (β)	0.0452						
65					Approximate Chi Square Value (72.17, α)	53.61				Adjusted Chi Square Value (72.17, β)	53.13	
66					95% Gamma Approximate UCL	11.59				95% Gamma Adjusted UCL	11.69	
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	8.706				SD (KM)	7.139	
70					Variance (KM)	50.96				SE of Mean (KM)	1.021	
71					k hat (KM)	1.487				k star (KM)	1.411	
72					nu hat (KM)	148.7				nu star (KM)	141.1	
73					theta hat (KM)	5.853				theta star (KM)	6.168	
74					80% gamma percentile (KM)	13.56				90% gamma percentile (KM)	18.41	
75					95% gamma percentile (KM)	23.15				99% gamma percentile (KM)	33.88	
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (141.15, α)	114.7				Adjusted Chi Square Value (141.15, β)	114	
79					95% KM Approximate Gamma UCL	10.71				95% KM Adjusted Gamma UCL	10.78	
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.972				**Shapiro Wilk GOF Test**		
83					10% Shapiro Wilk Critical Value	0.953				Detected Data appear Lognormal at 10% Significance Level		
84					Lilliefors Test Statistic	0.0799				**Lilliefors GOF Test**		
85					10% Lilliefors Critical Value	0.12				Detected Data appear Lognormal at 10% Significance Level		
86	**Detected Data appear Lognormal at 10% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	8.759				Mean in Log Scale	1.861	
90					SD in Original Scale	7.155				SD in Log Scale	0.83	
91					95% t UCL (assumes normality of ROS data)	10.46				95% Percentile Bootstrap UCL	10.41	
92					95% BCA Bootstrap UCL	10.56				95% Bootstrap t UCL	10.84	
93					95% H-UCL (Log ROS)	11.73						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	1.819				KM Geo Mean	6.167	
97					KM SD (logged)	0.898				95% Critical H Value (KM-Log)	2.237	
98					KM Standard Error of Mean (logged)	0.128				95% H-UCL (KM -Log)	12.3	
99					KM SD (logged)	0.898				95% Critical H Value (KM-Log)	2.237	
100					KM Standard Error of Mean (logged)	0.128						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	8.676				Mean in Log Scale	1.778	

105				SD in Original Scale	7.245					SD in Log Scale	1.003	
106				95% t UCL (Assumes normality)	10.39					95% H-Stat UCL	13.69	
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Gamma Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113				95% KM Approximate Gamma UCL	10.71					95% GROS Approximate Gamma UCL	11.59	
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
117	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
118												
119	**As-Culled**											
120												
121	**General Statistics**											
122				Total Number of Observations	45					Number of Distinct Observations	30	
123										Number of Missing Observations	5	
124				Number of Detects	40					Number of Non-Detects	5	
125				Number of Distinct Detects	29					Number of Distinct Non-Detects	2	
126				Minimum Detect	2					Minimum Non-Detect	1	
127				Maximum Detect	17.7					Maximum Non-Detect	2	
128				Variance Detects	16.17					Percent Non-Detects	11.11%	
129				Mean Detects	7.628					SD Detects	4.021	
130				Median Detects	7.15					CV Detects	0.527	
131				Skewness Detects	0.61					Kurtosis Detects	-0.0227	
132				Mean of Logged Detects	1.876					SD of Logged Detects	0.599	
133												
134	**Normal GOF Test on Detects Only**											
135				Shapiro Wilk Test Statistic	0.948					**Shapiro Wilk GOF Test**		
136				1% Shapiro Wilk Critical Value	0.919					Detected Data appear Normal at 1% Significance Level		
137				Lilliefors Test Statistic	0.0887					**Lilliefors GOF Test**		
138				1% Lilliefors Critical Value	0.162					Detected Data appear Normal at 1% Significance Level		
139	**Detected Data appear Normal at 1% Significance Level**											
140												
141	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
142				KM Mean	6.891					KM Standard Error of Mean	0.647	
143				90KM SD	4.284					95% KM (BCA) UCL	7.956	
144				95% KM (t) UCL	7.978					95% KM (Percentile Bootstrap) UCL	7.967	
145				95% KM (z) UCL	7.955					95% KM Bootstrap t UCL	8.013	
146				90% KM Chebyshev UCL	8.831					95% KM Chebyshev UCL	9.71	
147				97.5% KM Chebyshev UCL	10.93					99% KM Chebyshev UCL	13.33	
148												
149	**Gamma GOF Tests on Detected Observations Only**											
150				A-D Test Statistic	0.301					**Anderson-Darling GOF Test**		
151				5% A-D Critical Value	0.754					Detected data appear Gamma Distributed at 5% Significance Level		
152				K-S Test Statistic	0.0763					**Kolmogorov-Smirnov GOF**		
153				5% K-S Critical Value	0.14					Detected data appear Gamma Distributed at 5% Significance Level		
154	**Detected data appear Gamma Distributed at 5% Significance Level**											
155												
156	**Gamma Statistics on Detected Data Only**											

157					k hat (MLE)	3.367				k star (bias corrected MLE)		3.131
158					Theta hat (MLE)	2.265				Theta star (bias corrected MLE)		2.436
159					nu hat (MLE)	269.4				nu star (bias corrected)		250.5
160					Mean (detects)	7.628						
161												
162	**Gamma ROS Statistics using Imputed Non-Detects**											
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
166	This is especially true when the sample size is small.											
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
168					Minimum	0.56				Mean		6.905
169					Maximum	17.7				Median		6.2
170					SD	4.315				CV		0.625
171					k hat (MLE)	2.075				k star (bias corrected MLE)		1.952
172					Theta hat (MLE)	3.327				Theta star (bias corrected MLE)		3.538
173					nu hat (MLE)	186.8				nu star (bias corrected)		175.7
174					Adjusted Level of Significance (β)	0.0447						
175					Approximate Chi Square Value (175.67, α)	146				Adjusted Chi Square Value (175.67, β)		145.1
176					95% Gamma Approximate UCL	8.307				95% Gamma Adjusted UCL		8.358
177												
178	**Estimates of Gamma Parameters using KM Estimates**											
179					Mean (KM)	6.891				SD (KM)		4.284
180					Variance (KM)	18.35				SE of Mean (KM)		0.647
181					k hat (KM)	2.588				k star (KM)		2.43
182					nu hat (KM)	232.9				nu star (KM)		218.7
183					theta hat (KM)	2.663				theta star (KM)		2.835
184					80% gamma percentile (KM)	10.08				90% gamma percentile (KM)		12.81
185					95% gamma percentile (KM)	15.39				99% gamma percentile (KM)		21.04
186												
187	**Gamma Kaplan-Meier (KM) Statistics**											
188					Approximate Chi Square Value (218.73, α)	185.5				Adjusted Chi Square Value (218.73, β)		184.5
189					95% KM Approximate Gamma UCL	8.126				95% KM Adjusted Gamma UCL		8.17
190												
191	**Lognormal GOF Test on Detected Observations Only**											
192					Shapiro Wilk Test Statistic	0.939				**Shapiro Wilk GOF Test**		
193					10% Shapiro Wilk Critical Value	0.949				Detected Data Not Lognormal at 10% Significance Level		
194					Lilliefors Test Statistic	0.103				**Lilliefors GOF Test**		
195					10% Lilliefors Critical Value	0.128				Detected Data appear Lognormal at 10% Significance Level		
196	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
197												
198	**Lognormal ROS Statistics Using Imputed Non-Detects**											
199					Mean in Original Scale	6.974				Mean in Log Scale		1.728
200					SD in Original Scale	4.223				SD in Log Scale		0.707
201					95% t UCL (assumes normality of ROS data)	8.031				95% Percentile Bootstrap UCL		8.013
202					95% BCA Bootstrap UCL	8.018				95% Bootstrap t UCL		8.059
203					95% H-UCL (Log ROS)	9.019						
204												
205	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
206					KM Mean (logged)	1.668				KM Geo Mean		5.299
207					KM SD (logged)	0.812				95% Critical H Value (KM-Log)		2.172
208					KM Standard Error of Mean (logged)	0.123				95% H-UCL (KM -Log)		9.608

209					KM SD (logged)	0.812				95% Critical H Value (KM-Log)		2.172
210					KM Standard Error of Mean (logged)	0.123						
211												
212	**DL/2 Statistics**											
213	**DL/2 Normal**						**DL/2 Log-Transformed**					
214					Mean in Original Scale	6.858				Mean in Log Scale		1.621
215					SD in Original Scale	4.38				SD in Log Scale		0.928
216					95% t UCL (Assumes normality)	7.955				95% H-Stat UCL		10.73
217	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Detected Data appear Normal Distributed at 1% Significance Level**											
221												
222	**Suggested UCL to Use**											
223					95% KM (t) UCL	7.978						
224												
225	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
226	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
227	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
228												
229	**Hg-All**											
230												
231	**General Statistics**											
232					Total Number of Observations	41				Number of Distinct Observations		26
233										Number of Missing Observations		7
234					Number of Detects	22				Number of Non-Detects		19
235					Number of Distinct Detects	19				Number of Distinct Non-Detects		8
236					Minimum Detect	0.017				Minimum Non-Detect		0.01
237					Maximum Detect	0.34				Maximum Non-Detect		0.2
238					Variance Detects	0.00645				Percent Non-Detects		46.34%
239					Mean Detects	0.0698				SD Detects		0.0803
240					Median Detects	0.039				CV Detects		1.151
241					Skewness Detects	2.617				Kurtosis Detects		6.716
242					Mean of Logged Detects	-3.031				SD of Logged Detects		0.786
243												
244	**Normal GOF Test on Detects Only**											
245					Shapiro Wilk Test Statistic	0.619	**Shapiro Wilk GOF Test**					
246					1% Shapiro Wilk Critical Value	0.878	Detected Data Not Normal at 1% Significance Level					
247					Lilliefors Test Statistic	0.282	**Lilliefors GOF Test**					
248					1% Lilliefors Critical Value	0.214	Detected Data Not Normal at 1% Significance Level					
249	**Detected Data Not Normal at 1% Significance Level**											
250												
251	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
252					KM Mean	0.0539				KM Standard Error of Mean		0.0104
253					90KM SD	0.0622				95% KM (BCA) UCL		0.0731
254					95% KM (t) UCL	0.0714				95% KM (Percentile Bootstrap) UCL		0.0732
255					95% KM (z) UCL	0.071				95% KM Bootstrap t UCL		0.0839
256					90% KM Chebyshev UCL	0.0851				95% KM Chebyshev UCL		0.0992
257					97.5% KM Chebyshev UCL	0.119				99% KM Chebyshev UCL		0.157
258												
259	**Gamma GOF Tests on Detected Observations Only**											
260					A-D Test Statistic	1.459	**Anderson-Darling GOF Test**					

261				5% A-D Critical Value	0.759	Detected Data Not Gamma Distributed at 5% Significance Level						
262				K-S Test Statistic	0.196	Kolmogorov-Smirnov GOF						
263				5% K-S Critical Value	0.189	Detected Data Not Gamma Distributed at 5% Significance Level						
264	Detected Data Not Gamma Distributed at 5% Significance Level											
265												
266	Gamma Statistics on Detected Data Only											
267				k hat (MLE)	1.5	k star (bias corrected MLE)	1.326					
268				Theta hat (MLE)	0.0465	Theta star (bias corrected MLE)	0.0526					
269				nu hat (MLE)	66.02	nu star (bias corrected)	58.35					
270				Mean (detects)	0.0698							
271												
272	Gamma ROS Statistics using Imputed Non-Detects											
273	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
274	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
275	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
276	This is especially true when the sample size is small.											
277	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
278				Minimum	0.01	Mean	0.0533					
279				Maximum	0.34	Median	0.0313					
280				SD	0.0649	CV	1.218					
281				k hat (MLE)	1.282	k star (bias corrected MLE)	1.204					
282				Theta hat (MLE)	0.0416	Theta star (bias corrected MLE)	0.0443					
283				nu hat (MLE)	105.1	nu star (bias corrected)	98.76					
284				Adjusted Level of Significance (β)	0.0441							
285				Approximate Chi Square Value (98.76, α)	76.83	Adjusted Chi Square Value (98.76, β)	76.13					
286				95% Gamma Approximate UCL	0.0685	95% Gamma Adjusted UCL	0.0692					
287												
288	Estimates of Gamma Parameters using KM Estimates											
289				Mean (KM)	0.0539	SD (KM)	0.0622					
290				Variance (KM)	0.00387	SE of Mean (KM)	0.0104					
291				k hat (KM)	0.752	k star (KM)	0.714					
292				nu hat (KM)	61.69	nu star (KM)	58.51					
293				theta hat (KM)	0.0717	theta star (KM)	0.0756					
294				80% gamma percentile (KM)	0.0886	90% gamma percentile (KM)	0.135					
295				95% gamma percentile (KM)	0.182	99% gamma percentile (KM)	0.296					
296												
297	Gamma Kaplan-Meier (KM) Statistics											
298				Approximate Chi Square Value (58.51, α)	41.92	Adjusted Chi Square Value (58.51, β)	41.41					
299				95% KM Approximate Gamma UCL	0.0753	95% KM Adjusted Gamma UCL	0.0762					
300												
301	Lognormal GOF Test on Detected Observations Only											
302				Shapiro Wilk Test Statistic	0.904	Shapiro Wilk GOF Test						
303				10% Shapiro Wilk Critical Value	0.926	Detected Data Not Lognormal at 10% Significance Level						
304				Lilliefors Test Statistic	0.152	Lilliefors GOF Test						
305				10% Lilliefors Critical Value	0.169	Detected Data appear Lognormal at 10% Significance Level						
306	Detected Data appear Approximate Lognormal at 10% Significance Level											
307												
308	Lognormal ROS Statistics Using Imputed Non-Detects											
309				Mean in Original Scale	0.0538	Mean in Log Scale	-3.262					
310				SD in Original Scale	0.0626	SD in Log Scale	0.759					
311				95% t UCL (assumes normality of ROS data)	0.0703	95% Percentile Bootstrap UCL	0.0704					
312				95% BCA Bootstrap UCL	0.0757	95% Bootstrap t UCL	0.0896					

313				95% H-UCL (Log ROS)		0.0658						
314												
315	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
316				KM Mean (logged)		-3.266				KM Geo Mean		0.0381
317				KM SD (logged)		0.754				95% Critical H Value (KM-Log)		2.104
318				KM Standard Error of Mean (logged)		0.143				95% H-UCL (KM -Log)		0.0652
319				KM SD (logged)		0.754				95% Critical H Value (KM-Log)		2.104
320				KM Standard Error of Mean (logged)		0.143						
321	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
322												
323	**DL/2 Statistics**											
324	**DL/2 Normal**									**DL/2 Log-Transformed**		
325				Mean in Original Scale		0.0706				Mean in Log Scale		-2.963
326				SD in Original Scale		0.0631				SD in Log Scale		0.827
327				95% t UCL (Assumes normality)		0.0872				95% H-Stat UCL		0.0966
328	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
329												
330	**Nonparametric Distribution Free UCL Statistics**											
331	**Detected Data appear Approximate Lognormal Distributed at 10% Significance Level**											
332												
333	**Suggested UCL to Use**											
334				KM H-UCL		0.0652						
335												
336	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
337	**Please verify the data were collected from random locations.**											
338	**If the data were collected using judgmental or other non-random methods,**											
339	**then contact a statistician to correctly calculate UCLs.**											
340												
341	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
342	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
343	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
344												
345	**Hg-Culled**											
346												
347	**General Statistics**											
348				Total Number of Observations		37				Number of Distinct Observations		23
349										Number of Missing Observations		11
350				Number of Detects		20				Number of Non-Detects		17
351				Number of Distinct Detects		17				Number of Distinct Non-Detects		7
352				Minimum Detect		0.017				Minimum Non-Detect		0.01
353				Maximum Detect		0.34				Maximum Non-Detect		0.2
354				Variance Detects		0.00513				Percent Non-Detects		45.95%
355				Mean Detects		0.0604				SD Detects		0.0716
356				Median Detects		0.036				CV Detects		1.187
357				Skewness Detects		3.465				Kurtosis Detects		13.34
358				Mean of Logged Detects		-3.133				SD of Logged Detects		0.718
359												
360	**Normal GOF Test on Detects Only**											
361				Shapiro Wilk Test Statistic		0.551				**Shapiro Wilk GOF Test**		
362				1% Shapiro Wilk Critical Value		0.868				Detected Data Not Normal at 1% Significance Level		
363				Lilliefors Test Statistic		0.285				**Lilliefors GOF Test**		
364				1% Lilliefors Critical Value		0.223				Detected Data Not Normal at 1% Significance Level		

365	**Detected Data Not Normal at 1% Significance Level**											
366												
367	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
368					KM Mean	0.0488			KM Standard Error of Mean	0.00993		
369					90KM SD	0.0555			95% KM (BCA) UCL	0.0673		
370					95% KM (t) UCL	0.0655			95% KM (Percentile Bootstrap) UCL	0.0665		
371					95% KM (z) UCL	0.0651			95% KM Bootstrap t UCL	0.081		
372					90% KM Chebyshev UCL	0.0786			95% KM Chebyshev UCL	0.0921		
373					97.5% KM Chebyshev UCL	0.111			99% KM Chebyshev UCL	0.148		
374	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
375												
376	**Gamma GOF Tests on Detected Observations Only**											
377					A-D Test Statistic	1.365			**Anderson-Darling GOF Test**			
378					5% A-D Critical Value	0.756			Detected Data Not Gamma Distributed at 5% Significance Level			
379					K-S Test Statistic	0.209			**Kolmogorov-Smirnov GOF**			
380					5% K-S Critical Value	0.197			Detected Data Not Gamma Distributed at 5% Significance Level			
381	**Detected Data Not Gamma Distributed at 5% Significance Level**											
382												
383	**Gamma Statistics on Detected Data Only**											
384					k hat (MLE)	1.685			k star (bias corrected MLE)	1.466		
385					Theta hat (MLE)	0.0358			Theta star (bias corrected MLE)	0.0412		
386					nu hat (MLE)	67.41			nu star (bias corrected)	58.63		
387					Mean (detects)	0.0604						
388												
389	**Gamma ROS Statistics using Imputed Non-Detects**											
390	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
391	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
392	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
393	This is especially true when the sample size is small.											
394	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
395					Minimum	0.01			Mean	0.0483		
396					Maximum	0.34			Median	0.031		
397					SD	0.058			CV	1.2		
398					k hat (MLE)	1.451			k star (bias corrected MLE)	1.351		
399					Theta hat (MLE)	0.0333			Theta star (bias corrected MLE)	0.0358		
400					nu hat (MLE)	107.4			nu star (bias corrected)	100		
401					Adjusted Level of Significance (β)	0.0431						
402					Approximate Chi Square Value (100.01, α)	77.94			Adjusted Chi Square Value (100.01, β)	77.09		
403					95% Gamma Approximate UCL	0.062			95% Gamma Adjusted UCL	0.0627		
404												
405	**Estimates of Gamma Parameters using KM Estimates**											
406					Mean (KM)	0.0488			SD (KM)	0.0555		
407					Variance (KM)	0.00308			SE of Mean (KM)	0.00993		
408					k hat (KM)	0.771			k star (KM)	0.727		
409					nu hat (KM)	57.07			nu star (KM)	53.78		
410					theta hat (KM)	0.0632			theta star (KM)	0.0671		
411					80% gamma percentile (KM)	0.0801			90% gamma percentile (KM)	0.121		
412					95% gamma percentile (KM)	0.164			99% gamma percentile (KM)	0.265		
413												
414	**Gamma Kaplan-Meier (KM) Statistics**											
415					Approximate Chi Square Value (53.78, α)	37.93			Adjusted Chi Square Value (53.78, β)	37.35		
416					95% KM Approximate Gamma UCL	0.0691			95% KM Adjusted Gamma UCL	0.0702		

417	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
418												
419	**Lognormal GOF Test on Detected Observations Only**											
420					Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**					
421					10% Shapiro Wilk Critical Value	0.92	Detected Data Not Lognormal at 10% Significance Level					
422					Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**					
423					10% Lilliefors Critical Value	0.176	Detected Data appear Lognormal at 10% Significance Level					
424	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
425												
426	**Lognormal ROS Statistics Using Imputed Non-Detects**											
427					Mean in Original Scale	0.0484	Mean in Log Scale	-3.327				
428					SD in Original Scale	0.0556	SD in Log Scale	0.706				
429					95% t UCL (assumes normality of ROS data)	0.0639	95% Percentile Bootstrap UCL	0.0645				
430					95% BCA Bootstrap UCL	0.0703	95% Bootstrap t UCL	0.0821				
431					95% H-UCL (Log ROS)	0.0589						
432												
433	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
434					KM Mean (logged)	-3.33	KM Geo Mean	0.0358				
435					KM SD (logged)	0.71	95% Critical H Value (KM-Log)	2.088				
436					KM Standard Error of Mean (logged)	0.144	95% H-UCL (KM -Log)	0.059				
437					KM SD (logged)	0.71	95% Critical H Value (KM-Log)	2.088				
438					KM Standard Error of Mean (logged)	0.144						
439	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**											
440												
441	**DL/2 Statistics**											
442	**DL/2 Normal**						**DL/2 Log-Transformed**					
443					Mean in Original Scale	0.067	Mean in Log Scale	-3.005				
444					SD in Original Scale	0.0581	SD in Log Scale	0.826				
445					95% t UCL (Assumes normality)	0.0831	95% H-Stat UCL	0.0943				
446	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
447												
448	**Nonparametric Distribution Free UCL Statistics**											
449	**Detected Data appear Approximate Lognormal Distributed at 10% Significance Level**											
450												
451	**Suggested UCL to Use**											
452					KM H-UCL	0.059						
453												
454	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
455	**Please verify the data were collected from random locations.**											
456	**If the data were collected using judgmental or other non-random methods,**											
457	**then contact a statistician to correctly calculate UCLs.**											
458												
459	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
460	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
461	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
462												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/23/2024 5:03:53 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

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General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	11	Mean	29.78
Maximum	59	Median	28
SD	16.13	Std. Error of Mean	5.377
Coefficient of Variation	0.542	Skewness	0.615

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	39.78	95% Adjusted-CLT UCL (Chen-1995)	39.8
		95% Modified-t UCL (Johnson-1978)	39.96

Gamma GOF Test

A-D Test Statistic	0.226	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.179	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	3.728	k star (bias corrected MLE)	2.559
Theta hat (MLE)	7.989	Theta star (bias corrected MLE)	11.64
nu hat (MLE)	67.1	nu star (bias corrected)	46.06
MLE Mean (bias corrected)	29.78	MLE Sd (bias corrected)	18.61

53											Approximate Chi Square Value (0.05)	31.49
54					Adjusted Level of Significance	0.0231					Adjusted Chi Square Value	28.97
55												
56					**Assuming Gamma Distribution**							
57					95% Approximate Gamma UCL	43.56					95% Adjusted Gamma UCL	47.34
58												
59					**Lognormal GOF Test**							
60					Shapiro Wilk Test Statistic	0.958			**Shapiro Wilk Lognormal GOF Test**			
61					10% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 10% Significance Level			
62					Lilliefors Test Statistic	0.149			**Lilliefors Lognormal GOF Test**			
63					10% Lilliefors Critical Value	0.252			Data appear Lognormal at 10% Significance Level			
64					**Data appear Lognormal at 10% Significance Level**							
65					**Note GOF tests may be unreliable for small sample sizes**							
66												
67					**Lognormal Statistics**							
68					Minimum of Logged Data	2.398					Mean of logged Data	3.254
69					Maximum of Logged Data	4.078					SD of logged Data	0.576
70												
71					**Assuming Lognormal Distribution**							
72					95% H-UCL	49.56					90% Chebyshev (MVUE) UCL	47.47
73					95% Chebyshev (MVUE) UCL	55.42					97.5% Chebyshev (MVUE) UCL	66.45
74					99% Chebyshev (MVUE) UCL	88.12						
75												
76					**Nonparametric Distribution Free UCL Statistics**							
77					**Data appear to follow a Discernible Distribution**							
78												
79					**Nonparametric Distribution Free UCLs**							
80					95% CLT UCL	38.62					95% BCA Bootstrap UCL	39.11
81					95% Standard Bootstrap UCL	38.28					95% Bootstrap-t UCL	42.25
82					95% Hall's Bootstrap UCL	40.81					95% Percentile Bootstrap UCL	38.33
83					90% Chebyshev(Mean, Sd) UCL	45.91					95% Chebyshev(Mean, Sd) UCL	53.21
84					97.5% Chebyshev(Mean, Sd) UCL	63.36					99% Chebyshev(Mean, Sd) UCL	83.28
85												
86					**Suggested UCL to Use**							
87					95% Student's-t UCL	39.78						
88												
89	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
90	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
91	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
92												

	Background Statistics for Data Sets with Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 8/11/2023 10:38:11 AM	
From File	10 Background, Non-Mineralized, Culled.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Coverage	95%	
Different or Future K Observations	1	
Number of Bootstrap Operations	2000	

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General Statistics

Total Number of Observations	147	Number of Missing Observations	4
Number of Distinct Observations	77		
Number of Detects	128	Number of Non-Detects	19
Number of Distinct Detects	76	Number of Distinct Non-Detects	2
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	20.7	Maximum Non-Detect	2
Variance Detected	19.25	Percent Non-Detects	12.93%
Mean Detected	8.907	SD Detected	4.387
Mean of Detected Logged Data	2.043	SD of Detected Logged Data	0.581

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	1.87	d2max (for USL)	3.336

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.955	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0.00183	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.0693	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.091	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	7.887	KM SD	4.862
95% UTL95% Coverage	16.98	95% KM UPL (t)	15.96
90% KM Percentile (z)	14.12	95% KM Percentile (z)	15.88
99% KM Percentile (z)	19.2	95% KM USL	24.11

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	7.858	SD	4.921
95% UTL95% Coverage	17.06	95% UPL (t)	16.03
90% Percentile (z)	14.16	95% Percentile (z)	15.95
99% Percentile (z)	19.31	95% USL	24.28

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.662	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0654	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0826	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

53												
54	**Gamma Statistics on Detected Data Only**											
55						k hat (MLE)	3.63			k star (bias corrected MLE)		3.55
56						Theta hat (MLE)	2.454			Theta star (bias corrected MLE)		2.509
57						nu hat (MLE)	929.3			nu star (bias corrected)		908.8
58						MLE Mean (bias corrected)	8.907					
59						MLE Sd (bias corrected)	4.727			95% Percentile of Chisquare (2kstar)		14.21
60												
61	**Gamma ROS Statistics using Imputed Non-Detects**											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
63	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
64	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
65	This is especially true when the sample size is small.											
66	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
67						Minimum	0.607			Mean		8.008
68						Maximum	20.7			Median		7.5
69						SD	4.721			CV		0.589
70						k hat (MLE)	2.365			k star (bias corrected MLE)		2.321
71						Theta hat (MLE)	3.387			Theta star (bias corrected MLE)		3.451
72						nu hat (MLE)	695.2			nu star (bias corrected)		682.3
73						MLE Mean (bias corrected)	8.008			MLE Sd (bias corrected)		5.257
74						95% Percentile of Chisquare (2kstar)	10.51			90% Percentile		15.05
75						95% Percentile	18.14			99% Percentile		24.93
76	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
77	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
78							WH	HW			WH	HW
79						95% Approx. Gamma UTL with 95% Coverage	20.14	21.08		95% Approx. Gamma UPL	18.19	18.85
80						95% Gamma USL	37.81	42.63				
81												
82	**Estimates of Gamma Parameters using KM Estimates**											
83						Mean (KM)	7.887			SD (KM)		4.862
84						Variance (KM)	23.64			SE of Mean (KM)		0.403
85						k hat (KM)	2.631			k star (KM)		2.582
86						nu hat (KM)	773.4			nu star (KM)		759
87						theta hat (KM)	2.998			theta star (KM)		3.055
88						80% gamma percentile (KM)	11.45			90% gamma percentile (KM)		14.46
89						95% gamma percentile (KM)	17.29			99% gamma percentile (KM)		23.48
90												
91	**The following statistics are computed using gamma distribution and KM estimates**											
92	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
93							WH	HW			WH	HW
94						95% Approx. Gamma UTL with 95% Coverage	21.35	22.69		95% Approx. Gamma UPL	19.12	20.08
95						95% KM Gamma Percentile	18.96	19.88		95% Gamma USL	41.95	48.77
96												
97	**Lognormal GOF Test on Detected Observations Only**											
98						Shapiro Wilk Approximate Test Statistic	0.939			**Shapiro Wilk GOF Test**		
99						10% Shapiro Wilk P Value	1.1527E-5			Data Not Lognormal at 10% Significance Level		
100						Lilliefors Test Statistic	0.0985			**Lilliefors GOF Test**		
101						10% Lilliefors Critical Value	0.072			Data Not Lognormal at 10% Significance Level		
102	**Data Not Lognormal at 10% Significance Level**											
103												
104	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											

105				Mean in Original Scale	8.05					Mean in Log Scale	1.882	
106				SD in Original Scale	4.665					SD in Log Scale	0.69	
107				95% UTL95% Coverage	23.86					95% BCA UTL95% Coverage	18.7	
108				95% Bootstrap (%) UTL95% Coverage	18.7					95% UPL (t)	20.65	
109				90% Percentile (z)	15.89					95% Percentile (z)	20.42	
110				99% Percentile (z)	32.68					95% USL	65.59	
111												
112	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
113				KM Mean of Logged Data	1.78					95% KM UTL (Lognormal)95% Coverage	30.16	
114				KM SD of Logged Data	0.87					95% KM UPL (Lognormal)	25.15	
115				95% KM Percentile Lognormal (z)	24.8					95% KM USL (Lognormal)	107.9	
116												
117	**Background DL/2 Statistics Assuming Lognormal Distribution**											
118				Mean in Original Scale	7.858					Mean in Log Scale	1.741	
119				SD in Original Scale	4.921					SD in Log Scale	0.963	
120				95% UTL95% Coverage	34.51					95% UPL (t)	28.22	
121				90% Percentile (z)	19.58					95% Percentile (z)	27.78	
122				99% Percentile (z)	53.53					95% USL	141.5	
123	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
124												
125	**Nonparametric Distribution Free Background Statistics**											
126	**Data appear to follow a Discernible Distribution**											
127												
128	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
129				Order of Statistic, r	144					95% UTL with95% Coverage	19	
130				Approx, f used to compute achieved CC	1.895					Approximate Actual Confidence Coefficient achieved by UTL	0.939	
131				Approximate Sample Size needed to achieve specified CC	124					95% UPL	17.58	
132				95% USL	20.7					95% KM Chebyshev UPL	29.15	
133												
134	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
135	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
136	and consists of observations collected from clean unimpacted locations.											
137	The use of USL tends to provide a balance between false positives and false negatives provided the data											
138	represents a background data set and when many onsite observations need to be compared with the BTV.											
139												
140	**Cd**											
141												
142	**General Statistics**											
143				Total Number of Observations	87					Number of Missing Observations	0	
144				Number of Distinct Observations	38							
145				Number of Detects	40					Number of Non-Detects	47	
146				Number of Distinct Detects	27					Number of Distinct Non-Detects	20	
147				Minimum Detect	0.19					Minimum Non-Detect	0.05	
148				Maximum Detect	2.9					Maximum Non-Detect	2.5	
149				Variance Detected	0.584					Percent Non-Detects	54.02%	
150				Mean Detected	0.746					SD Detected	0.764	
151				Mean of Detected Logged Data	-0.594					SD of Detected Logged Data	0.687	
152												
153	**Critical Values for Background Threshold Values (BTVs)**											
154				Tolerance Factor K (For UTL)	1.946					d2max (for USL)	3.161	
155												
156	**Normal GOF Test on Detects Only**											

157				Shapiro Wilk Test Statistic		0.586	**Shapiro Wilk GOF Test**					
158				1% Shapiro Wilk Critical Value		0.919	Data Not Normal at 1% Significance Level					
159				Lilliefors Test Statistic		0.358	**Lilliefors GOF Test**					
160				1% Lilliefors Critical Value		0.162	Data Not Normal at 1% Significance Level					
161	**Data Not Normal at 1% Significance Level**											
162												
163	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
164				KM Mean		0.476	KM SD					0.607
165				95% UTL95% Coverage		1.657	95% KM UPL (t)					1.491
166				90% KM Percentile (z)		1.254	95% KM Percentile (z)					1.474
167				99% KM Percentile (z)		1.888	95% KM USL					2.395
168												
169	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
170				Mean		0.735	SD					0.661
171				95% UTL95% Coverage		2.022	95% UPL (t)					1.841
172				90% Percentile (z)		1.582	95% Percentile (z)					1.823
173				99% Percentile (z)		2.273	95% USL					2.825
174	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
175												
176	**Gamma GOF Tests on Detected Observations Only**											
177				A-D Test Statistic		4.495	**Anderson-Darling GOF Test**					
178				5% A-D Critical Value		0.762	Data Not Gamma Distributed at 5% Significance Level					
179				K-S Test Statistic		0.272	**Kolmogorov-Smirnov GOF**					
180				5% K-S Critical Value		0.142	Data Not Gamma Distributed at 5% Significance Level					
181	**Data Not Gamma Distributed at 5% Significance Level**											
182												
183	**Gamma Statistics on Detected Data Only**											
184				k hat (MLE)		1.811	k star (bias corrected MLE)					1.692
185				Theta hat (MLE)		0.412	Theta star (bias corrected MLE)					0.441
186				nu hat (MLE)		144.9	nu star (bias corrected)					135.3
187				MLE Mean (bias corrected)		0.746						
188				MLE Sd (bias corrected)		0.574	95% Percentile of Chisquare (2kstar)					8.47
189												
190	**Gamma ROS Statistics using Imputed Non-Detects**											
191	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
192	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
193	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
194	This is especially true when the sample size is small.											
195	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
196				Minimum		0.01	Mean					0.451
197				Maximum		2.9	Median					0.33
198				SD		0.638	CV					1.416
199				k hat (MLE)		0.514	k star (bias corrected MLE)					0.504
200				Theta hat (MLE)		0.877	Theta star (bias corrected MLE)					0.894
201				nu hat (MLE)		89.41	nu star (bias corrected)					87.66
202				MLE Mean (bias corrected)		0.451	MLE Sd (bias corrected)					0.635
203				95% Percentile of Chisquare (2kstar)		3.86	90% Percentile					1.217
204				95% Percentile		1.726	99% Percentile					2.977
205	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
206	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
207					WH	HW					WH	HW
208	95% Approx. Gamma UTL with 95% Coverage				2.048	2.326	95% Approx. Gamma UPL				1.632	1.783

209				95% Gamma USL	4.754	6.354						
210												
211	**Estimates of Gamma Parameters using KM Estimates**											
212				Mean (KM)	0.476				SD (KM)	0.607		
213				Variance (KM)	0.368				SE of Mean (KM)	0.0704		
214				k hat (KM)	0.617				k star (KM)	0.603		
215				nu hat (KM)	107.3				nu star (KM)	104.9		
216				theta hat (KM)	0.773				theta star (KM)	0.79		
217				80% gamma percentile (KM)	0.785				90% gamma percentile (KM)	1.238		
218				95% gamma percentile (KM)	1.711				99% gamma percentile (KM)	2.856		
219												
220	**The following statistics are computed using gamma distribution and KM estimates**											
221	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
222					WH	HW				WH	HW	
223				95% Approx. Gamma UTL with 95% Coverage	1.692	1.781			95% Approx. Gamma UPL	1.407	1.451	
224				95% KM Gamma Percentile	1.38	1.42			95% Gamma USL	3.422	3.972	
225												
226	**Lognormal GOF Test on Detected Observations Only**											
227				Shapiro Wilk Test Statistic	0.809		**Shapiro Wilk GOF Test**					
228				10% Shapiro Wilk Critical Value	0.949		Data Not Lognormal at 10% Significance Level					
229				Lilliefors Test Statistic	0.208		**Lilliefors GOF Test**					
230				10% Lilliefors Critical Value	0.128		Data Not Lognormal at 10% Significance Level					
231	**Data Not Lognormal at 10% Significance Level**											
232												
233	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
234				Mean in Original Scale	0.497				Mean in Log Scale	-1.077		
235				SD in Original Scale	0.589				SD in Log Scale	0.804		
236				95% UTL95% Coverage	1.627				95% BCA UTL95% Coverage	2.9		
237				95% Bootstrap (%) UTL95% Coverage	2.9				95% UPL (t)	1.306		
238				90% Percentile (z)	0.954				95% Percentile (z)	1.277		
239				99% Percentile (z)	2.209				95% USL	4.323		
240												
241	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
242				KM Mean of Logged Data	-1.343				95% KM UTL (Lognormal)95% Coverage	2.473		
243				KM SD of Logged Data	1.155				95% KM UPL (Lognormal)	1.802		
244				95% KM Percentile Lognormal (z)	1.746				95% KM USL (Lognormal)	10.07		
245												
246	**Background DL/2 Statistics Assuming Lognormal Distribution**											
247				Mean in Original Scale	0.735				Mean in Log Scale	-0.784		
248				SD in Original Scale	0.661				SD in Log Scale	1.114		
249				95% UTL95% Coverage	3.989				95% UPL (t)	2.941		
250				90% Percentile (z)	1.903				95% Percentile (z)	2.852		
251				99% Percentile (z)	6.095				95% USL	15.45		
252	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
253												
254	**Nonparametric Distribution Free Background Statistics**											
255	**Data do not follow a Discernible Distribution**											
256												
257	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
258				Order of Statistic, r	86				95% UTL with95% Coverage	2.9		
259				Approx, f used to compute achieved CC	2.263				Approximate Actual Confidence Coefficient achieved by UTL	0.936		
260				Approximate Sample Size needed to achieve specified CC	59				95% UPL	2.5		

261					95% USL	2.9				95% KM Chebyshev UPL		3.136
262												
263	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
264	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
265	and consists of observations collected from clean unimpacted locations.											
266	The use of USL tends to provide a balance between false positives and false negatives provided the data											
267	represents a background data set and when many onsite observations need to be compared with the BTV.											
268												
269	**Pb**											
270												
271	**General Statistics**											
272					Total Number of Observations	87				Number of Missing Observations		0
273					Number of Distinct Observations	61						
274					Number of Detects	84				Number of Non-Detects		3
275					Number of Distinct Detects	60				Number of Distinct Non-Detects		1
276					Minimum Detect	2.7				Minimum Non-Detect		7.5
277					Maximum Detect	26.3				Maximum Non-Detect		7.5
278					Variance Detected	25.48				Percent Non-Detects		3.448%
279					Mean Detected	14.38				SD Detected		5.048
280					Mean of Detected Logged Data	2.591				SD of Detected Logged Data		0.424
281												
282	**Critical Values for Background Threshold Values (BTVs)**											
283					Tolerance Factor K (For UTL)	1.946				d2max (for USL)		3.161
284												
285	**Normal GOF Test on Detects Only**											
286					Shapiro Wilk Test Statistic	0.979				**Normal GOF Test on Detected Observations Only**		
287					1% Shapiro Wilk P Value	0.538				Detected Data appear Normal at 1% Significance Level		
288					Lilliefors Test Statistic	0.0626				**Lilliefors GOF Test**		
289					1% Lilliefors Critical Value	0.112				Detected Data appear Normal at 1% Significance Level		
290	**Detected Data appear Normal at 1% Significance Level**											
291												
292	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
293					KM Mean	14.03				KM SD		5.27
294					95% UTL95% Coverage	24.29				95% KM UPL (t)		22.85
295					90% KM Percentile (z)	20.79				95% KM Percentile (z)		22.7
296					99% KM Percentile (z)	26.3				95% KM USL		30.7
297												
298	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
299					Mean	14.02				SD		5.329
300					95% UTL95% Coverage	24.39				95% UPL (t)		22.93
301					90% Percentile (z)	20.85				95% Percentile (z)		22.78
302					99% Percentile (z)	26.41				95% USL		30.86
303	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
304												
305	**Gamma GOF Tests on Detected Observations Only**											
306					A-D Test Statistic	0.736				**Anderson-Darling GOF Test**		
307					5% A-D Critical Value	0.753				Detected data appear Gamma Distributed at 5% Significance Level		
308					K-S Test Statistic	0.0901				**Kolmogorov-Smirnov GOF**		
309					5% K-S Critical Value	0.0976				Detected data appear Gamma Distributed at 5% Significance Level		
310	**Detected data appear Gamma Distributed at 5% Significance Level**											
311												
312	**Gamma Statistics on Detected Data Only**											

313					k hat (MLE)	6.799					k star (bias corrected MLE)	6.564
314					Theta hat (MLE)	2.115					Theta star (bias corrected MLE)	2.191
315					nu hat (MLE)	1142					nu star (bias corrected)	1103
316					MLE Mean (bias corrected)	14.38						
317					MLE Sd (bias corrected)	5.614					95% Percentile of Chisquare (2kstar)	22.53
318												
319	**Gamma ROS Statistics using Imputed Non-Detects**											
320	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
321	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
322	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
323	This is especially true when the sample size is small.											
324	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
325					Minimum	2.7					Mean	14.11
326					Maximum	26.3					Median	14.3
327					SD	5.168					CV	0.366
328					k hat (MLE)	6.314					k star (bias corrected MLE)	6.104
329					Theta hat (MLE)	2.235					Theta star (bias corrected MLE)	2.312
330					nu hat (MLE)	1099					nu star (bias corrected)	1062
331					MLE Mean (bias corrected)	14.11					MLE Sd (bias corrected)	5.712
332					95% Percentile of Chisquare (2kstar)	21.3					90% Percentile	21.75
333					95% Percentile	24.63					99% Percentile	30.66
334	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
335	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
336						WH	HW				WH	HW
337					95% Approx. Gamma UTL with 95% Coverage	27.03	27.69			95% Approx. Gamma UPL	24.72	25.17
338					95% Gamma USL	39.02	41.21					
339												
340	**Estimates of Gamma Parameters using KM Estimates**											
341					Mean (KM)	14.03					SD (KM)	5.27
342					Variance (KM)	27.78					SE of Mean (KM)	0.569
343					k hat (KM)	7.091					k star (KM)	6.854
344					nu hat (KM)	1234					nu star (KM)	1193
345					theta hat (KM)	1.979					theta star (KM)	2.048
346					80% gamma percentile (KM)	18.23					90% gamma percentile (KM)	21.19
347					95% gamma percentile (KM)	23.85					99% gamma percentile (KM)	29.4
348												
349	**The following statistics are computed using gamma distribution and KM estimates**											
350	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
351						WH	HW				WH	HW
352					95% Approx. Gamma UTL with 95% Coverage	27.67	28.47			95% Approx. Gamma UPL	25.2	25.76
353					95% KM Gamma Percentile	24.97	25.5			95% Gamma USL	40.55	43.18
354												
355	**Lognormal GOF Test on Detected Observations Only**											
356					Shapiro Wilk Approximate Test Statistic	0.905				**Shapiro Wilk GOF Test**		
357					10% Shapiro Wilk P Value	7.9884E-7				Data Not Lognormal at 10% Significance Level		
358					Lilliefors Test Statistic	0.111				**Lilliefors GOF Test**		
359					10% Lilliefors Critical Value	0.0886				Data Not Lognormal at 10% Significance Level		
360	**Data Not Lognormal at 10% Significance Level**											
361												
362	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
363					Mean in Original Scale	14.1					Mean in Log Scale	2.564
364					SD in Original Scale	5.184					SD in Log Scale	0.441

365				95% UTL95% Coverage		30.64				95% BCA UTL95% Coverage		24.7
366				95% Bootstrap (%) UTL95% Coverage		24.7				95% UPL (t)		27.15
367				90% Percentile (z)		22.85				95% Percentile (z)		26.83
368				99% Percentile (z)		36.23				95% USL		52.37
369												
370	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
371				KM Mean of Logged Data		2.55				95% KM UTL (Lognormal)95% Coverage		32.04
372				KM SD of Logged Data		0.471				95% KM UPL (Lognormal)		28.16
373				95% KM Percentile Lognormal (z)		27.8				95% KM USL (Lognormal)		56.82
374												
375	**Background DL/2 Statistics Assuming Lognormal Distribution**											
376				Mean in Original Scale		14.02				Mean in Log Scale		2.547
377				SD in Original Scale		5.329				SD in Log Scale		0.478
378				95% UTL95% Coverage		32.34				95% UPL (t)		28.38
379				90% Percentile (z)		23.55				95% Percentile (z)		28.01
380				99% Percentile (z)		38.79				95% USL		57.8
381	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
382												
383	**Nonparametric Distribution Free Background Statistics**											
384	**Data appear to follow a Discernible Distribution**											
385												
386	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
387				Order of Statistic, r		86				95% UTL with95% Coverage		26.3
388				Approx, f used to compute achieved CC		2.263				Approximate Actual Confidence Coefficient achieved by UTL		0.936
389				Approximate Sample Size needed to achieve specified CC		59				95% UPL		23.62
390				95% USL		26.3				95% KM Chebyshev UPL		37.14
391												
392	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
393	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
394	and consists of observations collected from clean unimpacted locations.											
395	The use of USL tends to provide a balance between false positives and false negatives provided the data											
396	represents a background data set and when many onsite observations need to be compared with the BTV.											
397												
398	**Hg**											
399												
400	**General Statistics**											
401				Total Number of Observations		87				Number of Missing Observations		0
402				Number of Distinct Observations		42						
403				Number of Detects		42				Number of Non-Detects		45
404				Number of Distinct Detects		35				Number of Distinct Non-Detects		12
405				Minimum Detect		0.017				Minimum Non-Detect		0.01
406				Maximum Detect		0.23				Maximum Non-Detect		0.2
407				Variance Detected		0.00316				Percent Non-Detects		51.72%
408				Mean Detected		0.0697				SD Detected		0.0562
409				Mean of Detected Logged Data		-2.926				SD of Detected Logged Data		0.71
410												
411	**Critical Values for Background Threshold Values (BTVs)**											
412				Tolerance Factor K (For UTL)		1.946				d2max (for USL)		3.161
413												
414	**Normal GOF Test on Detects Only**											
415				Shapiro Wilk Test Statistic		0.763				**Shapiro Wilk GOF Test**		
416				1% Shapiro Wilk Critical Value		0.922				Data Not Normal at 1% Significance Level		

417				Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**						
418				1% Lilliefors Critical Value	0.157	Data Not Normal at 1% Significance Level						
419	**Data Not Normal at 1% Significance Level**											
420												
421	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
422				KM Mean	0.0519	KM SD	0.0461					
423				95% UTL95% Coverage	0.142	95% KM UPL (t)	0.129					
424				90% KM Percentile (z)	0.111	95% KM Percentile (z)	0.128					
425				99% KM Percentile (z)	0.159	95% KM USL	0.198					
426												
427	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
428				Mean	0.0628	SD	0.0467					
429				95% UTL95% Coverage	0.154	95% UPL (t)	0.141					
430				90% Percentile (z)	0.123	95% Percentile (z)	0.14					
431				99% Percentile (z)	0.172	95% USL	0.211					
432	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
433												
434	**Gamma GOF Tests on Detected Observations Only**											
435				A-D Test Statistic	1.263	**Anderson-Darling GOF Test**						
436				5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level						
437				K-S Test Statistic	0.151	**Kolmogorov-Smirnov GOF**						
438				5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level						
439	**Data Not Gamma Distributed at 5% Significance Level**											
440												
441	**Gamma Statistics on Detected Data Only**											
442				k hat (MLE)	2.054	k star (bias corrected MLE)	1.923					
443				Theta hat (MLE)	0.0339	Theta star (bias corrected MLE)	0.0362					
444				nu hat (MLE)	172.6	nu star (bias corrected)	161.6					
445				MLE Mean (bias corrected)	0.0697							
446				MLE Sd (bias corrected)	0.0503	95% Percentile of Chisquare (2kstar)	9.238					
447												
448	**Gamma ROS Statistics using Imputed Non-Detects**											
449	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
450	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
451	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
452	This is especially true when the sample size is small.											
453	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
454				Minimum	0.01	Mean	0.0501					
455				Maximum	0.23	Median	0.035					
456				SD	0.0472	CV	0.943					
457				k hat (MLE)	1.533	k star (bias corrected MLE)	1.488					
458				Theta hat (MLE)	0.0327	Theta star (bias corrected MLE)	0.0337					
459				nu hat (MLE)	266.8	nu star (bias corrected)	258.9					
460				MLE Mean (bias corrected)	0.0501	MLE Sd (bias corrected)	0.0411					
461				95% Percentile of Chisquare (2kstar)	7.773	90% Percentile	0.105					
462				95% Percentile	0.131	99% Percentile	0.19					
463	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
464	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
465					WH	HW					WH	HW
466				95% Approx. Gamma UTL with 95% Coverage	0.152	0.157	95% Approx. Gamma UPL				0.13	0.132
467				95% Gamma USL	0.28	0.309						
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	**Estimates of Gamma Parameters using KM Estimates**											
470					Mean (KM)	0.0519				SD (KM)		0.0461
471					Variance (KM)	0.00213				SE of Mean (KM)		0.00548
472					k hat (KM)	1.265				k star (KM)		1.229
473					nu hat (KM)	220.1				nu star (KM)		213.9
474					theta hat (KM)	0.041				theta star (KM)		0.0422
475					80% gamma percentile (KM)	0.0819				90% gamma percentile (KM)		0.114
476					95% gamma percentile (KM)	0.145				99% gamma percentile (KM)		0.216
477												
478	**The following statistics are computed using gamma distribution and KM estimates**											
479	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
480					WH	HW					WH	HW
481				95% Approx. Gamma UTL with 95% Coverage	0.144	0.146				95% Approx. Gamma UPL	0.125	0.125
482				95% KM Gamma Percentile	0.123	0.123				95% Gamma USL	0.254	0.273
483												
484	**Lognormal GOF Test on Detected Observations Only**											
485					Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**					
486					10% Shapiro Wilk Critical Value	0.951	Data Not Lognormal at 10% Significance Level					
487					Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**					
488					10% Lilliefors Critical Value	0.124	Data Not Lognormal at 10% Significance Level					
489	**Data Not Lognormal at 10% Significance Level**											
490												
491	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
492					Mean in Original Scale	0.0512	Mean in Log Scale	-3.249				
493					SD in Original Scale	0.0453	SD in Log Scale	0.715				
494					95% UTL95% Coverage	0.156	95% BCA UTL95% Coverage	0.191				
495					95% Bootstrap (%) UTL95% Coverage	0.2	95% UPL (t)	0.128				
496					90% Percentile (z)	0.097	95% Percentile (z)	0.126				
497					99% Percentile (z)	0.205	95% USL	0.372				
498												
499	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
500					KM Mean of Logged Data	-3.245	95% KM UTL (Lognormal)95% Coverage	0.16				
501					KM SD of Logged Data	0.725	95% KM UPL (Lognormal)	0.131				
502					95% KM Percentile Lognormal (z)	0.128	95% KM USL (Lognormal)	0.385				
503												
504	**Background DL/2 Statistics Assuming Lognormal Distribution**											
505					Mean in Original Scale	0.0628	Mean in Log Scale	-3.034				
506					SD in Original Scale	0.0467	SD in Log Scale	0.764				
507					95% UTL95% Coverage	0.213	95% UPL (t)	0.173				
508					90% Percentile (z)	0.128	95% Percentile (z)	0.169				
509					99% Percentile (z)	0.285	95% USL	0.539				
510	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
511												
512	**Nonparametric Distribution Free Background Statistics**											
513	**Data do not follow a Discernible Distribution**											
514												
515	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
516					Order of Statistic, r	86	95% UTL with95% Coverage	0.23				
517					Approx, f used to compute achieved CC	2.263	Approximate Actual Confidence Coefficient achieved by UTL	0.936				
518				Approximate Sample Size needed to achieve specified CC		59	95% UPL	0.2				
519					95% USL	0.23	95% KM Chebyshev UPL	0.254				
520												

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

Mo

General Statistics

Total Number of Observations	31	Number of Missing Observations	55
Number of Distinct Observations	5		
Number of Detects	1	Number of Non-Detects	30
Number of Distinct Detects	1	Number of Distinct Non-Detects	4
Minimum Detect	3.7	Minimum Non-Detect	1
Maximum Detect	3.7	Maximum Non-Detect	10
Variance Detected	N/A	Percent Non-Detects	96.77%
Mean Detected	3.7	SD Detected	N/A
Mean of Detected Logged Data	1.308	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Mo was not processed!

Se

General Statistics

Total Number of Observations	87	Number of Missing Observations	0
Number of Distinct Observations	25		
Number of Detects	68	Number of Non-Detects	19
Number of Distinct Detects	24	Number of Distinct Non-Detects	3
Minimum Detect	0.3	Minimum Non-Detect	0.3
Maximum Detect	2	Maximum Non-Detect	2.5
Variance Detected	0.168	Percent Non-Detects	21.84%
Mean Detected	1.068	SD Detected	0.41
Mean of Detected Logged Data	-0.0347	SD of Detected Logged Data	0.496

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	1.946	d2max (for USL)	3.161

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.949	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0.0164	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.124	Data Not Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.965	KM SD	0.445
95% UTL95% Coverage	1.83	95% KM UPL (t)	1.708
90% KM Percentile (z)	1.535	95% KM Percentile (z)	1.696

573				99% KM Percentile (z)		1.999					95% KM USL	2.37
574												
575					DL/2 Substitution Background Statistics Assuming Normal Distribution							
576					Mean	0.967					SD	0.453
577				95% UTL95% Coverage		1.848					95% UPL (t)	1.724
578				90% Percentile (z)		1.547					95% Percentile (z)	1.711
579				99% Percentile (z)		2.02					95% USL	2.398
580					DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons							
581												
582					Gamma GOF Tests on Detected Observations Only							
583					A-D Test Statistic	2.418					Anderson-Darling GOF Test	
584					5% A-D Critical Value	0.754					Data Not Gamma Distributed at 5% Significance Level	
585					K-S Test Statistic	0.162					Kolmogorov-Smirnov GOF	
586					5% K-S Critical Value	0.108					Data Not Gamma Distributed at 5% Significance Level	
587					Data Not Gamma Distributed at 5% Significance Level							
588												
589					Gamma Statistics on Detected Data Only							
590					k hat (MLE)	5.154					k star (bias corrected MLE)	4.936
591					Theta hat (MLE)	0.207					Theta star (bias corrected MLE)	0.216
592					nu hat (MLE)	700.9					nu star (bias corrected)	671.4
593					MLE Mean (bias corrected)	1.068						
594					MLE Sd (bias corrected)	0.481					95% Percentile of Chisquare (2kstar)	18.13
595												
596					Gamma ROS Statistics using Imputed Non-Detects							
597					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
598					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
599					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
600					This is especially true when the sample size is small.							
601					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
602					Minimum	0.273					Mean	0.975
603					Maximum	2					Median	1
604					SD	0.423					CV	0.434
605					k hat (MLE)	4.411					k star (bias corrected MLE)	4.267
606					Theta hat (MLE)	0.221					Theta star (bias corrected MLE)	0.228
607					nu hat (MLE)	767.5					nu star (bias corrected)	742.4
608					MLE Mean (bias corrected)	0.975					MLE Sd (bias corrected)	0.472
609					95% Percentile of Chisquare (2kstar)	16.26					90% Percentile	1.607
610					95% Percentile	1.858					99% Percentile	2.391
611					The following statistics are computed using Gamma ROS Statistics on Imputed Data							
612					Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods							
613						WH	HW				WH	HW
614					95% Approx. Gamma UTL with 95% Coverage	2.073	2.135				95% Approx. Gamma UPL	1.869	1.91
615					95% Gamma USL	3.16	3.383						
616												
617					Estimates of Gamma Parameters using KM Estimates							
618					Mean (KM)	0.965					SD (KM)	0.445
619					Variance (KM)	0.198					SE of Mean (KM)	0.0505
620					k hat (KM)	4.712					k star (KM)	4.557
621					nu hat (KM)	819.8					nu star (KM)	792.9
622					theta hat (KM)	0.205					theta star (KM)	0.212
623					80% gamma percentile (KM)	1.311					90% gamma percentile (KM)	1.571
624					95% gamma percentile (KM)	1.808					99% gamma percentile (KM)	2.313

625												
626	**The following statistics are computed using gamma distribution and KM estimates**											
627	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
628					WH	HW					WH	HW
629				95% Approx. Gamma UTL with 95% Coverage	2.162	2.239				95% Approx. Gamma UPL	1.935	1.986
630				95% KM Gamma Percentile	1.913	1.962				95% Gamma USL	3.386	3.667
631												
632	**Lognormal GOF Test on Detected Observations Only**											
633				Shapiro Wilk Approximate Test Statistic		0.847	**Shapiro Wilk GOF Test**					
634				10% Shapiro Wilk P Value		2.2148E-9	Data Not Lognormal at 10% Significance Level					
635				Lilliefors Test Statistic		0.184	**Lilliefors GOF Test**					
636				10% Lilliefors Critical Value		0.0982	Data Not Lognormal at 10% Significance Level					
637	**Data Not Lognormal at 10% Significance Level**											
638												
639	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
640				Mean in Original Scale		0.963	Mean in Log Scale					-0.166
641				SD in Original Scale		0.434	SD in Log Scale					0.545
642				95% UTL95% Coverage		2.448	95% BCA UTL95% Coverage					1.67
643				95% Bootstrap (%) UTL95% Coverage		1.7	95% UPL (t)					2.109
644				90% Percentile (z)		1.704	95% Percentile (z)					2.078
645				99% Percentile (z)		3.013	95% USL					4.75
646												
647	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
648				KM Mean of Logged Data		-0.177	95% KM UTL (Lognormal)95% Coverage					2.577
649				KM SD of Logged Data		0.578	95% KM UPL (Lognormal)					2.2
650				95% KM Percentile Lognormal (z)		2.165	95% KM USL (Lognormal)					5.199
651												
652	**Background DL/2 Statistics Assuming Lognormal Distribution**											
653				Mean in Original Scale		0.967	Mean in Log Scale					-0.195
654				SD in Original Scale		0.453	SD in Log Scale					0.646
655				95% UTL95% Coverage		2.89	95% UPL (t)					2.422
656				90% Percentile (z)		1.882	95% Percentile (z)					2.379
657				99% Percentile (z)		3.694	95% USL					6.334
658	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
659												
660	**Nonparametric Distribution Free Background Statistics**											
661	**Data appear to follow a Discernible Distribution**											
662												
663	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
664				Order of Statistic, r		86	95% UTL with95% Coverage					2.5
665				Approx, f used to compute achieved CC		2.263	Approximate Actual Confidence Coefficient achieved by UTL					0.936
666				Approximate Sample Size needed to achieve specified CC		59	95% UPL					2.5
667				95% USL		2.5	95% KM Chebyshev UPL					2.914
668												
669	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
670	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
671	and consists of observations collected from clean unimpacted locations.											
672	The use of USL tends to provide a balance between false positives and false negatives provided the data											
673	represents a background data set and when many onsite observations need to be compared with the BTV.											
674												
675	Ag											
676												

677	**General Statistics**											
678					Total Number of Observations	87				Number of Missing Observations	0	
679					Number of Distinct Observations	35						
680					Number of Detects	42				Number of Non-Detects	45	
681					Number of Distinct Detects	33				Number of Distinct Non-Detects	5	
682					Minimum Detect	0.13				Minimum Non-Detect	1	
683					Maximum Detect	1.3				Maximum Non-Detect	2.5	
684					Variance Detected	0.0633				Percent Non-Detects	51.72%	
685					Mean Detected	0.683				SD Detected	0.252	
686					Mean of Detected Logged Data	-0.468				SD of Detected Logged Data	0.466	
687												
688	**Critical Values for Background Threshold Values (BTVs)**											
689					Tolerance Factor K (For UTL)	1.946				d2max (for USL)	3.161	
690												
691	**Normal GOF Test on Detects Only**											
692					Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**					
693					1% Shapiro Wilk Critical Value	0.922	Detected Data appear Normal at 1% Significance Level					
694					Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**					
695					1% Lilliefors Critical Value	0.157	Detected Data appear Normal at 1% Significance Level					
696	**Detected Data appear Normal at 1% Significance Level**											
697												
698	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
699					KM Mean	0.667				KM SD	0.237	
700					95% UTL95% Coverage	1.129				95% KM UPL (t)	1.064	
701					90% KM Percentile (z)	0.971				95% KM Percentile (z)	1.057	
702					99% KM Percentile (z)	1.219				95% KM USL	1.417	
703												
704	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
705					Mean	0.824				SD	0.335	
706					95% UTL95% Coverage	1.476				95% UPL (t)	1.384	
707					90% Percentile (z)	1.253				95% Percentile (z)	1.375	
708					99% Percentile (z)	1.603				95% USL	1.883	
709	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
710												
711	**Gamma GOF Tests on Detected Observations Only**											
712					A-D Test Statistic	0.738	**Anderson-Darling GOF Test**					
713					5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level					
714					K-S Test Statistic	0.123	**Kolmogorov-Smirnov GOF**					
715					5% K-S Critical Value	0.137	Detected data appear Gamma Distributed at 5% Significance Level					
716	**Detected data appear Gamma Distributed at 5% Significance Level**											
717												
718	**Gamma Statistics on Detected Data Only**											
719					k hat (MLE)	5.936				k star (bias corrected MLE)	5.528	
720					Theta hat (MLE)	0.115				Theta star (bias corrected MLE)	0.123	
721					nu hat (MLE)	498.7				nu star (bias corrected)	464.4	
722					MLE Mean (bias corrected)	0.683						
723					MLE Sd (bias corrected)	0.29				95% Percentile of Chisquare (2kstar)	19.75	
724												
725	**Gamma ROS Statistics using Imputed Non-Detects**											
726	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
727	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
728	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

	A	B	C	D	E	F	G	H	I	J	K	L
729	This is especially true when the sample size is small.											
730	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
731					Minimum	0.13				Mean		0.663
732					Maximum	1.3				Median		0.645
733					SD	0.22				CV		0.332
734					k hat (MLE)	8.021				k star (bias corrected MLE)		7.752
735					Theta hat (MLE)	0.0826				Theta star (bias corrected MLE)		0.0855
736					nu hat (MLE)	1396				nu star (bias corrected)		1349
737					MLE Mean (bias corrected)	0.663				MLE Sd (bias corrected)		0.238
738					95% Percentile of Chisquare (2kstar)	25.65				90% Percentile		0.98
739					95% Percentile	1.097				99% Percentile		1.338
740	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
741	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
742					WH	HW				WH		HW
743				95% Approx. Gamma UTL with 95% Coverage	1.192	1.215			95% Approx. Gamma UPL	1.1		1.116
744				95% Gamma USL	1.666	1.741						
745												
746	**Estimates of Gamma Parameters using KM Estimates**											
747					Mean (KM)	0.667				SD (KM)		0.237
748					Variance (KM)	0.0563				SE of Mean (KM)		0.0357
749					k hat (KM)	7.903				k star (KM)		7.638
750					nu hat (KM)	1375				nu star (KM)		1329
751					theta hat (KM)	0.0844				theta star (KM)		0.0873
752					80% gamma percentile (KM)	0.857				90% gamma percentile (KM)		0.989
753					95% gamma percentile (KM)	1.107				99% gamma percentile (KM)		1.352
754												
755	**The following statistics are computed using gamma distribution and KM estimates**											
756	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
757					WH	HW				WH		HW
758				95% Approx. Gamma UTL with 95% Coverage	1.283	1.32			95% Approx. Gamma UPL	1.173		1.199
759				95% KM Gamma Percentile	1.162	1.187			95% Gamma USL	1.856		1.973
760												
761	**Lognormal GOF Test on Detected Observations Only**											
762					Shapiro Wilk Test Statistic	0.849			**Shapiro Wilk GOF Test**			
763					10% Shapiro Wilk Critical Value	0.951			Data Not Lognormal at 10% Significance Level			
764					Lilliefors Test Statistic	0.154			**Lilliefors GOF Test**			
765					10% Lilliefors Critical Value	0.124			Data Not Lognormal at 10% Significance Level			
766	**Data Not Lognormal at 10% Significance Level**											
767												
768	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
769					Mean in Original Scale	0.656				Mean in Log Scale		-0.495
770					SD in Original Scale	0.237				SD in Log Scale		0.407
771					95% UTL95% Coverage	1.347				95% BCA UTL95% Coverage		1.118
772					95% Bootstrap (%) UTL95% Coverage	1.24				95% UPL (t)		1.205
773					90% Percentile (z)	1.028				95% Percentile (z)		1.192
774					99% Percentile (z)	1.573				95% USL		2.211
775												
776	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
777					KM Mean of Logged Data	-0.489				95% KM UTL (Lognormal)95% Coverage		1.486
778					KM SD of Logged Data	0.455				95% KM UPL (Lognormal)		1.312
779					95% KM Percentile Lognormal (z)	1.296				95% KM USL (Lognormal)		2.583
780												

781	**Background DL/2 Statistics Assuming Lognormal Distribution**											
782					Mean in Original Scale	0.824				Mean in Log Scale	-0.29	
783					SD in Original Scale	0.335				SD in Log Scale	0.472	
784					95% UTL95% Coverage	1.875				95% UPL (t)	1.648	
785					90% Percentile (z)	1.37				95% Percentile (z)	1.627	
786					99% Percentile (z)	2.244				95% USL	3.328	
787	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
788												
789	**Nonparametric Distribution Free Background Statistics**											
790	**Data appear to follow a Discernible Distribution**											
791												
792	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
793					Order of Statistic, r	86				95% UTL with95% Coverage	2.5	
794					Approx, f used to compute achieved CC	2.263				Approximate Actual Confidence Coefficient achieved by UTL	0.936	
795					Approximate Sample Size needed to achieve specified CC	59				95% UPL	2.5	
796					95% USL	2.5				95% KM Chebyshev UPL	1.707	
797												
798	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
799	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
800	and consists of observations collected from clean unimpacted locations.											
801	The use of USL tends to provide a balance between false positives and false negatives provided the data											
802	represents a background data set and when many onsite observations need to be compared with the BTV.											
803												

	Background Statistics for Data Sets with Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 8/11/2023 10:42:07 AM	
From File	11 Background, Mineralized, All Data.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Coverage	95%	
Different or Future K Observations	1	
Number of Bootstrap Operations	2000	

As

General Statistics

Total Number of Observations	65	Number of Missing Observations	2
Number of Distinct Observations	59		
Number of Detects	63	Number of Non-Detects	2
Number of Distinct Detects	58	Number of Distinct Non-Detects	1
Minimum Detect	5.4	Minimum Non-Detect	2
Maximum Detect	1300	Maximum Non-Detect	2
Variance Detected	57936	Percent Non-Detects	3.077%
Mean Detected	155.9	SD Detected	240.7
Mean of Detected Logged Data	4.301	SD of Detected Logged Data	1.173

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2	d2max (for USL)	3.057

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.611	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.129	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	151.2	KM SD	236.6
95% UTL95% Coverage	624.3	95% KM UPL (t)	549
90% KM Percentile (z)	454.3	95% KM Percentile (z)	540.3
99% KM Percentile (z)	701.5	95% KM USL	874.3

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	151.1	SD	238.4
95% UTL95% Coverage	628	95% UPL (t)	552.1
90% Percentile (z)	456.7	95% Percentile (z)	543.3
99% Percentile (z)	705.8	95% USL	880

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.066	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.79	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

53												
54	**Gamma Statistics on Detected Data Only**											
55					k hat (MLE)	0.794			k star (bias corrected MLE)	0.767		
56					Theta hat (MLE)	196.4			Theta star (bias corrected MLE)	203.3		
57					nu hat (MLE)	100			nu star (bias corrected)	96.59		
58					MLE Mean (bias corrected)	155.9						
59					MLE Sd (bias corrected)	178			95% Percentile of Chisquare (2kstar)	5.051		
60												
61	**Gamma ROS Statistics using Imputed Non-Detects**											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
63	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
64	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
65	This is especially true when the sample size is small.											
66	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
67					Minimum	0.01			Mean	151.1		
68					Maximum	1300			Median	59		
69					SD	238.5			CV	1.578		
70					k hat (MLE)	0.62			k star (bias corrected MLE)	0.602		
71					Theta hat (MLE)	243.6			Theta star (bias corrected MLE)	251		
72					nu hat (MLE)	80.64			nu star (bias corrected)	78.26		
73					MLE Mean (bias corrected)	151.1			MLE Sd (bias corrected)	194.7		
74					95% Percentile of Chisquare (2kstar)	4.327			90% Percentile	392.7		
75					95% Percentile	543			99% Percentile	906.6		
76	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
77	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
78						WH	HW			WH	HW	
79					95% Approx. Gamma UTL with 95% Coverage	630.7	685		95% Approx. Gamma UPL	495.4	520.2	
80					95% Gamma USL	1252	1521					
81												
82	**Estimates of Gamma Parameters using KM Estimates**											
83					Mean (KM)	151.2			SD (KM)	236.6		
84					Variance (KM)	55968			SE of Mean (KM)	29.58		
85					k hat (KM)	0.408			k star (KM)	0.4		
86					nu hat (KM)	53.07			nu star (KM)	51.95		
87					theta hat (KM)	370.3			theta star (KM)	378.2		
88					80% gamma percentile (KM)	243.9			90% gamma percentile (KM)	427		
89					95% gamma percentile (KM)	628.2			99% gamma percentile (KM)	1134		
90												
91	**The following statistics are computed using gamma distribution and KM estimates**											
92	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
93						WH	HW			WH	HW	
94					95% Approx. Gamma UTL with 95% Coverage	605.4	629.8		95% Approx. Gamma UPL	478.2	484.1	
95					95% KM Gamma Percentile	464.7	469		95% Gamma USL	1185	1356	
96												
97	**Lognormal GOF Test on Detected Observations Only**											
98					Shapiro Wilk Approximate Test Statistic	0.963			**Shapiro Wilk GOF Test**			
99					10% Shapiro Wilk P Value	0.134			Detected Data appear Lognormal at 10% Significance Level			
100					Lilliefors Test Statistic	0.119			**Lilliefors GOF Test**			
101					10% Lilliefors Critical Value	0.102			Data Not Lognormal at 10% Significance Level			
102	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
103												
104	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											

105				Mean in Original Scale	151.2					Mean in Log Scale	4.211	
106				SD in Original Scale	238.4					SD in Log Scale	1.261	
107				95% UTL95% Coverage	839.9					95% BCA UTL95% Coverage	912	
108				95% Bootstrap (%) UTL95% Coverage	950					95% UPL (t)	562.3	
109				90% Percentile (z)	339.4					95% Percentile (z)	536.7	
110				99% Percentile (z)	1267					95% USL	3183	
111												
112				**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**								
113				KM Mean of Logged Data	4.19					95% KM UTL (Lognormal)95% Coverage	896	
114				KM SD of Logged Data	1.304					95% KM UPL (Lognormal)	591.6	
115				95% KM Percentile Lognormal (z)	563.8					95% KM USL (Lognormal)	3554	
116												
117				**Background DL/2 Statistics Assuming Lognormal Distribution**								
118				Mean in Original Scale	151.1					Mean in Log Scale	4.168	
119				SD in Original Scale	238.4					SD in Log Scale	1.376	
120				95% UTL95% Coverage	1013					95% UPL (t)	653.6	
121				90% Percentile (z)	376.8					95% Percentile (z)	621.2	
122				99% Percentile (z)	1586					95% USL	4334	
123				**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**								
124												
125				**Nonparametric Distribution Free Background Statistics**								
126				**Data appear to follow a Discernible Distribution**								
127												
128				**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**								
129				Order of Statistic, r	64					95% UTL with95% Coverage	1300	
130				Approx, f used to compute achieved CC	1.684					Approximate Actual Confidence Coefficient achieved by UTL	0.842	
131				Approximate Sample Size needed to achieve specified CC	59					95% UPL	718	
132				95% USL	1300					95% KM Chebyshev UPL	1190	
133												
134				Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.								
135				Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers								
136				and consists of observations collected from clean unimpacted locations.								
137				The use of USL tends to provide a balance between false positives and false negatives provided the data								
138				represents a background data set and when many onsite observations need to be compared with the BTV.								
139												
140	**Cd**											
141												
142				**General Statistics**								
143				Total Number of Observations	16					Number of Missing Observations	50	
144				Number of Distinct Observations	15							
145				Number of Detects	10					Number of Non-Detects	6	
146				Number of Distinct Detects	10					Number of Distinct Non-Detects	5	
147				Minimum Detect	0.37					Minimum Non-Detect	0.26	
148				Maximum Detect	6.6					Maximum Non-Detect	0.43	
149				Variance Detected	6.387					Percent Non-Detects	37.5%	
150				Mean Detected	3.324					SD Detected	2.527	
151				Mean of Detected Logged Data	0.757					SD of Detected Logged Data	1.139	
152												
153				**Critical Values for Background Threshold Values (BTVs)**								
154				Tolerance Factor K (For UTL)	2.524					d2max (for USL)	2.443	
155												
156				**Normal GOF Test on Detects Only**								

157				Shapiro Wilk Test Statistic		0.869	**Shapiro Wilk GOF Test**					
158				1% Shapiro Wilk Critical Value		0.781	Detected Data appear Normal at 1% Significance Level					
159				Lilliefors Test Statistic		0.194	**Lilliefors GOF Test**					
160				1% Lilliefors Critical Value		0.304	Detected Data appear Normal at 1% Significance Level					
161	**Detected Data appear Normal at 1% Significance Level**											
162												
163	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
164				KM Mean		2.176	KM SD					2.406
165				95% UTL95% Coverage		8.249	95% KM UPL (t)					6.524
166				90% KM Percentile (z)		5.259	95% KM Percentile (z)					6.134
167				99% KM Percentile (z)		7.773	95% KM USL					8.055
168												
169	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
170				Mean		2.139	SD					2.515
171				95% UTL95% Coverage		8.488	95% UPL (t)					6.685
172				90% Percentile (z)		5.363	95% Percentile (z)					6.277
173				99% Percentile (z)		7.991	95% USL					8.285
174	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
175												
176	**Gamma GOF Tests on Detected Observations Only**											
177				A-D Test Statistic		0.63	**Anderson-Darling GOF Test**					
178				5% A-D Critical Value		0.743	Detected data appear Gamma Distributed at 5% Significance Level					
179				K-S Test Statistic		0.211	**Kolmogorov-Smirnov GOF**					
180				5% K-S Critical Value		0.272	Detected data appear Gamma Distributed at 5% Significance Level					
181	**Detected data appear Gamma Distributed at 5% Significance Level**											
182												
183	**Gamma Statistics on Detected Data Only**											
184				k hat (MLE)		1.267	k star (bias corrected MLE)					0.953
185				Theta hat (MLE)		2.624	Theta star (bias corrected MLE)					3.486
186				nu hat (MLE)		25.34	nu star (bias corrected)					19.07
187				MLE Mean (bias corrected)		3.324						
188				MLE Sd (bias corrected)		3.404	95% Percentile of Chisquare (2kstar)					5.81
189												
190	**Gamma ROS Statistics using Imputed Non-Detects**											
191	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
192	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
193	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
194	This is especially true when the sample size is small.											
195	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
196				Minimum		0.01	Mean					2.081
197				Maximum		6.6	Median					0.535
198				SD		2.565	CV					1.232
199				k hat (MLE)		0.34	k star (bias corrected MLE)					0.318
200				Theta hat (MLE)		6.12	Theta star (bias corrected MLE)					6.545
201				nu hat (MLE)		10.88	nu star (bias corrected)					10.18
202				MLE Mean (bias corrected)		2.081	MLE Sd (bias corrected)					3.691
203				95% Percentile of Chisquare (2kstar)		2.855	90% Percentile					6.093
204				95% Percentile		9.343	99% Percentile					17.73
205	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
206	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
207					WH	HW					WH	HW
208	95% Approx. Gamma UTL with 95% Coverage				18.58	25.35	95% Approx. Gamma UPL				10.1	12.03

209				95% Gamma USL	17.45	23.47					
210											
211	**Estimates of Gamma Parameters using KM Estimates**										
212				Mean (KM)	2.176				SD (KM)	2.406	
213				Variance (KM)	5.789				SE of Mean (KM)	0.634	
214				k hat (KM)	0.818				k star (KM)	0.706	
215				nu hat (KM)	26.18				nu star (KM)	22.6	
216				theta hat (KM)	2.66				theta star (KM)	3.081	
217				80% gamma percentile (KM)	3.576				90% gamma percentile (KM)	5.451	
218				95% gamma percentile (KM)	7.383				99% gamma percentile (KM)	11.99	
219											
220	**The following statistics are computed using gamma distribution and KM estimates**										
221	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**										
222					WH	HW				WH	HW
223				95% Approx. Gamma UTL with 95% Coverage	12.87	14.55			95% Approx. Gamma UPL	7.867	8.288
224				95% KM Gamma Percentile	6.953	7.212			95% Gamma USL	12.23	13.71
225											
226	**Lognormal GOF Test on Detected Observations Only**										
227				Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**					
228				10% Shapiro Wilk Critical Value	0.869	Data Not Lognormal at 10% Significance Level					
229				Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**					
230				10% Lilliefors Critical Value	0.241	Detected Data appear Lognormal at 10% Significance Level					
231	**Detected Data appear Approximate Lognormal at 10% Significance Level**										
232											
233	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**										
234				Mean in Original Scale	2.137				Mean in Log Scale	-0.228	
235				SD in Original Scale	2.517				SD in Log Scale	1.591	
236				95% UTL95% Coverage	44.2				95% BCA UTL95% Coverage	6.6	
237				95% Bootstrap (%) UTL95% Coverage	6.6				95% UPL (t)	14.12	
238				90% Percentile (z)	6.119				95% Percentile (z)	10.91	
239				99% Percentile (z)	32.27				95% USL	38.87	
240											
241	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**										
242				KM Mean of Logged Data	-0.0282				95% KM UTL (Lognormal)95% Coverage	27.66	
243				KM SD of Logged Data	1.326				95% KM UPL (Lognormal)	10.68	
244				95% KM Percentile Lognormal (z)	8.616				95% KM USL (Lognormal)	24.85	
245											
246	**Background DL/2 Statistics Assuming Lognormal Distribution**										
247				Mean in Original Scale	2.139				Mean in Log Scale	-0.207	
248				SD in Original Scale	2.515				SD in Log Scale	1.563	
249				95% UTL95% Coverage	41.98				95% UPL (t)	13.69	
250				90% Percentile (z)	6.023				95% Percentile (z)	10.63	
251				99% Percentile (z)	30.82				95% USL	37	
252	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**										
253											
254	**Nonparametric Distribution Free Background Statistics**										
255	**Data appear to follow a Discernible Distribution**										
256											
257	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**										
258				Order of Statistic, r	16				95% UTL with95% Coverage	6.6	
259				Approx, f used to compute achieved CC	0.842				Approximate Actual Confidence Coefficient achieved by UTL	0.56	
260				Approximate Sample Size needed to achieve specified CC	59				95% UPL	6.6	

261				95% USL	6.6				95% KM Chebyshev UPL	12.99		
262												
263	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
264	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
265	and consists of observations collected from clean unimpacted locations.											
266	The use of USL tends to provide a balance between false positives and false negatives provided the data											
267	represents a background data set and when many onsite observations need to be compared with the BTV.											
268												
269	**Pb**											
270												
271	**General Statistics**											
272				Total Number of Observations	17				Number of Missing Observations	49		
273				Number of Distinct Observations	17							
274				Number of Detects	14				Number of Non-Detects	3		
275				Number of Distinct Detects	14				Number of Distinct Non-Detects	3		
276				Minimum Detect	3.6				Minimum Non-Detect	2.5		
277				Maximum Detect	360				Maximum Non-Detect	7.5		
278				Variance Detected	8623				Percent Non-Detects	17.65%		
279				Mean Detected	37.79				SD Detected	92.86		
280				Mean of Detected Logged Data	2.717				SD of Detected Logged Data	1.026		
281												
282	**Critical Values for Background Threshold Values (BTVs)**											
283				Tolerance Factor K (For UTL)	2.486				d2max (for USL)	2.475		
284												
285	**Normal GOF Test on Detects Only**											
286				Shapiro Wilk Test Statistic	0.345				**Shapiro Wilk GOF Test**			
287				1% Shapiro Wilk Critical Value	0.825				Data Not Normal at 1% Significance Level			
288				Lilliefors Test Statistic	0.505				**Lilliefors GOF Test**			
289				1% Lilliefors Critical Value	0.263				Data Not Normal at 1% Significance Level			
290	**Data Not Normal at 1% Significance Level**											
291												
292	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
293				KM Mean	31.78				KM SD	82.24		
294				95% UTL95% Coverage	236.2				95% KM UPL (t)	179.5		
295				90% KM Percentile (z)	137.2				95% KM Percentile (z)	167.1		
296				99% KM Percentile (z)	223.1				95% KM USL	235.3		
297												
298	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
299				Mean	31.64				SD	84.82		
300				95% UTL95% Coverage	242.5				95% UPL (t)	184		
301				90% Percentile (z)	140.3				95% Percentile (z)	171.2		
302				99% Percentile (z)	229				95% USL	241.6		
303	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
304												
305	**Gamma GOF Tests on Detected Observations Only**											
306				A-D Test Statistic	2.799				**Anderson-Darling GOF Test**			
307				5% A-D Critical Value	0.778				Data Not Gamma Distributed at 5% Significance Level			
308				K-S Test Statistic	0.445				**Kolmogorov-Smirnov GOF**			
309				5% K-S Critical Value	0.239				Data Not Gamma Distributed at 5% Significance Level			
310	**Data Not Gamma Distributed at 5% Significance Level**											
311												
312	**Gamma Statistics on Detected Data Only**											

313					k hat (MLE)	0.665				k star (bias corrected MLE)		0.57
314					Theta hat (MLE)	56.8				Theta star (bias corrected MLE)		66.25
315					nu hat (MLE)	18.63				nu star (bias corrected)		15.97
316					MLE Mean (bias corrected)	37.79						
317					MLE Sd (bias corrected)	50.04				95% Percentile of Chisquare (2kstar)		4.181
318												
319	**Gamma ROS Statistics using Imputed Non-Detects**											
320	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
321	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
322	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
323	This is especially true when the sample size is small.											
324	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
325					Minimum	0.01				Mean		31.13
326					Maximum	360				Median		12.7
327					SD	85.01				CV		2.731
328					k hat (MLE)	0.336				k star (bias corrected MLE)		0.316
329					Theta hat (MLE)	92.56				Theta star (bias corrected MLE)		98.46
330					nu hat (MLE)	11.43				nu star (bias corrected)		10.75
331					MLE Mean (bias corrected)	31.13				MLE Sd (bias corrected)		55.36
332					95% Percentile of Chisquare (2kstar)	2.844				90% Percentile		91.2
333					95% Percentile	140				99% Percentile		266
334	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
335	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
336						WH	HW				WH	HW
337					95% Approx. Gamma UTL with 95% Coverage	219	266.3			95% Approx. Gamma UPL	122.9	134
338					95% Gamma USL	217.2	263.6					
339												
340	**Estimates of Gamma Parameters using KM Estimates**											
341					Mean (KM)	31.78				SD (KM)		82.24
342					Variance (KM)	6764				SE of Mean (KM)		20.7
343					k hat (KM)	0.149				k star (KM)		0.162
344					nu hat (KM)	5.076				nu star (KM)		5.513
345					theta hat (KM)	212.9				theta star (KM)		196
346					80% gamma percentile (KM)	36.74				90% gamma percentile (KM)		95.1
347					95% gamma percentile (KM)	172.1				99% gamma percentile (KM)		392.2
348												
349	**The following statistics are computed using gamma distribution and KM estimates**											
350	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
351						WH	HW				WH	HW
352					95% Approx. Gamma UTL with 95% Coverage	169.7	163.7			95% Approx. Gamma UPL	102.5	94.65
353					95% KM Gamma Percentile	90.64	83			95% Gamma USL	168.4	162.4
354												
355	**Lognormal GOF Test on Detected Observations Only**											
356					Shapiro Wilk Test Statistic	0.734				**Shapiro Wilk GOF Test**		
357					10% Shapiro Wilk Critical Value	0.895				Data Not Lognormal at 10% Significance Level		
358					Lilliefors Test Statistic	0.322				**Lilliefors GOF Test**		
359					10% Lilliefors Critical Value	0.208				Data Not Lognormal at 10% Significance Level		
360	**Data Not Lognormal at 10% Significance Level**											
361												
362	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
363					Mean in Original Scale	31.61				Mean in Log Scale		2.409
364					SD in Original Scale	84.83				SD in Log Scale		1.16

365				95% UTL95% Coverage		198.8					95% BCA UTL95% Coverage	360
366				95% Bootstrap (%) UTL95% Coverage		360					95% UPL (t)	89.36
367				90% Percentile (z)		49.18					95% Percentile (z)	74.95
368				99% Percentile (z)		165.2					95% USL	196.2
369												
370	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
371				KM Mean of Logged Data		2.453					95% KM UTL (Lognormal)95% Coverage	168.8
372				KM SD of Logged Data		1.076					95% KM UPL (Lognormal)	80.37
373				95% KM Percentile Lognormal (z)		68.26					95% KM USL (Lognormal)	166.8
374												
375	**Background DL/2 Statistics Assuming Lognormal Distribution**											
376				Mean in Original Scale		31.64					Mean in Log Scale	2.406
377				SD in Original Scale		84.82					SD in Log Scale	1.177
378				95% UTL95% Coverage		206.9					95% UPL (t)	91.88
379				90% Percentile (z)		50.11					95% Percentile (z)	76.86
380				99% Percentile (z)		171.4					95% USL	204.2
381	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
382												
383	**Nonparametric Distribution Free Background Statistics**											
384	**Data do not follow a Discernible Distribution**											
385												
386	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
387				Order of Statistic, r		17					95% UTL with95% Coverage	360
388				Approx, f used to compute achieved CC		0.895					Approximate Actual Confidence Coefficient achieved by UTL	0.582
389				Approximate Sample Size needed to achieve specified CC		59					95% UPL	360
390				95% USL		360					95% KM Chebyshev UPL	400.7
391												
392	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
393	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
394	and consists of observations collected from clean unimpacted locations.											
395	The use of USL tends to provide a balance between false positives and false negatives provided the data											
396	represents a background data set and when many onsite observations need to be compared with the BTV.											
397												
398	**Hg**											
399												
400	**General Statistics**											
401				Total Number of Observations		17					Number of Missing Observations	49
402				Number of Distinct Observations		11						
403				Number of Detects		6					Number of Non-Detects	11
404				Number of Distinct Detects		6					Number of Distinct Non-Detects	5
405				Minimum Detect		0.13					Minimum Non-Detect	0.04
406				Maximum Detect		0.3					Maximum Non-Detect	0.2
407				Variance Detected		0.00395					Percent Non-Detects	64.71%
408				Mean Detected		0.205					SD Detected	0.0628
409				Mean of Detected Logged Data		-1.626					SD of Detected Logged Data	0.318
410												
411	**Critical Values for Background Threshold Values (BTVs)**											
412				Tolerance Factor K (For UTL)		2.486					d2max (for USL)	2.475
413												
414	**Normal GOF Test on Detects Only**											
415				Shapiro Wilk Test Statistic		0.929	**Shapiro Wilk GOF Test**					
416				1% Shapiro Wilk Critical Value		0.713	Detected Data appear Normal at 1% Significance Level					

417				Lilliefors Test Statistic		0.198	**Lilliefors GOF Test**					
418				1% Lilliefors Critical Value		0.373	Detected Data appear Normal at 1% Significance Level					
419	**Detected Data appear Normal at 1% Significance Level**											
420												
421	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
422				KM Mean		0.102				KM SD		0.0854
423				95% UTL95% Coverage		0.314				95% KM UPL (t)		0.255
424				90% KM Percentile (z)		0.211				95% KM Percentile (z)		0.242
425				99% KM Percentile (z)		0.3				95% KM USL		0.313
426												
427	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
428				Mean		0.106				SD		0.0868
429				95% UTL95% Coverage		0.322				95% UPL (t)		0.262
430				90% Percentile (z)		0.218				95% Percentile (z)		0.249
431				99% Percentile (z)		0.308				95% USL		0.321
432	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
433												
434	**Gamma GOF Tests on Detected Observations Only**											
435				A-D Test Statistic		0.363	**Anderson-Darling GOF Test**					
436				5% A-D Critical Value		0.698	Detected data appear Gamma Distributed at 5% Significance Level					
437				K-S Test Statistic		0.238	**Kolmogorov-Smirnov GOF**					
438				5% K-S Critical Value		0.332	Detected data appear Gamma Distributed at 5% Significance Level					
439	**Detected data appear Gamma Distributed at 5% Significance Level**											
440												
441	**Gamma Statistics on Detected Data Only**											
442				k hat (MLE)		12.35				k star (bias corrected MLE)		6.284
443				Theta hat (MLE)		0.0166				Theta star (bias corrected MLE)		0.0326
444				nu hat (MLE)		148.1				nu star (bias corrected)		75.41
445				MLE Mean (bias corrected)		0.205						
446				MLE Sd (bias corrected)		0.0818				95% Percentile of Chisquare (2kstar)		21.79
447												
448	**Gamma ROS Statistics using Imputed Non-Detects**											
449	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
450	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
451	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
452	This is especially true when the sample size is small.											
453	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
454				Minimum		0.01				Mean		0.0998
455				Maximum		0.3				Median		0.0739
456				SD		0.0908				CV		0.91
457				k hat (MLE)		1.139				k star (bias corrected MLE)		0.977
458				Theta hat (MLE)		0.0876				Theta star (bias corrected MLE)		0.102
459				nu hat (MLE)		38.72				nu star (bias corrected)		33.22
460				MLE Mean (bias corrected)		0.0998				MLE Sd (bias corrected)		0.101
461				95% Percentile of Chisquare (2kstar)		5.903				90% Percentile		0.231
462				95% Percentile		0.301				99% Percentile		0.465
463	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
464	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
465					WH	HW					WH	HW
466				95% Approx. Gamma UTL with 95% Coverage	0.488	0.548				95% Approx. Gamma UPL	0.321	0.341
467				95% Gamma USL	0.485	0.544						
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	**Estimates of Gamma Parameters using KM Estimates**											
470					Mean (KM)	0.102				SD (KM)		0.0854
471					Variance (KM)	0.0073				SE of Mean (KM)		0.0232
472					k hat (KM)	1.414				k star (KM)		1.204
473					nu hat (KM)	48.09				nu star (KM)		40.93
474					theta hat (KM)	0.0718				theta star (KM)		0.0844
475					80% gamma percentile (KM)	0.161				90% gamma percentile (KM)		0.223
476					95% gamma percentile (KM)	0.285				99% gamma percentile (KM)		0.427
477												
478	**The following statistics are computed using gamma distribution and KM estimates**											
479	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
480					WH	HW					WH	HW
481				95% Approx. Gamma UTL with 95% Coverage	0.393	0.414				95% Approx. Gamma UPL	0.274	0.279
482				95% KM Gamma Percentile	0.252	0.254				95% Gamma USL	0.391	0.411
483												
484	**Lognormal GOF Test on Detected Observations Only**											
485					Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**					
486					10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level					
487					Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**					
488					10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level					
489	**Detected Data appear Lognormal at 10% Significance Level**											
490												
491	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
492					Mean in Original Scale	0.122				Mean in Log Scale		-2.251
493					SD in Original Scale	0.0738				SD in Log Scale		0.547
494					95% UTL95% Coverage	0.41				95% BCA UTL95% Coverage		0.3
495					95% Bootstrap (%) UTL95% Coverage	0.3				95% UPL (t)		0.281
496					90% Percentile (z)	0.212				95% Percentile (z)		0.259
497					99% Percentile (z)	0.376				95% USL		0.408
498												
499	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
500					KM Mean of Logged Data	-2.614				95% KM UTL (Lognormal)95% Coverage		0.512
501					KM SD of Logged Data	0.782				95% KM UPL (Lognormal)		0.299
502					95% KM Percentile Lognormal (z)	0.265				95% KM USL (Lognormal)		0.507
503												
504	**Background DL/2 Statistics Assuming Lognormal Distribution**											
505					Mean in Original Scale	0.106				Mean in Log Scale		-2.599
506					SD in Original Scale	0.0868				SD in Log Scale		0.92
507					95% UTL95% Coverage	0.732				95% UPL (t)		0.388
508					90% Percentile (z)	0.242				95% Percentile (z)		0.338
509					99% Percentile (z)	0.632				95% USL		0.725
510	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
511												
512	**Nonparametric Distribution Free Background Statistics**											
513	**Data appear to follow a Discernible Distribution**											
514												
515	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
516					Order of Statistic, r	17				95% UTL with95% Coverage		0.3
517					Approx, f used to compute achieved CC	0.895	Approximate Actual Confidence Coefficient achieved by UTL					0.582
518				Approximate Sample Size needed to achieve specified CC		59				95% UPL		0.3
519					95% USL	0.3				95% KM Chebyshev UPL		0.485
520												

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

Mo

General Statistics

Total Number of Observations	7	Number of Missing Observations	59
Number of Distinct Observations	3		
Number of Detects	1	Number of Non-Detects	6
Number of Distinct Detects	1	Number of Distinct Non-Detects	2
Minimum Detect	120	Minimum Non-Detect	1
Maximum Detect	120	Maximum Non-Detect	9.9
Variance Detected	N/A	Percent Non-Detects	85.71%
Mean Detected	120	SD Detected	N/A
Mean of Detected Logged Data	4.787	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Mo was not processed!

Se

General Statistics

Total Number of Observations	16	Number of Missing Observations	50
Number of Distinct Observations	10		
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.54	Minimum Non-Detect	0.3
Maximum Detect	1.2	Maximum Non-Detect	2.5
Variance Detected	0.0357	Percent Non-Detects	43.75%
Mean Detected	0.764	SD Detected	0.189
Mean of Detected Logged Data	-0.293	SD of Detected Logged Data	0.226

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.524	d2max (for USL)	2.443

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.68	KM SD	0.241
95% UTL95% Coverage	1.288	95% KM UPL (t)	1.115
90% KM Percentile (z)	0.989	95% KM Percentile (z)	1.076

	A	B	C	D	E	F	G	H	I	J	K	L
573					99% KM Percentile (z)	1.241					95% KM USL	1.269
574												
575	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
576					Mean	0.839					SD	0.377
577					95% UTL95% Coverage	1.79					95% UPL (t)	1.52
578					90% Percentile (z)	1.322					95% Percentile (z)	1.459
579					99% Percentile (z)	1.716					95% USL	1.76
580	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
581												
582	**Gamma GOF Tests on Detected Observations Only**											
583					A-D Test Statistic	0.382	**Anderson-Darling GOF Test**					
584					5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level					
585					K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**					
586					5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level					
587	**Detected data appear Gamma Distributed at 5% Significance Level**											
588												
589	**Gamma Statistics on Detected Data Only**											
590					k hat (MLE)	20.99					k star (bias corrected MLE)	14.07
591					Theta hat (MLE)	0.0364					Theta star (bias corrected MLE)	0.0543
592					nu hat (MLE)	377.9					nu star (bias corrected)	253.3
593					MLE Mean (bias corrected)	0.764						
594					MLE Sd (bias corrected)	0.204					95% Percentile of Chisquare (2kstar)	41.51
595												
596	**Gamma ROS Statistics using Imputed Non-Detects**											
597	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
598	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
599	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
600	This is especially true when the sample size is small.											
601	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
602					Minimum	0.336					Mean	0.693
603					Maximum	1.2					Median	0.697
604					SD	0.213					CV	0.307
605					k hat (MLE)	11					k star (bias corrected MLE)	8.981
606					Theta hat (MLE)	0.063					Theta star (bias corrected MLE)	0.0772
607					nu hat (MLE)	352.1					nu star (bias corrected)	287.4
608					MLE Mean (bias corrected)	0.693					MLE Sd (bias corrected)	0.231
609					95% Percentile of Chisquare (2kstar)	28.82					90% Percentile	1.001
610					95% Percentile	1.112					99% Percentile	1.341
611	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
612	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
613					WH	HW					WH	HW
614					95% Approx. Gamma UTL with 95% Coverage	1.36	1.386				95% Approx. Gamma UPL	1.132	1.142
615					95% Gamma USL	1.333	1.357						
616												
617	**Estimates of Gamma Parameters using KM Estimates**											
618					Mean (KM)	0.68					SD (KM)	0.241
619					Variance (KM)	0.0581					SE of Mean (KM)	0.0771
620					k hat (KM)	7.962					k star (KM)	6.511
621					nu hat (KM)	254.8					nu star (KM)	208.4
622					theta hat (KM)	0.0854					theta star (KM)	0.104
623					80% gamma percentile (KM)	0.888					90% gamma percentile (KM)	1.036
624					95% gamma percentile (KM)	1.169					99% gamma percentile (KM)	1.448

	A	B	C	D	E	F	G	H	I	J	K	L
625												
626	**The following statistics are computed using gamma distribution and KM estimates**											
627	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
628					WH	HW					WH	HW
629				95% Approx. Gamma UTL with 95% Coverage	1.499	1.545				95% Approx. Gamma UPL	1.209	1.228
630				95% KM Gamma Percentile	1.149	1.164				95% Gamma USL	1.464	1.507
631												
632	**Lognormal GOF Test on Detected Observations Only**											
633					Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**					
634					10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level					
635					Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**					
636					10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level					
637	**Detected Data appear Lognormal at 10% Significance Level**											
638												
639	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
640					Mean in Original Scale	0.702	Mean in Log Scale	-0.389				
641					SD in Original Scale	0.196	SD in Log Scale	0.275				
642					95% UTL95% Coverage	1.356	95% BCA UTL95% Coverage	1.2				
643					95% Bootstrap (%) UTL95% Coverage	1.2	95% UPL (t)	1.113				
644					90% Percentile (z)	0.964	95% Percentile (z)	1.065				
645					99% Percentile (z)	1.284	95% USL	1.326				
646												
647	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
648					KM Mean of Logged Data	-0.458	95% KM UTL (Lognormal)95% Coverage	1.74				
649					KM SD of Logged Data	0.401	95% KM UPL (Lognormal)	1.305				
650					95% KM Percentile Lognormal (z)	1.223	95% KM USL (Lognormal)	1.685				
651												
652	**Background DL/2 Statistics Assuming Lognormal Distribution**											
653					Mean in Original Scale	0.839	Mean in Log Scale	-0.332				
654					SD in Original Scale	0.377	SD in Log Scale	0.676				
655					95% UTL95% Coverage	3.957	95% UPL (t)	2.436				
656					90% Percentile (z)	1.707	95% Percentile (z)	2.183				
657					99% Percentile (z)	3.461	95% USL	3.746				
658	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
659												
660	**Nonparametric Distribution Free Background Statistics**											
661	**Data appear to follow a Discernible Distribution**											
662												
663	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
664					Order of Statistic, r	16	95% UTL with95% Coverage	2.5				
665					Approx, f used to compute achieved CC	0.842	Approximate Actual Confidence Coefficient achieved by UTL	0.56				
666					Approximate Sample Size needed to achieve specified CC	59	95% UPL	2.5				
667					95% USL	2.5	95% KM Chebyshev UPL	1.763				
668												
669	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
670	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
671	and consists of observations collected from clean unimpacted locations.											
672	The use of USL tends to provide a balance between false positives and false negatives provided the data											
673	represents a background data set and when many onsite observations need to be compared with the BTV.											
674												
675	Ag											
676												

677	**General Statistics**											
678					Total Number of Observations	16				Number of Missing Observations	50	
679					Number of Distinct Observations	10						
680					Number of Detects	8				Number of Non-Detects	8	
681					Number of Distinct Detects	7				Number of Distinct Non-Detects	3	
682					Minimum Detect	0.17				Minimum Non-Detect	1	
683					Maximum Detect	0.71				Maximum Non-Detect	2.5	
684					Variance Detected	0.056				Percent Non-Detects	50%	
685					Mean Detected	0.421				SD Detected	0.237	
686					Mean of Detected Logged Data	-1.024				SD of Detected Logged Data	0.621	
687												
688	**Critical Values for Background Threshold Values (BTVs)**											
689					Tolerance Factor K (For UTL)	2.524				d2max (for USL)	2.443	
690												
691	**Normal GOF Test on Detects Only**											
692					Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**					
693					1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level					
694					Lilliefors Test Statistic	0.29	**Lilliefors GOF Test**					
695					1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level					
696	**Detected Data appear Normal at 1% Significance Level**											
697												
698	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
699					KM Mean	0.421				KM SD	0.221	
700					95% UTL95% Coverage	0.98				95% KM UPL (t)	0.821	
701					90% KM Percentile (z)	0.705				95% KM Percentile (z)	0.785	
702					99% KM Percentile (z)	0.936				95% KM USL	0.962	
703												
704	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
705					Mean	0.558				SD	0.318	
706					95% UTL95% Coverage	1.36				95% UPL (t)	1.132	
707					90% Percentile (z)	0.965				95% Percentile (z)	1.081	
708					99% Percentile (z)	1.297				95% USL	1.334	
709	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
710												
711	**Gamma GOF Tests on Detected Observations Only**											
712					A-D Test Statistic	0.771	**Anderson-Darling GOF Test**					
713					5% A-D Critical Value	0.721	Data Not Gamma Distributed at 5% Significance Level					
714					K-S Test Statistic	0.29	**Kolmogorov-Smirnov GOF**					
715					5% K-S Critical Value	0.296	Detected data appear Gamma Distributed at 5% Significance Level					
716	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
717												
718	**Gamma Statistics on Detected Data Only**											
719					k hat (MLE)	3.292				k star (bias corrected MLE)	2.141	
720					Theta hat (MLE)	0.128				Theta star (bias corrected MLE)	0.197	
721					nu hat (MLE)	52.67				nu star (bias corrected)	34.25	
722					MLE Mean (bias corrected)	0.421						
723					MLE Sd (bias corrected)	0.288				95% Percentile of Chisquare (2kstar)	9.941	
724												
725	**Gamma ROS Statistics using Imputed Non-Detects**											
726	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
727	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
728	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

	A	B	C	D	E	F	G	H	I	J	K	L
729	This is especially true when the sample size is small.											
730	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
731					Minimum	0.17				Mean		0.415
732					Maximum	0.71				Median		0.392
733					SD	0.197				CV		0.475
734					k hat (MLE)	4.4				k star (bias corrected MLE)		3.616
735					Theta hat (MLE)	0.0943				Theta star (bias corrected MLE)		0.115
736					nu hat (MLE)	140.8				nu star (bias corrected)		115.7
737					MLE Mean (bias corrected)	0.415				MLE Sd (bias corrected)		0.218
738					95% Percentile of Chisquare (2kstar)	14.41				90% Percentile		0.708
739					95% Percentile	0.827				99% Percentile		1.082
740	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
741	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
742					WH	HW				WH		HW
743				95% Approx. Gamma UTL with 95% Coverage	1.114	1.159			95% Approx. Gamma UPL	0.854		0.871
744				95% Gamma USL	1.083	1.124						
745												
746	**Estimates of Gamma Parameters using KM Estimates**											
747					Mean (KM)	0.421				SD (KM)		0.221
748					Variance (KM)	0.049				SE of Mean (KM)		0.0837
749					k hat (KM)	3.619				k star (KM)		2.982
750					nu hat (KM)	115.8				nu star (KM)		95.42
751					theta hat (KM)	0.116				theta star (KM)		0.141
752					80% gamma percentile (KM)	0.601				90% gamma percentile (KM)		0.748
753					95% gamma percentile (KM)	0.886				99% gamma percentile (KM)		1.183
754												
755	**The following statistics are computed using gamma distribution and KM estimates**											
756	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
757					WH	HW				WH		HW
758				95% Approx. Gamma UTL with 95% Coverage	1.235	1.294			95% Approx. Gamma UPL	0.924		0.944
759				95% KM Gamma Percentile	0.861	0.876			95% Gamma USL	1.197		1.25
760												
761	**Lognormal GOF Test on Detected Observations Only**											
762					Shapiro Wilk Test Statistic	0.821			**Shapiro Wilk GOF Test**			
763					10% Shapiro Wilk Critical Value	0.851			Data Not Lognormal at 10% Significance Level			
764					Lilliefors Test Statistic	0.264			**Lilliefors GOF Test**			
765					10% Lilliefors Critical Value	0.265			Detected Data appear Lognormal at 10% Significance Level			
766	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
767												
768	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
769					Mean in Original Scale	0.406				Mean in Log Scale		-1.024
770					SD in Original Scale	0.2				SD in Log Scale		0.519
771					95% UTL95% Coverage	1.33				95% BCA UTL95% Coverage		0.718
772					95% Bootstrap (%) UTL95% Coverage	0.718				95% UPL (t)		0.917
773					90% Percentile (z)	0.698				95% Percentile (z)		0.843
774					99% Percentile (z)	1.2				95% USL		1.275
775												
776	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
777					KM Mean of Logged Data	-1.024				95% KM UTL (Lognormal)95% Coverage		1.555
778					KM SD of Logged Data	0.581				95% KM UPL (Lognormal)		1.025
779					95% KM Percentile Lognormal (z)	0.933				95% KM USL (Lognormal)		1.483
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781	**Background DL/2 Statistics Assuming Lognormal Distribution**											
782					Mean in Original Scale	0.558				Mean in Log Scale		-0.738
783					SD in Original Scale	0.318				SD in Log Scale		0.59
784					95% UTL95% Coverage	2.121				95% UPL (t)		1.389
785					90% Percentile (z)	1.019				95% Percentile (z)		1.262
786					99% Percentile (z)	1.888				95% USL		2.023
787	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
788												
789	**Nonparametric Distribution Free Background Statistics**											
790	**Data appear to follow a Discernible Distribution**											
791												
792	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
793					Order of Statistic, r	16				95% UTL with95% Coverage		2.5
794					Approx, f used to compute achieved CC	0.842				Approximate Actual Confidence Coefficient achieved by UTL		0.56
795					Approximate Sample Size needed to achieve specified CC	59				95% UPL		2.5
796					95% USL	2.5				95% KM Chebyshev UPL		1.416
797												
798	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
799	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
800	and consists of observations collected from clean unimpacted locations.											
801	The use of USL tends to provide a balance between false positives and false negatives provided the data											
802	represents a background data set and when many onsite observations need to be compared with the BTV.											
803												

	Background Statistics for Data Sets with Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.2 8/11/2023 10:42:57 AM	
From File	14 Background, Mineralized, Culled.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Coverage	95%	
Different or Future K Observations	1	
Number of Bootstrap Operations	2000	

As

General Statistics

Total Number of Observations	47	Number of Missing Observations	0
Number of Distinct Observations	41		
Number of Detects	45	Number of Non-Detects	2
Number of Distinct Detects	40	Number of Distinct Non-Detects	1
Minimum Detect	5.4	Minimum Non-Detect	2
Maximum Detect	120	Maximum Non-Detect	2
Variance Detected	707.2	Percent Non-Detects	4.255%
Mean Detected	48.18	SD Detected	26.59
Mean of Detected Logged Data	3.695	SD of Detected Logged Data	0.66

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.074	d2max (for USL)	2.933

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.102	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	46.21	KM SD	27.37
95% UTL95% Coverage	103	95% KM UPL (t)	92.64
90% KM Percentile (z)	81.28	95% KM Percentile (z)	91.23
99% KM Percentile (z)	109.9	95% KM USL	126.5

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	46.17	SD	27.73
95% UTL95% Coverage	103.7	95% UPL (t)	93.21
90% Percentile (z)	81.71	95% Percentile (z)	91.78
99% Percentile (z)	110.7	95% USL	127.5

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.184	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0738	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.133	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

53												
54	**Gamma Statistics on Detected Data Only**											
55					k hat (MLE)	2.943			k star (bias corrected MLE)	2.762		
56					Theta hat (MLE)	16.37			Theta star (bias corrected MLE)	17.44		
57					nu hat (MLE)	264.9			nu star (bias corrected)	248.6		
58					MLE Mean (bias corrected)	48.18						
59					MLE Sd (bias corrected)	28.99			95% Percentile of Chisquare (2kstar)	11.87		
60												
61	**Gamma ROS Statistics using Imputed Non-Detects**											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
63	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
64	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
65	This is especially true when the sample size is small.											
66	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
67					Minimum	4.695			Mean	46.38		
68					Maximum	120			Median	42		
69					SD	27.4			CV	0.591		
70					k hat (MLE)	2.39			k star (bias corrected MLE)	2.251		
71					Theta hat (MLE)	19.41			Theta star (bias corrected MLE)	20.6		
72					nu hat (MLE)	224.6			nu star (bias corrected)	211.6		
73					MLE Mean (bias corrected)	46.38			MLE Sd (bias corrected)	30.91		
74					95% Percentile of Chisquare (2kstar)	10.29			90% Percentile	87.75		
75					95% Percentile	106			99% Percentile	146.3		
76	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
77	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
78						WH	HW			WH	HW	
79					95% Approx. Gamma UTL with 95% Coverage	128.6	136.2		95% Approx. Gamma UPL	107.4	111.7	
80					95% Gamma USL	186.8	206.7					
81												
82	**Estimates of Gamma Parameters using KM Estimates**											
83					Mean (KM)	46.21			SD (KM)	27.37		
84					Variance (KM)	748.9			SE of Mean (KM)	4.037		
85					k hat (KM)	2.851			k star (KM)	2.683		
86					nu hat (KM)	268			nu star (KM)	252.2		
87					theta hat (KM)	16.21			theta star (KM)	17.22		
88					80% gamma percentile (KM)	66.8			90% gamma percentile (KM)	84.02		
89					95% gamma percentile (KM)	100.2			99% gamma percentile (KM)	135.4		
90												
91	**The following statistics are computed using gamma distribution and KM estimates**											
92	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
93						WH	HW			WH	HW	
94					95% Approx. Gamma UTL with 95% Coverage	134.2	145.2		95% Approx. Gamma UPL	111.2	117.6	
95					95% KM Gamma Percentile	108.3	114.2		95% Gamma USL	198	225.7	
96												
97	**Lognormal GOF Test on Detected Observations Only**											
98					Shapiro Wilk Test Statistic	0.951			**Shapiro Wilk GOF Test**			
99					10% Shapiro Wilk Critical Value	0.953			Data Not Lognormal at 10% Significance Level			
100					Lilliefors Test Statistic	0.0748			**Lilliefors GOF Test**			
101					10% Lilliefors Critical Value	0.12			Detected Data appear Lognormal at 10% Significance Level			
102	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
103												
104	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											

105				Mean in Original Scale		46.49				Mean in Log Scale		3.629
106				SD in Original Scale		27.24				SD in Log Scale		0.72
107				95% UTL95% Coverage		167.7				95% BCA UTL95% Coverage		114
108				95% Bootstrap (%) UTL95% Coverage		114				95% UPL (t)		127.8
109				90% Percentile (z)		94.81				95% Percentile (z)		123.1
110				99% Percentile (z)		201.1				95% USL		311.2
111												
112	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
113				KM Mean of Logged Data		3.568				95% KM UTL (Lognormal)95% Coverage		220
114				KM SD of Logged Data		0.88				95% KM UPL (Lognormal)		157.8
115				95% KM Percentile Lognormal (z)		150.8				95% KM USL (Lognormal)		468.6
116												
117	**Background DL/2 Statistics Assuming Lognormal Distribution**											
118				Mean in Original Scale		46.17				Mean in Log Scale		3.538
119				SD in Original Scale		27.73				SD in Log Scale		0.993
120				95% UTL95% Coverage		269.6				95% UPL (t)		185.3
121				90% Percentile (z)		122.8				95% Percentile (z)		176.1
122				99% Percentile (z)		346.3				95% USL		632.2
123	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
124												
125	**Nonparametric Distribution Free Background Statistics**											
126	**Data appear to follow a Discernible Distribution**											
127												
128	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
129				Order of Statistic, r		47				95% UTL with95% Coverage		120
130				Approx, f used to compute achieved CC		2.474				Approximate Actual Confidence Coefficient achieved by UTL		0.91
131				Approximate Sample Size needed to achieve specified CC		59				95% UPL		100
132				95% USL		120				95% KM Chebyshev UPL		166.8
133												
134	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
135	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
136	and consists of observations collected from clean unimpacted locations.											
137	The use of USL tends to provide a balance between false positives and false negatives provided the data											
138	represents a background data set and when many onsite observations need to be compared with the BTV.											
139												
140	**Cd**											
141												
142	**General Statistics**											
143				Total Number of Observations		13				Number of Missing Observations		26
144				Number of Distinct Observations		12						
145				Number of Detects		7				Number of Non-Detects		6
146				Number of Distinct Detects		7				Number of Distinct Non-Detects		5
147				Minimum Detect		0.37				Minimum Non-Detect		0.26
148				Maximum Detect		5.4				Maximum Non-Detect		0.43
149				Variance Detected		3.619				Percent Non-Detects		46.15%
150				Mean Detected		2.091				SD Detected		1.902
151				Mean of Detected Logged Data		0.3				SD of Detected Logged Data		1.065
152												
153	**Critical Values for Background Threshold Values (BTVs)**											
154				Tolerance Factor K (For UTL)		2.671				d2max (for USL)		2.331
155												
156	**Normal GOF Test on Detects Only**											

157				Shapiro Wilk Test Statistic		0.866	**Shapiro Wilk GOF Test**					
158				1% Shapiro Wilk Critical Value		0.73	Detected Data appear Normal at 1% Significance Level					
159				Lilliefors Test Statistic		0.22	**Lilliefors GOF Test**					
160				1% Lilliefors Critical Value		0.35	Detected Data appear Normal at 1% Significance Level					
161	**Detected Data appear Normal at 1% Significance Level**											
162												
163	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
164				KM Mean		1.248	KM SD					1.581
165				95% UTL95% Coverage		5.472	95% KM UPL (t)					4.173
166				90% KM Percentile (z)		3.274	95% KM Percentile (z)					3.849
167				99% KM Percentile (z)		4.927	95% KM USL					4.933
168												
169	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
170				Mean		1.202	SD					1.676
171				95% UTL95% Coverage		5.679	95% UPL (t)					4.302
172				90% Percentile (z)		3.35	95% Percentile (z)					3.959
173				99% Percentile (z)		5.101	95% USL					5.108
174	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
175												
176	**Gamma GOF Tests on Detected Observations Only**											
177				A-D Test Statistic		0.423	**Anderson-Darling GOF Test**					
178				5% A-D Critical Value		0.724	Detected data appear Gamma Distributed at 5% Significance Level					
179				K-S Test Statistic		0.25	**Kolmogorov-Smirnov GOF**					
180				5% K-S Critical Value		0.318	Detected data appear Gamma Distributed at 5% Significance Level					
181	**Detected data appear Gamma Distributed at 5% Significance Level**											
182												
183	**Gamma Statistics on Detected Data Only**											
184				k hat (MLE)		1.284	k star (bias corrected MLE)					0.829
185				Theta hat (MLE)		1.629	Theta star (bias corrected MLE)					2.523
186				nu hat (MLE)		17.97	nu star (bias corrected)					11.6
187				MLE Mean (bias corrected)		2.091						
188				MLE Sd (bias corrected)		2.297	95% Percentile of Chisquare (2kstar)					5.31
189												
190	**Gamma ROS Statistics using Imputed Non-Detects**											
191	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
192	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
193	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
194	This is especially true when the sample size is small.											
195	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
196				Minimum		0.01	Mean					1.131
197				Maximum		5.4	Median					0.37
198				SD		1.725	CV					1.526
199				k hat (MLE)		0.326	k star (bias corrected MLE)					0.302
200				Theta hat (MLE)		3.469	Theta star (bias corrected MLE)					3.744
201				nu hat (MLE)		8.476	nu star (bias corrected)					7.854
202				MLE Mean (bias corrected)		1.131	MLE Sd (bias corrected)					2.057
203				95% Percentile of Chisquare (2kstar)		2.757	90% Percentile					3.332
204				95% Percentile		5.161	99% Percentile					9.911
205	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
206	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
207					WH	HW					WH	HW
208	95% Approx. Gamma UTL with 95% Coverage				11.42	15.27	95% Approx. Gamma UPL				5.666	6.517

209				95% Gamma USL	8.707	10.96						
210												
211	**Estimates of Gamma Parameters using KM Estimates**											
212				Mean (KM)	1.248				SD (KM)	1.581		
213				Variance (KM)	2.501				SE of Mean (KM)	0.474		
214				k hat (KM)	0.622				k star (KM)	0.53		
215				nu hat (KM)	16.18				nu star (KM)	13.78		
216				theta hat (KM)	2.005				theta star (KM)	2.354		
217				80% gamma percentile (KM)	2.053				90% gamma percentile (KM)	3.334		
218				95% gamma percentile (KM)	4.694				99% gamma percentile (KM)	8.019		
219												
220	**The following statistics are computed using gamma distribution and KM estimates**											
221	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
222					WH	HW				WH	HW	
223				95% Approx. Gamma UTL with 95% Coverage	7.301	7.905			95% Approx. Gamma UPL	4.309	4.38	
224				95% KM Gamma Percentile	3.72	3.726			95% Gamma USL	5.933	6.254	
225												
226	**Lognormal GOF Test on Detected Observations Only**											
227				Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**						
228				10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level						
229				Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**						
230				10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level						
231	**Detected Data appear Lognormal at 10% Significance Level**											
232												
233	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
234				Mean in Original Scale	1.165				Mean in Log Scale	-0.996		
235				SD in Original Scale	1.701				SD in Log Scale	1.655		
236				95% UTL95% Coverage	30.72				95% BCA UTL95% Coverage	5.4		
237				95% Bootstrap (%) UTL95% Coverage	5.4				95% UPL (t)	7.888		
238				90% Percentile (z)	3.081				95% Percentile (z)	5.621		
239				99% Percentile (z)	17.37				95% USL	17.49		
240												
241	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
242				KM Mean of Logged Data	-0.455				95% KM UTL (Lognormal)95% Coverage	11.7		
243				KM SD of Logged Data	1.092				95% KM UPL (Lognormal)	4.775		
244				95% KM Percentile Lognormal (z)	3.819				95% KM USL (Lognormal)	8.072		
245												
246	**Background DL/2 Statistics Assuming Lognormal Distribution**											
247				Mean in Original Scale	1.202				Mean in Log Scale	-0.676		
248				SD in Original Scale	1.676				SD in Log Scale	1.335		
249				95% UTL95% Coverage	18.02				95% UPL (t)	6.015		
250				90% Percentile (z)	2.817				95% Percentile (z)	4.576		
251				99% Percentile (z)	11.37				95% USL	11.43		
252	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
253												
254	**Nonparametric Distribution Free Background Statistics**											
255	**Data appear to follow a Discernible Distribution**											
256												
257	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
258				Order of Statistic, r	13				95% UTL with95% Coverage	5.4		
259				Approx, f used to compute achieved CC	0.684				Approximate Actual Confidence Coefficient achieved by UTL	0.487		
260				Approximate Sample Size needed to achieve specified CC	59				95% UPL	5.4		

261				95% USL	5.4					95% KM Chebyshev UPL	8.401	
262												
263	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
264	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
265	and consists of observations collected from clean unimpacted locations.											
266	The use of USL tends to provide a balance between false positives and false negatives provided the data											
267	represents a background data set and when many onsite observations need to be compared with the BTV.											
268												
269	**Pb**											
270												
271	**General Statistics**											
272				Total Number of Observations	13					Number of Missing Observations	26	
273				Number of Distinct Observations	13							
274				Number of Detects	10					Number of Non-Detects	3	
275				Number of Distinct Detects	10					Number of Distinct Non-Detects	3	
276				Minimum Detect	3.6					Minimum Non-Detect	2.5	
277				Maximum Detect	18.4					Maximum Non-Detect	7.5	
278				Variance Detected	22.9					Percent Non-Detects	23.08%	
279				Mean Detected	12.18					SD Detected	4.786	
280				Mean of Detected Logged Data	2.404					SD of Detected Logged Data	0.506	
281												
282	**Critical Values for Background Threshold Values (BTVs)**											
283				Tolerance Factor K (For UTL)	2.671					d2max (for USL)	2.331	
284												
285	**Normal GOF Test on Detects Only**											
286				Shapiro Wilk Test Statistic	0.956					**Shapiro Wilk GOF Test**		
287				1% Shapiro Wilk Critical Value	0.781					Detected Data appear Normal at 1% Significance Level		
288				Lilliefors Test Statistic	0.143					**Lilliefors GOF Test**		
289				1% Lilliefors Critical Value	0.304					Detected Data appear Normal at 1% Significance Level		
290	**Detected Data appear Normal at 1% Significance Level**											
291												
292	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
293				KM Mean	10.22					KM SD	5.413	
294				95% UTL95% Coverage	24.68					95% KM UPL (t)	20.23	
295				90% KM Percentile (z)	17.16					95% KM Percentile (z)	19.13	
296				99% KM Percentile (z)	22.82					95% KM USL	22.84	
297												
298	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
299				Mean	10.04					SD	5.838	
300				95% UTL95% Coverage	25.63					95% UPL (t)	20.84	
301				90% Percentile (z)	17.52					95% Percentile (z)	19.64	
302				99% Percentile (z)	23.62					95% USL	23.64	
303	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
304												
305	**Gamma GOF Tests on Detected Observations Only**											
306				A-D Test Statistic	0.403					**Anderson-Darling GOF Test**		
307				5% A-D Critical Value	0.729					Detected data appear Gamma Distributed at 5% Significance Level		
308				K-S Test Statistic	0.195					**Kolmogorov-Smirnov GOF**		
309				5% K-S Critical Value	0.267					Detected data appear Gamma Distributed at 5% Significance Level		
310	**Detected data appear Gamma Distributed at 5% Significance Level**											
311												
312	**Gamma Statistics on Detected Data Only**											

313					k hat (MLE)	5.383					k star (bias corrected MLE)	3.835
314					Theta hat (MLE)	2.263					Theta star (bias corrected MLE)	3.176
315					nu hat (MLE)	107.7					nu star (bias corrected)	76.69
316					MLE Mean (bias corrected)	12.18						
317					MLE Sd (bias corrected)	6.22					95% Percentile of Chisquare (2kstar)	15.03
318												
319	**Gamma ROS Statistics using Imputed Non-Detects**											
320	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
321	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
322	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
323	This is especially true when the sample size is small.											
324	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
325					Minimum	2.79					Mean	10.41
326					Maximum	18.4					Median	10.9
327					SD	5.376					CV	0.517
328					k hat (MLE)	3.356					k star (bias corrected MLE)	2.633
329					Theta hat (MLE)	3.101					Theta star (bias corrected MLE)	3.953
330					nu hat (MLE)	87.25					nu star (bias corrected)	68.45
331					MLE Mean (bias corrected)	10.41					MLE Sd (bias corrected)	6.413
332					95% Percentile of Chisquare (2kstar)	11.48					90% Percentile	19
333					95% Percentile	22.69					99% Percentile	30.73
334	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
335	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
336						WH	HW				WH	HW
337					95% Approx. Gamma UTL with 95% Coverage	33.31	35.54			95% Approx. Gamma UPL	23.83	24.63
338					95% Gamma USL	29.13	30.65					
339												
340	**Estimates of Gamma Parameters using KM Estimates**											
341					Mean (KM)	10.22					SD (KM)	5.413
342					Variance (KM)	29.3					SE of Mean (KM)	1.605
343					k hat (KM)	3.567					k star (KM)	2.795
344					nu hat (KM)	92.75					nu star (KM)	72.68
345					theta hat (KM)	2.866					theta star (KM)	3.657
346					80% gamma percentile (KM)	14.71					90% gamma percentile (KM)	18.42
347					95% gamma percentile (KM)	21.9					99% gamma percentile (KM)	29.47
348												
349	**The following statistics are computed using gamma distribution and KM estimates**											
350	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
351						WH	HW				WH	HW
352					95% Approx. Gamma UTL with 95% Coverage	34.45	37.15			95% Approx. Gamma UPL	24.25	25.21
353					95% KM Gamma Percentile	22.06	22.75			95% Gamma USL	29.93	31.78
354												
355	**Lognormal GOF Test on Detected Observations Only**											
356					Shapiro Wilk Test Statistic	0.875				**Shapiro Wilk GOF Test**		
357					10% Shapiro Wilk Critical Value	0.869				Detected Data appear Lognormal at 10% Significance Level		
358					Lilliefors Test Statistic	0.207				**Lilliefors GOF Test**		
359					10% Lilliefors Critical Value	0.241				Detected Data appear Lognormal at 10% Significance Level		
360	**Detected Data appear Lognormal at 10% Significance Level**											
361												
362	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
363					Mean in Original Scale	10.39					Mean in Log Scale	2.189
364					SD in Original Scale	5.373					SD in Log Scale	0.608

365				95% UTL95% Coverage		45.28				95% BCA UTL95% Coverage		18.4
366				95% Bootstrap (%) UTL95% Coverage		18.4				95% UPL (t)		27.48
367				90% Percentile (z)		19.45				95% Percentile (z)		24.26
368				99% Percentile (z)		36.72				95% USL		36.81
369												
370	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
371				KM Mean of Logged Data		2.131				95% KM UTL (Lognormal)95% Coverage		51.86
372				KM SD of Logged Data		0.681				95% KM UPL (Lognormal)		29.65
373				95% KM Percentile Lognormal (z)		25.79				95% KM USL (Lognormal)		41.13
374												
375	**Background DL/2 Statistics Assuming Lognormal Distribution**											
376				Mean in Original Scale		10.04				Mean in Log Scale		2.069
377				SD in Original Scale		5.838				SD in Log Scale		0.815
378				95% UTL95% Coverage		69.8				95% UPL (t)		35.74
379				90% Percentile (z)		22.49				95% Percentile (z)		30.24
380				99% Percentile (z)		52.7				95% USL		52.89
381	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
382												
383	**Nonparametric Distribution Free Background Statistics**											
384	**Data appear to follow a Discernible Distribution**											
385												
386	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
387				Order of Statistic, r		13				95% UTL with95% Coverage		18.4
388				Approx, f used to compute achieved CC		0.684				Approximate Actual Confidence Coefficient achieved by UTL		0.487
389				Approximate Sample Size needed to achieve specified CC		59				95% UPL		18.4
390				95% USL		18.4				95% KM Chebyshev UPL		34.71
391												
392	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
393	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
394	and consists of observations collected from clean unimpacted locations.											
395	The use of USL tends to provide a balance between false positives and false negatives provided the data											
396	represents a background data set and when many onsite observations need to be compared with the BTV.											
397												
398	**Hg**											
399												
400	**General Statistics**											
401				Total Number of Observations		13				Number of Missing Observations		26
402				Number of Distinct Observations		9						
403				Number of Detects		4				Number of Non-Detects		9
404				Number of Distinct Detects		4				Number of Distinct Non-Detects		5
405				Minimum Detect		0.21				Minimum Non-Detect		0.04
406				Maximum Detect		0.3				Maximum Non-Detect		0.2
407				Variance Detected		0.00167				Percent Non-Detects		69.23%
408				Mean Detected		0.24				SD Detected		0.0408
409				Mean of Detected Logged Data		-1.437				SD of Detected Logged Data		0.16
410												
411	**Critical Values for Background Threshold Values (BTVs)**											
412				Tolerance Factor K (For UTL)		2.671				d2max (for USL)		2.331
413												
414	**Normal GOF Test on Detects Only**											
415				Shapiro Wilk Test Statistic		0.807	**Shapiro Wilk GOF Test**					
416				1% Shapiro Wilk Critical Value		0.687	Detected Data appear Normal at 1% Significance Level					

417				Lilliefors Test Statistic		0.347	**Lilliefors GOF Test**					
418				1% Lilliefors Critical Value		0.413	Detected Data appear Normal at 1% Significance Level					
419	**Detected Data appear Normal at 1% Significance Level**											
420												
421	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
422				KM Mean		0.102	KM SD					0.0944
423				95% UTL95% Coverage		0.354	95% KM UPL (t)					0.276
424				90% KM Percentile (z)		0.222	95% KM Percentile (z)					0.257
425				99% KM Percentile (z)		0.321	95% KM USL					0.321
426												
427	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
428				Mean		0.107	SD					0.0982
429				95% UTL95% Coverage		0.369	95% UPL (t)					0.288
430				90% Percentile (z)		0.233	95% Percentile (z)					0.268
431				99% Percentile (z)		0.335	95% USL					0.336
432	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
433												
434	**Gamma GOF Tests on Detected Observations Only**											
435				A-D Test Statistic		0.524	**Anderson-Darling GOF Test**					
436				5% A-D Critical Value		0.656	Detected data appear Gamma Distributed at 5% Significance Level					
437				K-S Test Statistic		0.35	**Kolmogorov-Smirnov GOF**					
438				5% K-S Critical Value		0.394	Detected data appear Gamma Distributed at 5% Significance Level					
439	**Detected data appear Gamma Distributed at 5% Significance Level**											
440												
441	**Gamma Statistics on Detected Data Only**											
442				k hat (MLE)		50.22	k star (bias corrected MLE)					12.72
443				Theta hat (MLE)		0.00478	Theta star (bias corrected MLE)					0.0189
444				nu hat (MLE)		401.7	nu star (bias corrected)					101.8
445				MLE Mean (bias corrected)		0.24						
446				MLE Sd (bias corrected)		0.0673	95% Percentile of Chisquare (2kstar)					38.2
447												
448	**Gamma ROS Statistics using Imputed Non-Detects**											
449	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
450	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
451	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
452	This is especially true when the sample size is small.											
453	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
454				Minimum		0.0486	Mean					0.14
455				Maximum		0.3	Median					0.124
456				SD		0.0765	CV					0.547
457				k hat (MLE)		3.81	k star (bias corrected MLE)					2.982
458				Theta hat (MLE)		0.0367	Theta star (bias corrected MLE)					0.0469
459				nu hat (MLE)		99.07	nu star (bias corrected)					77.54
460				MLE Mean (bias corrected)		0.14	MLE Sd (bias corrected)					0.081
461				95% Percentile of Chisquare (2kstar)		12.54	90% Percentile					0.249
462				95% Percentile		0.294	99% Percentile					0.393
463	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
464	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
465					WH	HW					WH	HW
466				95% Approx. Gamma UTL with 95% Coverage	0.423	0.442	95% Approx. Gamma UPL				0.307	0.313
467				95% Gamma USL	0.372	0.384						
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	**Estimates of Gamma Parameters using KM Estimates**											
470					Mean (KM)	0.102				SD (KM)		0.0944
471					Variance (KM)	0.00891				SE of Mean (KM)		0.0302
472					k hat (KM)	1.158				k star (KM)		0.942
473					nu hat (KM)	30.1				nu star (KM)		24.49
474					theta hat (KM)	0.0877				theta star (KM)		0.108
475					80% gamma percentile (KM)	0.164				90% gamma percentile (KM)		0.237
476					95% gamma percentile (KM)	0.311				99% gamma percentile (KM)		0.482
477												
478	**The following statistics are computed using gamma distribution and KM estimates**											
479	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
480					WH	HW					WH	HW
481				95% Approx. Gamma UTL with 95% Coverage	0.462	0.49				95% Approx. Gamma UPL	0.296	0.301
482				95% KM Gamma Percentile	0.263	0.264				95% Gamma USL	0.387	0.403
483												
484	**Lognormal GOF Test on Detected Observations Only**											
485					Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**					
486					10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level					
487					Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**					
488					10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level					
489	**Detected Data appear Lognormal at 10% Significance Level**											
490												
491	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
492					Mean in Original Scale	0.164				Mean in Log Scale		-1.861
493					SD in Original Scale	0.0585				SD in Log Scale		0.325
494					95% UTL95% Coverage	0.371				95% BCA UTL95% Coverage		0.3
495					95% Bootstrap (%) UTL95% Coverage	0.3				95% UPL (t)		0.284
496					90% Percentile (z)	0.236				95% Percentile (z)		0.265
497					99% Percentile (z)	0.331				95% USL		0.332
498												
499	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
500					KM Mean of Logged Data	-2.671				95% KM UTL (Lognormal)95% Coverage		0.628
501					KM SD of Logged Data	0.826				95% KM UPL (Lognormal)		0.319
502					95% KM Percentile Lognormal (z)	0.269				95% KM USL (Lognormal)		0.474
503												
504	**Background DL/2 Statistics Assuming Lognormal Distribution**											
505					Mean in Original Scale	0.107				Mean in Log Scale		-2.682
506					SD in Original Scale	0.0982				SD in Log Scale		1.02
507					95% UTL95% Coverage	1.043				95% UPL (t)		0.451
508					90% Percentile (z)	0.253				95% Percentile (z)		0.366
509					99% Percentile (z)	0.734				95% USL		0.737
510	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
511												
512	**Nonparametric Distribution Free Background Statistics**											
513	**Data appear to follow a Discernible Distribution**											
514												
515	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
516					Order of Statistic, r	13				95% UTL with95% Coverage		0.3
517					Approx, f used to compute achieved CC	0.684				Approximate Actual Confidence Coefficient achieved by UTL		0.487
518				Approximate Sample Size needed to achieve specified CC		59				95% UPL		0.3
519					95% USL	0.3				95% KM Chebyshev UPL		0.528
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
522	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
523	and consists of observations collected from clean unimpacted locations.											
524	The use of USL tends to provide a balance between false positives and false negatives provided the data											
525	represents a background data set and when many onsite observations need to be compared with the BTV.											
526												
527	**Mo**											
528												
529	**General Statistics**											
530	Total Number of Observations					4	Number of Missing Observations					29
531	Number of Distinct Observations					2						
532	Number of Detects					0	Number of Non-Detects					4
533	Number of Distinct Detects					0	Number of Distinct Non-Detects					2
534	Minimum Detect					N/A	Minimum Non-Detect					1
535	Maximum Detect					N/A	Maximum Non-Detect					9.9
536	Variance Detected					N/A	Percent Non-Detects					100%
537	Mean Detected					N/A	SD Detected					N/A
538	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
539												
540	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
541	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
542	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
543												
544	**The data set for variable Mo was not processed!**											
545												
546												
547	**Se**											
548												
549	**General Statistics**											
550	Total Number of Observations					13	Number of Missing Observations					26
551	Number of Distinct Observations					10						
552	Number of Detects					9	Number of Non-Detects					4
553	Number of Distinct Detects					8	Number of Distinct Non-Detects					2
554	Minimum Detect					0.54	Minimum Non-Detect					0.3
555	Maximum Detect					1.2	Maximum Non-Detect					2.5
556	Variance Detected					0.0357	Percent Non-Detects					30.77%
557	Mean Detected					0.764	SD Detected					0.189
558	Mean of Detected Logged Data					-0.293	SD of Detected Logged Data					0.226
559												
560	**Critical Values for Background Threshold Values (BTVs)**											
561	Tolerance Factor K (For UTL)					2.671	d2max (for USL)					2.331
562												
563	**Normal GOF Test on Detects Only**											
564	Shapiro Wilk Test Statistic					0.86	**Shapiro Wilk GOF Test**					
565	1% Shapiro Wilk Critical Value					0.764	Detected Data appear Normal at 1% Significance Level					
566	Lilliefors Test Statistic					0.273	**Lilliefors GOF Test**					
567	1% Lilliefors Critical Value					0.316	Detected Data appear Normal at 1% Significance Level					
568	**Detected Data appear Normal at 1% Significance Level**											
569												
570	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
571	KM Mean					0.68	KM SD					0.241
572	95% UTL95% Coverage					1.324	95% KM UPL (t)					1.126

573				90% KM Percentile (z)		0.989				95% KM Percentile (z)		1.076
574				99% KM Percentile (z)		1.241				95% KM USL		1.242
575												
576	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
577				Mean		0.745				SD		0.354
578				95% UTL95% Coverage		1.691				95% UPL (t)		1.4
579				90% Percentile (z)		1.199				95% Percentile (z)		1.328
580				99% Percentile (z)		1.569				95% USL		1.571
581	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
582												
583	**Gamma GOF Tests on Detected Observations Only**											
584				A-D Test Statistic		0.382	**Anderson-Darling GOF Test**					
585				5% A-D Critical Value		0.721	Detected data appear Gamma Distributed at 5% Significance Level					
586				K-S Test Statistic		0.234	**Kolmogorov-Smirnov GOF**					
587				5% K-S Critical Value		0.279	Detected data appear Gamma Distributed at 5% Significance Level					
588	**Detected data appear Gamma Distributed at 5% Significance Level**											
589												
590	**Gamma Statistics on Detected Data Only**											
591				k hat (MLE)		20.99				k star (bias corrected MLE)		14.07
592				Theta hat (MLE)		0.0364				Theta star (bias corrected MLE)		0.0543
593				nu hat (MLE)		377.9				nu star (bias corrected)		253.3
594				MLE Mean (bias corrected)		0.764						
595				MLE Sd (bias corrected)		0.204				95% Percentile of Chisquare (2kstar)		41.51
596												
597	**Gamma ROS Statistics using Imputed Non-Detects**											
598	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
599	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
600	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
601	This is especially true when the sample size is small.											
602	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
603				Minimum		0.336				Mean		0.693
604				Maximum		1.2				Median		0.71
605				SD		0.216				CV		0.312
606				k hat (MLE)		10.85				k star (bias corrected MLE)		8.399
607				Theta hat (MLE)		0.0638				Theta star (bias corrected MLE)		0.0825
608				nu hat (MLE)		282.2				nu star (bias corrected)		218.4
609				MLE Mean (bias corrected)		0.693				MLE Sd (bias corrected)		0.239
610				95% Percentile of Chisquare (2kstar)		27.33				90% Percentile		1.011
611				95% Percentile		1.127				99% Percentile		1.366
612	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
613	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
614					WH	HW					WH	HW
615				95% Approx. Gamma UTL with 95% Coverage	1.422	1.453				95% Approx. Gamma UPL	1.151	1.163
616				95% Gamma USL	1.305	1.327						
617												
618	**Estimates of Gamma Parameters using KM Estimates**											
619				Mean (KM)		0.68				SD (KM)		0.241
620				Variance (KM)		0.0581				SE of Mean (KM)		0.0771
621				k hat (KM)		7.962				k star (KM)		6.176
622				nu hat (KM)		207				nu star (KM)		160.6
623				theta hat (KM)		0.0854				theta star (KM)		0.11
624				80% gamma percentile (KM)		0.893				90% gamma percentile (KM)		1.046

625				95% gamma percentile (KM)		1.183				99% gamma percentile (KM)		1.472
626												
627	**The following statistics are computed using gamma distribution and KM estimates**											
628	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
629					WH	HW					WH	HW
630			95% Approx. Gamma UTL with 95% Coverage		1.563	1.617			95% Approx. Gamma UPL		1.225	1.246
631				95% KM Gamma Percentile	1.149	1.164				95% Gamma USL	1.416	1.454
632												
633	**Lognormal GOF Test on Detected Observations Only**											
634					Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**					
635					10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level					
636					Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**					
637					10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level					
638	**Detected Data appear Lognormal at 10% Significance Level**											
639												
640	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
641					Mean in Original Scale	0.702				Mean in Log Scale		-0.39
642					SD in Original Scale	0.2				SD in Log Scale		0.279
643					95% UTL95% Coverage	1.425				95% BCA UTL95% Coverage		1.2
644					95% Bootstrap (%) UTL95% Coverage	1.2				95% UPL (t)		1.134
645					90% Percentile (z)	0.968				95% Percentile (z)		1.071
646					99% Percentile (z)	1.295				95% USL		1.296
647												
648	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
649					KM Mean of Logged Data	-0.458				95% KM UTL (Lognormal)95% Coverage		1.846
650					KM SD of Logged Data	0.401				95% KM UPL (Lognormal)		1.328
651					95% KM Percentile Lognormal (z)	1.223				95% KM USL (Lognormal)		1.61
652												
653	**Background DL/2 Statistics Assuming Lognormal Distribution**											
654					Mean in Original Scale	0.745				Mean in Log Scale		-0.46
655					SD in Original Scale	0.354				SD in Log Scale		0.691
656					95% UTL95% Coverage	3.995				95% UPL (t)		2.265
657					90% Percentile (z)	1.53				95% Percentile (z)		1.966
658					99% Percentile (z)	3.148				95% USL		3.158
659	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
660												
661	**Nonparametric Distribution Free Background Statistics**											
662	**Data appear to follow a Discernible Distribution**											
663												
664	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
665					Order of Statistic, r	13				95% UTL with95% Coverage		2.5
666					Approx, f used to compute achieved CC	0.684				Approximate Actual Confidence Coefficient achieved by UTL		0.487
667					Approximate Sample Size needed to achieve specified CC	59				95% UPL		2.5
668					95% USL	2.5				95% KM Chebyshev UPL		1.77
669												
670	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
671	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
672	and consists of observations collected from clean unimpacted locations.											
673	The use of USL tends to provide a balance between false positives and false negatives provided the data											
674	represents a background data set and when many onsite observations need to be compared with the BTV.											
675												
676	Ag											

677												
678	**General Statistics**											
679					Total Number of Observations	13			Number of Missing Observations	26		
680					Number of Distinct Observations	10						
681					Number of Detects	8			Number of Non-Detects	5		
682					Number of Distinct Detects	7			Number of Distinct Non-Detects	3		
683					Minimum Detect	0.17			Minimum Non-Detect	1		
684					Maximum Detect	0.71			Maximum Non-Detect	2.5		
685					Variance Detected	0.056			Percent Non-Detects	38.46%		
686					Mean Detected	0.421			SD Detected	0.237		
687					Mean of Detected Logged Data	-1.024			SD of Detected Logged Data	0.621		
688												
689	**Critical Values for Background Threshold Values (BTVs)**											
690					Tolerance Factor K (For UTL)	2.671			d2max (for USL)	2.331		
691												
692	**Normal GOF Test on Detects Only**											
693					Shapiro Wilk Test Statistic	0.817			**Shapiro Wilk GOF Test**			
694					1% Shapiro Wilk Critical Value	0.749			Detected Data appear Normal at 1% Significance Level			
695					Lilliefors Test Statistic	0.29			**Lilliefors GOF Test**			
696					1% Lilliefors Critical Value	0.333			Detected Data appear Normal at 1% Significance Level			
697	**Detected Data appear Normal at 1% Significance Level**											
698												
699	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
700					KM Mean	0.421			KM SD	0.221		
701					95% UTL95% Coverage	1.013			95% KM UPL (t)	0.831		
702					90% KM Percentile (z)	0.705			95% KM Percentile (z)	0.785		
703					99% KM Percentile (z)	0.936			95% KM USL	0.937		
704												
705	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
706					Mean	0.571			SD	0.354		
707					95% UTL95% Coverage	1.516			95% UPL (t)	1.226		
708					90% Percentile (z)	1.025			95% Percentile (z)	1.153		
709					99% Percentile (z)	1.394			95% USL	1.396		
710	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
711												
712	**Gamma GOF Tests on Detected Observations Only**											
713					A-D Test Statistic	0.771			**Anderson-Darling GOF Test**			
714					5% A-D Critical Value	0.721			Data Not Gamma Distributed at 5% Significance Level			
715					K-S Test Statistic	0.29			**Kolmogorov-Smirnov GOF**			
716					5% K-S Critical Value	0.296			Detected data appear Gamma Distributed at 5% Significance Level			
717	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
718												
719	**Gamma Statistics on Detected Data Only**											
720					k hat (MLE)	3.292			k star (bias corrected MLE)	2.141		
721					Theta hat (MLE)	0.128			Theta star (bias corrected MLE)	0.197		
722					nu hat (MLE)	52.67			nu star (bias corrected)	34.25		
723					MLE Mean (bias corrected)	0.421						
724					MLE Sd (bias corrected)	0.288			95% Percentile of Chisquare (2kstar)	9.941		
725												
726	**Gamma ROS Statistics using Imputed Non-Detects**											
727	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
728	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

	A	B	C	D	E	F	G	H	I	J	K	L
729	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
730	This is especially true when the sample size is small.											
731	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
732					Minimum	0.17				Mean		0.413
733					Maximum	0.71				Median		0.392
734					SD	0.193				CV		0.467
735					k hat (MLE)	4.638				k star (bias corrected MLE)		3.619
736					Theta hat (MLE)	0.089				Theta star (bias corrected MLE)		0.114
737					nu hat (MLE)	120.6				nu star (bias corrected)		94.09
738					MLE Mean (bias corrected)	0.413				MLE Sd (bias corrected)		0.217
739					95% Percentile of Chisquare (2kstar)	14.41				90% Percentile		0.704
740					95% Percentile	0.822				99% Percentile		1.076
741	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
742	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
743					WH	HW					WH	HW
744				95% Approx. Gamma UTL with 95% Coverage	1.151	1.201				95% Approx. Gamma UPL	0.855	0.872
745				95% Gamma USL	1.021	1.055						
746												
747	**Estimates of Gamma Parameters using KM Estimates**											
748					Mean (KM)	0.421				SD (KM)		0.221
749					Variance (KM)	0.049				SE of Mean (KM)		0.0837
750					k hat (KM)	3.619				k star (KM)		2.835
751					nu hat (KM)	94.09				nu star (KM)		73.71
752					theta hat (KM)	0.116				theta star (KM)		0.149
753					80% gamma percentile (KM)	0.605				90% gamma percentile (KM)		0.757
754					95% gamma percentile (KM)	0.899				99% gamma percentile (KM)		1.207
755												
756	**The following statistics are computed using gamma distribution and KM estimates**											
757	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
758					WH	HW					WH	HW
759				95% Approx. Gamma UTL with 95% Coverage	1.307	1.376				95% Approx. Gamma UPL	0.941	0.963
760				95% KM Gamma Percentile	0.861	0.876				95% Gamma USL	1.145	1.191
761												
762	**Lognormal GOF Test on Detected Observations Only**											
763					Shapiro Wilk Test Statistic	0.821				**Shapiro Wilk GOF Test**		
764					10% Shapiro Wilk Critical Value	0.851				Data Not Lognormal at 10% Significance Level		
765					Lilliefors Test Statistic	0.264				**Lilliefors GOF Test**		
766					10% Lilliefors Critical Value	0.265				Detected Data appear Lognormal at 10% Significance Level		
767	**Detected Data appear Approximate Lognormal at 10% Significance Level**											
768												
769	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
770					Mean in Original Scale	0.403				Mean in Log Scale		-1.024
771					SD in Original Scale	0.194				SD in Log Scale		0.506
772					95% UTL95% Coverage	1.389				95% BCA UTL95% Coverage		0.71
773					95% Bootstrap (%) UTL95% Coverage	0.71				95% UPL (t)		0.916
774					90% Percentile (z)	0.687				95% Percentile (z)		0.826
775					99% Percentile (z)	1.166				95% USL		1.169
776												
777	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
778					KM Mean of Logged Data	-1.024				95% KM UTL (Lognormal)95% Coverage		1.693
779					KM SD of Logged Data	0.581				95% KM UPL (Lognormal)		1.051
780					95% KM Percentile Lognormal (z)	0.933				95% KM USL (Lognormal)		1.389

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782	**Background DL/2 Statistics Assuming Lognormal Distribution**											
783					Mean in Original Scale	0.571			Mean in Log Scale			-0.748
784					SD in Original Scale	0.354			SD in Log Scale			0.66
785					95% UTL95% Coverage	2.755			95% UPL (t)			1.602
786					90% Percentile (z)	1.102			95% Percentile (z)			1.4
787					99% Percentile (z)	2.194			95% USL			2.201
788	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
789												
790	**Nonparametric Distribution Free Background Statistics**											
791	**Data appear to follow a Discernible Distribution**											
792												
793	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
794					Order of Statistic, r	13			95% UTL with95% Coverage			2.5
795					Approx, f used to compute achieved CC	0.684			Approximate Actual Confidence Coefficient achieved by UTL			0.487
796					Approximate Sample Size needed to achieve specified CC	59			95% UPL			2.5
797					95% USL	2.5			95% KM Chebyshev UPL			1.423
798												
799	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
800	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
801	and consists of observations collected from clean unimpacted locations.											
802	The use of USL tends to provide a balance between false positives and false negatives provided the data											
803	represents a background data set and when many onsite observations need to be compared with the BTV.											
804												

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/11/2023 2:19:23 PM
From File	15 Central Tendency Comparison, Bellwether Mine and Culled Mineralized Background, values only.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: As Bell

Sample 2 Data: As Bkg

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	7	47
Number of Non-Detects	0	2
Number of Detect Data	7	45
Minimum Non-Detect	N/A	2
Maximum Non-Detect	N/A	2
Percent Non-detects	0.00%	4.26%
Minimum Detect	5	5.4
Maximum Detect	139	120
Mean of Detects	48.29	48.18
Median of Detects	12	43
SD of Detects	56.46	26.59

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	163
Standardized WMW U-Stat	-0.773
Mean (U)	164.5
SD(U) - Adj ties	38.83
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.78

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Uncensor Full Data Sets without NDs

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/11/2023 4:00:51 PM
From File	15 Central Tendency Comparison, Bellwether Mine and Culled Mineralized Background, values only.xls
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0.000
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Pb Bell

Sample 2 Data: Pb Bkg

Raw Statistics

	Sample 1	Sample 2
Number of Valid Observations	7	13
Number of Missing Observations	0	26
Number of Distinct Observations	6	13
Minimum	9.1	2.5
Maximum	21	18.4
Mean	13.44	10.71
Median	12	10.9
SD	4.14	5.135
SE of Mean	1.565	1.424

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	88.5
WMW U-Stat	60.5
Mean (U)	45.5
SD(U) - Adj ties	12.61
WMW U-Stat Critical Value (0.05)	66
Standardized WMW U-Stat	1.15
Approximate P-Value	0.125

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/11/2023 4:01:27 PM
From File	15 Central Tendency Comparison, Bellwether Mine and Culled Mineralized Background, values only.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Hg Bell

Sample 2 Data: Hg Bkg

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	7	13
Number of Missing Observations	0	26
Number of Non-Detects	2	9
Number of Detect Data	5	4
Minimum Non-Detect	0.2	0.04
Maximum Non-Detect	0.2	0.2
Percent Non-detects	28.57%	69.23%
Minimum Detect	0.018	0.21
Maximum Detect	0.32	0.3
Mean of Detects	0.174	0.24
Median of Detects	0.24	0.225
SD of Detects	0.144	0.0408

WMW test is meant for a Single Detection Limit Case

Use of Gehan or T-W test is suggested when multiple detection limits are present

All observations <= 0.2 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	83
WMW U-Stat	55
Mean (U)	45.5
SD(U) - Adj ties	12.62
WMW U-Stat Critical Value (0.05)	66
Standardized WMW U-Stat	0.837
Approximate P-Value	0.201

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/17/2024 5:15:47 PM
From File	16 Central Tendency Comparison, Background, Non-Mineralized, Locations HA-93, SOIL20, and SOIL26.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: As-All

Sample 2 Data: As-Culled

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	50	45
Number of Missing Observations	0	5
Number of Non-Detects	5	5
Number of Detect Data	45	40
Minimum Non-Detect	1	1
Maximum Non-Detect	2	2
Percent Non-detects	10.00%	11.11%
Minimum Detect	2	2
Maximum Detect	37.6	17.7
Mean of Detects	9.562	7.628
Median of Detects	7.5	7.15
SD of Detects	7.1	4.021

WMW test is meant for a Single Detection Limit Case

Use of Gehan or T-W test is suggested when multiple detection limits are present

All observations <= 2 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	2511
Standardized WMW U-Stat	0.823
Mean (U)	1125
SD(U) - Adj ties	134.1
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.205

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

P-Value >= alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/17/2024 5:26:49 PM
From File	16 Central Tendency Comparison, Background, Non-Mineralized, Locations HA-93, SOIL20, and SOIL26.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: As-All

Sample 2 Data: As-Culled

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	50	45
Number of Missing Observations	0	5
Number of Non-Detects	5	5
Number of Detect Data	45	40
Minimum Non-Detect	1	1
Maximum Non-Detect	2	2
Percent Non-detects	10.00%	11.11%
Minimum Detect	2	2
Maximum Detect	37.6	17.7
Mean of Detects	9.562	7.628
Median of Detects	7.5	7.15
SD of Detects	7.1	4.021
KM Mean	8.706	6.891
KM SD	7.139	4.284

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	0.548
Critical z (0.05)	1.645
P-Value	0.292

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

P-Value >= alpha (0.05)

Wilcoxon-Mann-Whitney Sample 1 vs Sample 2 Comparison Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/17/2024 5:26:07 PM
From File	16 Central Tendency Comparison, Background, Non-Mineralized, Locations HA-93, SOIL20, and SOIL26.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Hg-All

Sample 2 Data: Hg-Culled

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	41	37
Number of Missing Observations	7	11
Number of Non-Detects	19	17
Number of Detect Data	22	20
Minimum Non-Detect	0.01	0.01
Maximum Non-Detect	0.2	0.2
Percent Non-detects	46.34%	45.95%
Minimum Detect	0.017	0.017
Maximum Detect	0.34	0.34
Mean of Detects	0.0698	0.0604
Median of Detects	0.039	0.036
SD of Detects	0.0803	0.0716

WMW test is meant for a Single Detection Limit Case

Use of Gehan or T-W test is suggested when multiple detection limits are present

All observations <= 0.2 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Sample 1 <= Mean/Median of Sample 2

Sample 1 Rank Sum W-Stat	1636
Standardized WMW U-Stat	0.466
Mean (U)	758.5
SD(U) - Adj ties	99.93
Approximate U-Stat Critical Value (0.05)	1.645
P-Value (Adjusted for Ties)	0.321

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

P-Value >= alpha (0.05)

Gehan Sample 1 vs Sample 2 Comparison Hypothesis Test for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/17/2024 5:27:36 PM
From File	16 Central Tendency Comparison, Background, Non-Mineralized, Locations HA-93, SOIL20, and SOIL26.xls
Full Precision	OFF
Confidence Coefficient	95%
Selected Null Hypothesis	Sample 1 Mean/Median <= Sample 2 Mean/Median (Form 1)
Alternative Hypothesis	Sample 1 Mean/Median > Sample 2 Mean/Median

Sample 1 Data: Hg-All

Sample 2 Data: Hg-Culled

Raw Statistics

	Sample 1	Sample 2
Number of Valid Data	41	37
Number of Missing Observations	7	11
Number of Non-Detects	19	17
Number of Detect Data	22	20
Minimum Non-Detect	0.01	0.01
Maximum Non-Detect	0.2	0.2
Percent Non-detects	46.34%	45.95%
Minimum Detect	0.017	0.017
Maximum Detect	0.34	0.34
Mean of Detects	0.0698	0.0604
Median of Detects	0.039	0.036
SD of Detects	0.0803	0.0716
KM Mean	0.0539	0.0488
KM SD	0.0622	0.0555

Sample 1 vs Sample 2 Gehan Test

H0: Mean/Median of Sample 1 <= Mean/Median of background

Gehan z Test Value	0.16
Critical z (0.05)	1.645
P-Value	0.436

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Sample 1 <= Sample 2

P-Value >= alpha (0.05)

APPENDIX H

Table 1a - Contaminants of Concern, Lakebed Area, Comparison to Non-Mineralized Background
Oro de Amador
Jackson, California

Constituent	CAS No.	Unit	Max Detect for AOCs	EPC[1]	EPC Source	BTV[1]	BTV Source	Does the EPC exceed the Site background range?	Does the Max Detect exceed the Site background range?	Is the constituent considered a COC?
Antimony	7440-36-0	mg/kg	ND	na	na	1.1	Upper Range Bkg	no	no	no
Arsenic	7440-38-2	mg/kg	320	125	UCL	20.7	95% USL	**yes**	**yes**	**yes**
Barium	7440-39-3	mg/kg	178	105.6	UCL	768	Upper Range Bkg	no	no	no
Beryllium	7440-41-7	mg/kg	1.3	0.41	UCL	12	Upper Range Bkg	no	no	no
Cadmium	7440-43-9	mg/kg	2.5	0.84	UCL	2.9	95% USL	no	no	no
Chromium	16065-83-1	mg/kg	92.4	32.0	UCL	167	Upper Range Bkg	no	no	no
Cobalt	7440-48-4	mg/kg	34	12.5	UCL	101	Upper Range Bkg	no	no	no
Copper	7440-50-8	mg/kg	90.9	52.2	UCL	178	Upper Range Bkg	no	no	no
Lead	7439-92-1	mg/kg	102	33.4	UCL	26.3	95% USL	**yes**	**yes**	**yes**
Mercury	7439-97-6	mg/kg	9.7	2.38	UCL	0.23	95% USL	**yes**	**yes**	**yes**
Molybdenum	7439-98-7	mg/kg	3.9	2.54	UCL	3.7	Upper Range Bkg	no	**yes**	**yes**
Nickel	7440-02-0	mg/kg	67	32.7	UCL	111	Upper Range Bkg	no	no	no
Selenium	7782-49-2	mg/kg	4.0	1.26	UCL	2.5	95% USL	no	**yes**	**yes**
Silver	7440-22-4	mg/kg	1.0	0.46	UCL	2.5	95% USL	no	no	no
Thallium	7440-28-0	mg/kg	1.6	0.55	UCL	1.9	Upper Range Bkg	no	no	no
Vanadium	7440-62-2	mg/kg	121	32.4	UCL	130	Upper Range Bkg	no	no	no
Zinc	7440-66-6	mg/kg	118[a]	77.5	UCL	175	Upper Range Bkg	no	no	no
Cyanide	57-12-5	mg/kg	ND	na	na	ND	na	no	no	no

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022).
a = A single outlying zinc concentration (307 mg/kg, sample TP-18-1.5) was culled from the Lakebed Area dataset because it is associated with native soil rather than tailings.
BTV = background threshold value
COC = contaminant of concern
EPC = exposure point concentration
mg/kg = milligram per kilogram
na = not applicable
ND = not detected
Upper Range Bkg = upper range of detected site background concentrations
UCL = 95% upper confidence limit on arithmetic mean value

Table 1b - Constituents of Concern, Tailings Pile, Comparison to Non-Mineralized Background
Oro de Amador
Jackson, California

Constituent	CAS No.	Unit	Max Detect for AOCs	EPC[1]	EPC Source	BTV[1]	BTV Source	Does the EPC exceed the Site background range?	Does the Max Detect exceed the Site background range?	Is the constituent considered a COC?
Antimony	7440-36-0	mg/kg	1.0	1.0	Maximum Detection	1.1	Upper Range Bkg	no	no	no
Arsenic	7440-38-2	mg/kg	236	125	UCL	20.7	95% USL	**yes**	**yes**	**yes**
Barium	7440-39-3	mg/kg	226	97.8	UCL	768	Upper Range Bkg	no	no	no
Beryllium	7440-41-7	mg/kg	1.4	0.47	UCL	12	Upper Range Bkg	no	no	no
Cadmium	7440-43-9	mg/kg	4.4	1.39	UCL	2.9	95% USL	no	**yes**	**yes**
Chromium	16065-83-1	mg/kg	54	17.0	UCL	167	Upper Range Bkg	no	no	no
Cobalt	7440-48-4	mg/kg	29	12.4	UCL	101	Upper Range Bkg	no	no	no
Copper	7440-50-8	mg/kg	97.3	43.6	UCL	178	Upper Range Bkg	no	no	no
Lead	7439-92-1	mg/kg	400	50.5	UCL	26.3	95% USL	**yes**	**yes**	**yes**
Mercury	7439-97-6	mg/kg	15	3.20	UCL	0.23	95% USL	**yes**	**yes**	**yes**
Molybdenum	7439-98-7	mg/kg	5.50	2.3	UCL	3.7	Upper Range Bkg	no	**yes**	**yes**
Nickel	7440-02-0	mg/kg	43[a]	25.6	UCL	111	Upper Range Bkg	no	no	no
Selenium	7782-49-2	mg/kg	0.5	0.5	Maximum Detection	2.5	95% USL	no	no	no
Silver	7440-22-4	mg/kg	1.2	0.50	UCL	2.5	95% USL	no	no	no
Thallium	7440-28-0	mg/kg	ND	na	na	1.9	Upper Range Bkg	no	no	no
Vanadium	7440-62-2	mg/kg	121[b]	47.5	UCL	130	Upper Range Bkg	no	no	no
Zinc	7440-66-6	mg/kg	156	70.5	UCL	175	Upper Range Bkg	no	no	no
Cyanide	57-12-5	mg/kg	21.9	4.14	UCL	ND	na	**yes**	**yes**	**yes**

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022).
a = A single outlying nickel concentration (126 mg/kg, sample TP-12-4.5) was culled from the Tailings Pile dataset.
b = Two anomalous vanadium concentrations (148 mg/kg, 133 mg/kg) were culled from the Tailings Pile dataset because they are associated with soil and rock rather than tailings.
BTV = background threshold value
COC = contaminant of concern
EPC = exposure point concentration
mg/kg = milligram per kilogram
na = not applicable
ND = not detected
Upper Range Bkg = upper range of detected site background concentrations
UCL = 95% upper confidence limit on arithmetic mean value

Table 1c - Constituents of Concern, Cyanide Process Area, Comparison to Mineralized Background
Oro de Amador
Jackson, California

Constituent	CAS No.	Unit	Max Detect for AOCs	EPC[1]	EPC Source	BTV[1]	BTV Source	Does the EPC exceed the Site background range?	Does the Max Detect exceed the Site background range?	Is the constituent considered a COC?
Antimony	7440-36-0	mg/kg	5.8	5.8	Maximum Detection	20	Upper Range Bkg	no	no	no
Arsenic	7440-38-2	mg/kg	450	185	UCL	120	95% USL	**yes**	**yes**	**yes**
Barium	7440-39-3	mg/kg	158	100	UCL	230	Upper Range Bkg	no	no	no
Beryllium	7440-41-7	mg/kg	1.4	1.00	UCL	2.1	Upper Range Bkg	no	no	no
Cadmium	7440-43-9	mg/kg	2.7	2.2	UCL	5.4	95% USL	no	no	no
Chromium	16065-83-1	mg/kg	575[a]	470	UCL	943	Upper Range Bkg	no	no	no
Cobalt	7440-48-4	mg/kg	85.8	41.7	UCL	140	Upper Range Bkg	no	no	no
Copper	7440-50-8	mg/kg	92.9	76.5	UCL	170	Upper Range Bkg	no	no	no
Lead	7439-92-1	mg/kg	72	33.0	UCL	18.4	95% USL	**yes**	**yes**	**yes**
Mercury	7439-97-6	mg/kg	1.0	0.42	UCL	0.30	95% USL	**yes**	**yes**	**yes**
Molybdenum	7439-98-7	mg/kg	13.1	6.58	UCL	ND	na	**yes**	**yes**	**yes**
Nickel	7440-02-0	mg/kg	930[a]	509	UCL	1000	Upper Range Bkg	no	no	no
Selenium	7782-49-2	mg/kg	ND	na	na	2.5	95% USL	no	no	no
Silver	7440-22-4	mg/kg	2.1	1.51	UCL	2.5	95% USL	no	no	no
Thallium	7440-28-0	mg/kg	ND	na	na	0.96	na	no	no	no
Vanadium	7440-62-2	mg/kg	86.6	64.0	UCL	91	Upper Range Bkg	no	no	no
Zinc	7440-66-6	mg/kg	111	92.1	UCL	120	Upper Range Bkg	no	no	no
Cyanide	57-12-5	mg/kg	ND	na	na	ND	na	no	no	no

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022).
a = A single outlying chromium concentration (1,690 mg/kg, sample SURF-16-.0.0) is co-located with an anomalously high nickel concentration (1,340 mg/kg), and both were culled from the Cyanide Process Area dataset.
BTV = background threshold value
COC = contaminant of concern
EPC = exposure point concentration
mg/kg = milligram per kilogram
na = not applicable
ND = not detected
Upper Range Bkg = upper range of detected site background concentrations
UCL = 95% upper confidence limit on arithmetic mean value

Table 1d - Constituents of Concern, Bellwether Mine Waste Rock, Comparison to Mineralized Background
Oro de Amador
Jackson, California

Constituent	CAS No.	Unit	Max Detect for AOCs	EPC[1]	EPC Source	BTV[1]	BTV Source	Does the EPC exceed the Site background range?	Does the Max Detect exceed the Site background range?	Is the constituent considered a COC?
Antimony	7440-36-0	mg/kg	ND	na	Maximum Detection	20	Upper Range Bkg	no	no	no
Arsenic	7440-38-2	mg/kg	139	89.8	UCL	120	95% USL	no	yes	no
Barium	7440-39-3	mg/kg	131	131	Maximum Detection	230	Upper Range Bkg	no	no	no
Beryllium	7440-41-7	mg/kg	0.9	0.9	Maximum Detection	2.1	Upper Range Bkg	no	no	no
Cadmium	7440-43-9	mg/kg	5.0	5.0	Maximum Detection	5.4	95% USL	no	no	no
Chromium	16065-83-1	mg/kg	193	193	Maximum Detection	943	Upper Range Bkg	no	no	no
Cobalt	7440-48-4	mg/kg	43	43	Maximum Detection	140	Upper Range Bkg	no	no	no
Copper	7440-50-8	mg/kg	140	140	Maximum Detection	170	Upper Range Bkg	no	no	no
Lead	7439-92-1	mg/kg	21	16.5	UCL	18.4	95% USL	no	yes	no
Mercury	7439-97-6	mg/kg	0.32	0.24	UCL	0.30	95% USL	no	yes	no
Molybdenum	7439-98-7	mg/kg	ND	na	Maximum Detection	ND	na	no	no	no
Nickel	7440-02-0	mg/kg	174	174	Maximum Detection	1000	Upper Range Bkg	no	no	no
Selenium	7782-49-2	mg/kg	ND	na	na	2.5	95% USL	no	no	no
Silver	7440-22-4	mg/kg	ND	na	Maximum Detection	2.5	95% USL	no	no	no
Thallium	7440-28-0	mg/kg	ND	na	na	0.96	na	no	no	no
Vanadium	7440-62-2	mg/kg	81.0	81.0	Maximum Detection	91	Upper Range Bkg	no	no	no
Zinc	7440-66-6	mg/kg	98	98	Maximum Detection	120	Upper Range Bkg	no	no	no
Cyanide	57-12-5	mg/kg	ND	na	na	ND	na	no	no	no

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022).
a = A single outlying chromium concentration (1,690 mg/kg, sample SURF-16-.0.0) is co-located with an anomalously high nickel concentration (1,340 mg/kg), and both were culled from the Cyanide Process Area dataset.
BTV = background threshold value
COC = contaminant of concern
EPC = exposure point concentration
mg/kg = milligram per kilogram
na = not applicable
ND = not detected
Upper Range Bkg = upper range of detected site background concentrations
UCL = 95% upper confidence limit on arithmetic mean value

Table 1e - Constituents of Concern, Groundwater and Surface Water, Comparison to Upgradient Background
Oro de Amador
Jackson, California

Constituent	CAS No.	Unit	Maximum Detected Site Concentration			Maximum Detected Background Concentration			Is the constituent a COC?		
			Groundwater	Groundwater Seeps	Surface Water	Groundwater	Groundwater Seeps	Surface Water	**Groundwater:** Does the max site detection exceed groundwater site background (MW-5)?	**Groundwater Seeps:** Does the max site detection exceed groundwater site background (MW-5)?	**Surface water:** Does the max site detection exceed surface water background (SW-4, SW-5, SW-6)?
Arsenic	7440-38-2	mg/l	0.061	0.820	0.010	0.0023	na	ND	**yes**	**yes**	**yes**
Cadmium	7440-43-9	mg/l	ND	ND	ND	ND	na	ND	no	no	no
Iron	7439-89-6	mg/l	160	31	1.10	0.930	na	0.540	**yes**	**yes**	**yes**
Lead	7439-92-1	mg/l	0.002	0.0052	ND	ND	na	0.023	**yes**	**yes**	no
Manganese	7439-96-5	mg/l	2.70	4.4	0.110	0.370	na	0.052	**yes**	**yes**	**yes**
Mercury	7439-97-6	mg/l	ND	0.00039[a]	ND	ND	na	ND	no	no[a]	no
Molybdenum	7439-98-7	mg/l	ND	ND	ND	ND	na	ND	no	no	no
Selenium	7782-49-2	mg/l	ND	ND	ND	ND	na	ND	no	no	no
Silver	7440-22-4	mg/l	ND	ND	ND	ND	na	ND	no	no	no
Cyanide	57-12-5	mg/l	0.190	0.350	0.360	ND	na	ND	**yes**	**yes**	**yes**

Notes:
a = Mercury was detected in one unfiltered sample from seep location S-2 at 0.00039 mg/l but was not detected in the duplicate sample nor in filtered samples. The anomalous detection of mercury in the unfiltered sample is believed to be associated with suspended sediment in the water sample.
COC = contaminant of concern
EPC = exposure point concentration
mg/l = milligram per liter
na = not analyzed
ND = not detected

Table 2 - Toxicity Values
Oro de Amador
Jackson, California

Analyte	CAS No.	**RfDo** (mg/kg-day)		**RfDi** (mg/kg-day)			**SFo** $(mg/kg\text{-}day)^{-1}$		**SFi** $(mg/kg\text{-}day)^{-1}$			ABS
		value	source	RfCi (mg/m^3)	source	value	value	source	IUR $(ug/m^3)^{-1}$	source	value	
Antimony	7440-36-0	4.0.E-04	IRIS	--	--	--	--	--	--	--	--	0.01
Arsenic	7440-38-2	3.5E-06	OEHHA	1.5E-05	OEHHA	3.8E-06	9.5E+00	OEHHA PHG	4.3E-03	IRIS	1.7E+01	0.03
Barium	7440-39-3	2.0E-01	IRIS	5.0E-04	HEAST	1.3E-04	--	--	--	--	--	0.01
Beryllium and compounds	7440-41-7	2.0E-04	OEHHA PHG	7.0E-06	OEHHA	1.8E-06	--	--	2.4E-03	IRIS	9.6E+00	0.01
Cadmium	7440-43-9	1.0E-04	ATSDR	1.0E-05	ATSDR	2.5E-06	--	--	4.2E-03	OEHHA	1.7E+01	0.001
Chromium (III)	16065-83-1	1.5E+00	IRIS	--	--	--	--	--	--	--	--	0.01
Cobalt	7440-48-4	3.0E-04	PPRTV	6.0E-06	PPRTV	1.5E-06	--	--	9.0E-03	PPRTV	3.6E+01	0.01
Copper	7440-50-8	4.0E-02	HEAST	--	--	--	--	--	--	--	--	0.01
Lead	7439-92-1	Lead is evaluated using the LeadSpread 8 model (DTSC, 2011 Sept)										
Mercury	7439-97-6	1.6E-04	OEHHA	3.0E-05	OEHHA	7.5E-06	--	--	--	--	--	0.01
Molybdenum	7439-98-7	5.0E-03	IRIS	--	--	--	--	--	--	--	--	0.01
Nickel	7440-02-0	1.1E-02	OEHHA	1.4E-05	OEHHA	3.5E-06	--	--	2.6E-04	OEHHA	1.0E+00	0.01
Selenium	7782-49-2	5.0E-03	IRIS	2.0E-02	OEHHA	5.0E-03	--	--	--	--	--	0.01
Silver	7440-22-4	5.0E-03	IRIS	--	--	--	--	--	--	--	--	0.01
Thallium	7440-28-0	1.0E-05	PPRTV*	--	--	--	--	--	--	--	--	0.01
Vanadium	7440-62-2	5.0E-03	RSL	1.0E-04	ATSDR	2.5E-05	--	--	--	--	--	0.01
Zinc	7440-66-6	3.0E-01	IRIS	--	--	--	--	--	--	--	--	0.01
Cyanide	57-12-5	6.0E-04	IRIS	8.E-04	IRIS	2.0E-04	--	--	--	--	--	0.01

Notes:
Toxicity criteria from DTSC Human and Ecological Risk Office (HERO) Human Health Risk Assessment (HHRA) Note 10, Toxicity Criteria, February 25, 2109
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
ATSDR = Agency for Toxic Substances and Disease Registry
Conversions per Supplemental Guidance to RAGS: Region 4 Bulletins Human Health Risk Assessment (US EPA, November 1995), with updated body weight (DTSC, 2014)
HEAST = US EPA Office of Research and Development, Health Effects Assessment Summary Tables
IRIS = US EPA Integrated Risk Information System (http://www.epa.gov/iris/)
IUR = inhalation unit risk
OEHHA = CalEPA Office of Environmental Health Hazard Assessment
PPRTV = Provisional Peer Reviewed Toxicity Values, US EPA OSWER Office of Superfund Remediation Technology Inovation (OSRTI)
RfCi = reference concentraton for inhalation exposure
RfDi = reference dose for chronic inhalation exposure: RfDi [mg/kg-day] = RfCi $[mg/m^3]$ * (20 m^3/day) * $(80\ kg)^{-1}$
RfDo = reference dose for chronic oral exposure
RSL = USEPA Region IX RSL user guide Section 5: Value is based on IRIS oral RfD for Vanadium Pentoxide, factoring out the molecular weight (MW) of the oxide ion.
SFi = cancer slope factor for inhalation exposure: SFi $[(mg/kg\text{-}day)^{-1}]$ = IUR $[(ug/m^3)^{-1}]$ * $(10^3 ug/mg)$ * (80 kg) * $(20 m^3/day)^{-1}$.
SFo = cancer slope factor for oral exposure
* Appendix PPRTV Screen (see USEPA FAQ #27, http://www.epa.gov/region9/superfund/prg/)

Table 3a - Summary of Risk/Hazard Calculations for Standard Exposure Scenario (Unrestricted Land Use), Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	9.19E-08	1.30E+02	1.57E-02	1.30E+02	6.29E-04	1.95E-07	6.29E-04
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	1.75E-09	1.95E-01	2.16E+00	2.36E+00			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	1.87E-09	6.65E-03		6.65E-03			0.00E+00
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	9.26E-10	3.30E-03	1.18E-07	3.30E-03			0.00E+00
TOTAL									1.30E+02	2.18E+00	**1.3E+02**	6.29E-04	1.95E-07	**6.3E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 2.4E+00
Arsenic Hazard Quotient: 1.3.E+02
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 6.3E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-carcinogen)	6	20	yr	HERO HHRA Note No. 1
EFs, exposure frequency (ingestion)	350	350	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (dermal)	350	100	days/yr	PEA Guidance Manual
EFi, exposure frequency (inhalation)	350	350	days/yr	HERO HHRA Note No. 1
ED, exposure duration	6	20	yr	HERO HHRA Note No. 1
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission factor	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (OEHHA, November 2004, revised January 2005)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 3b - Summary of Risk/Hazard Calculations for Standard Exposure Scenario (Unrestricted Land Use), Tailings Pile, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	9.21E-08	1.30E+02	1.57E-02	1.30E+02	6.30E-04	1.95E-07	6.30E-04
Cadmium	UCL	1.0E-04	2.5E-06	--	1.7E+01	0.001	1.39	1.02E-09	1.78E-01	2.61E-04	1.78E-01		2.11E-09	2.11E-09
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	2.35E-09	2.61E-01	2.90E+00	3.16E+00			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.3	1.68E-09	5.98E-03		5.98E-03			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	3.04E-09	5.50E-02	9.73E-06	5.50E-02			0.00E+00
TOTAL									1.30E+02	2.92E+00	**1.3E+02**	6.30E-04	1.97E-07	**6.3E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 3.4E+00
Arsenic Hazard Quotient: 1.3.E+02
Risk excluding Arsenic: 2.1E-09
Arsenic Risk: 6.3E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinoge	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-car	6	20	yr	HERO HHRA Note No. 1
EFs, exposure frequency (inge	350	350	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (derr	350	100	days/yr	PEA Guidance Manual
EFi, exposure frequency (inhal	350	350	days/yr	HERO HHRA Note No. 1
ED, exposure duration	6	20	yr	HERO HHRA Note No. 1
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (OEHHA, November 2004, revised January 2005)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 3c - Summary of Risk/Hazard Calculations for Standard Exposure Scenario (Unrestricted Land Use), Cyanide Process Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	185	1.36E-07	2.03E+02	2.32E-02	2.03E+02	9.61E-04	2.88E-07	9.62E-04
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	3.09E-10	3.44E-02	3.81E-01	4.16E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	4.84E-09	1.72E-02		1.72E-02			0.00E+00
TOTAL									2.03E+02	4.05E-01	**2.0E+02**	9.61E-04	2.88E-07	**9.6E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 4.3E-01
Arsenic Hazard Quotient: 2.0.E+02
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 9.6E-04
Arsenic RBA (%): 23

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinoge	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-car	6	20	yr	HERO HHRA Note No. 1
EFs, exposure frequency (inge	350	350	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (derr	350	100	days/yr	PEA Guidance Manual
EFi, exposure frequency (inhal	350	350	days/yr	HERO HHRA Note No. 1
ED, exposure duration	6	20	yr	HERO HHRA Note No. 1
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission facto	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (OEHHA, November 2004, revised January 2005)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 4a - Summary of Risk/Hazard Calculations for Standard Exposure Scenario (Unrestricted Land Use), Lakebed Area, All Detected Constituents
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Antimony	na	4.0E-04	--	--	--	0.01	ND							
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	9.17E-08	1.29E+02	1.56E-02	1.29E+02	6.27E-04	1.94E-07	6.27E-04
Barium	UCL	2.0E-01	1.3E-04	--	--	0.01	105.6	7.76E-08	6.91E-03	3.97E-04	7.31E-03			0.00E+00
Beryllium	UCL	2.0E-04	1.8E-06	--	9.6E+00	0.01	0.41	2.98E-10	2.65E-02	1.09E-04	2.66E-02		3.52E-10	3.52E-10
Cadmium	UCL	1.0E-04	2.5E-06	--	1.7E+01	0.001	0.84	6.18E-10	1.08E-01	1.58E-04	1.08E-01		1.28E-09	1.28E-09
Chromium	UCL	1.5E+00	--	--	--	0.01	32.0	2.35E-08	2.79E-04		2.79E-04			0.00E+00
Cobalt	UCL	3.0E-04	1.5E-06	--	3.6E+01	0.01	12.5	9.18E-09	5.45E-01	3.91E-03	5.49E-01		4.08E-08	4.08E-08
Copper	UCL	4.0E-02	--	--	--	0.01	52.2	3.84E-08	1.71E-02		1.71E-02			0.00E+00
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	1.75E-09	1.94E-01	2.16E+00	2.35E+00			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	1.87E-09	6.65E-03		6.65E-03			0.00E+00
Nickel	UCL	1.1E-02	3.5E-06	--	1.0E+00	0.01	32.7	2.41E-08	3.89E-02	4.40E-03	4.33E-02		3.09E-09	3.09E-09
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	9.26E-10	3.30E-03	1.18E-07	3.30E-03			0.00E+00
Silver	UCL	5.0E-03	--	--	--	0.01	0.46	3.41E-10	1.21E-03		1.21E-03			0.00E+00
Thallium	UCL	1.0E-05	--	--	--	0.01	0.55	4.02E-10	7.16E-01		7.16E-01			0.00E+00
Vanadium	UCL	5.0E-03	2.5E-05	--	--	0.01	32.4	2.38E-08	8.47E-02	6.09E-04	8.53E-02			0.00E+00
Zinc	UCL	3.0E-01	--	--	--	0.01	77.5	5.70E-08	3.38E-03		3.38E-03			0.00E+00
Cyanide	na	6.0E-04	2.0E-04	--	--	0.01	ND							
TOTAL									1.31E+02	2.18E+00	**1.3E+02**	6.27E-04	2.40E-07	**6.3E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 3.9E+00
Arsenic Hazard Quotient: 1.3.E+02
Risk excluding Arsenic: 4.5E-08
Arsenic Risk: 6.3E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinog	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-ca	6	20	yr	HERO HHRA Note No. 1
EFs, exposure frequency (inge	350	350	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (der	350	100	days/yr	PEA Guidance Manual
EFi, exposure frequency (inha	350	350	days/yr	HERO HHRA Note No. 1
ED, exposure duration	6	20	yr	HERO HHRA Note No. 1
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (OEHHA, November 2004, revised January 2005)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 4b - Summary of Risk/Hazard Calculations for Standard Exposure Scenario (Unrestricted Land Use), Tailings Pile, All Detected Constituents
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Antimony	Max	4.0E-04	--	--	--	0.01	1.0	7.35E-10	3.27E-02		3.27E-02			0.00E+00
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	9.21E-08	1.30E+02	1.57E-02	1.30E+02	6.30E-04	1.95E-07	6.30E-04
Barium	UCL	2.0E-01	1.3E-04	--	--	0.01	97.8	7.19E-08	6.40E-03	3.68E-04	6.77E-03			0.00E+00
Beryllium	UCL	2.0E-04	1.8E-06	--	9.6E+00	0.01	0.47	3.43E-10	3.05E-02	1.25E-04	3.06E-02		4.06E-10	4.06E-10
Cadmium	UCL	1.0E-04	2.5E-06	--	1.7E+01	0.001	1.39	1.02E-09	1.78E-01	2.61E-04	1.78E-01		2.11E-09	2.11E-09
Chromium	UCL	1.5E+00	--	--	--	0.01	17.0	1.25E-08	1.48E-04		1.48E-04			0.00E+00
Cobalt	UCL	3.0E-04	1.5E-06	--	3.6E+01	0.01	12.4	9.13E-09	5.41E-01	3.89E-03	5.45E-01		4.05E-08	4.05E-08
Copper	UCL	4.0E-02	--	--	--	0.01	43.6	3.20E-08	1.43E-02		1.43E-02			0.00E+00
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	2.35E-09	2.61E-01	2.90E+00	3.16E+00			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.3	1.68E-09	5.98E-03		5.98E-03			0.00E+00
Nickel	UCL	1.1E-02	3.5E-06	--	1.0E+00	0.01	25.6	1.88E-08	3.04E-02	3.44E-03	3.39E-02		2.41E-09	2.41E-09
Selenium	Max	5.0E-03	5.0E-03	--	--	0.01	0.5	3.68E-10	1.31E-03	4.70E-08	1.31E-03			0.00E+00
Silver	UCL	5.0E-03	--	--	--	0.01	0.50	3.65E-10	1.30E-03		1.30E-03			0.00E+00
Thallium	na	1.0E-05	--	--	--	0.01	ND							
Vanadium	UCL	5.0E-03	2.5E-05	--	--	0.01	47.5	3.49E-08	1.24E-01	8.93E-04	1.25E-01			0.00E+00
Zinc	UCL	3.0E-01	--	--	--	0.01	70.5	5.19E-08	3.08E-03		3.08E-03			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	3.04E-09	5.50E-02	9.73E-06	5.50E-02			0.00E+00
TOTAL									1.31E+02	2.93E+00	**1.3E+02**	6.30E-04	2.41E-07	**6.3E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 4.2E+00
Arsenic Hazard Quotient: 1.3.E+02
Risk excluding Arsenic: 4.5E-08
Arsenic Risk: 6.3E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinog	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-ca	6	20	yr	HERO HHRA Note No. 1
EFs, exposure frequency (inge	350	350	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (der	350	100	days/yr	PEA Guidance Manual
EFi, exposure frequency (inha	350	350	days/yr	HERO HHRA Note No. 1
ED, exposure duration	6	20	yr	HERO HHRA Note No. 1
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (OEHHA, November 2004, revised January 2005)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 4c - Summary of Risk/Hazard Calculations for Standard Exposure Scenario (Unrestricted Land Use), Cyanide Process Area, All Detected Constituents
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Antimony	Max	4.0E-04	--	--	--	0.01	5.8	4.26E-09	1.90E-01		1.90E-01			0.00E+00
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	185	1.36E-07	2.03E+02	2.32E-02	2.03E+02	9.61E-04	2.88E-07	9.62E-04
Barium	UCL	2.0E-01	1.3E-04	--	--	0.01	100	7.34E-08	6.53E-03	3.75E-04	6.91E-03			0.00E+00
Beryllium	UCL	2.0E-04	1.8E-06	--	9.6E+00	0.01	1.00	7.35E-10	6.54E-02	2.69E-04	6.57E-02		8.70E-10	8.70E-10
Cadmium	UCL	1.0E-04	2.5E-06	--	1.7E+01	0.001	2.2	1.59E-09	2.78E-01	4.08E-04	2.78E-01		3.30E-09	3.30E-09
Chromium	UCL	1.5E+00	--	--	--	0.01	470	3.46E-07	4.10E-03		4.10E-03			0.00E+00
Cobalt	UCL	3.0E-04	1.5E-06	--	3.6E+01	0.01	41.7	3.07E-08	1.82E+00	1.31E-02	1.83E+00		1.36E-07	1.36E-07
Copper	UCL	4.0E-02	--	--	--	0.01	76.5	5.62E-08	2.50E-02		2.50E-02			0.00E+00
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	3.09E-10	3.44E-02	3.81E-01	4.16E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	4.84E-09	1.72E-02		1.72E-02			0.00E+00
Nickel	UCL	1.1E-02	3.5E-06	--	1.0E+00	0.01	509	3.74E-07	6.06E-01	6.84E-02	6.74E-01		4.80E-08	4.80E-08
Selenium	na	5.0E-03	5.0E-03	--	--	0.01	ND							
Silver	UCL	5.0E-03	--	--	--	0.01	1.51	1.11E-09	3.94E-03		3.94E-03			0.00E+00
Thallium	na	1.0E-05	--	--	--	0.01	ND							
Vanadium	UCL	5.0E-03	2.5E-05	--	--	0.01	64.0	4.71E-08	1.68E-01	1.20E-03	1.69E-01			0.00E+00
Zinc	UCL	3.0E-01	--	--	--	0.01	92.1	6.77E-08	4.02E-03		4.02E-03			0.00E+00
Cyanide	na	6.0E-04	2.0E-04	--	--	0.01	ND							
TOTAL									2.06E+02	4.88E-01	**2.1E+02**	9.61E-04	4.76E-07	**9.6E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 3.7E+00
Arsenic Hazard Quotient: 2.0.E+02
Risk excluding Arsenic: 1.9E-07
Arsenic Risk: 9.6E-04
Arsenic RBA (%): 23

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinog	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-ca	6	20	yr	HERO HHRA Note No. 1
EFs, exposure frequency (inge	350	350	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (der	350	100	days/yr	PEA Guidance Manual
EFi, exposure frequency (inha	350	350	days/yr	HERO HHRA Note No. 1
ED, exposure duration	6	20	yr	HERO HHRA Note No. 1
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (OEHHA, November 2004, revised January 2005)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 5a - Summary of Risk/Hazard Calculations for Industrial Land Use, Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	$Hazard_{soil}$	$Hazard_{air}$	Hazard, soil + air	$Risk_{soil}$	$Risk_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	125	9.19E-08	1.76E+01	2.94E-03	1.76E+01	2.09E-04	6.77E-08	2.09E-04
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	1.75E-09	1.43E-02	5.15E-01	5.29E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	1.87E-09	4.87E-04		4.87E-04			0.00E+00
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	9.26E-10	2.42E-04	2.22E-08	2.42E-04			0.00E+00
TOTAL									1.76E+01	5.17E-01	**1.8E+01**	2.09E-04	6.77E-08	**2.1E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 5.3.E-01
Arsenic Hazard Quotient: 1.8.E+01
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 2.1E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carci	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non	--	25	yr	HERO HHRA Note No. 1
EFs, exposure frequency (	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (i	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	25	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	100	mg/day	USEPA Supplemental Guidance
IRa, inhalation rate	--	14	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface a	--	6,032	cm^2	USEPA Risk Assessment Guidance
AF, adherance factor	--	0.2	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission f	--	1.36E+09	m^3/kg	HERO HHRA Note No. 1

USEPA Exposure Factors Handbook (EPA/600/P-95/002Fa)
USEPA Risk Assessment Guidance for Superfund (RAGS), Part E, Chapter 3 and Appendix C (2004)
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) December 2002.
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 5b - Summary of Risk/Hazard Calculations for Industrial Land Use, Tailings Pile, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	125	9.21E-08	1.76E+01	2.94E-03	1.76E+01	2.09E-04	6.78E-08	2.09E-04
Cadmium	UCL	1.0E-04	2.5E-06	--	1.68E+01	0.001	1.39	1.02E-09	1.20E-02	4.89E-05	1.21E-02		7.33E-10	7.33E-10
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	2.35E-09	1.92E-02	6.91E-01	7.10E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.3	1.68E-09	4.38E-04		4.38E-04			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	3.04E-09	4.26E-03	1.82E-06	4.26E-03			0.00E+00
TOTAL									1.76E+01	6.94E-01	**1.8E+01**	2.09E-04	6.85E-08	**2.1E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 7.3.E-01
Arsenic Hazard Quotient: 1.8.E+01
Risk excluding Arsenic: 7.3E-10
Arsenic Risk: 2.1E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carci	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non	--	25	yr	HERO HHRA Note No. 1
EFs, exposure frequency (	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (i	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	25	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	100	mg/day	USEPA Supplemental Guidance
IRa, inhalation rate	--	14	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface a	--	6,032	cm^2	USEPA Risk Assessment Guidance
AF, adherance factor	--	0.2	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission f	--	1.36E+09	m^3/kg	HERO HHRA Note No. 1

USEPA Exposure Factors Handbook (EPA/600/P-95/002Fa)
USEPA Risk Assessment Guidance for Superfund (RAGS), Part E, Chapter 3 and Appendix C (2004)
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) December 2002.
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 5c - Summary of Risk/Hazard Calculations for Industrial Land Use, Cyanide Process Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	$Hazard_{soil}$	$Hazard_{air}$	Hazard, soil + air	$Risk_{soil}$	$Risk_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	185	1.36E-07	2.67E+01	4.34E-03	2.67E+01	3.18E-04	1.00E-07	3.18E-04
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	3.09E-10	2.52E-03	9.08E-02	9.33E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	4.84E-09	1.26E-03		1.26E-03			0.00E+00
TOTAL									2.67E+01	9.51E-02	**2.7E+01**	3.18E-04	1.00E-07	**3.2E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 9.5.E-02
Arsenic Hazard Quotient: 2.7.E+01
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 3.2E-04
Arsenic RBA (%): 23

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carci	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non	--	25	yr	HERO HHRA Note No. 1
EFs, exposure frequency (	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (i	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	25	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	100	mg/day	USEPA Supplemental Guidance
IRa, inhalation rate	--	14	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface a	--	6,032	cm^2	USEPA Risk Assessment Guidance
AF, adherance factor	--	0.2	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission f	--	1.36E+09	m^3/kg	HERO HHRA Note No. 1

USEPA Exposure Factors Handbook (EPA/600/P-95/002Fa)
USEPA Risk Assessment Guidance for Superfund (RAGS), Part E, Chapter 3 and Appendix C (2004)
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) December 2002.
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 6a - Summary of Risk/Hazard Calculations for Indoor Commercial Scenario, Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	125	9.19E-08	9.31E+00	2.94E-03	9.31E+00	1.11E-04	6.77E-08	1.11E-04
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	1.75E-09	7.21E-03	5.15E-01	5.22E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	1.87E-09	2.46E-04		2.46E-04			0.00E+00
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	9.26E-10	1.22E-04	2.22E-08	1.22E-04			0.00E+00
TOTAL									9.32E+00	5.17E-01	**9.8E+00**	1.11E-04	6.77E-08	**1.1E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 5.2.E-01
Arsenic Hazard Quotient: 9.3.E+00
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 1.1E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinc	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-c	--	25	yr	HERO HHRA Note No. 1
EFs, exposure frequency (in	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (d	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (inl	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	25	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	50	mg/day	USEPA Supplemental Guidance
IRa, inhalation rate	--	14	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface ar	--	3,300	cm^2	USEPA Risk Assessment Guidance
AF, adherance factor	--	0.2	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fa	--	1.36E+09	m^3/kg	HERO HHRA Note No. 1

USEPA Exposure Factors Handbook (EPA/600/P-95/002Fa)
USEPA Risk Assessment Guidance for Superfund (RAGS), Part E, Chapter 3 and Appendix C (2004)
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) December 2002.
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 6b - Summary of Risk/Hazard Calculations for Indoor Commercial Scenario, Tailings PIIe, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	$Hazard_{soil}$	$Hazard_{air}$	Hazard, soil + air	$Risk_{soil}$	$Risk_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	125	9.21E-08	9.33E+00	2.94E-03	9.33E+00	1.11E-04	6.78E-08	1.11E-04
Cadmium	UCL	1.0E-04	2.5E-06	--	1.68E+01	0.001	1.39	1.02E-09	6.02E-03	4.89E-05	6.06E-03		7.33E-10	7.33E-10
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	2.35E-09	9.68E-03	6.91E-01	7.01E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.3	1.68E-09	2.21E-04		2.21E-04			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	3.04E-09	2.16E-03	1.82E-06	2.16E-03			0.00E+00
TOTAL									9.34E+00	6.94E-01	**1.0E+01**	1.11E-04	6.85E-08	**1.1E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 7.1.E-01
Arsenic Hazard Quotient: 9.3.E+00
Risk excluding Arsenic: 7.3E-10
Arsenic Risk: 1.1E-04
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinc	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-c	--	25	yr	HERO HHRA Note No. 1
EFs, exposure frequency (in	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (d	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (inl	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	25	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	50	mg/day	USEPA Supplemental Guidance
IRa, inhalation rate	--	14	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface ar	--	3,300	cm^2	USEPA Risk Assessment Guidance
AF, adherance factor	--	0.2	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fa	--	1.36E+09	m^3/kg	HERO HHRA Note No. 1

USEPA Exposure Factors Handbook (EPA/600/P-95/002Fa)
USEPA Risk Assessment Guidance for Superfund (RAGS), Part E, Chapter 3 and Appendix C (2004)
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) December 2002.
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 6c - Summary of Risk/Hazard Calculations for Indoor Commercial Scenario, Cyanide Process Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	185	1.36E-07	1.41E+01	4.34E-03	1.41E+01	1.68E-04	1.00E-07	1.68E-04
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	3.09E-10	1.27E-03	9.08E-02	9.21E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	4.84E-09	6.38E-04		6.38E-04			0.00E+00
TOTAL									1.41E+01	9.51E-02	**1.4E+01**	1.68E-04	1.00E-07	**1.7E-04**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 9.3.E-02
Arsenic Hazard Quotient: 1.4.E+01
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 1.7E-04
Arsenic RBA (%): 23

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinc	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-c	--	25	yr	HERO HHRA Note No. 1
EFs, exposure frequency (in	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (d	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (inl	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	25	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	50	mg/day	USEPA Supplemental Guidance
IRa, inhalation rate	--	14	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface ar	--	3,300	cm^2	USEPA Risk Assessment Guidance
AF, adherance factor	--	0.2	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fa	--	1.36E+09	m^3/kg	HERO HHRA Note No. 1

USEPA Exposure Factors Handbook (EPA/600/P-95/002Fa)
USEPA Risk Assessment Guidance for Superfund (RAGS), Part E, Chapter 3 and Appendix C (2004)
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) December 2002.
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 7a - Summary of Risk/Hazard Calculations for Adult Recreational Trail Runner Exposure Scenario, Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	125	1.25E-04	1.13E+00	1.02E+00	2.15E+00	1.62E-05	2.81E-05	4.43E-05
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	2.38E-06	4.82E-04	5.15E-02	5.19E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	2.54E-06	1.65E-05		1.65E-05			0.00E+00
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	1.26E-06	8.17E-06	7.69E-06	1.59E-05			0.00E+00
TOTAL									1.14E+00	1.07E+00	**2.2E+00**	1.62E-05	2.81E-05	**4.4E-05**

Notes:
1 Cadmium hazard evaluated per HHRA Note 3 (DTSC, 2016) considering 26-year adult exposure
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
na= not applicable
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 5.2E-02 Risk excluding Arsenic: 0.0E+00
Arsenic Hazard Quotient: 2.2.E+00 Arsenic Risk: 4.4E-05
Arsenic RBA (%): 21.3

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	na	70	yr	DTSC, 2006
ATnc, averaging time (non-carcin	na	30	yr	DTSC, 2006
EFs, exposure frequency (ingesti	na	200	days/yr	DTSC, 2006
EFd, exposure frequency (dermal	na	200	days/yr	DTSC, 2006
EFi, exposure frequency (inhalati	na	200	days/yr	DTSC, 2006
ED, exposure duration	na	30	yr	DTSC, 2006
ET, exposure time	na	1	hr/day	DTSC, 2006
IRs, soil ingestion rate	na	3	mg/day	DTSC, 2006 (100 x default (0.03 mg/hr) = 3 mg/hr; 3 mg/hr x 1 hr/day = 3 mg/day)
IRa, inhalation rate	na	3.9	m^3/day	DTSC, 2006 (from USEPA EFH 1997; 3.9 m^3/hr x 1 hr/day = 3.9 m^3/day)
BW, body weight	na	70	kg	DTSC, 2006 (more conservative than HERO HHRA Note No. 1 [DTSC, 2014])
SA, exposed skin surface area	na	5,700	cm^2	DTSC, 2006 (corresponding to runner BW from DTSC, 2006)
AF, adherance factor	na	0.2	mg/cm^2	DTSC, 2006
PEF, particulate emission factor	na	1.0E+06	m^3/kg	DTSC, 2006
Absorption correction factor	na	0.1	unitless	DTSC, 2006 (default is 24 hr/day; 0.1 x 24 hr/day = 2.4 hr/day)

DTSC = California Department of Toxic Substances Control
HERO = Office of Human and Ecological Risk (formerly Human and Ecological Risk Division [HERD])
DTSC, 2006 = HERD Memorandum titled Remediation Goals for the Recreational Runner on Trails, Empire Mine State Historical Park, Grass Valley (September 29, 2006)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, September 2014.
HERO Human Health Risk Assessment Note No. 3, Recommended methodology for use of U.S. EPA Regional Screening Levels (RSLs) in the Human Health Risk Assessment process at hazardous waste sites and permitted facilities, January 2016.

Table 7b - Summary of Risk/Hazard Calculations for Adult Recreational Trail Runner Exposure Scenario, Tailings Pile, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	125	1.25E-04	1.14E+00	1.02E+00	2.16E+00	1.62E-05	2.82E-05	4.44E-05
Cadmium	UCL	1.0E-04	2.5E-06	--	1.68E+01	0.001	1.39	1.39E-06	3.38E-04	1.69E-02	1.73E-02		3.05E-07	3.05E-07
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	3.20E-06	6.47E-04	6.91E-02	6.97E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.3	2.28E-06	1.48E-05		1.48E-05			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	4.14E-06	2.24E-04	2.62E-05	2.50E-04			0.00E+00
TOTAL									1.14E+00	1.11E+00	**2.2E+00**	1.62E-05	2.85E-05	**4.5E-05**

Notes:
1 Cadmium hazard evaluated per HHRA Note 3 (DTSC, 2016) considering 26-year adult exposure
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
na= not applicable
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 8.7E-02 Risk excluding Arsenic: 3.0E-07
Arsenic Hazard Quotient: 2.2.E+00 Arsenic Risk: 4.4E-05
Arsenic RBA (%): 21.3

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	na	70	yr	DTSC, 2006
ATnc, averaging time (non-carcin	na	30	yr	DTSC, 2006
EFs, exposure frequency (ingestio	na	200	days/yr	DTSC, 2006
EFd, exposure frequency (dermal	na	200	days/yr	DTSC, 2006
EFi, exposure frequency (inhalatio	na	200	days/yr	DTSC, 2006
ED, exposure duration	na	30	yr	DTSC, 2006
ET, exposure time	na	1	hr/day	DTSC, 2006
IRs, soil ingestion rate	na	3	mg/day	DTSC, 2006 (100 x default (0.03 mg/hr) = 3 mg/hr; 3 mg/hr x 1 hr/day = 3 mg/day)
IRa, inhalation rate	na	3.9	m^3/day	DTSC, 2006 (from USEPA EFH 1997; 3.9 m^3/hr x 1 hr/day = 3.9 m^3/day)
BW, body weight	na	70	kg	DTSC, 2006 (more conservative than HERO HHRA Note No. 1 [DTSC, 2014])
SA, exposed skin surface area	na	5,700	cm^2	DTSC, 2006 (corresponding to runner BW from DTSC, 2006)
AF, adherance factor	na	0.2	mg/cm^2	DTSC, 2006
PEF, particulate emission factor	na	1.0E+06	m^3/kg	DTSC, 2006
Absorption correction factor	na	0.1	unitless	DTSC, 2006 (default is 24 hr/day; 0.1 x 24 hr/day = 2.4 hr/day)

DTSC = California Department of Toxic Substances Control
HERO = Office of Human and Ecological Risk (formerly Human and Ecological Risk Division [HERD])
DTSC, 2006 = HERD Memorandum titled Remediation Goals for the Recreational Runner on Trails, Empire Mine State Historical Park, Grass Valley (September 29, 2006)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, September 2014.
HERO Human Health Risk Assessment Note No. 3, Recommended methodology for use of U.S. EPA Regional Screening Levels (RSLs) in the Human Health Risk Assessment process at hazardous waste sites and permitted facilities, January 2016.

Table 7c - Summary of Risk/Hazard Calculations for Adult Recreational Trail Runner Exposure Scenario, Cyanide Process Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	185	1.85E-04	1.70E+00	1.50E+00	3.20E+00	2.42E-05	4.16E-05	6.58E-05
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	4.20E-07	8.51E-05	9.08E-03	9.17E-03			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	6.58E-06	4.27E-05		4.27E-05			0.00E+00
TOTAL									1.70E+00	1.51E+00	**3.2E+00**	2.42E-05	4.16E-05	**6.6E-05**

Notes:
1 Cadmium hazard evaluated per HHRA Note 3 (DTSC, 2016) considering 26-year adult exposure
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
na= not applicable
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 9.2E-03
Arsenic Hazard Quotient: 3.2.E+00
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 6.6E-05
Arsenic RBA (%): 23

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	na	70	yr	DTSC, 2006
ATnc, averaging time (non-carcin	na	30	yr	DTSC, 2006
EFs, exposure frequency (ingestio	na	200	days/yr	DTSC, 2006
EFd, exposure frequency (dermal	na	200	days/yr	DTSC, 2006
EFi, exposure frequency (inhalatio	na	200	days/yr	DTSC, 2006
ED, exposure duration	na	30	yr	DTSC, 2006
ET, exposure time	na	1	hr/day	DTSC, 2006
IRs, soil ingestion rate	na	3	mg/day	DTSC, 2006 (100 x default (0.03 mg/hr) = 3 mg/hr; 3 mg/hr x 1 hr/day = 3 mg/day)
IRa, inhalation rate	na	3.9	m^3/day	DTSC, 2006 (from USEPA EFH 1997; 3.9 m^3/hr x 1 hr/day = 3.9 m^3/day)
BW, body weight	na	70	kg	DTSC, 2006 (more conservative than HERO HHRA Note No. 1 [DTSC, 2014])
SA, exposed skin surface area	na	5,700	cm^2	DTSC, 2006 (corresponding to runner BW from DTSC, 2006)
AF, adherance factor	na	0.2	mg/cm^2	DTSC, 2006
PEF, particulate emission factor	na	1.0E+06	m^3/kg	DTSC, 2006
Absorption correction factor	na	0.1	unitless	DTSC, 2006 (default is 24 hr/day; 0.1 x 24 hr/day = 2.4 hr/day)

DTSC = California Department of Toxic Substances Control
HERO = Office of Human and Ecological Risk (formerly Human and Ecological Risk Division [HERD])
DTSC, 2006 = HERD Memorandum titled Remediation Goals for the Recreational Runner on Trails, Empire Mine State Historical Park, Grass Valley (September 29, 2006)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, September 2014.
HERO Human Health Risk Assessment Note No. 3, Recommended methodology for use of U.S. EPA Regional Screening Levels (RSLs) in the Human Health Risk Assessment process at hazardous waste sites and permitted facilities, January 2016.

Table 7d - Summary of Risk/Hazard Calculations for Adult Recreational Trail Runner Exposure Scenario, Western Area and Southern Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.50E+00	1.72E+01	0.03	39.8	3.98E-05	3.61E-01	3.24E-01	6.85E-01	5.15E-06	8.96E-06	1.41E-05
Cadmium	Max Detection	1.0E-04	2.5E-06	--	1.68E+01	0.001	0.95	9.50E-07	2.32E-04	1.16E-02	1.18E-02		2.09E-07	2.09E-07
Mercury	Max Detection	1.6E-04	7.5E-06	--	--	0.01	1.2	1.20E-06	2.43E-04	2.59E-02	2.62E-02			0.00E+00
Molybdenum	Max Detection	5.0E-03	--	--	--	0.01	1.3	1.30E-06	8.43E-06		8.43E-06			0.00E+00
Selenium	Not Detected	5.0E-03	5.0E-03	--	--	0.01	ND				0.00E+00			0.00E+00
Cyanide	Not Detected	6.0E-04	2.0E-04	--	--	0.01	ND				0.00E+00			0.00E+00
TOTAL									3.62E-01	3.62E-01	**7.2E-01**	5.15E-06	9.17E-06	**1.4E-05**

Notes:
1 Cadmium hazard evaluated per HHRA Note 3 (DTSC, 2016) considering 26-year adult exposure
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
na= not applicable
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 3.8E-02
Arsenic Hazard Quotient: 6.9.E-01
Risk excluding Arsenic: 2.1E-07
Arsenic Risk: 1.4E-05
Arsenic RBA (%): 21.3

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	na	70	yr	DTSC, 2006
ATnc, averaging time (non-carcin	na	30	yr	DTSC, 2006
EFs, exposure frequency (ingestio	na	200	days/yr	DTSC, 2006
EFd, exposure frequency (dermal	na	200	days/yr	DTSC, 2006
EFi, exposure frequency (inhalatio	na	200	days/yr	DTSC, 2006
ED, exposure duration	na	30	yr	DTSC, 2006
ET, exposure time	na	1	hr/day	DTSC, 2006
IRs, soil ingestion rate	na	3	mg/day	DTSC, 2006 (100 x default (0.03 mg/hr) = 3 mg/hr; 3 mg/hr x 1 hr/day = 3 mg/day)
IRa, inhalation rate	na	3.9	m^3/day	DTSC, 2006 (from USEPA EFH 1997; 3.9 m^3/hr x 1 hr/day = 3.9 m^3/day)
BW, body weight	na	70	kg	DTSC, 2006 (more conservative than HERO HHRA Note No. 1 [DTSC, 2014])
SA, exposed skin surface area	na	5,700	cm^2	DTSC, 2006 (corresponding to runner BW from DTSC, 2006)
AF, adherance factor	na	0.2	mg/cm^2	DTSC, 2006
PEF, particulate emission factor	na	1.0E+06	m^3/kg	DTSC, 2006
Absorption correction factor	na	0.1	unitless	DTSC, 2006 (default is 24 hr/day; 0.1 x 24 hr/day = 2.4 hr/day)

DTSC = California Department of Toxic Substances Control
HERO = Office of Human and Ecological Risk (formerly Human and Ecological Risk Division [HERD])
DTSC, 2006 = HERD Memorandum titled Remediation Goals for the Recreational Runner on Trails, Empire Mine State Historical Park, Grass Valley (September 29, 2006)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, September 2014.
HERO Human Health Risk Assessment Note No. 3, Recommended methodology for use of U.S. EPA Regional Screening Levels (RSLs) in the Human Health Risk Assessment process at hazardous waste sites and permitted facilities, January 2016.

Table 7e - Summary of Risk/Hazard Calculations for Child and Adult Recreational Use , Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	9.19E-08	4.45E+00	5.37E-04	4.45E+00	2.48E-05	7.42E-09	2.48E-05
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	1.75E-09	6.68E-03	7.41E-02	8.08E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	1.87E-09	2.28E-04		2.28E-04			0.00E+00
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	9.26E-10	1.13E-04	4.06E-09	1.13E-04			0.00E+00
TOTAL									4.46E+00	7.46E-02	**4.5E+00**	2.48E-05	7.42E-09	**2.5E-05**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 8.1E-02
Arsenic Hazard Quotient: 4.4.E+00
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 2.5E-05
Arsenic RBA (%): 21.3

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-carcinog	6	24	yr	HERO Comments on Draft RAP
EFs, exposure frequency (ingestion)	12	12	days/yr	HERO Comments on Draft RAP
EFd, exposure frequency (dermal)	12	12	days/yr	HERO Comments on Draft RAP
EFi, exposure frequency (inhalation)	12	12	days/yr	HERO Comments on Draft RAP
ED, exposure duration	6	24	yr	HERO Comments on Draft RAP
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, dermal adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission factor	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
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Table 7f - Summary of Risk/Hazard Calculations for Child and Adult Recreational Use, Tailings Pile, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	9.17E-08	4.44E+00	5.36E-04	4.44E+00	2.48E-05	7.41E-09	2.48E-05
Cadmium	UCL	1.0E-04	2.5E-06	--	1.7E+01	0.001	1.39	1.02E-09	6.11E-03	8.96E-06	6.12E-03		8.06E-11	8.06E-11
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	2.35E-09	8.98E-03	9.96E-02	1.09E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.30	1.69E-09	2.06E-04		2.06E-04			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	3.04E-09	7.16E-04	3.34E-07	7.16E-04			0.00E+00
TOTAL									4.45E+00	1.00E-01	**4.6E+00**	2.48E-05	7.49E-09	**2.5E-05**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 1.2E-01
Arsenic Hazard Quotient: 4.4.E+00
Risk excluding Arsenic: 8.1E-11
Arsenic Risk: 2.5E-05
Arsenic RBA (%): 21.3

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-carcinog	6	24	yr	HERO Comments on Draft RAP
EFs, exposure frequency (ingestion)	12	12	days/yr	HERO Comments on Draft RAP
EFd, exposure frequency (dermal)	12	12	days/yr	HERO Comments on Draft RAP
EFi, exposure frequency (inhalation)	12	12	days/yr	HERO Comments on Draft RAP
ED, exposure duration	6	24	yr	HERO Comments on Draft RAP
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, dermal adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission factor	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
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Table 7g - Summary of Risk/Hazard Calculations for Child and Adult Recreational Use, Cyanide Process Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	185	1.36E-07	6.98E+00	7.95E-04	6.98E+00	3.79E-05	1.10E-08	3.79E-05
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	3.09E-10	1.18E-03	1.31E-02	1.43E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	4.84E-09	5.91E-04		5.91E-04			0.00E+00
TOTAL									6.98E+00	1.39E-02	**7.0E+00**	3.79E-05	1.10E-08	**3.8E-05**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 1.5E-02
Arsenic Hazard Quotient: 7.0.E+00
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 3.8E-05
Arsenic RBA (%): 23

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-carcinog	6	24	yr	HERO Comments on Draft RAP
EFs, exposure frequency (ingestion)	12	12	days/yr	HERO Comments on Draft RAP
EFd, exposure frequency (dermal)	12	12	days/yr	HERO Comments on Draft RAP
EFi, exposure frequency (inhalation)	12	12	days/yr	HERO Comments on Draft RAP
ED, exposure duration	6	24	yr	HERO Comments on Draft RAP
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, dermal adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission factor	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
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Table 7h - Summary of Risk/Hazard Calculations for Child and Adult Recreational Use, Western Area and Southern Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	39.8	2.93E-08	1.42E+00	1.71E-04	1.42E+00	7.91E-06	2.36E-09	7.91E-06
Cadmium	Max Detection	1.0E-04	2.5E-06	--	1.7E+01	0.001	0.95	6.99E-10	4.17E-03	6.12E-06	4.18E-03		5.51E-11	5.51E-11
Mercury	Max Detection	1.6E-04	7.5E-06	--	--	0.01	1.2	8.82E-10	3.37E-03	3.74E-02	4.07E-02			0.00E+00
Molybdenum	Max Detection	5.0E-03	--	--	--	0.01	1.3	9.56E-10	1.17E-04		1.17E-04			0.00E+00
Selenium	Not Detected	5.0E-03	5.0E-03	--	--	0.01	ND				0.00E+00			0.00E+00
Cyanide	Not Detected	6.0E-04	2.0E-04	--	--	0.01	ND				0.00E+00			0.00E+00
TOTAL									1.42E+00	3.75E-02	**1.5E+00**	7.91E-06	2.42E-09	**7.9E-06**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding arsenic: 4.5E-02
Arsenic Hazard Quotient: 1.4.E+00
Risk excluding Arsenic: 5.5E-11
Arsenic Risk: 7.9E-06
Arsenic RBA (%): 21.3

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-carcinog	6	24	yr	HERO Comments on Draft RAP
EFs, exposure frequency (ingestion)	12	12	days/yr	HERO Comments on Draft RAP
EFd, exposure frequency (dermal)	12	12	days/yr	HERO Comments on Draft RAP
EFi, exposure frequency (inhalation)	12	12	days/yr	HERO Comments on Draft RAP
ED, exposure duration	6	24	yr	HERO Comments on Draft RAP
ET, exposure time	24	24	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	200	100	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	10	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	15	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface area	2,373	6,032	cm^2	HERO HHRA Note No. 1
AF, dermal adherance factor	0.2	0.07	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission factor	1.360E+09	1.360E+09	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
Response to Comments for Remedial Action Plan [RAP] - Oro de Amador, Jackson, California (HERO, December 11, 2023)

Table 8a - Summary of Risk/Hazard Calculations for Construction Scenario, Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	1.25E-04	6.58E+01	5.71E+00	7.15E+01	3.12E-05	5.26E-06	3.65E-05
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	2.38	2.38E-06	4.82E-02	5.15E-01	5.63E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.54	2.54E-06	1.65E-03		1.65E-03			0.00E+00
Selenium	UCL	5.0E-03	5.0E-03	--	--	0.01	1.26	1.26E-06	8.16E-04	4.32E-05	8.59E-04			0.00E+00
TOTAL									6.58E+01	6.22E+00	**7.2E+01**	3.12E-05	5.26E-06	**3.6E-05**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 5.7.E-01
Arsenic Hazard Quotient: 7.1.E+01
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 3.6E-05
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinoc	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-ca	--	1	yr	HERO HHRA Note No. 1
EFs, exposure frequency (ing	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (der	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (inha	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	1	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	330	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	--	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface are	--	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	--	0.8	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	--	1.0E+06	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 8b - Summary of Risk/Hazard Calculations for Construction Scenario, Tailings Pile, Contaminants of Concerr
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	125	1.25E-04	6.59E+01	5.72E+00	7.16E+01	3.13E-05	5.27E-06	3.66E-05
Cadmium	UCL	1.0E-04	2.5E-06	--	1.7E+01	0.001	1.39	1.39E-06	3.98E-02	9.50E-02	1.35E-01		5.70E-08	5.70E-08
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	3.20	3.20E-06	6.47E-02	6.91E-01	7.56E-01			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	2.3	2.28E-06	1.48E-03		1.48E-03			0.00E+00
Cyanide	UCL	6.0E-04	2.0E-04	--	--	0.01	4.14	4.14E-06	1.45E-02	3.54E-03	1.81E-02			0.00E+00
TOTAL									6.60E+01	6.51E+00	**7.2E+01**	3.13E-05	5.32E-06	**3.7E-05**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 9.1.E-01
Arsenic Hazard Quotient: 7.2.E+01
Risk excluding Arsenic: 5.7E-08
Arsenic Risk: 3.7E-05
Arsenic RBA (%): 21.3

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinoc	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-ca	--	1	yr	HERO HHRA Note No. 1
EFs, exposure frequency (ing	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (der	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (inha	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	1	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	330	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	--	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface are	--	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	--	0.8	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	--	1.0E+06	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

Table 8c - Summary of Risk/Hazard Calculations for Construction Scenario, Cyanide Process Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	RfDi (mg/kg-day)	Sfo (mg/kg-day)$^{-1}$	Sfi (mg/kg-day)$^{-1}$	ABS	Cs (mg/kg)	Ca (mg/m^3)	Hazard$_{soil}$	Hazard$_{air}$	Hazard, soil + air	Risk$_{soil}$	Risk$_{air}$	Risk, soil + air
Arsenic	UCL	3.5E-06	3.8E-06	9.5E+00	1.7E+01	0.03	185	1.85E-04	9.97E+01	8.43E+00	1.08E+02	4.74E-05	7.77E-06	5.51E-05
Mercury	UCL	1.6E-04	7.5E-06	--	--	0.01	0.42	4.20E-07	8.50E-03	9.08E-02	9.93E-02			0.00E+00
Molybdenum	UCL	5.0E-03	--	--	--	0.01	6.58	6.58E-06	4.26E-03		4.26E-03			0.00E+00
TOTAL									9.97E+01	8.52E+00	**1.1E+02**	4.74E-05	7.77E-06	**5.5E-05**

Notes:
ABS = dermal absorption fraction (PEA Guidance Manual, Appendix A, Table 2)
Ca [mg/m^3] = air concentration = Cs [mg/kg] * (PEF [m^3/kg])$^{-1}$
Cs [mg/kg] = soil concentration
RfDo = reference dose for chronic oral exposure
RfDi = reference dose for chronic inhalation exposure
Sfo = standard oral slope factor
Sfi = standard inhalation slope factor
UCL = upper confidence limit

Hazard Index excluding Arsenic: 1.0.E-01
Arsenic Hazard Quotient: 1.1.E+02
Risk excluding Arsenic: 0.0E+00
Arsenic Risk: 5.5E-05
Arsenic RBA (%): 23

Max = maximum detected concentration
ND = constituent was not detected

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinoc	--	70	yr	HERO HHRA Note No. 1
ATnc, averaging time (non-ca	--	1	yr	HERO HHRA Note No. 1
EFs, exposure frequency (ing	--	250	days/yr	HERO HHRA Note No. 1
EFd, exposure frequency (der	--	250	days/yr	HERO HHRA Note No. 1
EFi, exposure frequency (inha	--	250	days/yr	HERO HHRA Note No. 1
ED, exposure duration	--	1	yr	HERO HHRA Note No. 1
ET, exposure time	--	8	hr/day	HERO HHRA Note No. 3
IRs, soil ingestion rate	--	330	mg/day	HERO HHRA Note No. 1
IRa, inhalation rate	--	20	m^3/day	HERO HHRA Note No. 1
BW, body weight	--	80	kg	HERO HHRA Note No. 1
SA, exposed skin surface are	--	6,032	cm^2	HERO HHRA Note No. 1
AF, adherance factor	--	0.8	mg/cm^2	HERO HHRA Note No. 1
PEF, particulate emission fact	--	1.0E+06	m^3/kg	HERO HHRA Note No. 1

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019
PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	33
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	7	
Days per week, occupational	-	5	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	30	80
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.1	0.1	0.1	356	301
BLOOD Pb, CHILD	0.3	0.5	0.6	70	59
BLOOD Pb, PICA CHILD	3.2	5.9	6.9	6	5
BLOOD Pb, OCCUPATIONAL	0.0	0.1	0.1	499	421

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	6.8E-5	0.00	4%	4.9E-5	0.00	4%
Soil Ingestion	1.6E-3	0.05	96%	1.2E-3	0.04	96%
Inhalation	2.5E-6	0.00	0.1%	1.8E-6	0.00	0.1%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	1.4E-4	0.00	1.7%		0.00	0.1%
Soil Ingestion	7.7E-3	0.26	98%	9.6E-2	3.21	100%
Inhalation	2.9E-6	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9a

Assessment Area: Lakebed Area

Exposure Point Concentration 95% UCL

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	102
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	7	
Days per week, occupational	-	5	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	30	80
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.2	0.3	0.4	356	301
BLOOD Pb, CHILD	0.8	1.5	1.7	70	59
BLOOD Pb, PICA CHILD	9.8	17.9	21.2	6	5
BLOOD Pb, OCCUPATIONAL	0.1	0.2	0.3	499	421

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	6.8E-5	0.01	4%	4.9E-5	0.00	4%
Soil Ingestion	1.6E-3	0.17	96%	1.2E-3	0.12	96%
Inhalation	2.5E-6	0.00	0.1%	1.8E-6	0.00	0.1%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	1.4E-4	0.01	1.7%		0.01	0.1%
Soil Ingestion	7.7E-3	0.78	98%	9.6E-2	9.79	100%
Inhalation	2.9E-6	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9b

Assessment Area: Lakebed Area

Exposure Point Concentration Maximum Detection

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	51
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	7	
Days per week, occupational	-	5	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	30	80
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.1	0.2	0.2	356	301
BLOOD Pb, CHILD	0.4	0.7	0.9	70	59
BLOOD Pb, PICA CHILD	4.9	8.9	10.5	6	5
BLOOD Pb, OCCUPATIONAL	0.1	0.1	0.1	499	421

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	6.8E-5	0.00	4%	4.9E-5	0.00	4%
Soil Ingestion	1.6E-3	0.08	96%	1.2E-3	0.06	96%
Inhalation	2.5E-6	0.00	0.1%	1.8E-6	0.00	0.1%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	1.4E-4	0.01	1.7%		0.01	0.1%
Soil Ingestion	7.7E-3	0.39	98%	9.6E-2	4.85	100%
Inhalation	2.9E-6	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9c

Assessment Area: Tailings Pile

Exposure Point Concentration 95% UCL

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	400
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	7	
Days per week, occupational	-	5	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	30	80
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.7	1.2	1.5	356	301
BLOOD Pb, CHILD	3.1	5.7	6.8	70	59
BLOOD Pb, PICA CHILD	38.5	70.2	83.1	6	5
BLOOD Pb, OCCUPATIONAL	0.5	0.9	1.0	499	421

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	6.8E-5	0.03	4%	4.9E-5	0.02	4%
Soil Ingestion	1.6E-3	0.65	96%	1.2E-3	0.46	96%
Inhalation	2.5E-6	0.00	0.1%	1.8E-6	0.00	0.1%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	1.4E-4	0.05	1.7%		0.05	0.1%
Soil Ingestion	7.7E-3	3.07	98%	9.6E-2	38.40	100%
Inhalation	2.9E-6	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9d

Assessment Area: Tailings Pile

Exposure Point Concentration Maximum Detection

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	33
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	7	
Days per week, occupational	-	5	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	30	80
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.1	0.1	0.1	356	301
BLOOD Pb, CHILD	0.3	0.5	0.6	70	59
BLOOD Pb, PICA CHILD	3.2	5.8	6.9	6	5
BLOOD Pb, OCCUPATIONAL	0.0	0.1	0.1	499	421

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	6.8E-5	0.00	4%	4.9E-5	0.00	4%
Soil Ingestion	1.6E-3	0.05	96%	1.2E-3	0.04	96%
Inhalation	2.5E-6	0.00	0.1%	1.8E-6	0.00	0.1%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	1.4E-4	0.00	1.7%		0.00	0.1%
Soil Ingestion	7.7E-3	0.25	98%	9.6E-2	3.17	100%
Inhalation	2.9E-6	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9e

Assessment Area: Cyanide Process Area

Exposure Point Concentration 95% UCL

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	72
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	7	
Days per week, occupational	-	5	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	30	80
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.1	0.2	0.3	356	301
BLOOD Pb, CHILD	0.6	1.0	1.2	70	59
BLOOD Pb, PICA CHILD	6.9	12.6	15.0	6	5
BLOOD Pb, OCCUPATIONAL	0.1	0.2	0.2	499	421

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	6.8E-5	0.00	4%	4.9E-5	0.00	4%
Soil Ingestion	1.6E-3	0.12	96%	1.2E-3	0.08	96%
Inhalation	2.5E-6	0.00	0.1%	1.8E-6	0.00	0.1%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	1.4E-4	0.01	1.7%		0.01	0.1%
Soil Ingestion	7.7E-3	0.55	98%	9.6E-2	6.91	100%
Inhalation	2.9E-6	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9f

Assessment Area: Cyanide Process Area

Exposure Point Concentration Maximum Detection

LeadSpread 9- LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

USERS GUIDE to Leadspread Version 9

INPUT

MEDIUM	LEVEL
Lead in Soil/Dust (µg/g)	500
Respirable Dust (µg/cubic m)	1.5

EXPOSURE PARAMETERS

Parameter	units	adults	children
Days per week	days/wk	0.231	
Days per week, occupational	-	0.231	
Geometric Standard Deviation	-	1.6	
Blood lead level of concern	(µg/dl)	1.1	1
Skin area, residential	square cm	6032	2373
Skin area occupational	square cm	6032	
Soil adherence	µg/square cm	70	200
Dermal uptake constant	(µg/dl)/(µg/day)	0.00027	0.00048
Soil ingestion	mg/day	100	200
Soil ingestion, pica	mg/day		1000
Ingestion constant	(µg/dl)/(µg/day)	0.09	0.16
Bioavailability	unitless	0.6	
Breathing rate	cubic meter/day	20	10
Inhalation constant	(µg/dl)/(µg/day)	0.082	0.192

Click here for REFERENCES

= modified exposure parameter

OUTPUT

ENDPOINT and RECEPTOR	50th Percentile Change in Blood Pb (µg/dl)	90th Percentile Change in Blood Pb (µg/dl)	95th Percentile Change in Blood Pb (µg/dl)	PRG-90 (µg/g)	PRG-95 (µg/g)
BLOOD Pb, ADULT	0.1	0.2	0.2	3335	2819
BLOOD Pb, CHILD	0.3	0.6	0.7	858	725
BLOOD Pb, PICA CHILD	1.6	2.9	3.4	173	146
BLOOD Pb, OCCUPATIONAL	0.1	0.2	0.2	3335	2819

PATHWAYS

ADULTS	Residential Pathway Contribution	Residential Pathway Contribution	Residential Pathway Contribution	Occupational Pathway contribution	Occupational Pathway contribution	Occupational Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	2.3E-6	0.00	1%	2.3E-6	0.00	1%
Soil Ingestion	1.8E-4	0.09	99%	1.8E-4	0.09	99%
Inhalation	8.1E-8	0.00	0.0%	8.1E-8	0.00	0.0%

CHILDREN	Typical Pathway contribution	Typical Pathway contribution	Typical Pathway contribution	with pica Pathway contribution	with pica Pathway contribution	with pica Pathway contribution
Pathway	PEF*	µg/dl	percent	PEF	µg/dl	percent
Soil Contact	4.5E-6	0.00	0.7%		0.00	0.1%
Soil Ingestion	6.3E-4	0.32	99%	3.2E-3	1.58	100%
Inhalation	9.5E-8	0.00	0.0%		0.00	0.0%

Click here for Equations

*Pathway Exposure Factor

Table 9g

Exposure Scenario: Child and Adult Recreational Use

Exposure Point Concentration 500 mg/kg

Table 10a - Summary of Risk/Hazard Calculations for Groundwater, Standard Exposure Scenario, Contaminants of Concern

Oro de Amador

Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	Sfo $(mg/kg\text{-}day)^{-1}$	Kp (cm/hr)	Cw (mg/l)	Hazard, water	Risk, water
Arsenic	Max Detection	3.5E-06	9.5E+00	1.0E-03	0.061	8.73E+02	7.48E-03
Iron	Max Detection	7.0E-01	--	1.0E-03	160	1.14E+01	--
Manganese	Max Detection	2.4E-02	--	1.0E-03	2.70	5.63E+00	--
Cyanide	Max Detection	6.0E-04	--	1.0E-03	0.190	1.59E+01	--
TOTAL				1.0E-03		**9.1E+02**	**7.5E-03**

Notes:

Cw [mg/l] = constituent concentration in water

ND = not detected

NL = not listed in reviewed toxicological data sources

RfDo = reference dose for chronic oral exposure

Sfo = standard oral slope factor

UCL = upper confidence limit

Excluding Arsenic:	3.3E+01	0.0E+00
Arsenic:	8.7.E+02	7.5E-03

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	PEA Guidance Manual
ATnc, averaging time (non-carcinogen)	6	20	yr	HHRA Note No. 1
EF, exposure frequency	350	350	days/yr	HHRA Note No. 1
ED, exposure duration	6	20	yr	HHRA Note No. 1
ET, exposure time during bathing	0.54	0.71	hr/day	HHRA Note No. 1
IRw, water ingestion rate	0.78	2.5	l/day	HHRA Note No. 1
BW, body weight	15	80	kg	HHRA Note No. 1
SA, exposed skin surface area	6,365	19,652	cm^2	HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 10b - Summary of Risk/Hazard Calculations for Groundwater Seeps, Standard Exposure Scenario, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	Sfo $(mg/kg\text{-}day)^{-1}$	Kp (cm/hr)	Cw (mg/l)	Hazard, water	Risk, water
Arsenic	Max Detection	3.5E-06	9.5E+00	1.0E-03	0.820	1.17E+04	1.01E-01
Iron	Max Detection	7.0E-01	--	1.0E-03	31	2.22E+00	--
Manganese	Max Detection	2.4E-02	--	1.0E-03	4.4	9.18E+00	--
Cyanide	Max Detection	6.0E-04	--	1.0E-03	0.350	2.92E+01	--
TOTAL				1.0E-03		**1.2E+04**	**1.0E-01**

Notes:
Cw [mg/l] = constituent concentration in water
ND = not detected
NL = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
Sfo = standard oral slope factor
UCL = upper confidence limit

Excluding Arsenic:	4.1E+01	0.0E+00
Arsenic:	1.2.E+04	1.0E-01

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	PEA Guidance Manual
ATnc, averaging time (non-carcinogen)	6	20	yr	HHRA Note No. 1
EF, exposure frequency	350	350	days/yr	HHRA Note No. 1
ED, exposure duration	6	20	yr	HHRA Note No. 1
ET, exposure time during bathing	0.54	0.71	hr/day	HHRA Note No. 1
IRw, water ingestion rate	0.78	2.5	l/day	HHRA Note No. 1
BW, body weight	15	80	kg	HHRA Note No. 1
SA, exposed skin surface area	6,365	19,652	cm^2	HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 10c - Summary of Risk/Hazard Calculations for Surface Water, Standard Exposure Scenario, Contaminants of Concern

Oro de Amador

Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	Sfo $(mg/kg\text{-}day)^{-1}$	Kp (cm/hr)	Cw (mg/l)	Hazard, water	Risk, water
Arsenic	Max Detection	3.5E-06	9.5E+00	1.0E-03	0.010	1.43E+02	1.23E-03
Iron	Max Detection	7.0E-01	--	1.0E-03	1.10	7.87E-02	--
Manganese	Max Detection	2.4E-02	--	1.0E-03	0.110	2.30E-01	--
Cyanide	Max Detection	6.0E-04	--	1.0E-03	0.360	3.00E+01	--
TOTAL				1.0E-03		**1.7E+02**	**1.2E-03**

Notes:

Cw [mg/l] = constituent concentration in water

ND = not detected

NL = not listed in reviewed toxicological data sources

RfDo = reference dose for chronic oral exposure

Sfo = standard oral slope factor

UCL = upper confidence limit

Excluding Arsenic:	3.0E+01	0.0E+00
Arsenic:	1.4.E+02	1.2E-03

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	70	yr	PEA Guidance Manual
ATnc, averaging time (non-carcinogen)	6	20	yr	HHRA Note No. 1
EF, exposure frequency	350	350	days/yr	HHRA Note No. 1
ED, exposure duration	6	20	yr	HHRA Note No. 1
ET, exposure time during bathing	0.54	0.71	hr/day	HHRA Note No. 1
IRw, water ingestion rate	0.78	2.5	l/day	HHRA Note No. 1
BW, body weight	15	80	kg	HHRA Note No. 1
SA, exposed skin surface area	6,365	19,652	cm^2	HHRA Note No. 1

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)

HERO Human Health Risk Assessment Note No. 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment, DTSC, April 2019

Table 10d - Summary of Risk/Hazard Calculations for Recreational Surface Water Wading, Lakebed Area, Contaminants of Concern
Oro de Amador
Jackson, California

Analyte	EPC Source	RfDo (mg/kg-day)	Sfo $(mg/kg\text{-}day)^{-1}$	Kp (cm/hr)	Cw (mg/l)	Hazard, water	Risk, water
Arsenic	Max Detection	3.5E-06	9.5E+00	1.0E-03	0.010	7.19E-01	4.10E-06
Iron	Max Detection	7.0E-01	--	1.0E-03	1.10	3.96E-04	--
Manganese	Max Detection	2.4E-02	--	1.0E-03	0.110	1.15E-03	--
Cyanide	Max Detection	6.0E-04	--	1.0E-03	0.360	1.51E-01	--
TOTAL				1.0E-03		**8.7E-01**	**4.1E-06**

Notes:
Cw [mg/l] = constituent concentration in water
ND = not detected
-- = not listed in reviewed toxicological data sources
RfDo = reference dose for chronic oral exposure
Sfo = standard oral slope factor
UCL = upper confidence limit

Excluding Arsenic:	1.5E-01	0.0E+00
Arsenic:	7.2.E-01	4.1E-06

Parameter	Value, child	Value, adult	Units	Reference
ATc, averaging time (carcinogen)	70	--	yr	PEA Guidance Manual
ATnc, averaging time (non-carcinogen)	12	--	yr	HERO Comments on Draft RAP
EF, exposure frequency	26	--	days/yr	Half of typical value (52 days/yr) for seasonal inundation only
ED, exposure duration	12	--	yr	HERO Comments on Draft RAP
ET, exposure time during wading	2	--	hr/day	HERO Comments on Draft RAP
IRw, water ingestion rate	0.137	--	l/day	HERO Comments on Draft RAP
BW, body weight	44.3	--	kg	HERO Comments on Draft RAP
SA, exposed skin surface area	9,800	--	cm^2	HERO Comments on Draft RAP

PEA Guidance Manual = Preliminary Endangermant Assessment Guidance Manual (DTSC, October 2015)
Response to Comments for Remedial Action Plan [RAP] - Oro de Amador, Jackson, California (HERO, December 11, 2023)

Table 11a - Ecological Exposure Point Concentrations, Lakebed Area
Oro de Amador
Jackson, California

Constituent	Exposure Medium	Unit	Site Investigation Data							Exposure Point Concentrations[1]		
			Number of Analyses	Number of Detections	Analysis Method	RL[2]	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	Distribution	EPC Source (UCL[3] or maximum)	EPC
Antimony	soil	mg/kg	35	0	EPA 6010B	2.5	ND	ND	ND	na	na	na
Arsenic	soil	mg/kg	65	65	EPA 6010B	1.0	4	320	107.5	Approx. Normal	UCL	125
Barium	soil	mg/kg	35	35	EPA 6010B	1.0	23.9	178	92.3	Normal	UCL	105.6
Beryllium	soil	mg/kg	35	18	EPA 6010B	1.0	0.011	1.3	0.415	Gamma	UCL	0.41
Cadmium	soil	mg/kg	35	16	EPA 6010B	1.0	0.39	2.5	1.05	Approx. Normal	UCL	0.84
Chromium	soil	mg/kg	49	48	EPA 6010B	1.0	1.8	92.4	26.5	Non-Parametric	UCL	32.0
Cobalt	soil	mg/kg	35	31	EPA 6010B	1.0	2.5	34	11.2	Approx. Normal	UCL	12.5
Copper	soil	mg/kg	35	35	EPA 6010B	5.0	11	90.9	46.0	Normal	UCL	52.2
Lead	soil	mg/kg	46	44	EPA 6010B	2.5	4.9	102	26.9	Lognormal	UCL	33.4
Mercury	soil	mg/kg	46	37	EPA 7471A	0.1	0.023	9.7	2.22	Gamma	UCL	2.38
Molybdenum	soil	mg/kg	17	6	EPA 6010B	1.0	1.5	3.9	2.60	Normal	UCL	2.54
Nickel	soil	mg/kg	46	46	EPA 6010B	1.0	12	67	29.5	Normal	UCL	32.7
Selenium	soil	mg/kg	35	20	EPA 6010B	2.5	0.66	4.0	1.25	Non-Parametric	UCL	1.26
Silver	soil	mg/kg	35	17	EPA 6010B	1.0	0.09	1.0	0.393	Non-Parametric	UCL	0.46
Thallium	soil	mg/kg	22	3	EPA 6010B	4.0	0.75	1.6	1.05	Normal	UCL	0.55
Vanadium	soil	mg/kg	35	35	EPA 6010B	1.0	2.3	121	25.4	Approx. Normal	UCL	32.4
Zinc	soil	mg/kg	35	35	EPA 6010B	1.0	31	118[a]	65.0	Non-Parametric	UCL	77.5
Cyanide	soil	mg/kg	29	0	EPA 9012A	2.5	ND	ND	ND	na	na	na

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022)
2 RL reported for Geocon (2023) data. Quantition limits for previous investigation data are listed in Table 2 of the Remedial Action Plan.
3 For specific UCL method see Appendix I of the Remedial Action Plan, Tables 1a through 1c
a = A single outlying zinc concentration (307 mg/kg, sample TP-18-1.5) was culled from the Lakebed Area dataset because it is associated with native soil rather than tailings.
EPC = exposure point concentration
RL = laboratory reporting limit
mg/kg = milligram per kilogram soil
na = not applicable
ND = not detected
NL = not listed
UCL = upper confidence limit on the arithmetic mean

Table 11b - Ecological Exposure Point Concentrations, Tailings Pile
Oro de Amador
Jackson, California

Constituent	Exposure Medium	Unit	Site Investigation Data							Exposure Point Concentrations[1]		
			Number of Analyses	Number of Detections	Analysis Method	RL[2]	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	Distribution	EPC Source (UCL[3] or maximum)	EPC
Antimony	soil	mg/kg	37	1	EPA 6010B	2.5	0.99	0.99	0.99	na	Max Detect	1.0
Arsenic	soil	mg/kg	67	67	EPA 6010B	1.0	3	263	101	Gamma	UCL	125
Barium	soil	mg/kg	37	37	EPA 6010B	1.0	6.2	226	81.6	Normal	UCL	97.8
Beryllium	soil	mg/kg	37	14	EPA 6010B	1.0	0.16	1.4	0.569	Normal	UCL	0.47
Cadmium	soil	mg/kg	37	25	EPA 6010B	1.0	0.34	4.4	1.41	Non-Parametric	UCL	1.39
Chromium	soil	mg/kg	57	52	EPA 6010B	1.0	1.5	54	12.6	Lognormal	UCL	17.0
Cobalt	soil	mg/kg	37	35	EPA 6010B	1.0	1	29	9.21	Lognormal	UCL	12.4
Copper	soil	mg/kg	37	37	EPA 6010B	5.0	3.5	97.3	36.5	Normal	UCL	43.6
Lead	soil	mg/kg	55	51	EPA 6010B	2.5	7.2	400	36.3	Gamma	UCL	50.5
Mercury	soil	mg/kg	55	45	EPA 7471A	0.1	0.099	15	2.84	Gamma	UCL	3.20
Molybdenum	soil	mg/kg	37	24	EPA 6010B	1.0	0.27	5.5	2.23	Normal	UCL	2.28
Nickel	soil	mg/kg	55	55	EPA 6010B	1.0	7	43[a]	21.9	Non-Parametric	UCL	25.6
Selenium	soil	mg/kg	37	1	EPA 6010B	2.5	0.5	0.5	0.5	na	Max Detect	0.50
Silver	soil	mg/kg	37	9	EPA 6010B	1.0	0.4	1.2	0.71	Normal	UCL	0.50
Thallium	soil	mg/kg	9	0	EPA 6010B	4.0	ND	ND	ND	na	na	na
Vanadium	soil	mg/kg	37	37	EPA 6010B	1.0	1.7	121[b]	35.8	Non-Parametric	UCL	47.5
Zinc	soil	mg/kg	37	37	EPA 6010B	1.0	15.3	156	63.9	Normal	UCL	70.5
Cyanide	soil	mg/kg	22	6	EPA 9012A	2.5	0.75	21.9	6.44	Approx. Normal	UCL	4.1

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022)
2 RL reported for Geocon (2023) data. Quantition limits for previous investigation data are listed in Table 2 of the Remedial Action Plan.
3 For specific UCL method see Appendix I of the Remedial Action Plan, Tables 1a through 1c
a = A single outlying nickel concentration (126 mg/kg, sample TP-12-4.5) was culled from the Tailings Pile dataset.
b = Two anomalous vanadium concentrations (148 mg/kg, 133 mg/kg) were culled from the Tailings Pile dataset because they are associated with soil and rock rather than tailings.
EPC = exposure point concentration
RL = laboratory reporting limit
mg/kg = milligram per kilogram soil
na = not applicable
ND = not detected
NL = not listed
UCL = upper confidence limit on the arithmetic mean

Table 11c - Ecological Exposure Point Concentrations, Cyanide Process Area
Oro de Amador
Jackson, California

Constituent	Exposure Medium	Unit	Site Investigation Data							Exposure Point Concentrations[1]		
			Number of Analyses	Number of Detections	Analysis Method	RL[2]	Minimum Detected Concentration	Maximum Detected Concentration	Mean Detected Concentration	Distribution	EPC Source (UCL[3] or maximum)	EPC
Antimony	soil	mg/kg	8	1	EPA 6010B	2.5	5.8	5.8	5.8	na	Max Detect	5.8
Arsenic	soil	mg/kg	28	28	EPA 6010B	1.0	4	450	125	Gamma	UCL	185
Barium	soil	mg/kg	8	8	EPA 6010B	1.0	11	158	70.3	Normal	UCL	100
Beryllium	soil	mg/kg	8	5	EPA 6010B	1.0	0.56	1.4	0.842	Normal	UCL	1.00
Cadmium	soil	mg/kg	8	7	EPA 6010B	1.0	1.1	2.7	1.89	Normal	UCL	2.2
Chromium	soil	mg/kg	18	18	EPA 6010B	1.0	10	575[a]	246	Gamma	UCL	470
Cobalt	soil	mg/kg	8	8	EPA 6010B	1.0	1	85.8	23.6	Normal	UCL	41.7
Copper	soil	mg/kg	8	8	EPA 6010B	5.0	7.2	92.9	58.6	Normal	UCL	76.5
Lead	soil	mg/kg	16	12	EPA 6010B	2.5	7.2	72	29.1	Normal	UCL	33.0
Mercury	soil	mg/kg	15	10	EPA 7471A	0.1	0.2	1.0	0.41	Normal	UCL	0.42
Molybdenum	soil	mg/kg	8	3	EPA 6010B	1.0	2.3	13.1	7.1	Normal	UCL	6.58
Nickel	soil	mg/kg	16	16	EPA 6010B	1.0	9.1	930[a]	248	Gamma	UCL	509
Selenium	soil	mg/kg	8	0	EPA 6010B	2.5	ND	ND	ND	na	na	na
Silver	soil	mg/kg	8	5	EPA 6010B	1.0	0.99	2.1	1.36	Normal	UCL	1.51
Thallium	soil	mg/kg	4	0	EPA 6010B	4.0	ND	ND	ND	na	na	na
Vanadium	soil	mg/kg	8	8	EPA 6010B	1.0	3.3	86.6	44.3	Normal	UCL	64.0
Zinc	soil	mg/kg	8	8	EPA 6010B	1.0	15	111	72.5	Normal	UCL	92.1
Cyanide	soil	mg/kg	6	0	EPA 9012A	2.5	ND	ND	ND	na	na	na

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022)
2 RL reported for Geocon (2023) data. Quantition limits for previous investigation data are listed in Table 2 of the Remedial Action Plan.
3 For specific UCL method see Appendix I of the Remedial Action Plan, Tables 1a through 1c
a = A single outlying chromium concentration (1,690 mg/kg, sample SURF-16-.0.0) is co-located with an anomalously high nickel concentration (1,340 mg/kg), and both were culled from the Cyanide Process Area dataset.
EPC = exposure point concentration
RL = laboratory reporting limit
mg/kg = milligram per kilogram soil
na = not applicable
ND = not detected
NL = not listed
UCL = upper confidence limit on the arithmetic mean

Table 12a - Chemicals of Potential Ecological Concern, Lakebed Area
Oro de Amador
Jackson, California

Constituent	Unit	EPC[1]	Background Data[1,2]				Eco-SSLs[3]				Does the EPC exceed SSL(s)?	Does the EPC exceed background range?	Does max detected exceed background range?	Is the constituent considered a COPEC?
			Min	Max	BTV	BTV Source[4]	Plants	Soil Inverte-brates	Avian Wildlife	Mam-malian Wildlife				
Antimony	mg/kg	na	na	1.1	1.1	Upper Range Bkg	NL	78	NL	0.27	no	no	no	no
Arsenic	mg/kg	125	1.2	46.9	20.7	95% USL	18	NL	43	46	**yes**	**yes**	**yes**	**yes**
Barium	mg/kg	105.6	27.1	768	768	Upper Range Bkg	NL	330	NL	2000	no	no	no	no
Beryllium	mg/kg	0.41	0.16	12	12	Upper Range Bkg	NL	40	NL	21	no	no	no	no
Cadmium	mg/kg	0.84	0.19	2.9	2.9	95% USL	32	140	0.77	0.36	**yes**	no	no	no
Chromium	mg/kg	32.0	11	167	167	Upper Range Bkg	NL	NL	26	34	**yes**	no	no	no
Cobalt	mg/kg	12.5	3.8	101	101	Upper Range Bkg	13	NL	120	230	no	no	no	no
Copper	mg/kg	52.2	34.9	178	178	Upper Range Bkg	70	80	28	49	**yes**	no	no	no
Lead	mg/kg	33.4	2.7	38	26.3	95% USL	120	1700	11	56	**yes**	**yes**	**yes**	**yes**
Mercury	mg/kg	2.38	0.017	0.34	0.23	95% USL	NL	NL	NL	NL	na	**yes**	**yes**	**yes**
Molybdenum	mg/kg	2.54	3.7	3.7	3.7	Upper Range Bkg	NL	NL	NL	NL	na	no	**yes**	**yes**
Nickel	mg/kg	32.7	9.4	111	111	Upper Range Bkg	560	NL	4.2	14	**yes**	no	no	no
Selenium	mg/kg	1.26	0.3	2	2.5	95% USL	0.52	4.1	1.2	0.63	**yes**	no	**yes**	**yes**
Silver	mg/kg	0.46	0.13	1.3	2.5	95% USL	560	NL	4.2	14	no	no	no	no
Thallium	mg/kg	0.55	0.26	1.9	1.9	Upper Range Bkg	NL	NL	NL	NL	na	no	no	no
Vanadium	mg/kg	32.4	13	130	130	Upper Range Bkg	NL	NL	7.8	280	**yes**	no	no	no
Zinc	mg/kg	77.5	14	175	175	Upper Range Bkg	160	120	46	79	**yes**	no	no	no
Cyanide	mg/kg	na	ND	ND	ND	na	NL	NL	NL	NL	na	no	no	no

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022)
2 Non-mineralized background
3 Ecological screening levels (Eco-SSLs) from USEPA, 2008 (www.epa.gov/ecotox/ecossl/)
4 The background evaluation is presented in Section 4.0 of the Remedial Action Plan
BTV = background threshold value
EPC = exposure point concentration
mg/kg = milligrams per kilogram soil
na = not applicable
ND = not detected
NL = not listed
UCL = upper confidence limit on the arithmetic mean

Table 12b - Chemicals of Potential Ecological Concern, Tailings Pile
Oro de Amador
Jackson, California

Constituent	Unit	EPC[1]	Background Data[1,2]				Eco-SSLs[3]				Does the EPC exceed SSL(s)?	Does the EPC exceed background range?	Does max detected exceed background range?	Is the constituent considered a COPEC?
			Min	Max	BTV	BTV Source[4]	Plants	Soil Inverte-brates	Avian Wildlife	Mam-malian Wildlife				
Antimony	mg/kg	1.0	na	1.1	1.1	Upper Range Bkg	NL	78	NL	0.27	yes	no	no	no
Arsenic	mg/kg	125	1.2	46.9	20.7	95% USL	18	NL	43	46	**yes**	**yes**	**yes**	**yes**
Barium	mg/kg	97.8	27.1	768	768	Upper Range Bkg	NL	330	NL	2000	no	no	no	no
Beryllium	mg/kg	0.47	0.16	12	12	Upper Range Bkg	NL	40	NL	21	no	no	no	no
Cadmium	mg/kg	1.39	0.19	2.9	2.9	95% USL	32	140	0.77	0.36	**yes**	no	**yes**	**yes**
Chromium	mg/kg	17.0	11	167	167	Upper Range Bkg	NL	NL	26	34	no	no	no	no
Cobalt	mg/kg	12.4	3.8	101	101	Upper Range Bkg	13	NL	120	230	no	no	no	no
Copper	mg/kg	43.6	34.9	178	178	Upper Range Bkg	70	80	28	49	**yes**	no	no	no
Lead	mg/kg	50.5	2.7	38	26.3	95% USL	120	1700	11	56	**yes**	**yes**	**yes**	**yes**
Mercury	mg/kg	3.20	0.017	0.34	0.23	95% USL	NL	NL	NL	NL	na	**yes**	**yes**	**yes**
Molybdenum	mg/kg	2.28	3.7	3.7	3.7	Upper Range Bkg	NL	NL	NL	NL	na	no	**yes**	**yes**
Nickel	mg/kg	25.6	9.4	111	111	Upper Range Bkg	560	NL	4.2	14	**yes**	no	no	no
Selenium	mg/kg	0.50	0.3	2	2.5	95% USL	0.52	4.1	1.2	0.63	no	no	no	no
Silver	mg/kg	0.50	0.13	1.3	2.5	95% USL	560	NL	4.2	14	no	no	no	no
Thallium	mg/kg	na	0.26	1.9	1.9	Upper Range Bkg	NL	NL	NL	NL	na	no	no	no
Vanadium	mg/kg	47.5	13	130	130	Upper Range Bkg	NL	NL	7.8	280	**yes**	no	no	no
Zinc	mg/kg	70.5	14	175	175	Upper Range Bkg	160	120	46	79	**yes**	no	no	no
Cyanide	mg/kg	4.1	ND	ND	ND	na	NL	NL	NL	NL	na	**yes**	**yes**	**yes**

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022)
2 Non-mineralized background
3 Ecological screening levels (Eco-SSLs) from USEPA, 2008 (www.epa.gov/ecotox/ecossl/)
4 The background evaluation is presented in Section 4.0 of the Remedial Action Plan
BTV = background threshold value
EPC = exposure point concentration
mg/kg = milligrams per kilogram soil
na = not applicable
ND = not detected
NL = not listed
UCL = upper confidence limit on the arithmetic mean

Table 12c - Chemicals of Potential Ecological Concern, Cyanide Process Area
Oro de Amador
Jackson, California

Constituent	Unit	EPC[1]	Background Data[1,2]				Eco-SSLs[3]				Does the EPC exceed SSL(s)?	Does the EPC exceed background range?	Does max detected exceed background range?	Is the constituent considered a COPEC?
			Min	Max	BTV	BTV Source[4]	Plants	Soil Inverte-brates	Avian Wildlife	Mam-malian Wildlife				
Antimony	mg/kg	5.8	12	20	20	Upper Range Bkg	NL	78	NL	0.27	**yes**	no	no	no
Arsenic	mg/kg	185	5.4	1300	120	95% USL	18	NL	43	46	**yes**	**yes**	**yes**	**yes**
Barium	mg/kg	100	22	230	230	Upper Range Bkg	NL	330	NL	2000	no	no	no	no
Beryllium	mg/kg	1.00	0.79	2.1	2.1	Upper Range Bkg	NL	40	NL	21	no	no	no	no
Cadmium	mg/kg	2.2	0.37	6.6	5.4	95% USL	32	140	0.77	0.36	**yes**	no	no	no
Chromium	mg/kg	470	10	943	943	Upper Range Bkg	NL	NL	26	34	**yes**	no	no	no
Cobalt	mg/kg	41.7	7.1	140	140	Upper Range Bkg	13	NL	120	230	**yes**	no	no	no
Copper	mg/kg	76.5	44.7	170	170	Upper Range Bkg	70	80	28	49	**yes**	no	no	no
Lead	mg/kg	33.0	3.6	360	18.4	95% USL	120	1700	11	56	**yes**	**yes**	**yes**	**yes**
Mercury	mg/kg	0.42	0.13	0.3	0.30	95% USL	NL	NL	NL	NL	na	**yes**	**yes**	**yes**
Molybdenum	mg/kg	6.58	ND	ND	ND	na	NL	NL	NL	NL	na	**yes**	**yes**	**yes**
Nickel	mg/kg	509	27.1	1000	1000	Upper Range Bkg	560	NL	4.2	14	**yes**	no	no	no
Selenium	mg/kg	na	0.54	1.2	2.5	95% USL	0.52	4.1	1.2	0.63	no	no	no	no
Silver	mg/kg	1.51	0.17	0.71	2.5	95% USL	560	NL	4.2	14	no	no	no	no
Thallium	mg/kg	na	0.96	0.96	0.96	na	NL	NL	NL	NL	na	no	no	no
Vanadium	mg/kg	64.0	10.9	91	91	Upper Range Bkg	NL	NL	7.8	280	**yes**	no	no	no
Zinc	mg/kg	92.1	44	120	120	Upper Range Bkg	160	120	46	79	**yes**	no	no	no
Cyanide	mg/kg	na	ND	ND	ND	na	NL	NL	NL	NL	na	no	no	no

Notes:
1 Statistical evaluation performed using ProUCL 5.2 (USEPA, 2022)
2 Non-mineralized background
3 Ecological screening levels (Eco-SSLs) from USEPA, 2008 (www.epa.gov/ecotox/ecossl/)
4 The background evaluation is presented in Section 4.0 of the Remedial Action Plan
BTV = background threshold value
EPC = exposure point concentration
mg/kg = milligrams per kilogram soil
na = not applicable
ND = not detected
NL = not listed
UCL = upper confidence limit on the arithmetic mean

Table 13 - Representative Terrestrial Species
Oro de Amador
Jackson, California

Guild	Representative Species	Attributes
1° Producer	"Plant"	Base of the food chain
Detritivore	"Invertebrate"	Critical prey species; nutrient recycling
1° Consumer	California Ground Squirrel	Eats primarily plant material; high site fidelity; burrows
	California Quail	Eats primarily plant material
2° Consumer	Ornate shrew	Eats invertebrates; known to exist in the geographic area and to occupy habitats typical of the site; high metabolic rate; intimate contact with soil (burrows); high exposure potential; high site fidelity (small home range)
	American Robin	Eats invertebrates and plant material; high exposure potential
3° Consumer	Long-tailed Weasel	Eats primarily small mammals; further assess food chain impacts
	Red-tailed Hawk	Eats primarily small mammals; societal value; further assess food chain impacts

Table 14 - Assessment and Measurement Endpoints
Oro de Amador
Jackson, California

Representative Species	Assessment Endpoint	Measurement Endpoint
"Plant"	Protect and maintain a healthy plant community	Soil toxicity values (mg/kg), low effects level
"Invertebrate"	Protect and maintain a healthy soil invertebrate community; provide prey for upper trophic level species	Soil toxicity values (mg/kg), low effects level
California Ground Squirrel	Protect populations for survival and reproductive success	Toxicity reference values or doses (mg/kg day^{-1}), NOAELs
Ornate Shrew		Toxicity reference values or doses (mg/kg day^{-1}), NOAELs
American Robin		Toxicity reference values or doses (mg/kg day^{-1}), NOAELs
California Quail		Toxicity reference values or doses (mg/kg day^{-1}), NOAELs
Long-tailed Weasel		Toxicity reference values or doses (mg/kg day^{-1}), NOAELs
Red-tailed Hawk		Toxicity reference values or doses (mg/kg day^{-1}), NOAELs

Table 15 - Ecological Uptake Equations
Oro de Amador
Jackson, California

COPEC	Uptake Equations[1]		
	soil to plant	**soil to invertebrate**	**soil to small mammal**
arsenic	$C_{PLANT} = 0.03752 * C_{SOIL}$	$\ln(C_{INVERT}) = 0.0706 * \ln(C_{SOIL}) - 1.421$	$\ln(C_{MAMMAL}) = 0.8188 * \ln(C_{SOIL}) - 4.8471$
lead	$\ln(C_{PLANT}) = 0.561 * \ln(C_{SOIL}) - 1.328$	$\ln(C_{INVERT}) = 0.807 * \ln(C_{SOIL}) - 0.218$	$\ln(C_{MAMMAL}) = 0.4422 * \ln(C_{SOIL}) + 0.0761$
mercury[2]	$\ln(C_{PLANT}) = 0.54 * \ln(C_{SOIL}) - 2.223$	$\ln(C_{INVERT}) = 0.12 * \ln(C_{SOIL}) - 0.68$	a: $\ln(C_{MAMMAL}) = -2.2764 * \ln(C_{SOIL}) - 4.87$ b: $\ln(C_{MAMMAL}) = -0.8965 * \ln(C_{SOIL}) - 4.03$
molybdenum	not established	not established	not established
selenium	$\ln(C_{PLANT}) = 1.104 * \ln(C_{SOIL}) - 0.677$	$\ln(C_{INVERT}) = 0.733 * \ln(C_{SOIL}) - 0.075$	$\ln(C_{MAMMAL}) = 0.3764 * \ln(C_{SOIL}) - 0.4158$

Notes
1 Uptake equations are from USEPA (2005) except for mercury, as described in note 2.
2 Mercury uptake equation for plants from Efroymson (2001), for invertebrates from Sample (1998a), and for small mammals from Sample (1998b). A general uptake equation for mammals (a) and an uptake equation for omnivorous mammals (b) are presented.
All concentrations are measured by dry weight.

C_{DIET} = concentration in diet (mg/kg)
C_{PLANT} = concentration in plant tissue (mg/kg)
C_{INVERT} = concentration in invertebrate tissue (mg/kg)
C_{SOIL} = concentration in soil (mg/kg)
C_{MAMMAL} = concentration in mammal tissue (mg/kg)
ln = natural logarithm

References
USEPA, 2005. Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs), Attachment 4-1, Wildlife Exposure Factors and Bioaccumulation Models, Table 4a. Available online at https://www.epa.gov/chemical-research/guidance-developing-ecological-soil-screening-levels
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Table 16 - Estimate of Prey Tissue Concentrations Using Literature-Derived Uptake Equations
Oro de Amador
Jackson, California

AOC	COPEC	Source EPC	Calculated EPCs		
		concentration in soil (C_{SOIL}, mg/kg)	concentration in plant tissue (C_{PLANT}, mg/kg)	concentration in invertebrate tissue (C_{INVERT}, mg/kg)	concentration in small mammal tissue (C_{MAMMAL}, mg/kg)
Lakebed Area	arsenic	125	4.69	0.34	0.41
	lead	33.4	1.90	13.65	5.09
	mercury[1]	2.38	0.17	0.56	0.0011
					0.008
	selenium	1.26	0.66	0.52	0.72
Cyanide Process Area	arsenic	185	6.94	0.35	0.56
	lead	33.0	1.88	13.51	5.06
	mercury[1]	0.42	0.07	0.46	0.0553
					0.0387

Notes:

1 Mammalian uptake equations for mercury presented for general case (upper EPC) and omnivores (lower EPC).

All concentrations are measured by dry weight.

C_{DIET} = concentration in diet (mg/kg)

C_{INVERT} = concentration in invertebrate tissue (mg/kg)

C_{MAMMAL} = concentration in mammal tissue (mg/kg)

C_{PLANT} = concentration in plant tissue (mg/kg)

C_{SOIL} = concentration in soil (mg/kg)

EPC = exposure point concentration

ln = natural logarithm

Table 17 - Exposure Factors
Oro de Amador
Jackson, California

Indicator Species			Exposure Factors								Diet Proportions (percent)				
Guild	Common Name	Scientific Name	Body Weight (BW, g)	Food Ingestion Rate (g food/ g BW*day)		Food Ingestion Rate (IR, g food/day)		Drinking Rate (DW, mL/day)	Home Range or Territory (acres)	Home Range or Territory (ha)	Soil		Plant	Invert	Mammal
			mean[1]	mean[2]	high[3]	mean	high	mean[4]	mean[5]	mean[5]	mean[6]	high[7]	mean[8]	mean[8]	mean[8]
1° Producer	"Plant"	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Detritivore	"Invertebrate"	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1° Consumer	California Ground Squirrel	Spermophilus beecheyi	584	0.08	na	47	na	na	0.69	0.28	5	na	90	10	0
	California Quail	Callipepla californica	180	0.045	na	8.1	na	na	4.9	2	6.1	13.9	100	0	0
2° Consumer	Ornate Shrew	Sorex ornatus	5.5	0.2	0.209	1.1	1.1	na	0.96	0.39	0.9	4.0	0	100	0
	American Robin	Turdus migratorius	77	1.52	1.96	117.04	151	na	2.0	0.81	6.1	13.9	0	100	0
3° Consumer	Long-tailed Weasel	Mustela frenata	202	0.071	0.13	14.3	26.3	na	25.0	10.1	1.3	4.3	0	0	100
	Red-tailed Hawk	Buteo jamaicensis	1134	0.0262	0.0353	29.7	40.0	na	148	60	2.4	5.7	0	0	100

Notes

1 Mean body weight for adult robins, all seasons, both sexes from USEPA 1993.
Mean body weight for ground squirrel from CRC 1995.
Mean body weight for ornate shrew from Silva & Downing 1995.
Mean body weight for adult weasel, both sexes from OEHHA 1999.
Mean body weight for adult quail from EcoNOTES Individual Body Weight Files, http://www.dtsc.ca.gov/AssessingRisk/eco.cfm, accessed June 5, 2007.

2 Mean food ingestion rate point estimate for weasel and hawk based on arithmetic mean of mean values presented in Table 1 of USEPA 2005.
Mean food ingestion rate for robin based on USEPA 1993.
Mean food ingestion rate for squirrel from Nagy 2001 (0.047 kg/day).
Mean food ingestion rate for quail from Nagy 2000 (data for Gambel's quail).
Food ingestion rate for ornate shrew based on ingestion rate algorithm presented in Nagy 2001.

3 High end point estimate for shrew, weasel and hawk based on arithmetic mean of high end values presented in Table 1 of USEPA 2005.
High end estimate based on USEPA 1993.

4 Surface water impact was not identified during the PEA investigation; therefore, a complete ecological exposure pathway has not been identified.

5 Mean adult summer foraging home range for robin (feeding fledglings) from USEPA 1993.
Mean adult foraging home range for hawk (lower value for California foothills from Fitch, et al, 1946) from USEPA 1993.
Mean home range for weasel from OEHHA 1999.
Mean adult home range for squirrel from OEHHA 1999.
Estimated mean adult quail foraging area during incubation, from DFG California Species Database, http://www.dfg.ca.gov/bdb/html/cawildlife.html, accessed June 5, 2007.

6 Mean value for shrew, weasel and hawk based on Monte Carlo simulation. Value presented in Table 3 of USEPA 2005.
Mean value for squirrel from Byer et al 1994.
Data for quail and robin based on data for dove from USEPA 2005.

7 High end (90th percentile) value for weasel and hawk based on Monte Carlo simulation. Value presented in Table 3 of USEPA 2005.
Incidental soil ingestion rate for ornate shrew from Byer et al.1984.

8 Per DTSC (2007) robin diet assumed to be 100% invertebrate, considering that invertebrates comprise more than 90% of diet during the spring when it is raising its young (Weelright, 1996).
Data estimated for squirrel.

ha = hectares
na = not applicable or not available
SPI = Site Presence Index

References

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USEPA, 2003. Wildlife Exposure Factors Handbook (EPA/600/R-93/187) http://www. baeg.uark.edu/Academics/BENG5933/govdocs/wefh.htm, accessed May 31, 2007.
USEPA, 2005. Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs), Attachment 4-1, Wildlife Exposure Factors and Bioaccumulation Models, http:// www.epa.gov/ecotox/ecossl/SOPs.htm, accessed May 31, 2007.

Table 18a - Toxicity Reference Values
Oro de Amador
Jackson, California

COPEC	Terrestrial Plants		Terrestrial Invertebrates		Birds											Mammals										
					TRV-low					TRV-high					b, Allometric Scale Factor[1]	TRV-low					TRV-high					b, Allometric Scale Factor[1]
	TRV (mg/kg)	Reference	TRV (mg/kg)	Reference	TRV-low (mg/kg-day)	Test Species	Toxic Endpoint(s)	Reference (primary source in parenthesis)	Test BW (g)	TRV-high (mg/kg-day)	Test Species	Toxic Endpoint(s)	Reference (primary source in parenthesis)	Test BW (g)		TRV-low (mg/kg-day)	Test Species	Toxic Endpoint(s)	Reference (primary source in parenthesis)	Test BW (g)	TRV-high (mg/kg-day)	Test Species	Toxic Endpoint(s)	Reference (primary source in parenthesis)	Test BW (g)	
arsenic	18	USEPA EcoSSLs[2]	60	Efroymson 1997b	5.5	mallard	reproductive	USEPA 2002 (Stanley et al. 1994)	1772	22	mallard	reproductive	USEPA 2002 (Stanley et al. 1994)	1172	1.2	0.32	rat	growth, cancer, serum chemistries	USEPA 2002 (Schroeder et al. 1968)	250	4.7	rat	kidney, pulmonary	USEPA 2002 (Brown et al. 1976)	250	0.874
lead	50	Efromyson 1997a (lead acetate)	500	Efroymson 1997b	0.014	Japanese quail	egg production, male organ weights	EFA West 1998	84	8.75	chicken	egg production	EFA West 1998	800	1.2	1.0	rat	kidney function	Fowler 1980	350	241	mouse	body weight, liver and kidney weight	EFA West 1998	19	0.94
mercury	0.3	Efroymson 1997a	0.1	Efroymson 1997b	0.039	mallard	reproductive	USEPA 2002 (USEPA (Great Lakes) 1995)	1000	0.18	mallard	mortality, neurological	USEPA 2002 (USEPA (Great Lakes) 1995)	1000	1.2	0.25	rat	reproductive, developmental	USEPA 2002 (USEPA (Great Lakes) 1995)	188	4.0	rat	reproductive, developmental	USEPA 2002 (USEPA (Great Lakes) 1995)	428	0.98
selenium	1	Efroymson 1997a	70	Efroymson 1997b	0.23	mallard	reproductive	USEPA 2002 (Heinz, et al., 1989)	1000	0.93	mallard	reproductive	USEPA 2002 (Heinz, et al., 1989)	1000	1.2	0.05	mouse	liver	USEPA 2002 (Harr, et al., 1967)	30	1.21	mouse	reproductive	USEPA 2002 (Schroeder & ; Mitchner, 1971)	25	0.94

Notes
1 Mammalian and avian allometric scale factor based on Sample & Arenal 1999. Scale factors not used per DTSC (2007) when difference in body weight of study species and representative species is less than two orders of magnitude.
2 Plant TRV for arsenic based on geometric mean of NOAEC and LOAEC from USEPA EcoSSLs.
BW = body weight NOAEL = no observed adverse effect level
LOAEL = lowest observed adverse effect level TRV = toxicity reference value
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Table 18b - Derivation of NOAEL Lead Toxicity Reference Value for Avian Receptors
Oro de Amador
Jackson, California

USEPA (2005d) Result No.	Reference	NOAEL Dose (mg/kg-day)	LOAEL Dose (mg/kg-day)	USEPA (2005d) Data Evalaution Score	Effect Group
50	Edens and Garlich, 1983	0.194	1.94	77	reproduction
51	Edens and Garlich, 1983	1.63	3.26	79	reproduction
52	Meluzzi et al., 1996	2.69	4.04	81	reproduction
53	Haegele et al. 1974	5.63		71	reproduction
54	Pattec 1984	12		90	reproduction
55	Morgan et al., 1975	12.6	126	78	reproduction
56	Morgan et al., 1975	67.4	135	80	reproduction
57	Stone and Soares, 1976	125		67	reproduction
58	Edens et al., 1976		0.11	77	reproduction
59	Edens and Garlich, 1983		0.194	75	reproduction
60	Edens and Garlich, 1983		3.26	75	reproduction
61	Kendall and Scanlon, 1981		11.8	68	reproduction
62	Edens and Melvin, 1989		93.1	75	reproduction
63	Stone and Soares, 1976		377	74	reproduction
64	Edens and Garlich, 1983	1.56	15.6	77	growth
65	Stone and Fox, 1984	2.77		72	growth
66	Stone et al., 1977	4.64		70	growth
67	Edens and Melvin, 1989	5.93	59.3	76	growth
68	Damron et al, 1969	6.14	61.4	76	growth
69	Damron et al, 1969	7.1	71	76	growth
70	Edens et al., 1976	11.1	111	79	growth
71	Edens, 1985	11.2	112	76	growth
72	Morgan et al., 1975	12.6	126	76	growth
73	Morgan et al., 1975	13.5	67.4	76	growth
74	Howell and Hill, 1978	14.2		67	growth
75	Jeng et. al, 1979	20		87	growth
76	Hoffman et al., 1985	25	125	88	growth
77	Howell and Hill, 1978	28.4		67	growth
78	Stone et al., 1981	34.5		77	growth
79	Custer et al., 1984	54.3		68	growth
80	Berg et al., 1980	61.3	123	83	growth
81	Frederick, 1976	66.9		67	growth
82	Donaldson and McGowan, 1989		38.2	72	growth
83	Latta and Donaldson, 1986		53.1	71	growth
84	Stone and Soares, 1976		64.3	72	growth
85	Leeming and Donaldson, 1984		76.3	71	growth
86	Berg et al., 1980		124	77	growth
87	Bafundo et al. 1984		152	71	growth
88	Donaldson, 1986		163	72	growth
89	Khan, et al, 1993		200	74	growth
90	Cupo and Donaldson, 1987		262	72	growth
91	Berg et al., 1980		270	77	growth
92	Franson and Custer, 1982		273	72	growth
93	Bafundo et al. 1984		282	71	growth
94	Finley et al., 1976	2.47		80	mortality
95	Barthalmus et al., 1977	12.5	25	82	mortality
96	Howell and Hill, 1978	14.2		77	mortality
97	Howell and Hill, 1978	28.4		77	mortality
98	Custer et al., 1984	54.3		78	mortality

99	Frederick, 1976	66.9		77	mortality
100	Hoffman et al., 1985	125	625	89	mortality
101	Vengris and Mare, 1974	160	320	86	mortality
102	Donaldson and McGowan, 1989	163		66	mortality
103	Johnsen and Damron 1982	196		73	mortality
104	Anders et al., 1982		6.25	73	mortality
105	Cupo and Donaldson, 1987		194	73	mortality
106	Khan et al, 1993		400	80	mortality

Notes:
Data from USEPA, 2005d. Ecological Soil Screening Levels for Lead, Interim Final. OSWER Directive 9285.7-70.

Table 18c - Derivation of NOAEL Methylmercury Toxicity Reference Value for Avian Receptors
Oro de Amador
Jackson, California

USEPA (1995) Reference	NOAEL Dose (mg/kg-day)	LOAEL Dose (mg/kg-day)	Effect Group
Scott, 1977		0.67	reproduction
Span, et al., 1972		0.25	reproduction
Fimreite, 1971		0.093	reproduction
Eskeland and Nafstad, 1978	0.26	0.52	reproduction
Heinz and Locke, 1976	0.03	0.18	reproduction
Heinz, 1974, 1975, 1976a, 1976b, 1979		0.078	reproduction
Fimreite, 1970		0.29	growth
Fimreite, 1970	0.57	0.86	mortality
Span, et al., 1972	0.25	0.74	mortality
Fimreite and Karstad, 1971	0.55	1	mortality
Scheuhammer, 1988	0.88	1.75	mortality

Notes:
Data from USEPA, 1995. Great Lakes Water Quality Initative Criteria Documents for the Protection of Wildlife. March. EPA/820/B-95/008. Table 2-6.

Table 19a - Summary of Exposure Assessment and Risk Characterization for Plant
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)	TRV (mg/kg)	Hazard Quotient	Hazard Index for lead and mercury if evaluated at AOC[1]
		C_{SOIL}, 95% UCL		HQ = EPC/TRV	HI
Lakebed Area	arsenic	125	18	6.9	8.6
	lead	33.4	50	0.67	
	mercury	2.38	0.3	7.9	
	selenium	1.26	1	1.3	
Cyanide Process Area	arsenic	185	18	10.28	2.1
	lead	33.0	50	0.66	
	mercury	0.42	0.3	1.4	

Notes:
All concentrations are measured by dry weight.
EPC = exposure point concentration
na = TRV not available
1 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19b - Summary of Exposure Assessment and Risk Characterization for Invertebrate
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)	TRV (mg/kg)	Hazard Quotient	Hazard Index for lead and mercury if evaluated at AOC[1]
		C_{SOIL}, 95% UCL		HQ = EPC/TRV	HI
Lakebed Area	arsenic	125	60	2.1	23.9
	lead	33.4	500	0.07	
	mercury	2.38	0.1	23.8	
	selenium	1.26	70	0.02	
Cyanide Process Area	arsenic	185	60	3.08	4.3
	lead	33.0	500	0.07	
	mercury	0.42	0.1	4.2	

Notes:
All concentrations are measured by dry weight.
EPC = exposure point concentration
1 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19c - Summary of Exposure Assessment and Risk Characterization for California Ground Squirrel
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)								Site Presence[1]		Total Dose (mg/kg-day)		TRV (mg/kg-day)[3]				Hazard Quotient[1,4]		Hazard Index for lead and mercury if evaluated at AOC[3]	
		C_{SOIL}		C_{PLANT}		C_{INVERT}		C_{MAMMAL}		AOC area (ha)	SPI = AOC area / Foraging Area	= IR x SPI x BW^{-1} x [(%Diet $_{SOIL}$ x C $_{SOIL}$) + (%Diet $_{PLANT}$ x C $_{PLANT}$) + (%Diet $_{INVERT}$ x C $_{INVERT}$) + (%Diet $_{MAMMAL}$ x C $_{MAMMAL}$)]		TRV-low	Scaled TRV-low[2]	TRV-high	Scaled TRV-high[2]	HQ_1 = Dose/ TRV-low	HQ_2 = Dose/ TRV-high	HI_1	HI_2
		95% UCL	Max	95% UCL	Max	95% UCL	Max	95% UCL	Max			95% UCL, SPI calc.	Max, SPI=1								
Lakebed Area	arsenic	125	320	4.69	12.01	0.34	0.36	0.41	0.88	16	1.0	8.4E-01	2.1E+00	0.32	0.15	4.7	2.2	6.7E+00	1.8E-01	1.2E+00	8.2E-03
	lead	33.4	102	1.90	3.55	13.6	33.6	5.09	8.34	16	1.0	3.8E-01	9.3E-01	1.0	0.618	241	9.6	9.3E-01	1.6E-03		
	mercury	2.38	9.7	0.173	0.369	0.56	0.67	0.008	0.002	16	1.0	2.6E-02	7.1E-02	0.25	0.082	4.0	2.9	2.8E-01	6.6E-03		
	selenium	1.26	4.0	0.66	2.35	0.52	1.15	0.72	1.11	16	1.0	5.6E-02	1.9E-01	0.050	0.0031	1.21	0.063	3.9E+00	4.7E-02		
Cyanide Process Area	arsenic	185	450	6.94	16.88	0.35	0.37	0.56	1.17	4.0	1.0	1.2E+00	3.0E+00	0.32	0.15	4.7	2.2	9.4E+00	2.6E-01	7.6E-01	4.1E-03
	lead	33.0	72	1.88	2.92	13.5	25.4	5.06	7.15	4.0	1.0	3.8E-01	7.0E-01	1.0	0.618	241	9.6	7.0E-01	1.6E-03		
	mercury	0.42	1.0	0.068	0.108	0.46	0.51	0.039	0.018	4.0	1.0	1.0E-02	1.6E-02	0.25	0.082	4.0	2.9	6.3E-02	2.6E-03		

Notes:
1 Per HERD (2007), SPI = 1 for hazard calculation based on NOEL TRV (TRV_{low}).
2 TRVs allometrically scaled per Sample & Arenal 1999. Scaled TRV $_{receptor}$ = TRV $_{test\ species}$ * (BW $_{test\ species}$ / BW $_{receptor}$)^{b}. Note that scaled TRVs are not used, as recommended by HERD, because the difference between BW $_{test\ species}$ and BW $_{receptor}$ is less than two orders of magnitude.
3 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.
4 Per HERD (2007), EPC = maximum detected value for hazard calculation based on NOEL TRV (TRV-low) and 95% UCL value for calculation based on LOAEL TRV (TRV-high).
All concentrations are measured by dry weight.
EPC = exposure point concentration
SPI = site presence index

Parameters:

Foraging Area	0.7	acres
$\%Diet_{SOIL}$	5	percent
$\%Diet_{PLANT}$	90	percent
$\%Diet_{INVERT}$	10	percent
$\%Diet_{MAMMAL}$	0	percent
IR, food ingestion rate	46.7	g food / day
BW, body weight	584	g

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19d - Summary of Exposure Assessment and Risk Characterization for California Quail
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)								Site Presence[1]		Total Dose (mg/kg-day)		TRV (mg/kg-day)[3]				Hazard Quotient[1,4]		Hazard Index for lead and mercury if evaluated at AOC[3]	
		C_{SOIL}		C_{PLANT}		C_{INVERT}		C_{MAMMAL}		AOC area (ha)	SPI = AOC area / Foraging Area	= IR x SPI x BW^{-1} x [(%Diet $_{SOIL}$ x C $_{SOIL}$) + (%Diet $_{PLANT}$ x C $_{PLANT}$) + (%Diet $_{INVERT}$ x C $_{INVERT}$) + (%Diet $_{MAMMAL}$ x C $_{MAMMAL}$)]		TRV-low	Scaled TRV-low[2]	TRV-high	Scaled TRV-high[2]	HQ_1 = Dose/ TRV-low	HQ_2 = Dose/ TRV-high	HI_1	HI_2
		95% UCL	Max	95% UCL	Max	95% UCL	Max	95% UCL	Max			95% UCL, SPI calc.	Max, SPI=1								
Lakebed Area	arsenic	125	320	4.69	12.01	0.34	0.36	0.41	0.88	16	1.0	5.5E-01	1.4E+00	5.5	85.54	22	208.4	2.6E-01	2.5E-02	3.3E+01	1.0E-01
	lead	33.4	102	1.90	3.55	13.6	33.6	5.09	8.34	16	1.0	1.8E-01	4.4E-01	0.014	0.0056	8.75	52.4	3.1E+01	2.0E-02		
	mercury	2.38	9.7	0.173	0.369	0.56	0.67	0.008	0.002	16	1.0	1.4E-02	4.3E-02	0.039	0.305	0.18	1.41	1.1E+00	8.0E-02		
	selenium	1.26	4.0	0.66	2.35	0.52	1.15	0.72	1.11	16	1.0	3.3E-02	1.2E-01	0.23	1.801	0.93	7.28	5.1E-01	3.5E-02		
Cyanide Process Area	arsenic	185	450	6.94	16.88	0.35	0.37	0.56	1.17	4.0	0.81	6.6E-01	2.0E+00	5.5	85.54	22	208.4	3.6E-01	3.0E-02	2.4E+01	3.5E-02
	lead	33.0	72	1.88	2.92	13.5	25.4	5.06	7.15	4.0	0.81	1.4E-01	3.3E-01	0.014	0.0056	8.75	52.4	2.3E+01	1.6E-02		
	mercury	0.42	1.0	0.068	0.108	0.46	0.51	0.039	0.018	4.0	0.81	3.4E-03	7.6E-03	0.039	0.305	0.18	1.41	2.0E-01	1.9E-02		

Notes:
1 Per HERD (2007), SPI = 1 for hazard calculation based on NOEL TRV (TRV_{low}).
2 TRVs allometrically scaled per Sample & Arenal 1999. Scaled TRV $_{receptor}$ = TRV $_{test\ species}$ * (BW $_{test\ species}$ / BW $_{receptor}$)^{b}. Note that scaled TRVs are not used, as recommended by HERD, because the difference between BW $_{test\ species}$ and BW $_{receptor}$ is less than two orders of magnitude.
3 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.
4 Per HERD (2007), EPC = maximum detected value for hazard calculation based on NOEL TRV (TRV-low) and 95% UCL value for calculation based on LOAEL TRV (TRV-high).
All concentrations are measured by dry weight.
EPC = exposure point concentration
SPI = site presence index

Parameters:

Foraging Area	4.9	acres
$\%Diet_{SOIL}$	6.1	percent
$\%Diet_{PLANT}$	100	percent
$\%Diet_{INVERT}$	0	percent
$\%Diet_{MAMMAL}$	0	percent
IR, food ingestion rate	8	g food / day
BW, body weight	180	g

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19e - Summary of Exposure Assessment and Risk Characterization for Ornate Shrew
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)								Site Presence[1]		Total Dose (mg/kg-day)		TRV (mg/kg-day)[3]				Hazard Quotient[1,4]		Hazard Index for lead and mercury if evaluated at AOC[3]	
		C_{SOIL}		C_{PLANT}		C_{INVERT}		C_{MAMMAL}		AOC area (ha)	SPI = AOC area / Foraging Area	= IR x SPI x BW^{-1} x [(%Diet $_{SOIL}$ x C $_{SOIL}$) + (%Diet $_{PLANT}$ x C $_{PLANT}$) + (%Diet $_{INVERT}$ x C $_{INVERT}$) + (%Diet $_{MAMMAL}$ x C $_{MAMMAL}$)]		TRV-low	Scaled TRV-low[2]	TRV-high	Scaled TRV-high[2]	HQ_1 = Dose/ TRV-low	HQ_2 = Dose/ TRV-high	HI_1	HI_2
		95% UCL	Max	95% UCL	Max	95% UCL	Max	95% UCL	Max			95% UCL, SPI calc.	Max, SPI=1								
Lakebed Area	arsenic	125	320	4.69	12.01	0.34	0.36	0.41	0.88	16	1.0	2.9E-01	6.5E-01	0.32	8.99	4.7	132	2.0E+00	6.2E-02	7.5E+00	4.1E-02
	lead	33.4	102	1.90	3.55	13.6	33.6	5.09	8.34	16	1.0	2.8E+00	6.9E+00	1.0	49.6	241	773	6.9E+00	1.2E-02		
	mercury	2.38	9.7	0.173	0.369	0.56	0.67	0.008	0.002	16	1.0	1.2E-01	1.5E-01	0.25	7.96	4.0	285	6.0E-01	2.9E-02		
	selenium	1.26	4.0	0.66	2.35	0.52	1.15	0.72	1.11	16	1.0	1.1E-01	2.4E-01	0.050	0.246	1.21	5.0	4.7E+00	8.8E-02		
Cyanide Process Area	arsenic	185	450	6.94	16.88	0.35	0.37	0.56	1.17	4.0	1.0	4.0E-01	8.8E-01	0.32	8.99	4.7	132	2.8E+00	8.6E-02	5.6E+00	3.4E-02
	lead	33.0	72	1.88	2.92	13.5	25.4	5.06	7.15	4.0	1.0	2.8E+00	5.2E+00	1.0	49.6	241	773	5.2E+00	1.1E-02		
	mercury	0.42	1.0	0.068	0.108	0.46	0.51	0.039	0.018	4.0	1.0	9.2E-02	1.0E-01	0.25	7.96	4.0	285	4.1E-01	2.3E-02		

Notes:
1 Per HERD (2007), SPI = 1 for hazard calculation based on NOEL TRV (TRV_{low}).
2 TRVs allometrically scaled per Sample & Arenal 1999. Scaled TRV $_{receptor}$ = TRV $_{test\ species}$ * (BW $_{test\ species}$ / BW $_{receptor}$)^{b}. Note that scaled TRVs are not used, as recommended by HERD, because the difference between BW $_{test\ species}$ and BW $_{receptor}$ is less than two orders of magnitude.
3 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.
4 Per HERD (2007), EPC = maximum detected value for hazard calculation based on NOEL TRV (TRV-low) and 95% UCL value for calculation based on LOAEL TRV (TRV-high).
All concentrations are measured by dry weight.
EPC = exposure point concentration
SPI = site presence index

Parameters:

Foraging Area	1.0	acres
$\%Diet_{SOIL}$	0.9	percent
$\%Diet_{PLANT}$	0	percent
$\%Diet_{INVERT}$	100	percent
$\%Diet_{MAMMAL}$	0	percent
IR, food ingestion rate	1.1	g food / day
BW, body weight	5.5	g

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19f - Summary of Exposure Assessment and Risk Characterization for American Robin
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)								Site Presence[1]		Total Dose (mg/kg-day)		TRV (mg/kg-day)[3]				Hazard Quotient[1,4]		Hazard Index for lead and mercury if evaluated at AOC[3]	
		C_{SOIL}		C_{PLANT}		C_{INVERT}		C_{MAMMAL}		AOC area (ha)	SPI = AOC area / Foraging Area	= IR x SPI x BW^{-1} x [(%Diet $_{SOIL}$ x C $_{SOIL}$) + (%Diet $_{PLANT}$ x C $_{PLANT}$) + (%Diet $_{INVERT}$ x C $_{INVERT}$) + (%Diet $_{MAMMAL}$ x C $_{MAMMAL}$)]		TRV-low	Scaled TRV-low[2]	TRV-high	Scaled TRV-high[2]	HQ_1 = Dose/ TRV-low	HQ_2 = Dose/ TRV-high	HI_1	HI_2
		95% UCL	Max	95% UCL	Max	95% UCL	Max	95% UCL	Max			95% UCL, SPI calc.	Max, SPI=1								
Lakebed Area	arsenic	125	320	4.69	12.01	0.34	0.36	0.41	0.88	16	1.0	1.2E+01	3.0E+01	5.5	236.99	22	577.2	5.5E+00	5.5E-01	4.4E+03	8.7E+00
	lead	33.4	102	1.90	3.55	13.6	33.6	5.09	8.34	16	1.0	2.4E+01	6.1E+01	0.014	0.0155	8.75	145.2	4.3E+03	2.7E+00		
	mercury	2.38	9.7	0.173	0.369	0.56	0.67	0.008	0.002	16	1.0	1.1E+00	1.9E+00	0.039	0.846	0.18	3.90	4.9E+01	6.0E+00		
	selenium	1.26	4.0	0.66	2.35	0.52	1.15	0.72	1.11	16	1.0	9.1E-01	2.1E+00	0.23	4.988	0.93	20.17	9.2E+00	9.8E-01		
Cyanide Process Area	arsenic	185	450	6.94	16.88	0.35	0.37	0.56	1.17	4.0	1.0	1.8E+01	4.2E+01	5.5	236.99	22	577.2	7.7E+00	8.0E-01	3.3E+03	6.8E+00
	lead	33.0	72	1.88	2.92	13.5	25.4	5.06	7.15	4.0	1.0	2.4E+01	4.5E+01	0.014	0.0155	8.75	145.2	3.2E+03	2.7E+00		
	mercury	0.42	1.0	0.068	0.108	0.46	0.51	0.039	0.018	4.0	1.0	7.3E-01	8.6E-01	0.039	0.846	0.18	3.90	2.2E+01	4.1E+00		

Notes:
1 Per HERD (2007), SPI = 1 for hazard calculation based on NOEL TRV (TRV_{low}).
2 TRVs allometrically scaled per Sample & Arenal 1999. Scaled TRV $_{receptor}$ = TRV $_{test\ species}$ * (BW $_{test\ species}$ / BW $_{receptor}$)^{b}. Note that scaled TRVs are not used, as recommended by HERD, because the difference between BW $_{test\ species}$ and BW $_{receptor}$ is less than two orders of magnitude.
3 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.
4 Per HERD (2007), EPC = maximum detected value for hazard calculation based on NOEL TRV (TRV-low) and 95% UCL value for calculation based on LOAEL TRV (TRV-high).
All concentrations are measured by dry weight.
EPC = exposure point concentration
SPI = site presence index

Parameters:

Foraging Area	2.0	acres
$\%Diet_{SOIL}$	6.1	percent
$\%Diet_{PLANT}$	0	percent
$\%Diet_{INVERT}$	100	percent
$\%Diet_{MAMMAL}$	0	percent
IR, food ingestion rate	117	g food / day
BW, body weight	77	g

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19g - Summary of Exposure Assessment and Risk Characterization for Long-Tailed Weasel
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)								Site Presence[1]		Total Dose (mg/kg-day)		TRV (mg/kg-day)[3]				Hazard Quotient[1,4]		Hazard Index for lead and mercury if evaluated at AOC[3]	
		C_{SOIL}		C_{PLANT}		C_{INVERT}		C_{MAMMAL}		AOC area (ha)	SPI = AOC area / Foraging Area	= IR x SPI x BW^{-1} x [(%Diet $_{SOIL}$ x C $_{SOIL}$) + (%Diet $_{PLANT}$ x C $_{PLANT}$) + (%Diet $_{INVERT}$ x C $_{INVERT}$) + (%Diet $_{MAMMAL}$ x C $_{MAMMAL}$)]		TRV-low	Scaled TRV-low[2]	TRV-high	Scaled TRV-high[2]	HQ_1 = Dose/ TRV-low	HQ_2 = Dose/ TRV-high	HI_1	HI_2
		95% UCL	Max	95% UCL	Max	95% UCL	Max	95% UCL	Max			95% UCL, SPI calc.	Max, SPI=1								
Lakebed Area	arsenic	125	320	4.69	12.01	0.34	0.36	0.41	0.88	16	0.64	9.3E-02	3.6E-01	0.32	0.39	4.7	5.7	1.1E+00	2.0E-02	7.2E-01	1.5E-03
	lead	33.4	102	1.90	3.55	13.6	33.6	5.09	8.34	16	0.64	2.5E-01	6.9E-01	1.0	1.676	241	26.1	6.9E-01	1.0E-03		
	mercury	2.38	9.7	0.173	0.369	0.56	0.67	0.008	0.002	16	0.64	1.8E-03	9.1E-03	0.25	0.233	4.0	8.3	3.6E-02	4.5E-04		
	selenium	1.26	4.0	0.66	2.35	0.52	1.15	0.72	1.11	16	0.64	3.4E-02	8.3E-02	0.050	0.0083	1.21	0.170	1.7E+00	2.8E-02		
Cyanide Process Area	arsenic	185	450	6.94	16.88	0.35	0.37	0.56	1.17	4.0	0.16	3.4E-02	5.0E-01	0.32	0.39	4.7	5.7	1.6E+00	7.2E-03	5.8E-01	3.8E-04
	lead	33.0	72	1.88	2.92	13.5	25.4	5.06	7.15	4.0	0.16	6.3E-02	5.7E-01	1.0	1.676	241	26.1	5.7E-01	2.6E-04		
	mercury	0.42	1.0	0.068	0.108	0.46	0.51	0.039	0.018	4.0	0.16	5.0E-04	2.2E-03	0.25	0.233	4.0	8.3	8.7E-03	1.3E-04		

Notes:
1 Per HERD (2007), SPI = 1 for hazard calculation based on NOEL TRV (TRV_{low}).
2 TRVs allometrically scaled per Sample & Arenal 1999. Scaled TRV $_{receptor}$ = TRV $_{test\ species}$ * (BW $_{test\ species}$ / BW $_{receptor}$)^{b}. Note that scaled TRVs are not used, as recommended by HERD, because the difference between BW $_{test\ species}$ and BW $_{receptor}$ is less than two orders of magnitude.
3 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.
4 Per HERD (2007), EPC = maximum detected value for hazard calculation based on NOEL TRV (TRV-low) and 95% UCL value for calculation based on LOAEL TRV (TRV-high).
All concentrations are measured by dry weight.
EPC = exposure point concentration
SPI = site presence index

Parameters:

Foraging Area	25	acres
$\%Diet_{SOIL}$	1.3	percent
$\%Diet_{PLANT}$	0	percent
$\%Diet_{INVERT}$	0	percent
$\%Diet_{MAMMAL}$	100	percent
IR, food ingestion rate	14	g food / day
BW, body weight	202	g

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

Table 19h - Summary of Exposure Assessment and Risk Characterization for Red-Tailed Hawk
Oro de Amador
Jackson, California

AOC	COPEC	EPC (mg/kg)								Site Presence[1]		Total Dose (mg/kg-day)		TRV (mg/kg-day)[3]				Hazard Quotient[1,4]		Hazard Index for lead and mercury if evaluated at AOC[3]	
		C_{SOIL}		C_{PLANT}		C_{INVERT}		C_{MAMMAL}		AOC area (ha)	SPI = AOC area / Foraging Area	= IR x SPI x BW^{-1} x [(%Diet $_{SOIL}$ x C $_{SOIL}$) + (%Diet $_{PLANT}$ x C $_{PLANT}$) + (%Diet $_{INVERT}$ x C $_{INVERT}$) + (%Diet $_{MAMMAL}$ x C $_{MAMMAL}$)]		TRV-low	Scaled TRV-low[2]	TRV-high	Scaled TRV-high[2]	HQ_1 = Dose/ TRV-low	HQ_2 = Dose/ TRV-high	HI_1	HI_2
		95% UCL	Max	95% UCL	Max	95% UCL	Max	95% UCL	Max			95% UCL, SPI calc.	Max, SPI=1								
Lakebed Area	arsenic	125	320	4.69	12.01	0.34	0.36	0.41	0.88	16	0.108	9.6E-03	2.2E-01	5.5	9.40	22	22.9	4.1E-02	4.4E-04	2.0E+01	2.9E-03
	lead	33.4	102	1.90	3.55	13.6	33.6	5.09	8.34	16	0.108	1.7E-02	2.8E-01	0.014	0.0006	8.75	5.8	2.0E+01	1.9E-03		
	mercury	2.38	9.7	0.173	0.369	0.56	0.67	0.008	0.002	16	0.108	1.8E-04	6.2E-03	0.039	0.034	0.18	0.15	1.6E-01	1.0E-03		
	selenium	1.26	4.0	0.66	2.35	0.52	1.15	0.72	1.11	16	0.108	2.1E-03	3.2E-02	0.23	0.198	0.93	0.80	1.4E-01	2.3E-03		
Cyanide Process Area	arsenic	185	450	6.94	16.88	0.35	0.37	0.56	1.17	4.0	0.027	3.5E-03	3.1E-01	5.5	9.40	22	22.9	5.7E-02	1.6E-04	1.7E+01	6.6E-04
	lead	33.0	72	1.88	2.92	13.5	25.4	5.06	7.15	4.0	0.027	4.1E-03	2.3E-01	0.014	0.0006	8.75	5.8	1.7E+01	4.7E-04		
	mercury	0.42	1.0	0.068	0.108	0.46	0.51	0.039	0.018	4.0	0.027	3.4E-05	1.1E-03	0.039	0.034	0.18	0.15	2.8E-02	1.9E-04		

Notes:
1 Per HERD (2007), SPI = 1 for hazard calculation based on NOEL TRV (TRV_{low}).
2 TRVs allometrically scaled per Sample & Arenal 1999. Scaled TRV $_{receptor}$ = TRV $_{test\ species}$ * (BW $_{test\ species}$ / BW $_{receptor}$)^{b}. Note that scaled TRVs are not used, as recommended by HERD, because the difference between BW $_{test\ species}$ and BW $_{receptor}$ is less than two orders of magnitude.
3 HERD (2007) considers cadmium, lead and mercury toxicity to be potentially additive because of their known interference with calcium-mediated intracellular signaling pathways and nephrotoxic effects.
4 Per HERD (2007), EPC = maximum detected value for hazard calculation based on NOEL TRV (TRV-low) and 95% UCL value for calculation based on LOAEL TRV (TRV-high).
All concentrations are measured by dry weight.
EPC = exposure point concentration
SPI = site presence index

Parameters:

Foraging Area	148	acres
$\%Diet_{SOIL}$	2.4	percent
$\%Diet_{PLANT}$	0	percent
$\%Diet_{INVERT}$	0	percent
$\%Diet_{MAMMAL}$	100	percent
IR, food ingestion rate	30	g food / day
BW, body weight	1134	g

References

HERD, 2007. Memorandum: Phase 1 Predictive Ecological Risk Assessment for Osborne Hill Property, Nevada County, California. DTSC Human and Ecological Risk Division, August 20, 2007. Included in: Comments on the Draft Removal Action Workplan for Osborne Hill Property, Nevada County, California. DTSC, October 3, 2007.

TABLE 20
SUMMARY OF GROUNDWATER AND SURFACE WATER DATA AND BENCHMARK VALUES
ORO DE AMADOR
JACKSON, CALIFORNIA

Constituent	Groundwater														Surface Water								Groundwater Benchmarks		Surface Water Benchmarks	
	Extractable Metals in Mine Tailings by SPLP		Shallow Groundwater in Tailings at the Lakebed Area (MW-1)		Groundwater in Fractured Rock Beneath the Lakebed Area (MW-4)		Perched Groundwater in the Tailings Pile (MW-2)		Shallow Groundwater at the Toe of the Tailngs Pile (MW-3)		Groundwater Seeps at the Toe of the Tailings Pile (S-2 and S-3)		Upgradient Background Groundwater (MW-5)		Seasonal Surface Water at the Lakebed Area (SW-3)		Surface Water Downgradient of Lakebed Area (SW-1)		Surface Water Downgradient of Tailings Pile (SW-2)		Upgradient Background Surface Water (SW-4, SW-5, and SW-6)		Benchmark Value for Water Quality (ug/L)	Source of Benchmark Value	Benchmark Value for Water Quality (ug/L)	Source of Benchmark Value
	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)	Max (ug/L)	Mean (ug/L)				
Arsenic	4.9	3.13	**54**	**40**	1.2	1.2	**61**	**50**	6.1	3.0	**820**	**150**	2.5	2.0	10	10	8.8	8.0	7.7	7.7	<5	<5	10	Primary MCL	10	Primary MCL
Cadmium	na	na	<0.5	<0.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<10	<10	<2.5	<2.5	<50	<50	<50	<50	<50	<50	<50	<50	5	Primary MCL	1.7	CTR CCC*
Iron	na	na	**4,800**	**4,800**	<250	<250	**1,800**	**1,090**	**160,000**	**80,150**	**31,000**	**6,456**	930	690	**22,000**	**22,000**	<300	<300	**1,100**	**1,100**	**340**	245	300	Secondary MCL	300	Secondary MCL
Lead	<0.3	<0.3	2.0	2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	5.2	3.4	<2.5	<2.5	<150	<150	<150	<150	<150	<150	**23**	**23**	15	Primary MCL	1.6	CTR CCC*
Manganese	na	na	**940**	**472**	7.7	7.7	**590**	**443**	**2,700**	**2,033**	**4,400**	**2,030**	370	168	**71**	**71**	50	50	**110**	**110**	**52**	31	50	Secondary MCL	50	Secondary MCL
Mercury	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.39	0.20	<0.2	<0.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	2	Primary MCL	0.05	CTR HH
Selenium	2.4 J	1.8 J	na	na	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	50	Primary MCL	5.0	CTR CCC
Silver	<0.24	<0.24	<5	<5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<10	<10	<2.5	<2.5	<50	<50	<50	<50	<50	<50	<50	<50	10	Secondary MCL	1.7	CTR CCC*
Cyanide, total	na	na	1.2	1.2	1.5	1.5	**190**	83.3	<1	<1	**350**	**197**	<1	<1	<20	<20	<20	<20	**360**	**310**	<20	<20	150	Primary MCL	150	Primary MCL
Cyanide, free[1]	na	na	<1	<1	<1	<1	1.6	1.1	<1	<1	**350**	**119**	<1	<1	na	na	na	na	na	na	na	na				

Notes:

1 Free cyanide is reported as amenable or weak acid dissociable (WAD) cyanide.

* CTR value is hardness dependent. Converted values were calculated based on a hardness of 86 mg/L as $CaCO_3$ (mean value for upgradient surface water locations SW-5 and SW-6).

Mean values were calculated using 0.5*MDL for non-detections when the detection limits were sufficiently low. Mean values for single data points are reported as the maximum value.

Concentrations in underlined font exceed background. Concentrations in **bold** font exceed a benchmark concentration.

Ag = Agricultrual Water Quality Goal

CCC = Criteria Continuous Concentration (CCC): aquatic life extended exposure (4 days) without observed deleterious effects

CMC = Criterion Maximum Concentration, freshwater, short-term exposure

CTR = California Toxics Rule

SPLP = Synthetic Precipitation Leaching Procedure

HH = Human health (one-per-million risk for carcinogens) for consumption of water and aquatic organisms.

MCL = Maximum Contaminant Level

ug/L = micrograms per liter

Department of Toxic Substances Control

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Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Perry Myers
Northern California Central Cleanup Operations Branch
8800 Cal Center Drive
Sacramento, CA 95826

FROM: Kimiko Klein, Ph.D.
Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: September 29, 2006

SUBJECT: Remediation Goals for the Recreational Runner on Trails
EMPIRE MINE STATE HISTORICAL PARK, GRASS VALLEY
PCA: 11045 SITE: 100235-00

Background

Empire Mine State Historical Park comprises 845 acres and is the site of one of the oldest, largest, deepest, longest and richest gold mines in California. The mine existed for more than 100 years, closing in 1956. The Park contains many of the mine's buildings, the owner's home and restored gardens, as well as the entrance to 367 miles of abandoned and flooded mine shafts. The park consists of forested backcountry and 12 miles of trails for hiking, mountain biking and horseback riding. There are also residences within the park occupied by park ernployees. There are extremely elevated concentrations of arsenic, lead, and mercury at various locations within the park, along with elevated cyanide and other metals. These elevated concentrations have been associated with mine and mill tailings. A recent investigation indicates elevated levels of arsenic along the trails. The Human and Ecological Risk Division (HERD) has been requested to develop remediation goals for arsenic for the recreational user of the trails.

Exposure Scenario

On a recent site visit, the HERD observed walkers, bicyclists, horseback riders and runners using the trails. The HERD determined that the runner who uses the trails routinely over the years would likely have the highest chronic exposure to contaminants in

the soil because of the extent of heavy physical activity involved in running compared to the other observed uses of the trails. The parameters used to define potential exposure by the runner were as follows.

The runner is assumed to run every other day, or approximately four times a week, except for two weeks out of the year (200 days per year), for an hour each running day over a period of 30 years. The runner is assumed to share the trails with other users, and, therefore, dusty conditions would prevail with as high as 1,000 ug/m^3 of respirable dust in the air, resulting in a particulate emission factor (PEF) of 1,000,000 m^3/kg. The breathing rate is assumed to be 3.9 m^3/hour, equivalent to heavy physical activity (US. Environmental Protection Agency (US EPA) Exposure Factors Handbook (EFH), 1997). The runner would breathe through the mouth as well as the nose and, thus, some fraction of dust is assumed to be taken in through the mouth and swallowed. This amount is estimated to be equal to 100 times the adult soil ingestion rate indoors of 0.03 mg/hour (professional judgment based on US EPA EFH Table 4-15). The runner is assumed to be wearing shorts and a short-sleeved shirt, and, thus, the default adult skin surface area of 5700 cm^2 is appropriate. An adherence of soil to skin of 0.2 mg/cm^2 is assumed to account for the increased likelihood of dust adhering to sweat-dampened skin. Dust will adhere to the skin for the duration of the run and until the runner showers. In order to account for the absorption that could take place during that time, an absorption correction factor of 0.1 is included to assume an absorption time of 2.4 hours (professional judgment based on the default absorption time for a dermal event of 24 hours multiplied by 0.1). This assumption is site-specific and a highly simplified incorporation of the work of McKone and Howd (1992), in which uptake of a chemical by skin from dermal contact with contaminated soil was considered to be dependent on exposure time, the thickness of the soil layer on the skin, and soil-skin permeability.

Toxicity Criteria

The oral cancer slope factor (CSF_o) for arsenic is 9.45 $(mg/kg/day)^{-1}$. The inhalation CSF (CSF_i) is 12 $(mg/kg/day)^{-1}$. The oral reference dose is 0.0003 mg/kg/day, and the inhalation reference dose is 0.0000086 mg/kg/day.

Remedial Goals for Arsenic

Using the exposure parameters and toxicity criteria as described above, the risk-based soil remedial goals for arsenic are: 3 to 300 mg/kg, representing a target risk range of 10^{-6} to 10^{-4}. The non-cancer soil remedial goal, representing a hazard index (HI) of one is 270 mg/kg.

Discussion

The remedial goals for arsenic were calculated assuming that the inhalation, ingestion and dermal routes are complete exposure pathways for the runner. This differs from the assumption described in the preliminary endangerment assessment (PEA) in

which only the inhalation pathway was assumed to be complete (Harding Lawson Associates 1992). The HERD considers that dust will easily adhere to the damp, sweat-laden skin of a runner and so utilized the adherence factor of 0.2 mg/cm^2. This is the reasonable maximum exposure (RME) value for the industrial worker but should be considered a central tendency value for the actively running person. The amount of dust a runner may ingest during breathing is very uncertain, but the HERD considers 3 mg dust ingested per hour to be reasonable. This is less than the prorated value of the amount of soil potentially incidentally ingested during a work day for a commercial/industrial worker of 12.5 mg/hour (100 mg soil/8-hour work day). Also, the exposure duration in the PEA was assumed to be nine years, whereas, the HERD assumes an exposure duration of 30 years. The HERD considers the assumption of 30 years to be a RME parameter.

In addition to these major differences in exposure assumptions, the PEA also assumed an active breathing rate and dust in air concentration that are somewhat lower than HERD's assumptions. These differences in breathing rate and dust in air concentrations only slightly affect the calculated results.

The PEA performed in 1992 also evaluated the child recreationist who visits the site once a week for six years and is exposed to contaminants anywhere on-site via incidental ingestion of soils and inhalation of dusts. The remedial goal for arsenic under this scenario was calculated to be 3 mg/kg at a target cancer risk of 10^{-6}, The toxicity criteria for arsenic have been recently been revised, so the remedial goal protective of the child recreationist is now 0.7 mg/kg, using the same PEA exposure assumptions.

Conclusions

The non-cancer-based remedial goal of 270 mg/kg is within the target cancer risk range of 3 to 300 mg/kg. If the risk management goal for this site is to be set at the 10^{-6} or 10^{-5} target risk level, this exposure analysis indicates that the trails should be remediated to close to the local background of approximately 15 mg/kg of arsenic. However, the HERD has determined that in this exposure scenario of using the trails for short time durations, considering arsenic as a threshold toxicant, rather than as a carcinogen, is appropriate and health protective. Therefore, the HERD recommends the consideration of a remedial goal for arsenic on the trails of 270 mg/kg.

The HERD emphasizes that this evaluation and these remedial goals are applicable for this site only. If you have any questions, please contact me at (510) 540-3762, (916) 255-6643, or via electronic mail at kklein@dtsc.ca.gov.

References

McKone, T.E. and Howd, R.A. 1992, Estimating Dermal Uptake of Nonionic Organic Chemicals from Water and Soil: Part 1, Unified Fugacity-Based Models for Risk Assessments, *Risk Analysis* 12: 543-557.

Preliminary Endangerment Assessment, Empire Mine State Historical Park. September 1992, Harding Lawson Associates.

U.S. Environmental Protection Agency Exposure Factors Handbook. 1997, Office of Research and Development.

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Attachment

Calculation of Risks
Recreationist at Empire Mine State Park

		Dose	Hazard Index		Risk	
ingestion:	$Dose_{ing}$ =	$\frac{Cs * IRs * EF * ED * ET * CF1}{BW * AP}$	HI_{ing} =	$Dose_{ing}/RfDo$	$Risk_{ing}$ =	$Dose_{ing} * CSFo$
dermal contact:	$Dose_{der}$ =	$\frac{Cs * SSA * ABS * SAR * EF * ED * ACF * CF1}{BW * AP}$	HI_{der} =	$Dose_{der}/RfDo$	$Risk_{der}$ =	$Dose_{der} * CSFo$
inhalation:	$Dose_{inh}$ =	$\frac{Cs * InhRs * EF * ED * ET * [(1/VF) \text{ or } (1/PEF)]}{BW * AP}$	HI_{inh} =	$Dose_{inh}/RfDi$	$Risk_{inh}$ =	$Dose_{inh} * CSFi$

Parameter	Description	Units	Value	Reference
Dose	Dose of chemical	mg/kg-day	See below	Calculated
HI	Hazard index	unitless	See below	Calculated
Risk	Risk	unitless	See below	Calculated
Cs	Chemical concentration in soil	mg/kg	See below	Calculated
IRs	Soil ingestion rate	mg/hr	3	a
EF	Exposure frequency	days/year	200	b
ED	Exposure duration	years	30	
ET	Exposure time	hr/day	1	c
ACF	Absorption correction factor	unitless	0.1	d
BW	Body weight	kg	70	
AP	Averaging period	days	See below	Calculated
PEF	Particulate emission factor	m^3/kg	1.00E+06	1,000 ug/m^3
SSA	Skin surface area	cm^2/day	5700	
ABS	Absorption factor	unitless	See below	Calculated
SAR	Soil adherence	mg/cm^2	0.2	e

InhRs	Inhalation rate	m^3/hr	3.9	USEPA EFH 1997
CF1	Conversion factor, mg to kg	kg/mg	1.00E-06	Calculated
RfDo	Oral reference dose	mg/kg-day	See below	EPA IRIS
RfDi	Inhalation reference dose	mg/kg-day	See below	OEHHA
CSFo	Oral cancer slope factor	(mg/kg-day)$^{-1}$	See below	OEHHA
CSFi	Inhalation cancer slope factor	(mg/kg-day)$^{-1}$	See below	OEHHA

Carcinogens			*AP =*	*25,550*	*days*							**Total**
Compound	**Cs**	**ABS**	**VF**	**CSFo**	**CSFi**	**Dose$_{ing}$**	**Dose$_{der}$**	**Dose$_{inh}$**	**Risk$_{ing}$**	**Risk$_{der}$**	**Risk$_{inh}$**	**Risk**
Arsenic	3.00E+00	0.03		9.45E+00	1.20E+01	3.02E-08	3.44E-08	3.93E-08	2.85E-07	3.25E-07	4.71E-07	1.08E-06

Noncarcinogens			*AP =*	*10,950*	*days*							**Total**
Compound	**Cs**	**ABS**	**VF**	**RfDo**	**RfDi**	**Dose$_{ing}$**	**Dose$_{der}$**	**Dose$_{inh}$**	**HI$_{ing}$**	**HI$_{der}$**	**HI$_{inh}$**	**HI**
Arsenic	2.70E+02	0.03		3.00E-04	8.60E-06	6.46E-06	7.36E-06	8.40E-06	2.15E-02	2.45E-02	9.76E-01	1.00E+00

a) Professional judgment - ingestion of dust by breathing in and swallowing dust while running. 100 times adult soil ingestion rate indoors of 0.03 mg/hr (EFH Table 4-15).

b) Professional judgment - running every other day, four days/week.

c) Professional judgment - running for one hr.

d) Professional judgment - absorption correction factor for dermal exposure time - default is assumed to be 24h/d. 0.1 x 24 hr/d = 2.4 hr.

e) Professional judgment - assumed to be equivalent to outdoor workers. (Exhibit 3-3 in EPA RAGS Volume I, Part E Dermal Risk Assessment 2004).

APPENDIX I

HEALTH AND SAFETY PLAN

REMEDIAL ACTION

ORO DE AMADOR PROPERTY
JACKSON, CALIFORNIA

PREPARED BY

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742
916.852.9118

PROJECT NO. S9959-07-03

AUGUST 2023

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Figure 1 – Site Location Map

Hospital Route Map

Hospital Directions

HEALTH AND SAFETY PLAN SUMMARY

Site Name: Oro de Amador Property

Site Location: Site is located east of North Main St and west of New York Ranch Rd in Jackson, California. Primary access is from the south via Cemetery Lane near the City of Jackson Public Works Department.

Project Representatives:

- Project Manager: **Jason Muir** **530-913-5996** - Cell No.
- Project Safety Officer: **Nicole Hastings-Bethel** **805-801-4998** - Cell No.
  Geocon Office No.: **916-852-9118**
- Geocon Consulting CIH: **Pamela Murcell** **916-712-4547** - Cell No.
- Client Project Manager: **Yvonne Kimball, City Manager** **209-223-1646** – Office No.

Scope:

- Environmental Monitoring (soil sampling, dust monitoring, water sampling)
- Construction Quality Assurance (field density testing, measurement, observation, and recordkeeping)

Hazard Summary:

- Mechanical – material handling, slip/trip, struck-by injuries, steep slopes; Earthwork – heavy construction equipment, traffic, and excavations
- Underground and Overhead Utilities
- Occupational Noise
- Biological – bites or stings; poison oak; COVID-19 pathogen
- Thermal Extremes – Cold Stress, Heat Stress
- Chemical – heavy metals, cyanide

Control Summary:

- PPE: Safety vests, hard hats, safety glasses, steel-toed boots
- Site Control – utility location/identification
- Hearing protection – ear plugs or muffs
- Site inspection and awareness; repellent; safe work practices
- Appropriate dress, shaded rest breaks, fluids
- Engineering Controls/Isolation/PPE – safe (wet) sampling methods & work practices; protective gloves; sanitation.

Hospital Reference: Sutter Amador Hospital **209-223-7500**
200 Mission Blvd.
Jackson, CA 95642

Directions: **From the Site:** From the southern access point at the Site, proceed south on Cemetery Lane past the City of Jackson Public Works Department for 0.1 mile and turn right (south) on Placer Drive. After 0.1 mile on Placer Drive, turn left (east) on Court Street. Proceed East on Court Street for 0.3 mile, then sharp right onto CA-88 West (Carson Pass Hwy) for 0.2 miles, then left (south) on Mission Blvd. After 0.1 mile, turn left into hospital facility, and take the Y to the right after 120 feet, then proceed 340 feet to hospital. (see Site Location Map, Figure 1).

Emergency Assistance: Fire/Police/Medical Assistance: **911**
Jackson Police Department: **209-223-1771**–Non-Emergency
Poison Control: **800-222-1222**

1.0 INTRODUCTION

This Health and Safety Plan (HSP) is a compilation of health and safety guidelines, policies and/or performance protocols that, when exercised, are intended to reduce or eliminate the potential for injury and exposure during the performance of the activities at the site described below. Conformance with its contents does not warrant that injuries or exposures will not occur.

This HSP is not a training tool and does not contain the degree of detail necessary to train an employee on the appropriate performance, approach and/or equipment-use protocols referenced, herein. Persons working on this project and referring to this HSP shall meet the minimum training requirements described in Section 2.2.

This HSP has been prepared to specifically support the field activities described herein. The provisions described herein apply to employees of Geocon Consultants, Inc. (Geocon) and its subcontractors, only. Representatives of the Client, Client-retained subcontractors, and representatives of state or local government agencies are expected to observe the safety rules and requirements established by their respective organizations, provided they do not conflict with this HSP. However, Geocon will not be responsible for enforcing the conditions of this HSP on these representatives.

The contents of this HSP are based on factors and conditions understood prior to the start of the field activities. If those factors and conditions change during performance of the activities or if conditions exist that were not considered in the preparation of this HSP, then they shall be brought to the immediate attention of the person approving this HSP, and the HSP shall be modified, accordingly. The date indicated in Section 8.0 of this document indicates the latest version of this HSP.

All project personnel will review and become familiar with the elements of the Plan prior to site work. A copy of the Plan will be provided to all subcontractors and the Project Manager, or designee involved with project activities.

A pre-job conference will be held to delineate roles and responsibilities, discuss key elements of the HSP, and coordinate activities. This HSP is a "working document" to be used by Geocon personnel. The HSP may be modified at any time in accordance with Section 1.4 to adequately address changing conditions or previously unrecognized exposure hazards which may be encountered during the project. An updated, current copy of the HSP will be maintained at the project site and be available to all affected personnel.

1.1 Project Location and Description

Site Location: The 160-acre Oro de Amador Property (the Site) is located east of North Main Street and west of New York Ranch Road in Jackson, California. Primary access is from the southern end of the Site on Cemetery Lane via a locked gate on Tyack Lane near the City of Jackson Public Works Department. Secondary access is by a locked gate on the southeastern site boundary at New York Ranch Road.

1.2 Background

The vacant 160-acre Site is owned by the City of Jackson and includes five parcels, which are designated by Amador County Assessor Parcel Numbers (APNs) 020-020-040, 020-070-037, 020-070-038, 020-070-040, and 020-070-031. Residential neighborhoods are immediately adjacent to the south, east, and west.

Beginning circa 1912, the Kennedy Mining and Milling Company acquired the Site, constructed a concrete dam, and transported approximately 1.5 million tons of mine tailings from the Kennedy Gold Mine (½ mile northwest of the Site) to a tailings impoundment located in the southern central portion of the Site for disposal. The tailings contain elevated concentrations of heavy metals such as arsenic, lead and mercury.

In 1933, the Kennedy Mine and Milling Company began construction of a 1,000-ton cyanide plant on the ridge immediately west of the tailings impoundment. The plant reportedly operated from 1935 to 1939, and was used to extract gold remaining in the tailings. Tailings were removed from the impoundment, processed through the cyanide leaching plant, and deposited into an approximately 30-acre tailings pile in the southwestern portion of the Site, west of the cyanide plant.

Although tailings reprocessing stopped in 1939, tailings from the Kennedy Mine were deposited at the Site until 1942 when the mine ceased operation. At the time of the closure of the Kennedy Mine in 1942, over one million cubic yards of tailings had been deposited in the Tailings Pile, and approximately 250,000 cubic yards of tailings remained in the tailings impoundment behind the concrete dam.

The cyanide processing plant and other onsite buildings were dismantled in the 1940s (during World War II; much of the metal was recycled). Small-scale attempts to extract gold from the tailings were reportedly made between 1948 and 1950. In September 1950, the Kennedy Mining and Milling Company went out of business.

Arsenic concentrations up to approximately 550 milligrams per kilogram (mg/kg) have been detected in mine tailings at the site. Lead and mercury are also metals of concern. Cyanide may be present at relatively low concentrations in groundwater and also in the subsurface near the base of the tailings pile in saturated materials that will not be disturbed as part of the investigation.

1.3 Project Objectives

The Site has been investigated seven times by various public agencies and private parties from 1989 to 2017, and a draft Removal Action Workplan (RAW) was prepared to evaluate remedial alternatives. Supplemental site investigation (SSI) is proposed to address data gaps in the previous site characterization.

1.4 Planned Scope of Services

Geocon will perform environmental monitoring and Quality Assurance (QA) during the remedial action. Geocon tasks include:

- Dust monitoring during the remedial action to verify the effectiveness of the contractor's engineering controls for dust mitigation and compliance with the DMP and CAMP;
- Review of geochemical laboratory data and coordination with DTSC for approval of clean fill prior to transport to the site;
- Review of geotechnical materials properties and coordination with the engineer for approval of clean fill prior to transport to the site;
- Observation of excavation areas to verify the extent of excavation and to verify compliance with the DMP;
- Collection of post-excavation verification samples from the base and perimeter of each excavation area pursuant to the VSAP, coordination of field/laboratory analysis and comparison to cleanup goals to verify excavation limits;
- Selection of appropriate locations for QA/QC samples;
- Observation of subgrade preparation prior to placement of fill;
- Verification of fill placement methods and verification of adequate moisture content, density and relative percent compaction;
- Review of cover soil material submittal (proposed source location for on-site borrow) and coordination with the project geotechnical engineer for review; and
- Documentation of field activities in accordance with the recordkeeping requirements set forth in the RAP and RDIP.

The remedial action is to be performed by a contractor hired by the City of Jackson. The remedial action scope includes:

1. Excavation of isolated tailings deposits, transport within the site, and placement of the tailings at the Tailings Pile as engineered fill:
    a. Off-site transport and disposal at a licensed solid waste disposal facility of excavated material classified as Class I (hazardous) waste (if encountered).
    b. Transport of non-hazardous materials to the Tailings Pile deck and placement as engineered fill.

c. Post-excavation sampling and analysis to verify that the isolated tailings deposits were removed.

d. Restoration of the excavation areas, including minor regrading, installation of erosion and sediment control BMPs, and application of seed, mulch, and fertilizer.

2. Regrading and capping of the Tailings Pile:

   a. Construction of approximately 2,000 feet of drainage ditches above the Tailings Pile to direct stormwater runoff into closed pipe collectors, which covey the water to a detention basin down slope of the dam.

   b. Regrading to drain the Tailings Pile deck:

      i. Regrading of the 12.5-acre development area on the Tailings Pile deck, including the upper (northwestern) deck and the lower (southeastern) deck, so that surface runoff is directed to storm water drainage collectors and no water ponds on the Tailings Pile surface.

      ii. Regrading of the 1-acre basin at the upslope (northeastern) edge of the Tailings Pile to so that stormwater runoff is directed to storm water drainage collectors and no water ponds at the upslope edge of the Tailings Pile.

   c. Construction of the stormwater collection system, which includes flared inlets, closed pipe collectors, overside drains, stilling basins and a storm water detention basin.

   d. Compaction of the regraded surface of the Tailings Pile.

   e. Construction of the Tailings Pile cap (all thicknesses are after compaction):

   f. In the 12.5-acre development area: placement and compaction of 1 foot of clayey imported soil overlain by 1 foot of predominantly granular imported soil.

   g. In the 5.5-acres upslope (northeast) of the development area: placement and compaction of 1 foot of clayey imported soil overlain by 6 inches of predominantly granular material capable of supporting vegetation growth.

   h. On the 11-acre slopes of the Tailings Pile (12 acres considering the vertical projection): placement and compaction of 1 foot of clayey imported soil overlain by 6 inches of predominantly granular material capable of supporting vegetation growth.

3. Fencing and posting of the Lakebed Area and Cyanide Process Area to restrict public use.

1.5 Schedule

Anticipated Period of Performance:	May to September 2025
Anticipated Weather/Temperature:	Weather conditions are expected to be cool and then hot, with possible periods of rain in the spring and fall months. Geocon's Heat Illness Prevention Plan will be implemented as needed. Field work will not be conducted during inclement wet weather.

2.0 ADMINISTRATIVE REQUIREMENTS/CONTROLS

2.1 Personnel

Personnel responsible for project safety include the Project Manager (PM), the Project Safety Officer (PSO), and participating project personnel.

2.1.1 Project Manager (PM)

The Project Manager has ultimate authority and responsibility for project Health and Safety. Accordingly, they have the responsibility to: develop and approve the HSP (or assign its development); audit compliance with the provisions of this HSP; suspend project activities or modify service practices for health and safety reasons; and, to dismiss from a project site, individuals whose onsite conduct either endangers the health and/or safety of others or is judged not to comply with the provisions of the HSP.

The PM is also responsible for sharing/distributing the HSP to participating field personnel. The PM is responsible for implementing all provisions of the HSP and any applicable addenda. Implementation includes:

- Reviewing and approving the HSP requirements (if prepared by another project member);
- Presenting an overview of the provisions of the HSP with project participants;
- Providing the safety equipment specified herein;
- Collecting and submitting the requisite health and safety documentation (training rosters/certificates, air monitoring records (exposure assessments); site personnel logs, medical approvals), and copying them to the PSO, if appropriate; and
- Designating/identifying a qualified project member as the PSO.

2.1.2 Project Safety Officer (PSO)

The designated PSO is responsible for onsite implementation of the HSP. The PSO's responsibilities include:

- Maintaining project safety equipment supplies;
- Performing air monitoring, if and as specified herein;
- Directing decontamination procedures, as appropriate;
- Enforcing the provisions of this HSP for Geocon personnel;
- Directing emergency response operations until public emergency personnel arrive;
- Setting up Site Controls, if needed and as specified herein; and
- Reporting all incidents and infractions to the PM.

The PSO has the authority to suspend project activities any time he/she determines that the provisions of the HSP are inadequate to provide a service/project environment conducive to employee safety.

Further, the PSO is to inform the PM of any individuals whose onsite actions jeopardize either their health and safety or the health and safety of others.

2.1.3 Certified Industrial Hygienist (CIH)

The Certified Industrial Hygienist (CIH) provides industrial hygiene and safety technical support to the PM and PSO. In this capacity she:

- Reviewing and approving the project HSP;
- Providing training, as requested;
- Approving or recommending airborne sampling strategies and monitoring equipment;
- Providing technical support for the selection and use of Personal Protective Equipment (PPE); and,
- Providing arbitration on project health and safety issues.

2.1.4 Project Field Staff

All project personnel are responsible for:

- Complying with the provisions of this HSP;
- Performing services in a manner that is consistent with good health and safety practice; and
- Reading and being knowledgeable of the contents of this HSP.

2.2 Personnel Training

2.2.1 General Site Employees

Site employees will attend a project orientation prior to starting the project. The orientation will review all elements of the HSP, including: 1) the location of potential health and safety hazards on the site and 2) requirements of the HSP. The training will also address other Cal/OSHA requirements such as the Geocon Hazard Communication Program (T8 CCR §5194), including the potential hazards of exposure to heavy metals and cyanide, and the Injury and Illness Prevention Program (T8 CCR §§3203 and 1509).

2.2.2 Tailgate Meetings

During the active field components of the project PSO will conduct regular (i.e., weekly or daily, as appropriate) "tailgate" safety meetings. These meetings will include information on the following subjects, as applicable:

- Changes to project scope;
- Recognized changes to site conditions;
- Review of safe work practices;

- On or off the project safety practices;
- Feedback from employees on hazards, safety suggestions, or concerns; and
- Recognition for compliance, good safety performance or attitude.

Attendance at the tailgate meetings is considered a part of each employee's job responsibilities.

2.3 Medical Surveillance

Substance-specific medical surveillance is not required for personnel assigned to this project.

Geocon and subcontractor employees, if required to wear respiratory protection shall have a current medical evaluation and approval by a physician or other licensed health care professional (PLHCP). Medical evaluations for Geocon staff will be provided in accordance with the Geocon Respiratory Protective Equipment Program (ref. T8 CCR §5144(e) "Medical Evaluation").

Project personnel are to arrive at the jobsite well rested and physically prepared to perform assigned tasks.

3.0 HAZARD AND CONTROL ANALYSIS

The following hazards were assessed to either exist, or have the potential to develop, during the performance of the project activities:

TASKS	HAZARDS							
	MECHANICAL	UNDERGROUND UTILITIES	NOISE	BIOLOGICAL	RADIOLOGICAL	THERMAL	CHEMICAL	OTHER
Work-related driving, equipment operation	X					X		
Earthwork CQA, density testing and materials classification	X	X	X	X		X	X	
Soil and water sampling	X	X	X	X		X	X	
Dust montoring	X		X	X		X	X	
Verification sampling around heavy equipment	X	X	X	X		X	X	

3.1 Safe Driving

Hundreds of workers are injured or die in job-related motor vehicle accidents annually. Motor vehicle accidents are one of the number-one causes of employee injuries and deaths. Most accidents can be avoided by practicing defensive driving. Geocon policies mandate that employees:

- Prepare themselves and their vehicle for the road before travel;
- Drive according to posted speed limits unless adverse conditions necessitate slower speeds;
- Never tailgate, employ the three (3) second rule in following vehicles;

- Fully comply with California Vehicle Code and other local laws and regulations regarding the use of cellular phones for communication while driving – talking on a cell phone and/or texting while driving is not only a significant hazard to yourself and others, but also violates Geocon H&S policy; and;
- Use practical driving procedures in cities, on the freeway, and in rural areas.

3.2 Mechanical Hazards

Type(s)/Source:

- Material Handling/Back Injury;
- Striking (slips, trips); and
- Struck-by injuries.

Qualified Exposure Risk: Moderate
Hazard Control(s):

- Safe Lifting;
- Isolation – work locations will be isolated/marked off and allow only authorized individuals in the area;
- PPE – safety shoes/boots, ANSI approved Class III safety vests, hardhats, safety glasses.

3.2.1 Material Handling/Back Injury

Hazard: It is expected that field personnel will be required to lift heavy equipment and supplies and/or perform arduous tasks during this project. Accordingly, back injuries or physical strain may be caused by: routine lifting or one-time-only lifting; the weight of a lifted object; the frequency of lifting; bending, twisting, or rotating during lifting; prolonged sitting; exposure to vibrations; poor arch support in shoes; and not stretching prior to physical activity. If the following "control" mechanisms are not exercised, debilitating back injury may occur.

Control(s): Before attempting to lift and carry an object, always test its weight first. If it is too heavy, get help. If possible, use mechanical lifting aids. If manageable, the proper method for lifting is:

- Get a good footing;
- Place feet about shoulder width apart;
- Bend knees to pick up load. Never bend from the waist;
- Keep back straight;
- Get a firm hold. Grasp opposite corners of the load, if possible;
- Keep the back as upright as possible;
- Lift gradually by straightening the legs - don't jerk the load;

- Keep the weight as close to the body as possible; and
- When changing directions, turn the entire body, including the feet. Don't twist the body.

If devices are used for handling materials manually (e.g., two-handed lifters, barrel ring clamps, hand trucks, wheelbarrows, etc.), wear protective equipment like gloves and safety shoes to minimize the potential of appendages becoming pinched or smashed between the load and stationary features. Also, avoid overloading the device.

3.2.2 "Striking" Injuries

Hazard: Injuries can, and often, result when a person (a kinetic mass) unexpectedly instigates contact with another kinetic mass. These occurrences typically result from inadvertent slips, trips and falls.

Control(s): To minimize risks of "slip/trip" hazards, personnel shall maintain a constant program of good housekeeping, keeping areas clear of trip hazards and wet and slippery surfaces. All hand tools shall be regularly secured and care shall be taken when entering areas where work is being performed above eye level.

3.2.3 Trauma Injuries – Struck by Vehicles or Heavy Equipment

Hazard: Injuries can, and often, result when workers are the unexpected receptor of contact with another kinetic mass. These occurrences typically result from the worker being struck by a dropped or collapsed mass, a moving piece of equipment, or more likely a moving vehicle.

Control(s): Geocon employees will be required to wear hard hats, safety glasses and ANSI safety vests when outside of their vehicles.

If, based on field observations, the PSO determines soil sampling at specific sites cannot be performed safely, the location will be identified on the Site Map and revisited when safety of the location can be assured.

All project workers will be cautioned to maintain a constant awareness of onsite traffic patterns/conditions and equipment operations throughout the duration of the field services.

3.3 Earthwork Excavation – Trenching Hazards

Hazard: Cave-in hazards may be created if excavations exceed 4 feet in depth.

Controls: Soil excavation work will be conducted in accordance with T8 CCR Construction Safety Orders, Article 6, §§1540, 1541, and 1541.1 Appendices A through F.

The PM will identify the "Competent Person" responsible for excavation safety. The Competent Person will inspect the site prior to the start of work and as needed throughout the project. In addition, daily inspections of excavations, the adjacent areas, and protective systems will also be conducted for evidence of a situation that could result in possible cave-ins, indications of failure of protective

systems, hazardous atmospheres, or other hazardous conditions; e.g., excavation sidewall slopes will not be steeper than 45 degrees beneath the edges of the footings of load bearing members to reduce the potential for structural distress.

The Competent Person, as directed by the PSO will attempt to minimize cave-in hazards by restricting all entry into and around an excavation deemed greater in depth than 5 feet, unstable and/or unsafe. Cal/OSHA requires that each employee in an excavation be protected from cave-ins during an excavation by an adequate protective system designed in accordance with Cal/OSHA standards. Protective system options include proper sloping or benching of the sides of the excavation; supporting the sides of the excavation with timber shoring or aluminum hydraulic shoring; or placing a shield between the side of the excavation and work area. The excavation contractor will choose the most practical design approach for any particular circumstance. Once an approach has been selected, however, the required performance criteria must be met by that system.

3.4 Underground – Overhead Utility Hazards

Type(s)/Source:	Electric powerlines, water, sewer, and gas (propane) utilities
Qualified Exposure Risk:	Moderate
Primary "Control":	Isolation (contact USA, independent Utility Locator, Ground Penetrating Radar)

3.4.1 Underground Utilities

Type(s)/Source:	Electrical, water, sewer, etc.
Qualified Exposure Risk:	Moderate to high – soil excavation, sampling
Hazard Control:	Isolation - contact USA, independent Utility Locator

Hazard: Contact with electrical current can cause shock, electrical burns, and/or be instantly fatal. If digging equipment makes contact with energized electrical wires, it may or may not be insulated from the ground by the tires of the carrier. Under either circumstance, the human body, if it simultaneously comes in contact with the digging equipment and the ground, will provide a conductor of the electricity to the ground.

Control(s): Demarcate all digging locations, first. Contact Underground Service Alert (USA) (1-800-227-2600) and review as-built plans before performing any excavation/drilling/coring activity. It is advised that a private utility locator be contacted to supplement USA's demarcations, especially when the project is on private property. Soil intrusive work shall not proceed until all locating activities have been completed and fully documented in the site records. The initial site safety orientation meeting for all personnel onsite shall include a review of the underground utility locations and the location of the site map, showing the position of any underground utility lines. The site safety orientation shall include a site walkover of each marked utility or line.

Should a sub-surface condition be encountered that creates suspicion that there may be an unidentified underground line or utility, immediately cease work and secure the equipment. Work will not proceed until the potential risk or condition is resolved.

3.4.2 Overhead Utilities

Prior to site work involving hoisting or lifting operations using heavy equipment a site inspection will be conducted to identify potential overhead hazards such as power lines. A clearance of at least 10 feet will be maintained between overhead power lines and equipment booms (and hoists).

3.5 Occupational Noise Hazards

Vehicle traffic or equipment operated at sampling sites may present a noise hazard to employees. In all cases where the sound pressure levels may exceed a time-weighted average noise dose of 85 decibels (the Action Level), the PSO will evaluate exposures according to the Geocon Hearing Conservation Program (ref. T8 CCR §§5095-5100). Selection of hearing protection will be made in accordance with the Geocon Safety Equipment Guide. Only hearing protectors (ear plugs or muffs) with a Noise Reduction Rating of 20 dB, or higher, will be used. When worn, earmuffs will be donned in the "over the head" position with the hair pulled back from the sealing surface.

Note: In general, noise levels in excess of 85 dBA interfere with communication between two individuals speaking in a normal tone of voice at a distance of 3 feet from one another.

3.6 Biological Hazards

Type(s)/Source: Biting insects (mosquitoes, wasps, bees & ticks), animals, poison oak, and COVID-19 virus

Qualified Exposure Risk: High

Primary Control(s):

- Site inspection & isolation/avoidance;
- PPE (Gloves/boots/long-sleeve shirts);
- Wet sampling methods in dry soils; and
- Insect repellent, barrier crèmes, wasp spray.

Hazard: Contact with plants, insects, and animals likely to be present at the site should be avoided. Plants (such as poison oak) can cause an allergic reaction and skin rash in some individuals. Stinging and biting insects, including bees, spiders, and ticks, can cause extreme discomfort and/or serious allergic responses. Insect bites are generally not dangerous, unless they are from a poisonous insect or mosquitoes potentially carrying West Nile and/or Zika virus.

The primary concern with animal bites and scratches is the potential for infection and/or rabies. Snake or scorpion bites can also be dangerous, but more from infection or trauma than the toxins injected by the snake or scorpion.

Control(s) – Poison Oak: Contact with poison oak leaves or stems at any time of the year can cause an allergic response. Once a reaction occurs, repeated exposures further increase sensitivity. Conversely, long periods with no exposure will reduce an individual's susceptibility. In addition to direct contact with the plant, transmission of the allergen can occur by touching contaminated clothing, gloves, or tools. When poison oak is burned, the oils can disperse via the smoke particles. Breathing this smoke can cause severe respiratory irritation. Over the counter topical barriers such as Tecnu® can be applied to exposed skin for protection against poison oak.

After coming in contact with the allergen, the best way to prevent skin irritation is to pour a mild solvent such as isopropyl (rubbing) alcohol over the exposed area then wash with plenty of mild soap and/or Tecnu® and cold water; avoid using warm water, since it enhances the penetration of the oil. If isopropyl alcohol and soap is not available, use cold water by itself to help dilute the oil, to help minimize the harmful effects of the resin.

Perform these steps within five minutes of exposure. Even if it's too late to prevent the rash, washing the skin to remove excess plant oil/resin will keep the rash from spreading. Be sure to thoroughly wash your hands, since they serve as the major route for transferring the allergen to other parts of the body, especially the face.

Using only a small amount of water or disposable hand wipes is more likely to spread the toxin than remove it. You can use soap and/or Tecnu® but only if you also use copious amounts of water.

Control(s) – Biting Insects: Before beginning fieldwork each day, inspect the work area for the presence of standing water and inhabitant reptiles and take measures necessary to minimize the potential for contact. Specially prepared topical barriers and insect repellent containing approximately 50% DEET, or picaridin, IR3535, oil of lemon eucalyptus, or para-menthane-diol for long lasting protection can be useful for protecting exposed skin from biting insects. These products are commercially available and may minimize the potential for development of skin rashes and/or irritations due to such exposures; apply insect repellent sparingly to exposed skin.

Note: Avoid contacting plastic zippers or other plastic closure mechanisms on clothing, equipment bags, etc., with DEET containing crème which will cause these materials to degrade.

If you are allergic to bee or wasp stings, be sure to have the appropriate first aid available (e.g., an epi-pen) on the project. If you are stung, administer first aid and seek immediate medical attention.

Be sure a reptile or animal bite victim obtains medical attention quickly if a bite or scratch occurs, especially if there is a potential that it was poisonous. In the meantime, administer First Aid by scrubbing the wound with soap and water, and rinsing thoroughly under running water. Dry off and place a clean bandage on the wound. Victims of these bites should lie down and remain calm and motionless; cold packs should be applied and medical attention sought immediately.

Hazard: The COVID-19 virus can be transmitted from infected individuals (who may or may not be experiencing symptoms). Project/worksite locations and surrounding communities as well as coworkers and community members represent a potential source of exposure for personnel. The virus is spread primarily through *inhalation* of airborne respiratory droplets and aerosols containing the virus, and through *direct contact to the mucous membranes (eyes, nose)* with unwashed hands after contacting virus-contaminated surfaces. Our risk reduction guidelines are based on the core strategies of *physical distancing (a.k.a. social distancing), rigorous personal hygiene (especially the hands)* and *workspace sanitation*, and in certain high-risk situations *personal protective equipment (in particular, N-95 respirator).*

Control(s) – COVID-19: Practice physical distancing, personal hygiene, and workspace sanitation to minimize exposure to COVID-19 virus. For all activities, maintain a minimum distance of 6 feet from other staff, visitors, client representatives, and the general public.

The use of a nose/mouth covering (face mask) provides a means for capturing potentially infectious droplets/aerosols produced by the wearer. This reduces the risk of others subsequently becoming exposed/infected by reducing airborne aerosols available to be inhaled or to settle onto surfaces. For this reason, State and local agencies are encouraging the use of nose/mouth coverings for all persons engaging in public activities. Therefore, sampling staff are authorized to wear an acceptable nose/mouth covering as an emission barrier for COVID-19 exposure risk reduction.

3.7 Chemical Hazards

The source of chemical hazards at this site is due to soil contamination from historical mining operations. The risk of significant airborne exposure to soil contaminants is considered to be low while performing backhoe soil excavation and soil sampling tasks required on this project. Dust control, soil sampling methods (wet) and safe work practices to be employed will significantly reduce the potential for airborne exposures. These controls will significantly reduce the potential for airborne exposures above the 30 µg/m3 Action Level for lead which is representative of exposure risks to other toxic metals such as arsenic and mercury.

Detailed information regarding the physical description of arsenic, lead, mercury, and cyanide, including health hazards, routes of entry into the body, signs and symptoms of exposure and target

organs, and chemical and physical properties are available in Attachments A, B, C and D. Attachment A for Heavy Metals is from the NIOSH Pocket Guide to Chemical Hazards. Attachments B and C for Arsenic and Lead are Appendix A of T8 CCR §§5214 and 1532.1, respectively. Chemical hazard information for mercury is on Page 5 of Attachment A. Attachment D for Cyanide is from the NIOSH Pocket Guide to Chemical Hazards.

3.7.1 Toxic Metals

Type(s)/Source: Soil impacted due to past uses of the property

Exposure Route: Inhalation and ingestion; ref. Attachments A, B and C

Exposure signs/symptoms: See Attachments A, B and C

Qualified Exposure Risk: Low

Exposure Controls:

- Isolation – site control
- Avoid contact with, and inhalation of, airborne contaminated dust.
- Dust control – wet methods; adherence to specific sampling methods and procedures

  Negative Exposure Assessment: Results of industrial hygiene monitoring of representative soil sampling procedures for lead, which is representative of potential exposure to toxic metals, using these controls, document exposures consistently below the 30 µg/m^3 Action Level for airborne lead [ref. T8 CCR §1532.1(d)(5)(A)].
- PPE – eye (safety glasses or goggles) and hand protection (leather and/or chemical-resistant gloves)
- Sanitation – follow sanitation and personal hygiene procedures outlined in Section 4.2.

3.7.1.1 Arsenic

T8 CCR GISO §5214

CHEMICAL NAME & CAS #	ROUTES OF ENTRY	PUBLISHED EXPOSURE LIMITS		
		CATEGORY	CONCENTRATION	SOURCE
Arsenic 7440-38-2	Inhalation, Ingestion	PEL-TWA Action Level	10 µg/m^3 5 µg/m^3	Cal/OSHA

3.7.1.2 Inorganic Lead

T8 CCR CSO §1532.1

CHEMICAL NAME CAS #	ROUTES OF ENTRY	PUBLISHED EXPOSURE LIMITS		
		CATEGORY	CONCENTRATION	SOURCE
Lead, Elemental & Inorganic Compounds 7439-92-1	Inhalation Ingestion	PEL-TWA[†] Action Level	50 µg/m^3 30 µg/m^3	Cal/OSHA
Lead Chromate	Inhalation Ingestion	PEL-TWA as Pb PEL-TWA as Cr	0.02 mg/m^3 0.005 mg/m^3	

[†]PEL – Cal/OSHA Permissible Exposure Limit; TWA – 8-hour time-weighted average concentration

3.7.2 Cyanide

Cyanide may be present at relatively low concentrations in groundwater and also in the subsurface near the base of the tailings pile in saturated materials that will not be disturbed as part of the investigation. Cyanide was used historically at the mine site for extracting gold remaining in the tailings. Exposure to cyanide can occur through inhalation and ingestion and is associated with acute health effects such as central nervous system impact (headaches, lassitude, nausea, vomiting) and respiratory system impact (chemical asphyxiation). The primary exposure of concern occurs if cyanide is released into the air as hydrogen cyanide (HCN). Cyanide in impacted soil and water is fairly stable unless the pH of the matrix (soil or water) becomes acidic (low pH). Acidic conditions cause the cyanide to be released from the matrix as HCN (a gas), which can then be easily breathed in if a worker is in close proximity.

Based on the planned activities, it is unlikely that HCN will be an exposure concern. Refer to Attachment D for additional information. Attachment D is from the NIOSH Pocket Guide to Chemical Hazards.

4.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

4.1 Air Monitoring

A *Community Air Monitoring Plan* (CAMP) must be prepared as part of the RDIP in accordance with the *Community Air Monitoring Plan Guidance* (CAMP Guidance; DTSC, 2020). As set forth in the CAMP Guidance, the CAMP must describe specifics of the proposed remedial action including but not limited to:

- physical and chemical characteristics of specific work areas;
- work tasks, objectives and personnel;
- start date, duration, work hours and associated air monitoring periods; and

- distance between air monitoring equipment and nearby potential obstructions to air flow (buildings, trees, topography) and the height of nearby obstructions.

Because a detailed redevelopment plan is not yet available for the site, the CAMP must be provided to the DTSC for review as part of the RDIP.

A CAMP is required at response sites under DTSC's oversight whenever remediation or removal activities may release contaminants into the air. The CAMP is intended to describe air monitoring protocols and best management practices to mitigate fugitive emissions (i.e., dust and/or vapor) containing contaminated material during authorized work.

A CAMP focuses on air monitoring at the perimeter of a site to verify the protection of the surrounding community and does not pertain to worker protection within the site, which is to be addressed by the site-specific health and safety plans prepared by each contractor at the site to protect their employees.

Fugitive Dust Action Levels

As set forth in CCR Title 17 Section 70200, the action level for fence-line suspended particulate matter (airborne dust) is 50 micrograms per cubic meter ($\mu g/m^3$), which is equal to 0.05 milligrams per cubic meter (mg/m^3).

This value is based on a 24-hour sample obtained using a PM10 sampler, determined by real-time air monitoring as the difference between upwind and downwind measurements. PM10 is defined generally by the CAMP Guidance as particulate matter with a diameter of 10 microns (µm, or micrometers) or less. CCR Title 17 Section 70200 states that the PM10 sampler is intended to collect a range of particulates reflecting the characteristics of lung deposition, collecting approximately 50% of all particles of 10 µm aerodynamic diameter and collecting a declining fraction of particles as their diameter increases and an increasing fraction of particles as their diameter decreases.

Particulate Matter-Based Site-Specific Action Limits for COCs

Procedures for development of Site-Specific Action Limits (SSAL) are presented in Appendix E of the CAMP Guidance. Appendix E outlines procedures for derivation of a health-based dust concentration limit (DCL) based on the assumption that contaminant concentrations in dust are proportional to contaminant concentrations detected in soil per the following equation.

$$DCL = \frac{SSAL_{COC}}{(C_{COC} \times CF)}$$

where:

CF = unit conversion factor [1E-06 kg soil/mg soil]
COC = contaminant of concern

C_{COC} = concentration of COC in soil [mg/kg]
DCL = dust concentration limit (not to exceed value) [ug/m^3]
$SSAL_{COC}$ = site-specific action limit for a specific COC [ug/m^3]

HERO (2022) recommends that site perimeter (fence-line) DCLs be calculated using:

- arsenic and mercury SSALs based on 8-hour Reference Exposure Levels (REL) developed by the OEHHA Air Toxics Hot Spots Program;
- a lead SSAL based on the National Ambient Air Quality Standard (NAAQS) three-month average; and
- both maximum and central-tendency (95% UCL) contaminant concentrations in soil.

These parameters and the calculated fence-line DCLs are listed in the following table. Contaminant concentrations listed in the table below are based on all validated data for the entire Tailings Pile assessment area (RAP Table 23).

Acronym	Parameter	Unit	Value					
			Arsenic		Lead		Mercury	
$SSAL_{COC}$	Site-Specific Action Limit	µg/m^3	0.015		0.15		0.06	
C_{COC}	Contaminant Concentration in Soil	mg/kg	95% UCL	Max Detect	95% UCL	Max Detect	95% UCL	Max Detect
			125	263	50.5	400	3.2	15
DCL	Dust Concentration Limit	µg/m^3	120	57	2,970	375	18,750	4,000

The CCR Title 17 Section 70200 action level for fence-line suspended particulate matter is 50 µg/m3. This value is lower than all DCLs listed in the table above. Use of this lower DCL (50 50 µg/m3) is appropriate for fence-line monitoring.

The CAMP Guidance states that if site-specific particulate or aerosol action levels are required, then additional integrated sampling and chemical analysis of the dust may also be required to verify the accuracy of the initial SSAL model.

Visual Assessment

At no time shall the remedial contractor allow visible dust to leave the site perimeter. If visible dust is observed leaving the work site, then work must cease immediately, the source of the visible dust must be controlled, and site activities must be re-evaluated. Additionally, pursuant to Chapter 7 of the

CAMP Guidance, the observation of visible dust emissions exiting the site must be recorded and reported to the DTSC.

Dust Monitoring

At a minimum, dust monitoring units will be placed at the following locations:

1. upwind to monitor background airborne dust conditions;
2. on the equipment operator where worst-case dust concentrations are anticipated; and
3. on the downwind property line.

Contractors performing the remedial action are required to prepare their own health and safety plans for the protection of their employees. We recommend that all remedial action contractors and subcontractors consult with a Certified Industrial Hygienist (CIH) to determine what dust action levels, engineering controls and personal protective equipment are required to protect their workers for each remedial task. Benchmarks include but are not limited to those described below.

- The Cal-OSHA Permissible Exposure Limit (PEL; 10 mg/m^3) for airborne dust.
- An action level based on the OEHHA 1-hour acute reference exposure level (REL) for arsenic (0.2 $\mu g/m^3$). The 1-hour acute REL is considered as a not-to-exceed value and may be appropriate for use as a can be used as a level of concern (LOC) in the Marlowe Equation [AL ($\mu g/m^3$) = LOC ($\mu g/m^3$) x 1,000,000 /Concentration in soil (mg/kg)] to calculate a dust action level (AL). Arsenic values detected in the Tailings Pile range up to 320 mg/kg, and an outlying value (502 mg/kg) was detected at a hot spot in the Background Area at sample location SOIL16 (Sheet 2). The mean detected value for the Tailings Pile is 101 mg/kg, and the 95% UCL on the mean concentration is 125 mg/kg. Using the central-tendency EPC for arsenic in soil/dust (125 mg/kg), an AL of 1,600 $\mu g/m^3$ (1.6 mg/m^3) can be calculated. The maximum soil arsenic detection (502 mg/kg) yields in an AL equal to 396 $\mu g/m^3$ (0.40 mg/m^3).
- An action level based on the Cal-OSHA action level for arsenic in air (5 $\mu g/m^3$): Dividing the Cal-OSHA action level for arsenic in air (5 µg arsenic / m^3 dust) by the central-tendency value for arsenic in soil and dust (125 mg arsenic / kg soil and dust) yields a suspended particulate AL of 40 mg/m^3. Using the maximum detected soil arsenic concentration (502 mg/kg) yields an AL equal to 10 mg/m^3.

Dust monitoring instruments must be calibrated daily pursuant to the manufacturer's recommendations, must be set to log dust levels over 5-minute periods, and must be visually read every 15 minutes.

If airborne dust monitoring results exceed the CCR Title 17 Section 70200 fence-line action level for dust in air (0.05 mg/m^3), additional water is to be applied to the soil, and additional engineering controls for dust suppression are to be performed as required to maintain dust concentrations below the action level. In addition to the monitoring requirements described above, the Amador Air District Rule

218 requires dust suppression using water or other means, reasonable vehicle speeds, and good housekeeping.

The lead agency or local enforcement agency may require additional dust monitoring and may also require air sampling and analysis at any time during the remedial action. If conditions arise such that additional monitoring is required, the monitoring shall be conducted in accordance with these guidelines unless modified by the agencies. Air sampling and analysis, if required, is to be performed in accordance with NIOSH Method 7082, with analysis by flame atomic absorption spectroscopy (FAAS). All results of air monitoring shall be reported to the DTSC within 48 hours

4.2 Personal Hygiene

The PSO will establish on-site sanitation procedures which may, depending on site tasks and conditions involve: hand-wash facilities including clean water and hand soap; waterless hand cleaner; sanitary wipes and clean towels at the project site.

All Geocon personnel, subcontractor employees, and Clients and their designees leaving the project site (work zones) will clean potential impacted soils from their footwear and follow personal hygiene procedures prior to leaving the project site. In addition, the following procedures will be followed to ensure worker protection against potential exposure through ingestion:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-in-mouth transfer and ingestion of material is prohibited in any area designated as being potentially impacted.
- Hands and face must be thoroughly washed upon leaving the work area, and before eating, drinking, or other non-project activities.
- Avoid unnecessary kneeling, sitting, leaning, or general contact with potentially impacted surfaces or with surfaces suspected of being potentially impacted by hazardous materials (i.e., puddles, mud, leachate, etc.).

4.3 Buddy System

Project personnel are to work with another person when performing sampling tasks; the client or a subcontractor's representative can serve as the second person while the work is being conducted in the field. Under no circumstances, other than completion of paper work at the end of the day, are field personnel to work alone at the site. If Geocon personnel are left alone at the site, he/she will check in with their PM via telephone to advise that they are safe.

4.4 Work Zone Controls

Although formal work zones will not be required for this project, work areas will be isolated using traffic cones.

4.5 Code of Safe Practices

General safe work practices to be utilized by all project personnel are summarized below:

- All nonessential personnel will be kept clear of work areas.
- The use of entertainment and personal communication devices in the work zone shall not be allowed.
- Adequate signs and safety devices will be installed on equipment.
- All site employees will wear assigned personal protective equipment and level of protection as designated by the PSO.
- Eating, drinking, smoking, chewing gum or tobacco, or application of cosmetics is allowed in designated areas only.
- At a minimum, all personnel will wash with soap and water before lunch, using the restroom, and at the end of work. The face and hands shall be washed before eating, drinking, smoking, chewing gum, applying cosmetics, etc.
- Over-the-counter drugs and prescription medications must be reported to the PSO for clearance before an employee is allowed to work near drill rig or other heavy equipment.
- When portable electric tools and equipment are used, three-wire extension cords are required.
- Employees will advise their supervisors of any malfunctioning equipment immediately.
- An ongoing safety maintenance program for tools and equipment will be instituted. Inspections will occur on a regular basis to ensure parts are secure and intact. Defective equipment will be repaired or replaced.
- Appropriate engineering controls and equipment guards will be installed on tools and equipment. This includes seat belts & backup warning lights and signals.
- A list of names of personnel who are trained in CPR and first aid shall be available.
- Labels shall be placed on containers of hazardous materials.
- No one will work alone; the "buddy system" shall be implemented for all field work.
- Employees shall be trained to identify effects and symptoms of toxic exposure and report them immediately.
- Under no circumstances are Geocon personnel authorized to enter a Permit-Required Confined Space or an excavation or trench greater than 4 feet in depth.

5.0 PERSONAL PROTECTIVE EQUIPMENT

The employment of the aforementioned engineering controls is the preferred method of providing personal protection from hazards identified at this and any site. PPE provides acceptable secondary recourse, but only when engineering controls fail or cannot adequately eliminate exposure to the hazard. The use of PPE is intended to provide protection for onsite personnel from operational hazards that cannot be controlled through other safety procedures or work practices. PPE required to be onsite for each worker during this project will include:

☒ Hard Hat (without face Shield)
☒ Safety Glasses
☒ Synthetic/Leather Safety Boots/Shoes
☒ Disposable inner gloves (for sample handling)
☐ Chem. Resistant Boots
☒ Chem. Resistant gloves
☒ Synthetic/Leather Gloves
☐ Air-Purifying Respirator
☒ Hearing Protection - Ear Plugs/Muffs
☐ APR Cartridges
☒ ANSI Class II/III Safety Vest
☐ Tyvek coveralls
☐ Other:_____

Only ANSI approved PPE and NIOSH approved respirators will be assigned for use. The use applications for this equipment are summarized in the following matrix. Specific procedures are further described below.

	PPE												
TASKS	Hard Hat	Safety Glasses	Synthetic/Leather Boots	Chemical Resistant Boots	Disposable Inner Gloves	Chemical Resistant Gloves	Synthetic/Leather Gloves	Hearing Protection Plugs/Muffs	Air-Purifying Respirator (Half-/Full Face)	APR Cartridges	ANSI Class II/III Vest	Tyvek Coveralls	Other
Work-related driving			**X**								**X**		
Earthwork CQA, density testing and materials classification	**X**	**X**	**X**				**X**	**X**			**X**		
Soil and water sampling	**X**	**X**	**X**			**X**		**X**			**X**		
Dust monitoring	**X**	**X**	**X**			**X**		**X**			**X**		
Verification sampling around heavy equipment	**X**	**X**	**X**			**X**		**X**			**X**		

5.1 Respiratory Protection

Respiratory protection will not be required during excavation. The PSO, in consultation with the PM, will determine the need for upgrading the level of protection from "D" to "C". If it is determined that respiratory protection is required, personnel shall don a full facepiece or half-mask air-purifying respirator fitted with HEPA (P100, Magenta) filters.

5.2 PPE – Level D Protection

The protective equipment to be donned by personnel working in the sampling areas (Exclusion Zones) includes:

- Body Protection: Body protection shall include the use of "work clothing," including long pants and long- or short-sleeved shirts, and Class II/III ANSI-approved safety vest.

- Head Protection: Non-metallic hard hats shall be worn by all personnel; ref. T8 CCR §§1514 & 3381 Head Protection.
- Hearing Protection: Hearing protection shall include the use of foam ear inserts or muffs; ref. T8 CCR §5098.
- Face & Eye Protection: Protective eye wear (i.e., safety glasses) shall be worn by personnel working in direct proximity to operating heavy equipment and highway traffic; ref. T8 CCR §§1514 & 3382 Eye Protection.
- Hand Protection: Appropriate hand protection shall be required for employees whose work involves unusual and excessive exposure of hands to cuts capable of causing injury or impairments; ref. T8 CCR §§1514 & 3384 Hand Protection.
- Foot Protection: Foot protection, such as steel toed shoes or boots shall be required for employees who are exposed to foot injuries from electrical hazards, falling objects, or crushing or penetrating actions; ref. T8 CCR §§1514 & 3385 Foot Protection.

5.3 PPE – Level "C" Protection

Back-Up Respiratory Protection: Level C respiratory protection shall be available as back-up and will include NIOSH approved half-face or full-face, air-purifying respirators outlined in Section 5.1.

These levels may be up-graded by anyone, with prior notification to management personnel, but shall only be downgraded upon approval by either the PSO or the PM.

5.4 Miscellaneous Safety Equipment

Additional protective equipment to be available to personnel working at the site is listed as follows:

- Communication: Portable radios/walkie talkies or cell phones shall accompany all personnel.
- A minimum 20-pound (B. C. Rated) fire extinguisher will be located onsite.
- An emergency first aid kit will be available at the support zone at all times.
- Emergency Response Spill Kit consisting of absorbents, plastic liners, rags, shovels, push brooms, Tyvek™ suits, gloves, half-face respirators and cartridges.
- Self-contained Portable Eyewash Equipment (ref. Sections 5, 7, or 9 of ANSI Z358.1-1981)
- Copious amounts of potable water - Shall be readily available for both drinking purposes and for personal hygiene purposes (e.g., washing, rinsing, and cooling of face and body, etc.). A minimum of 2 gallons of drinking water per onsite worker shall be available before work begins, or a drinking water source must be immediately available at the project site; ref. Section 3.7.
- Water source necessary for suppressing airborne (fugitive) dust emissions.

6.0 DECONTAMINATION

Decontamination procedures will be tailored to the specific hazards of the site and may vary in complexity and number of steps, depending on the level of hazard and employee exposure to potential hazards. Decontamination procedures and PPE decontamination methods will vary depending upon the

extent of potentially impacted soils required to be handled. Decontamination methods and procedures will be routinely evaluated, as necessary, to assure that employees are not exposed to hazards by reusing PPE.

The primary principle in consideration of decontamination procedures is: Avoid unnecessary contamination of PPE and Sampling Equipment. The following decontamination guide for construction materials, equipment, and PPE have been developed with the intent of reducing the potential for the transfer of hazardous chemicals outside the Exclusion Zone.

6.1 Construction Materials and Equipment

The PM or designee will control site access to ensure only authorized personnel and equipment and materials necessary for work handling impacted soils will be allowed in the exclusion zone. The exterior surfaces of excavation equipment, including buckets, tires and/or tracks will be scraped with shovels to remove substantial deposits of potentially contaminated soil prior to being rinsed with water.

Shovels, hand tools, and other equipment will also undergo gross decontamination to remove any potentially contaminated soils. Soil, dust, debris, water and decontamination rinseate will be controlled to prevent entering nearby storm drains, creeks, or streams.

6.2 Sampling Equipment Decontamination

Decontamination of soil sampling equipment shall include washing with a solution of TSP, Alconox®, or Liquinox® and water followed by a double rinse of deionized water between samples and before vacating the work area.

6.3 PPE Decontamination

The PSO will determine the necessity for and level of decontamination appropriate to this project. Decontamination of PPE may be accomplished by personnel passing through separate stations or stages to reduce and remove contaminated clothing and equipment. Decontamination stations may include the following procedures listed sequentially below.

Stage No. 1: Segregated Equipment Drop - Equipment and consumables that require either disposal or special handling (e.g., special and/or equipment decontamination) shall remain in this area and be decontaminated, if appropriate, or disposed of with the excavated materials or other potentially impacted materials.

Stage No. 2: PPE Decontamination – Disposable PPE that has been potentially impacted will be placed in 55-gallon steel drums or plastic liners and disposed of with the other solid wastes generated.

Stage No. 3: General Field Wash - Personnel shall wash and rinse face and hands with soap and water before leaving the site and/or eating. If changing of clothing is necessary, it shall be done at this

time. Respirator decontamination, if required, shall include a wash with soap and water followed by a clean water rinse.

7.0 EMERGENCY RESPONSE PROCEDURES

7.1 Physical Injury

In the event of an accident resulting in physical injury, call emergency service personnel immediately and perform first aid commensurate with training and seriousness of the injury. Severely injured personnel are to be transported only by emergency service personnel and/or by ambulance personnel, unless a life-threatening condition is judged to exist that must be addressed immediately. At the hospital, a physician's attention is mandatory regardless of how serious the injury appears.

The PM is to be notified by the PSO, as soon after the injury as practical, regarding the nature of the accident. A written report is also to be prepared and submitted by the PSO to the PM within 24 hours of the accident. If the PSO is unable to make the report (due to injury) an individual designated by the PM shall make the report.

7.2 Catastrophic Event

In the event of a catastrophic event (e.g., severe personal injury, fire, explosion, and/or property damage), notify the fire/safety and rescue department immediately by dialing 911.

Any accident involving serious injury will require suspension of site activities until the PM (or designee) has completed a review of the events and site conditions and authorized work to resume.

The PM (or designee) will notify the nearest Cal/OSHA District Office immediately (within 8 hours) by phone or fax upon learning of a death or serious injury:

Modesto District Office
4206 Technology Dr # 3
Modesto, CA 95356

Tel: 209-545-7310

email: DOSHMOD@dir.ca.gov

7.3 Emergency Telephone Numbers

Fire/Police/Medical Assistance:	**911**
Jackson Police Department:	**209-223-1771** – Non-Emergency
Poison Control:	**800-222-1222**

Other phone numbers may be available or required for emergency response at specific sites. Check with onsite representatives before mobilizing to the job site.

7.4 Project Site Address

Site Location: Site is located east of North Main St and west of New York Ranch Rd in Jackson, California. Primary access is from the south via Cemetery Lane near the City of Jackson Public Works Department.

7.5 Hospital Address and Route

Hospital Reference: Sutter Amador Hospital **209-223-7500**
200 Mission Blvd.
Jackson, CA 95642

From the Site: From the southern access point at the Site, proceed south on Cemetery Lane past the City of Jackson Public Works Department for 0.1 mile and turn right (south) on Placer Drive. After 0.1 mile on Placer Drive, turn left (east) on Court Street. Proceed East on Court Street for 0.3 mile, then sharp right onto CA-88 West (Carson Pass Hwy) for 0.2 miles, then left (south) on Mission Blvd. After 0.1 mile, turn left into hospital facility, and take the Y to the right after 120 feet, then proceed 340 feet to hospital. (see Site Location Map, Figure 1).

8.0 PLAN APPROVAL

The undersigned has reviewed and approved this Health and Safety Plan prepared for the Oro de Amador Property (the Site) located east of North Main St and west of New York Ranch Rd in Jackson, California, California, as described herein.

_____
Pamela Murcell, CIH
Project Certified Industrial Hygienist
ABIH Certification No. 3237, Exp. December 1, 2023

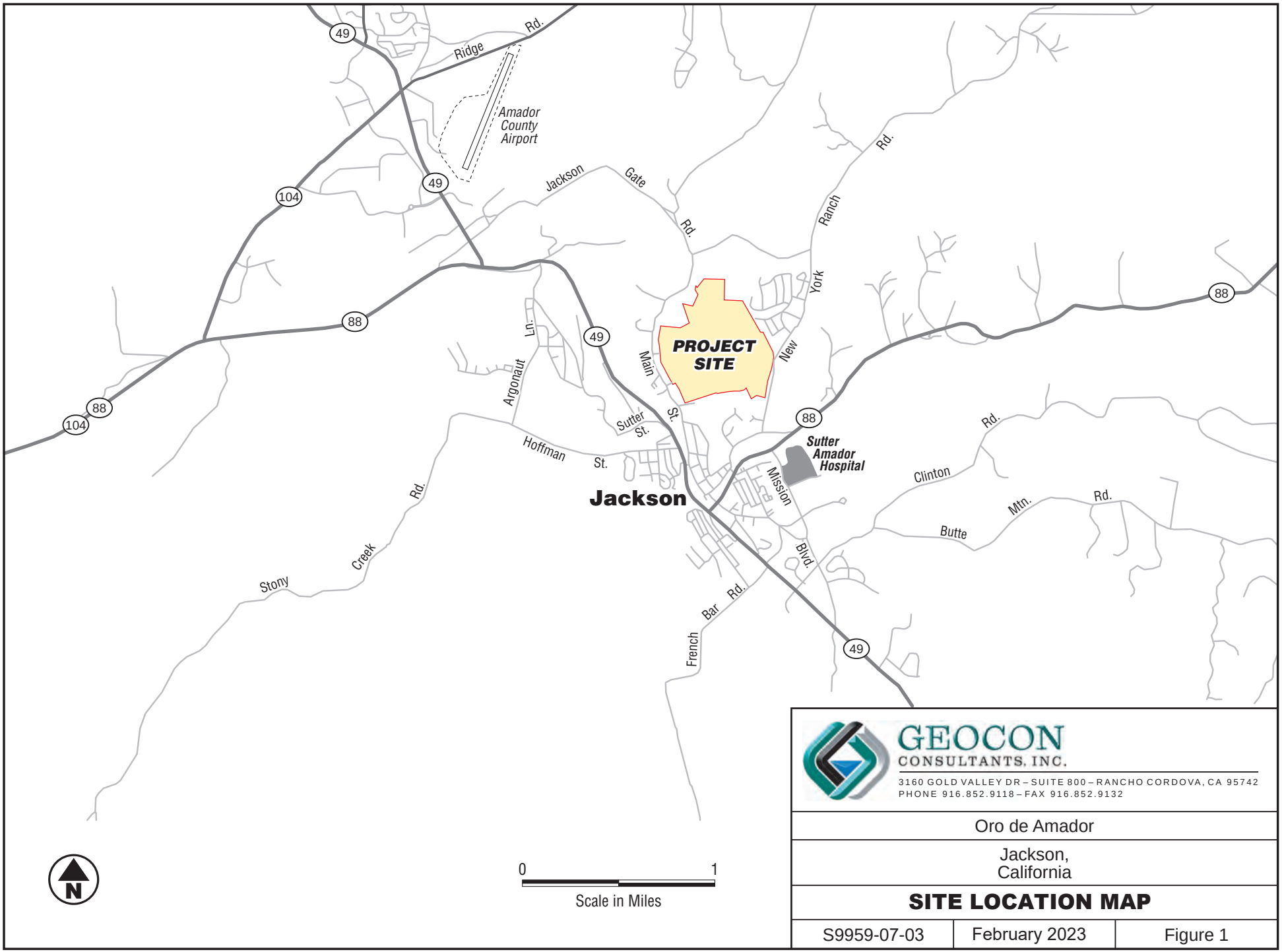
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Date

_____
Jason Muir
Project Manager

__
Date

The following personnel, including subcontractors involved with the project activities have reviewed, or received a copy of this Plan and Attachments A, B, C, and D, and agree to follow the health and safety procedures described herein.

Print Name	Title	Signature	Date



GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR – SUITE 800 – RANCHO CORDOVA, CA 95742
PHONE 916.852.9118 – FAX 916.852.9132

Oro de Amador

Jackson, California

SITE LOCATION MAP

S9959-07-03	February 2023	Figure 1


SITE LOCATION
Cemetery Ln
Placer Dr
Court St
Carson Pass Hwy
Mission Blvd
SUTTER AMADOR HOSPITAL
St Sava Serbian Orthodox Church
Amador Senior Center
Detert Park
Jackson
Jackson Ace Hardware
3 min
0.9 miles
Jackson Liquors
Amador County Sheriff's Office
Sutter St
Stasal Ave
N Main St
Hill St
4 min
1.2 miles
Sutter Amador Hospital
Brickhouse Brews
Water St
Center St
West Ln
East Ln
Bright Ave
Huberty Way
Jackson
Grocery Outlet
Google
88

3 min (0.9 mile)

via Court St

Fastest route now due to traffic conditions

Jackson
California 95642

- Head southeast on Cemetery Ln toward Tyack Ln
  0.1 mi
- Turn right onto Placer Dr
  0.1 mi
- Turn left onto Court St
  0.3 mi
- Sharp right onto CA-88 W
  0.2 mi
- Turn left onto Mission Blvd
  0.1 mi
- Turn left
  118 ft
- Turn right
  Destination will be on the right
  341 ft

Sutter Amador Hospital
200 Mission Blvd, Jackson, CA 95642

Antimony	**Formula:** Sb	**CAS#:** 7440-36-0	**RTECS#:** CC4025000	**IDLH:** 50 mg/m^3 (as Sb)
Conversion:	**DOT:** 1549 157 (inorganic compounds, n.o.s.); 2871 170 (powder); 3141 157 (inorganic liquid compounds, n.o.s.)			

Synonyms/Trade Names: Antimony metal, Antimony powder, Stibium

Exposure Limits:
NIOSH REL*: TWA 0.5 mg/m^3
OSHA PEL*: TWA 0.5 mg/m^3
[***Note:** The REL and PEL also apply to other antimony compounds (as Sb).]

Physical Description: Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder.

Measurement Methods (see Table 1):
NIOSH 7301, 7303, P&CAM 261 (II-4)
OSHA ID121, ID125G, ID206

Chemical & Physical Properties:
MW: 121.8
BP: 2975°F
Sol: Insoluble
FI.P: NA
IP: NA
Sp.Gr: 6.69
VP: 0 mmHg (approx)
MLT: 1166°F
UEL: NA
LEL: NA

Personal Protection/Sanitation (see Table 2):
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contam
Remove: When wet or contam
Change: Daily

Respirator Recommendations (see Tables 3 and 4):
NIOSH/OSHA
5 mg/m^3: 95XQ/Sa
12.5 mg/m^3: Sa:Cf/PaprHie
25 mg/m^3: 100F/SaT:Cf/PaprTHie/ScbaF/SaF
50 mg/m^3: Sa:Pd,Pp
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: 100F/ScbaE

Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame.

Incompatibilities and Reactivities: Strong oxidizers, acids, halogenated acids
[**Note:** Stibine is formed when antimony is exposed to nascent (freshly formed) hydrogen.]

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Ing, Con
SY: Irrit eyes, skin, nose, throat, mouth; cough; dizz; head; nau, vomit, diarr; stomach cramps; insom; anor; unable to smell properly
TO: Eyes, skin, resp sys, CVS

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap wash immed
Breath: Resp support
Swallow: Medical attention immed

Arsenic (inorganic compounds, as As)	**Formula:** As (metal)	**CAS#:** 7440-38-2 (metal)	**RTECS#:** CG0525000 (metal)	**IDLH:** Ca [5 mg/m^3 (as As)]
Conversion:	**DOT:** 1558 152 (metal); 1562 152 (dust)			

Synonyms/Trade Names: **Arsenic metal:** Arsenia
Other synonyms vary depending upon the specific As compound. [**Note:** OSHA considers "Inorganic Arsenic" to mean copper acetoarsenite & all inorganic compounds containing arsenic except ARSINE.]

Exposure Limits:
NIOSH REL: Ca
C 0.002 mg/m^3 [15-minute]
See Appendix A
OSHA PEL: [1910.1018] TWA 0.010 mg/m^3

Physical Description: Metal: Silver-gray or tin-white, brittle, odorless solid.

Measurement Methods (see Table 1):
NIOSH 7300, 7301, 7303, 9102, 7900
OSHA ID105

Chemical & Physical Properties:
MW: 74.9
BP: Sublimes
Sol: Insoluble
FI.P: NA
IP: NA
Sp.Gr: 5.73 (metal)
VP: 0 mmHg (approx)
MLT: 1135°F (Sublimes)
UEL: NA
LEL: NA

Personal Protection/Sanitation (see Table 2):
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contam/Daily
Remove: When wet or contam
Change: Daily
Provide: Eyewash
Quick drench

Respirator Recommendations (see Tables 3 and 4):
NIOSH
¥: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: GmFAg100/ScbaE

See Appendix E (page 351)

Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame.

Incompatibilities and Reactivities: Strong oxidizers, bromine azide
[**Note:** Hydrogen gas can react with inorganic arsenic to form the highly toxic gas arsine.]

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Abs, Con, Ing
SY: Ulceration of nasal septum, derm, GI disturbances, peri neur, resp irrit, hyperpig of skin, [carc]
TO: Liver, kidneys, skin, lungs, lymphatic sys [lung & lymphatic cancer]

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap wash immed
Breath: Resp support
Swallow: Medical attention immed

Barium chloride (as Ba)	**Formula:** $BaCl_2$	**CAS#:** 10361-37-2	**RTECS#:** CQ8750000	**IDLH:** 50 mg/m^3 (as Ba)
Conversion:	**DOT:** 1564 154 (barium compound, n.o.s.)			
Synonyms/Trade Names: Barium dichloride				
Exposure Limits: **NIOSH REL*:** TWA 0.5 mg/m^3 **OSHA PEL*:** TWA 0.5 mg/m^3 [***Note:** The REL and PEL also apply to other soluble barium compounds (as Ba) except Barium sulfate.]			**Measurement Methods (see Table 1):** **NIOSH** 7056, 7303 **OSHA** ID121	
Physical Description: White, odorless solid.				
Chemical & Physical Properties: **MW:** 208.2 **BP:** 2840°F **Sol:** 38% **FI.P:** NA **IP:** ? **Sp.Gr:** 3.86 **VP:** Low **MLT:** 1765°F **UEL:** NA **LEL:** NA Noncombustible Solid	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contam **Remove:** When wet or contam **Change:** Daily		**Respirator Recommendations (see Tables 3 and 4):** **NIOSH/OSHA** **5 mg/m^3:** 95XQ/Sa **12.5 mg/m^3:** Sa:Cf/PaprHie **25 mg/m^3:** 100F/SaT:Cf/PaprTHie/ ScbaF/SaF **50 mg/m^3:** SaF:Pd,Pp **§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE	
Incompatibilities and Reactivities: Acids, oxidizers				
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Irrit eyes, skin, upper resp sys; skin burns; gastroenteritis; musc spasm; slow pulse, extrasystoles; hypokalemia **TO:** Eyes, skin, resp sys, heart, CNS			**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Water flush immed **Breath:** Resp support **Swallow:** Medical attention immed	

Beryllium & beryllium compounds (as Be)	**Formula:** Be (metal)	**CAS#:** 7440-41-7 (metal)	**RTECS#:** DS1750000 (metal)	**IDLH:** Ca [4 mg/m^3 (as Be)]
Conversion:	**DOT:** 1566 154 (compounds); 1567 134 (powder)			
Synonyms/Trade Names: **Beryllium metal:** Beryllium Other synonyms vary depending upon the specific beryllium compound.				
Exposure Limits: **NIOSH REL:** Ca Not to exceed 0.0005 mg/m^3 See Appendix A **OSHA PEL:** TWA 0.002 mg/m^3 C 0.005 mg/m^3 0.025 mg/m^3 [30-minute maximum peak]			**Measurement Methods (see Table 1):** **NIOSH** 7102, 7300, 7301, 7303, 9102 **OSHA** ID125G, ID206	
Physical Description: Metal: A hard, brittle, gray-white solid.				
Chemical & Physical Properties: **MW:** 9.0 **BP:** 4532°F **Sol:** Insoluble **FI.P:** NA **IP:** NA **Sp.Gr:** 1.85 (metal) **VP:** 0 mmHg (approx) **MLT:** 2349°F **UEL:** NA **LEL:** NA	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** Daily **Remove:** When wet or contam **Change:** Daily **Provide:** Eyewash		**Respirator Recommendations (see Tables 3 and 4):** **NIOSH** **¥:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE	
Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of a powder or dust.				
Incompatibilities and Reactivities: Acids, caustics, chlorinated hydrocarbons, oxidizers, molten lithium				
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Con **SY:** Berylliosis (chronic exposure): anor, low-wgt, lass, chest pain, cough, clubbing of fingers, cyan, pulm insufficiency; irrit eyes; derm; [carc] **TO:** Eyes, skin, resp sys [lung cancer]			**First Aid (see Table 6):** **Eye:** Irr immed **Breath:** Fresh air	

Cadmium dust (as Cd)

Formula:	CAS#:	RTECS#:	IDLH:
Cd (metal)	7440-43-9 (metal)	EU9800000 (metal)	Ca [9 mg/m^3 (as Cd)]

Conversion: **DOT:** 2570 154 (cadmium compound)

Synonyms/Trade Names: **Cadmium metal:** Cadmium
Other synonyms vary depending upon the specific cadmium compound.

Exposure Limits:
NIOSH REL*: Ca
See Appendix A
OSHA PEL*: [1910.1027] TWA 0.005 mg/m^3
[***Note:** The REL and PEL apply to all Cadmium compounds (as Cd).]

Measurement Methods (see Table 1):
NIOSH 7048, 7300, 7301, 7303, 9102
OSHA ID121, ID125G, ID189, ID206

Physical Description: Metal: Silver-white, blue-tinged lustrous, odorless solid.

Chemical & Physical Properties:
MW: 112.4
BP: 1409°F
Sol: Insoluble
FI.P: NA
IP: NA
Sp.Gr: 8.65 (metal)
VP: 0 mmHg (approx)
MLT: 610°F
UEL: NA
LEL: NA
Metal: Noncombustible Solid in bulk form, but will burn in powder form.

Personal Protection/Sanitation (see Table 2):
Skin: N.R.
Eyes: N.R.
Wash skin: Daily
Remove: N.R.
Change: Daily

Respirator Recommendations (see Tables 3 and 4):
NIOSH
¥: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: 100F/ScbaE

See Appendix E (page 351)

Incompatibilities and Reactivities: Strong oxidizers; elemental sulfur, selenium & tellurium

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Ing
SY: Pulm edema, dysp, cough, chest tight, subs pain; head; chills, musc aches; nau, vomit, diarr; anos, emphy, prot, mild anemia; [carc]
TO: Resp sys, kidneys, prostate, blood [prostatic & lung cancer]

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap wash
Breath: Resp support
Swallow: Medical attention immed

Chromium metal

Formula:	CAS#:	RTECS#:	IDLH:
Cr	7440-47-3	GB4200000	250 mg/m^3 (as Cr)

Conversion: **DOT:**

Synonyms/Trade Names: Chrome, Chromium

Exposure Limits:
NIOSH REL: TWA 0.5 mg/m^3
See Appendix C
OSHA PEL*: TWA 1 mg/m^3
See Appendix C
[***Note:** The PEL also applies to insoluble chromium salts.]

Measurement Methods (see Table 1):
NIOSH 7024, 7300, 7301, 7303, 9102
OSHA ID121, ID125G

Physical Description: Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.

Chemical & Physical Properties:
MW: 52.0
BP: 4788°F
Sol: Insoluble
FI.P: NA
IP: NA
Sp.Gr: 7.14
VP: 0 mmHg (approx)
MLT: 3452°F
UEL: NA
LEL: NA
Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame.

Personal Protection/Sanitation (see Table 2):
Skin: N.R.
Eyes: N.R.
Wash skin: N.R.
Remove: N.R.
Change: N.R.

Respirator Recommendations (see Tables 3 and 4):
NIOSH
2.5 mg/m^3: Qm*
5 mg/m^3: 95XQ*/Sa*
12.5 mg/m^3: Sa:Cf*/PaprHie*
25 mg/m^3: 100F/PaprTHie*/ ScbaF/SaF
250 mg/m^3: SaF:Pd,Pp
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: 100F/ScbaE

Incompatibilities and Reactivities: Strong oxidizers (such as hydrogen peroxide), alkalis

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Ing, Con
SY: Irrit eyes, skin; lung fib (histologic)
TO: Eyes, skin, resp sys

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap wash
Breath: Resp support
Swallow: Medical attention immed

Cobalt metal dust and fume (as Co)	**Formula:** Co	**CAS#:** 7440-48-4	**RTECS#:** GF8750000	**IDLH:** 20 mg/m^3 (as Co)
Conversion:	**DOT:**			
Synonyms/Trade Names: Cobalt metal dust, Cobalt metal fume				
Exposure Limits: **NIOSH REL:** TWA 0.05 mg/m^3 **OSHA PEL†:** TWA 0.1 mg/m^3 **Physical Description:** Odorless, silver-gray to black solid.			**Measurement Methods (see Table 1):** **NIOSH** 7027, 7300, 7301, 7303, 9102 **OSHA** ID121, ID125G, ID213	
Chemical & Physical Properties: **MW:** 58.9 **BP:** 5612°F **Sol:** Insoluble **FI.P:** NA **IP:** NA **Sp.Gr:** 8.92 **VP:** 0 mmHg (approx) **MLT:** 2719°F **UEL:** NA **LEL:** NA Noncombustible Solid in bulk form, but finely divided dust will burn at high temperatures.	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** N.R. **Wash skin:** When contam **Remove:** When wet or contam **Change:** Daily		**Respirator Recommendations (see Tables 3 and 4):** **NIOSH** **0.25 mg/m^3:** Qm **0.5 mg/m^3:** 95XQ*/Sa* **1.25 mg/m^3:** Sa:Cf*/PaprHie* **2.5 mg/m^3:** 100F/ScbaF/SaF **20 mg/m^3:** SaF:Pd,Pp **§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers, ammonium nitrate				
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Cough, dysp, wheez, decr pulm func; low-wgt; derm; diffuse nodular fib; resp hypersensitivity, asthma **TO:** Skin, resp sys			**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Soap wash **Breath:** Resp support **Swallow:** Medical attention immed	

Copper (dusts and mists, as Cu)	**Formula:** Cu	**CAS#:** 7440-50-8	**RTECS#:** GL5325000	**IDLH:** 100 mg/m^3 (as Cu)
Conversion:	**DOT:**			
Synonyms/Trade Names: Copper metal dusts, Copper metal fumes				
Exposure Limits: **NIOSH REL*:** TWA 1 mg/m^3 **OSHA PEL*:** TWA 1 mg/m^3 [***Note:** The REL and PEL also apply to other copper compounds (as Cu) except copper fume.] **Physical Description:** Reddish, lustrous, malleable, odorless solid.			**Measurement Methods (see Table 1):** **NIOSH** 7029, 7300, 7301, 7303, 9102 **OSHA** ID121, ID125G	
Chemical & Physical Properties: **MW:** 63.5 **BP:** 4703°F **Sol:** Insoluble **FI.P:** NA **IP:** NA **Sp.Gr:** 8.94 **VP:** 0 mmHg (approx) **MLT:** 1981°F **UEL:** NA **LEL:** NA Noncombustible Solid in bulk form, but powdered form may ignite.	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contam **Remove:** When wet or contam **Change:** Daily		**Respirator Recommendations (see Tables 3 and 4):** **NIOSH/OSHA** **5 mg/m^3:** Qm* **10 mg/m^3:** 95XQ*/Sa* **25 mg/m^3:** Sa:Cf*/PaprHie* **50 mg/m^3:** 100F/PaprTHie*/ScbaF/SaF **100 mg/m^3:** SaF:Pd,Pp **§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE	
Incompatibilities and Reactivities: Oxidizers, alkalis, sodium azide, acetylene				
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Irrit eyes, nose, pharynx; nasal septum perf; metallic taste; derm; in animals: lung, liver, kidney damage; anemia **TO:** Eyes, skin, resp sys, liver, kidneys (incr risk with Wilson's disease)			**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Soap wash prompt **Breath:** Resp support **Swallow:** Medical attention immed	

Chromic acid and chromates

Formula:	CAS#:	RTECS#:	IDLH:
CrO_3 (acid)	1333-82-0 (CrO_3)	GB6650000 (CrO_3)	Ca [15 mg/m^3 {as Cr(VI)}]

Conversion: **DOT:** 1755 154 (acid solution); 1463 141 (acid, solid)

Synonyms/Trade Names: **Chromic acid (CrO_3):** Chromic anhydride, Chromic oxide, Chromium(VI) oxide (1:3), Chromium trioxide. Synonyms of chromates (i.e., chromium(VI) compounds) such as zinc chromate vary depending upon the specific compound.

Exposure Limits:
NIOSH REL (as Cr): Ca
TWA 0.001 mg/m^3
See Appendix A
See Appendix C
OSHA PEL (as CrO_3): C 0.1 mg/m^3 See Appendix C

Measurement Methods (see Table 1):
NIOSH 7600, 7604, 7605
OSHA ID103, ID215, W4001

Physical Description: CrO_3: Dark-red, odorless flakes or powder. [**Note:** Often used in an aqueous solution (H_2CrO_4).]

Chemical & Physical Properties:
MW: 100.0
BP: 482°F (Decomposes)
Sol: 63%
FI.P: NA
IP: NA
Sp.Gr: 2.70 (CrO_3)
VP: Very low
MLT: 387°F (Decomposes)
UEL: NA
LEL: NA
CrO_3: Noncombustible Solid, but will accelerate the burning of combustible materials.

Personal Protection/Sanitation (see Table 2):
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contam
Remove: When wet or contam
Change: Daily
Provide: Eyewash
Quick drench

Respirator Recommendations (see Tables 3 and 4):
NIOSH
¥: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: 100F/ScbaE

Incompatibilities and Reactivities: Combustible, organic, or other readily oxidizable materials (paper, wood, sulfur, aluminum, plastics, etc.); corrosive to metals

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Ing, Con
SY: Irrit resp sys; nasal septum perf; liver, kidney damage; leucyt, leupen, eosin; eye inj, conj; skin ulcer, sens derm; [carc]
TO: Blood, resp sys, liver, kidneys, eyes, skin [lung cancer]

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap flush immed
Breath: Resp support
Swallow: Medical attention immed

Mercury compounds [except (organo) alkyls] (as Hg)

Formula:	CAS#:	RTECS#:	IDLH:
Hg (metal)	7439-97-6 (metal)	OV4550000 (metal)	10 mg/m^3 (as Hg)

Conversion: **DOT:** 2809 172 (metal)

Synonyms/Trade Names: **Mercury metal:** Colloidal mercury, Metallic mercury, Quicksilver
Synonyms of "other" Hg compounds vary depending upon the specific compound.

Exposure Limits:
NIOSH REL: Hg Vapor: TWA 0.05 mg/m^3 [skin] **OSHA PEL†:** C 0.1 mg/m^3
Other: C 0.1 mg/m^3 [skin]

Measurement Methods (see Table 1):
NIOSH 6009 **OSHA** ID140

Physical Description: Metal: Silver-white, heavy, odorless liquid.
[**Note:** "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.]

Chemical & Physical Properties:
MW: 200.6
BP: 674°F
Sol: Insoluble
FI.P: NA
IP: ?
Sp.Gr: 13.6 (metal)
VP: 0.0012 mmHg
FRZ: -38°F
UEL: NA
LEL: NA
Metal: Noncombustible Liquid

Personal Protection/Sanitation (see Table 2):
Skin: Prevent skin contact
Eyes: N.R.
Wash skin: When contam
Remove: When wet or contam
Change: Daily

Incompatibilities and Reactivities: Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper

Respirator Recommendations (see Tables 3 and 4):
Mercury vapor:
NIOSH
0.5 mg/m^3: CcrS†/Sa
1.25 mg/m^3: Sa:Cf/PaprS†(canister)
2.5 mg/m^3: CcrFS†/GmFS†/SaT:Cf/PaprTS(canister)/ScbaF/SaF
10 mg/m^3: Sa:Pd,Pp
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: GmFS/ScbaE

Other mercury compounds:
NIOSH/OSHA
1 mg/m^3: CcrS†/Sa
2.5 mg/m^3: Sa:Cf/PaprS†(canister)
5 mg/m^3: CcrFS†/GmFS†/SaT:Cf/PaprTS(canister)/ScbaF/SaF
10 mg/m^3: Sa:Pd,Pp
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: GmFS/ScbaE

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Abs, Ing, Con
SY: Irrit eyes, skin; cough, chest pain, dysp, bron, pneu; tremor, insom, irrity, indecision, head, lass; stomatitis, salv; GI dist, anor, low-wgt; prot
TO: Eyes, skin, resp sys, CNS, kidneys

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap wash prompt
Breath: Resp support
Swallow: Medical attention immed

Molybdenum (soluble compounds, as Mo)	**Formula:**	**CAS#:**	**RTECS#:**	**IDLH:** 1000 mg/m^3 (as Mo)
Conversion:	**DOT:**			
Synonyms/Trade Names: Synonyms vary depending upon the specific soluble molybdenum compound.				
Exposure Limits: **NIOSH REL:** See Appendix D **OSHA PEL:** TWA 5 mg/m^3 **Physical Description:** Appearance and odor vary depending upon the specific soluble molybdenum compound.				**Measurement Methods (see Table 1):** **NIOSH** 7300, 7301, 7303, 9102 **OSHA** ID121, ID125G
Chemical & Physical Properties: Properties vary depending upon the specific soluble molybdenum compound.	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contam **Remove:** When wet or contam **Change:** N.R.		**Respirator Recommendations (see Tables 3 and 4):** **OSHA** **25 mg/m^3:** Qm* **50 mg/m^3:** 95XQ*/Sa* **125 mg/m^3:** Sa:Cf*/PaprHie* **250 mg/m^3:** 100F/SaT:Cf*/PaprTHie*/ ScbaF/SaF **1000 mg/m^3:** SaF:Pd,Pp **§:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE	
Incompatibilities and Reactivities: Varies				
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** In animals: irrit eyes, nose, throat; anor; inco; dysp; anemia **TO:** Eyes, resp sys, kidneys, blood			**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Water flush **Breath:** Resp support **Swallow:** Medical attention immed	

Nickel metal and other compounds (as Ni)	**Formula:** Ni (metal)	**CAS#:** 7440-02-0 (metal)	**RTECS#:** QR5950000 (metal)	**IDLH:** Ca [10 mg/m^3 (as Ni)]
Conversion:	**DOT:**			
Synonyms/Trade Names: **Nickel metal:** Elemental nickel, Nickel catalyst Synonyms of other nickel compounds vary depending upon the specific compound.				
Exposure Limits: **NIOSH REL*:** Ca TWA 0.015 mg/m^3 See Appendix A **OSHA PEL*†:** TWA 1 mg/m^3 [***Note:** The REL and PEL do not apply to Nickel carbonyl.] **Physical Description:** Metal: Lustrous, silvery, odorless solid.				**Measurement Methods (see Table 1):** **NIOSH** 7300, 7301, 7303, 9102 **OSHA** ID121, ID125G
Chemical & Physical Properties: **MW:** 58.7 **BP:** 5139°F **Sol:** Insoluble **Fl.P:** NA **IP:** NA **Sp.Gr:** 8.90 (Metal) **VP:** 0 mmHg (approx) **MLT:** 2831°F **UEL:** NA **LEL:** NA Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** N.R. **Wash skin:** When contam/Daily **Remove:** When wet or contam **Change:** Daily		**Respirator Recommendations (see Tables 3 and 4):** **NIOSH** **¥:** ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE	
	Incompatibilities and Reactivities: Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate			
Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Sens derm, allergic asthma, pneu; [carc] **TO:** Nasal cavities, lungs, skin [lung and nasal cancer]			**First Aid (see Table 6):** **Skin:** Water flush immed **Breath:** Resp support **Swallow:** Medical attention immed	

Selenium	**Formula:** Se	**CAS#:** 7782-49-2	**RTECS#:** VS7700000	**IDLH:** 1 mg/m^3 (as Se)
Conversion:	**DOT:** 2658 152 (powder)			

Synonyms/Trade Names: Elemental selenium, Selenium alloy

Exposure Limits: **NIOSH REL*:** TWA 0.2 mg/m^3 **OSHA PEL*:** TWA 0.2 mg/m^3 [***Note:** The REL and PEL also apply to other selenium compounds (as Se) except Selenium hexafluoride.]	**Measurement Methods (see Table 1):** **NIOSH** 7300, 7301, 7303, 9102, S190 (II-7) **OSHA** ID121
Physical Description: Amorphous or crystalline, red to gray solid. [**Note:** Occurs as an impurity in most sulfide ores.]	

Chemical & Physical Properties: **MW:** 79.0 **BP:** 1265°F **Sol:** Insoluble **Fl.P:** NA **IP:** NA **Sp.Gr:** 4.28 **VP:** 0 mmHg (approx) **MLT:** 392°F **UEL:** NA **LEL:** NA Combustible Solid	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** N.R. **Wash skin:** When contam **Remove:** When wet or contam **Change:** N.R. **Provide:** Quick drench	**Respirator Recommendations (see Tables 3 and 4):** **NIOSH/OSHA** **1 mg/m^3:** Qm*/95XQ*/100F/PaprHie*/ PaprHie*/Sa*/ScbaF §: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE

Incompatibilities and Reactivities: Acids, strong oxidizers, chromium trioxide, potassium bromate, cadmium

Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Irrit eyes, skin, nose, throat; vis dist; head; chills, fever; dysp, bron; metallic taste, garlic breath, GI dist; derm; eye, skin burns; in animals: anemia; liver nec, cirr; kidney, spleen damage **TO:** Eyes, skin, resp sys, liver, kidneys, blood, spleen	**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Soap wash immed **Breath:** Resp support **Swallow:** Medical attention immed

Silver (metal dust and soluble compounds, as Ag)	**Formula:** Ag (metal)	**CAS#:** 7440-22-4 (metal)	**RTECS#:** VW3500000 (metal)	**IDLH:** 10 mg/m^3 (as Ag)
Conversion:	**DOT:**			

Synonyms/Trade Names: **Silver metal:** Argentum
Synonyms of soluble silver compounds such as Silver nitrate ($AgNO_3$) vary depending upon the specific compound.

Exposure Limits: **NIOSH REL:** TWA 0.01 mg/m^3 **OSHA PEL:** TWA 0.01 mg/m^3	**Measurement Methods (see Table 1):** **NIOSH** 7300, 7301, 9102 **OSHA** ID121
Physical Description: Metal: White, lustrous solid.	

Chemical & Physical Properties: **MW:** 107.9 **BP:** 3632°F **Sol:** Insoluble **Fl.P:** NA **IP:** NA **Sp.Gr:** 10.49 (metal) **VP:** 0 mmHg (approx) **MLT:** 1761°F **UEL:** NA **LEL:** NA Metal: Noncombustible Solid, but flammable in form of dust or powder.	**Personal Protection/Sanitation (see Table 2):** **Skin:** Prevent skin contact **Eyes:** Prevent eye contact **Wash skin:** When contam **Remove:** When wet or contam ($AgNO_3$) **Change:** Daily **Provide:** Eyewash	**Respirator Recommendations (see Tables 3 and 4):** **NIOSH/OSHA** **0.25 mg/m^3:** Sa:Cf£/PaprHie£ **0.5 mg/m^3:** 100F/ScbaF/SaF **10 mg/m^3:** SaF:Pd,Pp §: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba **Escape:** 100F/ScbaE

Incompatibilities and Reactivities: Acetylene, ammonia, hydrogen peroxide, bromoazide, chlorine trifluoride, ethyleneimine, oxalic acid, tartaric acid

Exposure Routes, Symptoms, Target Organs (see Table 5): **ER:** Inh, Ing, Con **SY:** Blue-gray eyes, nasal septum, throat, skin; irrit, ulceration skin; GI dist **TO:** Nasal septum, skin, eyes	**First Aid (see Table 6):** **Eye:** Irr immed **Skin:** Water flush **Breath:** Resp support **Swallow:** Medical attention immed

Vanadium dust	**Formula:** V_2O_5	**CAS#:** 1314-62-1	**RTECS#:** YW2450000	**IDLH:** 35 mg/m^3 (as V)
Conversion:	**DOT:** 2862 151			

Synonyms/Trade Names: Divanadium pentoxide dust, Vanadic anhydride dust, Vanadium oxide dust, Vanadium pentaoxide dust. Other synonyms vary depending upon the specific vanadium compound.

Exposure Limits:
NIOSH REL*: C 0.05 mg V/m^3 [15-minute]
[***Note:** The REL applies to all vanadium compounds except Vanadium metal and Vanadium carbide (see Ferrovanadium dust).]
OSHA PEL†: C 0.5 mg V_2O_5/m^3 (resp)

Measurement Methods (see Table 1):
NIOSH 7300, 7301, 7303, 7504, 9102
OSHA ID185

Physical Description: Yellow-orange powder or dark-gray, odorless flakes dispersed in air.

Chemical & Physical Properties:
MW: 181.9
BP: 3182°F (Decomposes)
Sol: 0.8%
FI.P: NA
IP: NA
Sp.Gr: 3.36
VP: 0 mmHg (approx)
MLT: 1274°F
UEL: NA
LEL: NA
Noncombustible Solid, but may increase intensity of fire when in contact with combustible materials.

Personal Protection/Sanitation (see Table 2):
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contam
Remove: When wet or contam
Change: N.R.

Respirator Recommendations (see Tables 3 and 4):
NIOSH (as V)
0.5 mg/m^3: 100XQ*/Sa*
1.25 mg/m^3: Sa:Cf*/PaprHie*
2.5 mg/m^3: 100F/PaprTHie*/ScbaF/SaF
35 mg/m^3: SaF:Pd,Pp
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: 100F/ScbaE

Incompatibilities and Reactivities: Lithium, chlorine trifluoride

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Ing, Con
SY: Irrit eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheez, bron, dysp
TO: Eyes, skin, resp sys

First Aid (see Table 6):
Eye: Irr immed
Skin: Soap wash prompt
Breath: Resp support
Swallow: Medical attention immed

Zinc oxide	**Formula:** ZnO	**CAS#:** 1314-13-2	**RTECS#:** ZH4810000	**IDLH:** 500 mg/m^3
Conversion:	**DOT:** 1516 143			

Synonyms/Trade Names: Zinc peroxide

Exposure Limits:
NIOSH REL: Dust: TWA 5 mg/m^3
C 15 mg/m^3
Fume: TWA 5 mg/m^3
ST 10 mg/m^3
OSHA PEL†: TWA 5 mg/m^3 (fume)
TWA 15 mg/m^3 (total dust)
TWA 5 mg/m^3 (resp dust)

Measurement Methods (see Table 1):
NIOSH 7303, 7502
OSHA ID121, ID143

Physical Description: White, odorless solid.

Chemical & Physical Properties:
MW: 81.4
BP: ?
Sol(64°F): 0.0004%
FI.P: NA
IP: NA
Sp.Gr: 5.61
VP: 0 mmHg (approx)
MLT: 3587°F
UEL: NA
LEL: NA
Noncombustible Solid

Personal Protection/Sanitation (see Table 2):
Skin: N.R.
Eyes: N.R.
Wash skin: N.R.
Remove: N.R.
Change: N.R.

Respirator Recommendations (see Tables 3 and 4):
NIOSH/OSHA
50 mg/m^3: 95XQ/Sa
125 mg/m^3: Sa:Cf/PaprHie
250 mg/m^3: 100F/SaT:Cf/PaprTHie/ScbaF/SaF
500 mg/m^3: Sa:Pd,Pp
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: 100F/ScbaE

Incompatibilities and Reactivities: Chlorinated rubber (at 419°F), water
[Note: Slowly decomposed by water.]

Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh
SY: Metal fume fever: chills, musc ache, nau, fever, dry throat, cough; lass; metallic taste; head; blurred vision; low back pain; vomit; mal; chest tight; dysp, rales, decr pulm func
TO: Resp sys

First Aid (see Table 6):
Breath: Resp support

I. SUBSTANCE IDENTIFICATION

A. Substance. Inorganic Arsenic.

B. Definition. Copper acetoarsenite, arsenic and all inorganic compounds containing arsenic except arsine, measured as arsenic (As).

C. Permissible Exposure Limit. 0.01 milligrams per cubic meter of air (same as 10 micrograms per cubic meter of air) as determined as an average over an 8-hour period. No employee may be exposed to any skin or eye contact with arsenic trichloride or to skin or eye contact likely to cause skin or eye irritation.

D. Action Level. 0.005 milligrams per cubic meter of air (same as 5 micrograms per cubic meter of air) determined as an average over an 8-hour period.

E. Regulated Areas. Only employees authorized by your employer should enter a regulated area.

II. HEALTH HAZARD DATA

A. Comments. The health hazard of inorganic arsenic is high.

B. Ways In Which Inorganic Arsenic Affects Your Body. Exposure to airborne inorganic arsenic may cause lung cancer, and it can be a skin irritant. Inorganic arsenic may also affect your body if swallowed. One compound in particular, arsenic trichloride, is especially dangerous because it is highly corrosive and it can be absorbed readily through the skin. Because inorganic arsenic is a poison, you should wash your hands thoroughly prior to eating or smoking.

III. PROTECTIVE CLOTHING AND EQUIPMENT

A. Respirators. Respirators will be provided by your employer at no cost to you for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient. You must wear respirators for non-routine activities or in emergency situations where you are likely to be exposed to levels of inorganic arsenic in excess of the permissible exposure limit. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during training sessions.

B. Protective clothing. If you work in a regulated area, your employer is required to provide at no cost to you, and you must wear, appropriate, clean, protective clothing and equipment. The purpose of this equipment is to prevent you from bringing to your home arsenic-contaminated dust and to protect your body from repeated skin contact with inorganic arsenic likely to cause skin irritation. This clothing should include such items as coveralls or similar full-body clothing, gloves, shoes or coverlets, and aprons. Protective equipment should include face shields or vented goggles where eye injury may occur.

IV. HYGIENE FACILITIES AND PRACTICES

You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. If you work in a regulated area your employer is required to provide lunch rooms and other areas for these purposes.

If you work in a regulated area, your employer is required to provide showers, washing facilities, and change rooms. You must wash your face and hands before eating and must shower at the end of the work shift. Do not take used protective clothing out of change rooms without your employer's permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. SIGNS AND LABELS

Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized employees may enter the area, and that no smoking or eating is allowed, and that respirators must be worn.

VI. MEDICAL EXAMINATIONS

If your exposure to arsenic is over the action level at least 30 days per year, or your have been exposed to arsenic for more than 10 years over the action level, your employer is required to provide you with a medical examination. The examination shall be every 6 months for employees over 45 years old or with more than 10 years exposure over the action level and annually for other covered employees. The initial medical examination must include a medical history; a chest X-ray; skin examination; nasal examination and sputum cytology examination for the early detection of lung cancer. In subsequent medical examinations, the chest X-ray is not required unless recommended by the physician. The cytology exams are only included in the initial examination and examinations given after you are either 45 years or older or have 10 or more years employment over the action level. The examining physician will provide a written opinion to your employer interpreting the results of the medical exams. You should also receive a copy of this opinion. The physician must not tell your employer any conditions he or she detects unrelated to occupational exposure to arsenic but must tell you those conditions.

VII. OBSERVATION OF MONITORING

Your employer is required to monitor your exposure to arsenic and you or your representatives are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. ACCESS TO RECORDS

You or your representative are entitled to records of your exposure to inorganic arsenic upon request to your employer. Your medical examination records can be furnished to you, your physician, or any other individual or organization that you designate if you request your employer to provide them.

IX. TRAINING AND NOTIFICATION

Additional information on all of these items plus training as to hazards of exposure to inorganic arsenic and the engineering and work practice controls associated with your job will also be provided by your employer. If you are exposed over the permissible exposure limit, your employer must inform you of that fact and the actions he or she is taking to reduce your exposures.

I. SUBSTANCE IDENTIFICATION INORGANIC LEAD

A Substance: Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

B Compounds covered by the standard: The word "lead" when used in this standard means elemental lead, all inorganic lead compounds and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.

C Uses: Exposure to lead occurs in several different occupations in the construction industry, including demolition or salvage of structures where lead or lead-containing materials are present; removal or encapsulation of lead-containing materials, new construction, alteration, repair, or renovation of structures that contain lead or materials containing lead; installation of products containing lead. In addition, there are construction related activities where exposure to lead may occur, including transportation, disposal, storage, or containment of lead or materials containing lead on construction sites, and maintenance operations associated with construction activities.

D Permissible exposure: The permissible exposure limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air (50 µg/m3) averaged over an 8-hour workday.

E Action level: The standard establishes an action level of 30 micrograms of lead per cubic meter of air (30 µg/m3) averaged over an 8-hour workday. The action level triggers several ancillary provisions of the standard such as exposure monitoring, medical surveillance, and training.

II. HEALTH HAZARD DATA

A Ways in which lead enters your body. When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume or mist it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B Effects of overexposure to lead.

1. Short term (acute) overexposure. Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

2. Long-term (chronic) overexposure. Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible. Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood. Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

3. Exposure to lead throughout a working lifetime requires that a worker's blood lead level (BLL, also expressed as PbB) be maintained at or below forty micrograms per deciliter of whole blood (40 µg/dl). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 µg/dl to minimize adverse reproductive health effects to the parents and to the developing fetus. The measurement of your blood lead level (BLL) is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels are most often reported in units of milligrams (mg) or micrograms (ug) of lead (1 mg=1000 mg) per 100 grams (100g), 100 milliliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime BLLs are expressed in the form of mg% or mg%. This is a shorthand notation for 100g, 100 ml, or dl. (Reference to BLL measurements in this standard are expressed in the form of µg/dl.)

   BLL measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. BLL measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead-related diseases, however, has focused heavily on associations between BLLs and various diseases. As a result, your BLL is an important indicator of the likelihood that you will gradually acquire a lead-related health impairment or disease.

Once your blood lead level climbs about 40 µg/dl, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular BLL in a given person will cause a particular effect. Studies have associated fatal encephalopathy with BLLs as low as 150 µg/dl. Other studies have shown other forms of diseases in some workers with BLLs well below 80 µg/dl. Your BLL is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated BLLs. The longer you have an elevated BLL, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage. The best way to prevent all forms of lead-related impairments and diseases -- both short term and long term -- is to maintain your BLL below 40 µg/dl. The provisions of the standard are designed with this end in mind.

Your employer has prime responsibility to assure that the provisions of the standard are complied with both by the company and by individual workers. You, as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing his or her actions.

4. Reporting signs and symptoms of health problems. You should immediately notify your employer if you develop signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead or your ability to have a healthy child. You should also notify your employer if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases, your employer must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place. The standard contains a procedure whereby you can obtain a second opinion by a physician of your choice if your employer selected the initial physician.

<table>
<tr><td>Hydrogen cyanide</td><td>Formula:
HCN</td><td>CAS#:
74-90-8</td><td>RTECS#:
MW6825000</td><td>IDLH:
50 ppm</td></tr>
<tr><td>Conversion: 1 ppm = 1.10 mg/m^3</td><td colspan="4">DOT: 1051 117 (>20% solution); 1051 117 (anhydrous); 1613 154 (20% solution)</td></tr>
<tr><td colspan="5">Synonyms/Trade Names: Formonitrile, Hydrocyanic acid, Prussic acid</td></tr>
<tr><td colspan="4">Exposure Limits:
NIOSH REL: ST 4.7 ppm (5 mg/m^3) [skin]
OSHA PEL†: TWA 10 ppm (11 mg/m^3) [skin]</td><td>Measurement Methods (see Table 1):
NIOSH 6010, 6017</td></tr>
<tr><td colspan="5">Physical Description: Colorless or pale-blue liquid or gas (above 78°F) with a bitter, almond-like odor.
[Note: Often used as a 96% solution in water.]</td></tr>
<tr><td colspan="2">Chemical & Physical Properties:
MW: 27.0
BP: 78°F (96%)
Sol: Miscible
Fl.P: 0°F (96%)
IP: 13.60 eV
Sp.Gr: 0.69
VP: 630 mmHg
FRZ: 7°F (96%)
UEL: 40.0%
LEL: 5.6%
Class IA Flammable Liquid Flammable Gas</td><td colspan="2">Personal Protection/Sanitation (see Table 2):
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contam
Remove: When wet (flamm)
Change: N.R.
Provide: Eyewash
Quick drench</td><td>Respirator Recommendations (see Tables 3 and 4):
NIOSH
47 ppm: Sa
50 ppm:
Sa:Cf/ScbaF/SaF
§: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba
Escape: GmFS/ScbaE</td></tr>
<tr><td colspan="5">Incompatibilities and Reactivities: Amines, oxidizers, acids, sodium hydroxide, calcium hydroxide, sodium carbonate, caustics, ammonia [Note: Can polymerize at 122-140°F.]</td></tr>
<tr><td colspan="4">Exposure Routes, Symptoms, Target Organs (see Table 5):
ER: Inh, Abs, Ing, Con
SY: Asphy; lass, head, conf; nau, vomit; incr rate and depth of respiration or respiration slow and gasping; thyroid, blood changes
TO: CNS, CVS, thyroid, blood</td><td>First Aid (see Table 6):
Eye: Irr immed
Skin: Water flush immed
Breath: Resp support
Swallow: Medical attention immed</td></tr>
</table>

APPENDIX J

TABLE J1

REMEIDAL ACTION COST ESTIMATE - ON-SITE CONSOLIDATION

ORO DE AMADOR

JACKSON, CALIFORNIA

	Estimated Capital Costs[1]	Estimated Quantity[2]	Unit	Unit Cost	Estimated Cost
1	Mobilization, Demobilization, Site Control	1	lump sum	$160,000	$160,000
2	Clearing and Grubbing, Tailings Pile	29.0	acres	$2,800	$81,200
3	Clearing and Grubbing, Isolated Tailings Areas	3.2	acres	$2,800	$8,960
4	Clearing and Grubbing, Detention Basin	1.0	acres	$4,400	$4,400
5	Excavation, On-Site Transport, and Consolidation of Isolated Tailings (85%)[2,3]	11,818	cubic yards	$10.48	$123,857
6	Off Site Transport and Disposal of Isolated Tailings, Class I Non-RCRA (15%)[2,4]	2,711	tons	$216.45	$586,857
7	Regrade Tailings Pile Deck, Slopes and Upper Basin[5]	25,000	cubic yards	$8.70	$217,500
8	Construct Rock-Lined Drainage Ditches at Tailings Pile	2,000	linear feet	$28.75	$57,500
9	Install CMP Culvert at Tailings Pile	1,000	linear feet	$115.48	$115,480
10	Install Downdrains at Tailings Pile	800	linear feet	$100.00	$80,000
11	Construct Soil Berms at Tailings Pile	2,000	linear feet	$33.75	$67,500
12	Import and Construct 1.0 ft Clay Cap, 12.5-acre Tailings Pile Deck[5]	20,200	cubic yards	$42.98	$868,196
13	Import and Construct 1.0 ft Clay Cap, 5.5-ac Tailings Pile Upslope Area	8,900	cubic yards	$42.98	$382,522
14	Import and Construct 1.0 ft Clay Cap, 11-acre Tailings Pile Slopes[6]	19,400	cubic yards	$42.98	$833,812
15	Import and Construct 1.0 ft Clean Granular Fill, 12.5-ac Tailings Pile Deck[5]	20,200	cubic yards	$48.54	$980,508
16	Import and Construct 1.0 ft Clean Vegetative Fill, 5.5-acre Tailings Pile Upslope Area	8,900	cubic yards	$27.94	$248,666
17	Import and Construct 1.0 ft Clean Vegetative Fill, 11-acre Tailings Pile Slopes[6]	19,400	cubic yards	$27.94	$542,036
18	Fence Lakebed Area	3,850	linear feet	$17.55	$67,568
19	Fence Cyanide Process Area	2,550	linear feet	$17.55	$44,753
20	Post Lakebed Area and Cyanide Process Area	1	lump sum	$6,000	$6,000
21	Fiber Rolls, 100-ft spacing on deck areas	7,850	linear feet	$3.00	$23,550
22	Fiber Rolls, 30-ft spacing on slope areas	4,650	linear feet	$3.00	$13,950
23	Seed, Mulch, and Fertilizer	32.2	acers	$5,000	$161,000
Subtotal of Direct Costs					**$5,675,813**
24	Remeidal Design (Survey, Geotechnical, Grading and Drainage Plans, RDIP)	1	lump sum	$156,000	$156,000
25	Construction Quality Assurance and Environmental Monitoring	1	lump sum	$184,000	$184,000
26	DTSC Oversight	1	lump sum	$150,000	$150,000
Subtotal of Indirect Costs					**$490,000**
Contingency[6]		1	% direct costs	20%	**$1,135,163**
Total Estimated Capital Cost					**$7,300,976**

Notes:

RDIP = Remedial Design and Implementation Plan

1 Estimate based on unit rates obtained from earthwork contractors for similar tasks. Actual costs may vary significantly based on actual rates, material quantities, and site conditions. Bids must be obtained to verify current rates. Remedial design must be performed to verify quantities.

2 Quantities are subject to change based on the results of verification sampling and analysis.

3 Assuming 85% of the isolated tailings areas classify as non-hazardous. Total estimated volume is 13,904 cy.

4 Assuming 15% of the isolated tailngs areas classify as hazardous waste, and the in-place density is 1.3 tons per cubic yard.

5 Earthwork quantity for regrading will vary based on elevations and grades established as part of remedial design.

6 Horizontal projection of slopes is 11.0 acres; a 12-acre surface area was used for cost estimation.

7 A contingency is added as a percentage of direct costs to address uncertainties to be addressed by the RDIP.

TABLE J2

REMEIDAL ACTION COST ESTIMATE - OFF-SITE DISPOSAL

ORO DE AMADOR

JACKSON, CALIFORNIA

	Estimated Capital Costs[1]	Estimated Quantity[2]	Unit	Unit Cost	Estimated Cost
1	Mobilization, Demobilization, Site Control	1	lump sum	$93,923	$93,923
2	Site Preparation and Storm Water BMPs	1	lump sum	$76,102	$76,102
3	Clearing and Grubbing, Tailings Pile	29.0	acres	$2,800	$81,200
4	Clearing and Grubbing, Lakebed Area	14.0	acres	$2,800	$39,200
5	Clearing and Grubbing, Cyanide Process Area	4.0	acres	$2,800	$11,200
6	Clearing and Grubbing, Isolated Tailings Areas	3.2	acres	$2,800	$8,960
7	Off Site Transport and Disposal, Class II (85%)[2,3]	1,403,792	tons	$52.65	$73,909,649
8	Off Site Transport and Disposal, Class I Non-RCRA (15%)[2,4]	247,728	tons	$216.45	$53,620,726
9	Site Restoration	1.0	lump sum	$33,378	$33,378
Subtotal of Direct Costs					**$127,874,337**
10	Construction Quality Assurance and Environmental Monitoring	1	lump sum	$185,000	$185,000
11	DTSC Oversight	1	lump sum	$120,000	$120,000
Subtotal of Indirect Costs					**$305,000**
Contingency[5]		1	% direct costs	10%	**$12,787,434**
Total Estimated Capital Cost					**$140,966,771**

Notes:

1 Estimate based on unit rates obtained from earthwork contractors for similar tasks. Actual costs may vary significantly based on actual rates, material quantities, and site conditions. Bids must be obtained to verify current rates.

2 Quantities are subject to change based on the results of verification sampling and analysis.

3 Assuming 85% of the isolated tailings areas classify as non-hazardous. Total estimated waste volume is 1,000,000 cy for the Tailings Pile, 250,000 cy for the Lakebed Area, the Cyanide Process Area, and 13,900 cy for the isolated tailings deposits, resulting in a total estimated volume of 1,270,400 cy.

4 Assuming 15% of the isolated tailngs areas classify as hazardous waste, and the in-place density is 1.3 tons per cubic yard.

5 A contingency is added as a percentage of direct costs to address uncertainties regarding the waste quantity and classification.

TABLE J3

OPERATION AND MAINTENANCE COST ESTIMATE - EXTREME PRECIPITATION EVENT

ORO DE AMADOR

JACKSON, CALIFORNIA

	Task Description	Estimated Quantity[2]	Unit	Unit Cost	Estimated Cost
1	Mobilization (10% of Lines 2 through 11)	1	lump sum	1	$5,228
2	Grader (CAT 14G)	24	hour	$300.78	$7,219
3	Dozer (CAT D6H LGP)	24	hour	$266.70	$6,401
4	Excavator (CAT 225)	24	hour	$245.15	$5,884
5	Loader (CAT 988B)	24	hour	$488.03	$11,713
6	Haul Truck (End Dump)	24	hour	$222.74	$5,346
7	Water Truck	24	hour	$201.01	$4,824
8	Foreman	24	hour	$128.83	$3,092
9	Laborer	24	hour	$115.12	$2,763
10	Reconstruct vegetative layer	150	cubic yards	$21	$3,150
11	Revegetate	0.3	acres	$6,300	$1,890
12	Contingency (20% of Lines 1 through 11)	1	lump sum	1	$11,502
Subtotal of Direct Costs					**$69,011**
13	Engineering, Permitting, and Fees (10% of Direct Costs	1	lump sum	$6,901	$6,901
14	Construction Quuality Assurance (10% of Direct Costs)	1	lump sum	$6,901	$6,901
15	DTSC Oversight Fees (5% of Direct Costs)	1	lump sum	$3,451	$3,451
Subtotal of Indirect Costs					**$17,253**
Total Estimate					**$86,263**

Assumptions:

A low-recurrence storm exceeding the facility's design storm event may result in erosion of portions of the vegetative cover or stormwater conveyance ditches. Potential mitigation associated with storm damage is assumed to include repair of localized erosion of the cover soil and drainage features such as culverts, berms, and ditches; and sediment removal from downstream drainage channels.

Notes:

All equipment rates include prevailing wage operator and contractor profit and overhead as summarized in Table 6.

Unit price estimates include overhead, profit and bonding.

TABLE J4

OPERATION AND MAINTENANCE COST ESTIMATE - FENCE REPAIR

ORO DE AMADOR

JACKSON, CALIFORNIA

	Task Description	Estimated Quantity	Unit	Unit Cost	Estimated Cost
1	Mobilization (10% of Lines 2 through 3)	1	lump sum	1	$627
2	Fencing. Repair	300	linear feet	$17.55	$5,265
3	Sign Repair	1	lump sum	$1,000	$1,000
4	Contingency (20% of Lines 1 through 3)	1	lump sum	1	$1,378
Subtotal of Direct Costs					**$8,270**
5	Management (10% of Direct Costs)	1	lump sum	$827	$827
6	Construction Quuality Assurance (10% of Direct Costs)	1	lump sum	$827	$827
7	DTSC Oversight Fees (5% of Direct Costs)	1	lump sum	$413	$413
Subtotal of Indirect Costs					**$2,067**
Total Estimate					**$10,337**

Assumptions:

Treefall or vandalism may result in fence and sign damage. This cost estimate assumes that 300 feet of fence must be repaired every five years on average.

TABLE J5

OPERATION AND MAINTENANCE COST ESTIMATE - ENVIRONMENTAL MONITORING

ORO DE AMADOR

JACKSON, CALIFORNIA

	Task Description	Unit Cost	Quantity	Unit	Total Cost
1	**Groundwater Monitoring**				
1a	Elevation Measurement, Purging and Sampling	$110	8	hours	$880
1b	Water Level Indicator	$50	1	day	$50
1c	Sampling Pump	$150	1	day	$150
1d	Generator	$150	1	day	$150
1e	pH/Conductivity/Temperature Meter	$60	1	day	$60
1f	Dissolved Oxygen Meter	$35	1	day	$35
1g	Turbidity Meter	$80	1	day	$80
1h	ORP Meter	$25	1	day	$25
1i	Sampling Supplies (Distilled Water, Alconox®, Sampling Equipment)	$100	1	each	$100
1j	Mileage	$0.75	80	miles	$60
2	**Groundwater Laboratory Analysis**				
2a	Metals	$235.00	5	each	$1,175
2b	Total and Amenable Cyanide	$123.00	5	each	$615
3	**Surface Water Monitoring**				
3a	Sampling	$110	8	hours	$880
3b	pH/Conductivity/Temperature Meter	$60	1	day	$60
3c	Turbidity Meter	$80	1	day	$80
3d	Mileage	$0.75	80	miles	$60
4	**Surface Water Laboratory Analysis**				
4a	Metals	$235.00	4	each	$940
4b	Total and Amenable Cyanide	$123.00	4	each	$492
5	**Reporting**				
5a	Data Evaluation and Report Preparation	$150	8	hours	$1,200
5b	Drafting and Editing	$90	2	hours	$180
5c	Management and Review	$180	2	hours	$360
Total Estimate, Per Monitoring Event					**$7,632**

Assumptions:

Monitoring of 5 groundwater monitoring wells (MW-01 through MW-05) including groundwater elevation measurement, purging of three well volumes, measurement of field parameters, and collection of unfiltered groundwater samples; monitoring of two seep locations (S-02 and S-03) and three surface water locations (SW-01, SW-02, and SW-03); laboratory analysis of metals and cyanide; and preparation of a monitoring report.

TABLE J6

OPERATION AND MAINTENANCE COST ESTIMATE - HOURLY LABOR AND EQUIPMENT RATES

ORO DE AMADOR

JACKSON, CALIFORNIA

Code	**Description**	**Hourly Equipment Cost**[1]	**Equipment Markup** (15%)	**Labor Group**[2]	**Labor Cost**[2]	**Labor Surcharge**[3] (12%)	**Labor Profit**[4] (35%)	**Total Hourly Cost**
GRADR 3180	Grader CAT 14G	$149.52	$22.43	3	$87.64	$10.52	$30.67	$300.78
TRACC 3735	Dozer CAT D6H LGP	$119.89	$17.98	3	$87.64	$10.52	$30.67	$266.70
HCECL 1620	Excavator CAT 225	$101.15	$15.17	3	$87.64	$10.52	$30.67	$245.15
ROTAM 2320	Sheepsft Roller CAT 815F	$185.26	$27.79	3	$87.64	$10.52	$30.67	$341.88
LDRRT 2436	Loader CAT 988B	$312.35	$46.85	3	$87.64	$10.52	$30.67	$488.03
LDRCL 2508D	Loader/Crawler JD 410D	$65.31	$9.80	3	$87.64	$10.52	$30.67	$203.94
TRUON 3AXL	Small Dump Truck	$93.59	$14.04	3	$78.31	$9.40	$27.41	$222.74
TRUCK 60	Water Truck	$74.69	$11.20	3	$78.31	$9.40	$27.41	$201.01
TRUCK 00-06	Support Truck	$37.61	$5.64	NA[5]	$0.00	$0.00	$0.00	$43.25
TRACS C	Tractor Rubber Tire	$49.27	$7.39	3	$87.64	$10.52	$30.67	$185.49
Grade Setter	Grade Setter/Foreman	$0.00	$0.00	3	$87.64	$10.52	$30.67	$128.83
Laborer	Laborer	$0.00	$0.00	3(A)	$78.31	$9.40	$27.41	$115.12

Notes:

1 Caltrans 2023 Labor Surcharge and Equipment Rental Rates (includes fuel, lubrication, major repair and overhaul, depreciation, facilities capital cost, field repair costs and profit).

2 California Department of Industrial Relations 2023 General Prevailing Wage Determination, Operating Engineers, Northern California, Amador County.

3 12% labor surcharge from Caltrans (2023) including worker's compensation insurance, SSI, Medicare, unemployment insurance and State training taxes.

4 35% contractor profit per Caltrans Standard Specification 9-1.04B including profit, overhead, bonds, liability insurance, field office costs and other administrative costs.

5 Not applicable. Use of small equipment by laborer is considered incidental.

TABLE J7

OPERATION AND MAINTENANCE COST ESTIMATE - SUMMARY BY TASK

ORO DE AMADOR

JACKSON, CALIFORNIA

Task	Description	Recurrence	Cost Estimate	30-Year Cost	Reference
1	Cap and Drainage Repairs	10 years	$ 86,263	$ 258,790	Table 1
2	Fence and Sign Repairs	5 years	$ 10,337	$ 62,024	Table 2
3	Environmental Monitoring	5 years	$ 7,632	$ 45,792	Table 3; MRP[1]
4	Annual Inspection	1 year[1]	$ 1,000	$ 24,000	O&M Plan[2]
5	Five Year Review	5 years	$ 2,000	$ 12,000	O&M Plan[2]
6	DTSC Fees	1 year	$ 1,350	$ 40,500	O&M Plan[2]

Notes:

1 The MRP and O&M Plan are to be prepared as part of remedial design, and the cost estimate must be revised to reflect the plan requirements.

2 For years 5, 10, 15, 20, 25 and 30, annual inspection cost is included in 5-year inspection cost.

MRP = Monitoring and Reporting Plan

O&M Plan = Operation and Maintenance Plan

TABLE J8

OPERATION AND MAINTENANCE COST ESTIMATE - SUMMARY BY YEAR

ORO DE AMADOR

JACKSON, CALIFORNIA

Task No.	1	2	3	4	5	6			
Task Name / Year	Cap and Drainage Repairs	Fence and Sign Repairs	Environmental Monitoring	Annual Inspection[1]	Five Year Review[1]	DTSC Fees	**Estimated Cost**	20% Contingency[2]	**Estimated Annual Total**
1	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
2	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
3	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
4	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
5	$ -	$ 10,337	$ 7,632	$ -	$ 2,000	$ 1,350	$ 21,319	$ 4,264	$ 25,583
6	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
7	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
8	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
9	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
10	$ 86,263	$ 10,337	$ 7,632	$ -	$ 2,000	$ 1,350	$ 107,582	$ 21,516	$ 129,098
11	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
12	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
13	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
14	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
15	$ -	$ 10,337	$ 7,632	$ -	$ 2,000	$ 1,350	$ 21,319	$ 4,264	$ 25,583
16	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
17	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
18	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
19	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
20	$ 86,263	$ 10,337	$ 7,632	$ -	$ 2,000	$ 1,350	$ 107,582	$ 21,516	$ 129,098
21	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
22	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
23	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
24	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
25	$ -	$ 10,337	$ 7,632	$ -	$ 2,000	$ 1,350	$ 21,319	$ 4,264	$ 25,583
26	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
27	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
28	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
29	$ -	$ -	$ -	$ 1,000	$ -	$ 1,350	$ 2,350	$ 470	$ 2,820
30	$ 86,263	$ 10,337	$ 7,632	$ -	$ 2,000	$ 1,350	$ 107,582	$ 21,516	$ 129,098

Notes:

1 For years 5, 10, 15, 20, 25 and 30, annual inspection cost is included in 5-year inspection cost.

2 A 20% contingency is included to address the potential for additional groundwater requirements, unplanned events and intrustive work reporting.

TABLE J9

OPERATION AND MAINTENANCE COST ESTIMATE - 30-YEAR ESTIMATE, NET PRESENT VALUE

ORO DE AMADOR

JACKSON, CALIFORNIA

Real Interest Rate[1], i 2.0%

Year	Estimated Cost	20% Contingency	Estimated Total	Discount Factor[2]	Present Value of Costs[3]
1	$ 2,350	$ 470	$ 2,820	0.9804	$ 2,764.71
2	$ 2,350	$ 470	$ 2,820	0.9612	$ 2,710.50
3	$ 2,350	$ 470	$ 2,820	0.9423	$ 2,657.35
4	$ 2,350	$ 470	$ 2,820	0.9238	$ 2,605.24
5	$ 21,319	$ 4,264	$ 25,583	0.9057	$ 23,171.13
6	$ 2,350	$ 470	$ 2,820	0.8880	$ 2,504.08
7	$ 2,350	$ 470	$ 2,820	0.8706	$ 2,454.98
8	$ 2,350	$ 470	$ 2,820	0.8535	$ 2,406.84
9	$ 2,350	$ 470	$ 2,820	0.8368	$ 2,359.65
10	$ 107,582	$ 21,516	$ 129,098	0.8203	$ 105,905.65
11	$ 2,350	$ 470	$ 2,820	0.8043	$ 2,268.02
12	$ 2,350	$ 470	$ 2,820	0.7885	$ 2,223.55
13	$ 2,350	$ 470	$ 2,820	0.7730	$ 2,179.95
14	$ 2,350	$ 470	$ 2,820	0.7579	$ 2,137.21
15	$ 21,319	$ 4,264	$ 25,583	0.7430	$ 19,008.40
16	$ 2,350	$ 470	$ 2,820	0.7284	$ 2,054.22
17	$ 2,350	$ 470	$ 2,820	0.7142	$ 2,013.94
18	$ 2,350	$ 470	$ 2,820	0.7002	$ 1,974.45
19	$ 2,350	$ 470	$ 2,820	0.6864	$ 1,935.73
20	$ 107,582	$ 21,516	$ 129,098	0.6730	$ 86,879.52
21	$ 2,350	$ 470	$ 2,820	0.6598	$ 1,860.57
22	$ 2,350	$ 470	$ 2,820	0.6468	$ 1,824.09
23	$ 2,350	$ 470	$ 2,820	0.6342	$ 1,788.32
24	$ 2,350	$ 470	$ 2,820	0.6217	$ 1,753.25
25	$ 21,319	$ 4,264	$ 25,583	0.6095	$ 15,593.51
26	$ 2,350	$ 470	$ 2,820	0.5976	$ 1,685.17
27	$ 2,350	$ 470	$ 2,820	0.5859	$ 1,652.13
28	$ 2,350	$ 470	$ 2,820	0.5744	$ 1,619.74
29	$ 2,350	$ 470	$ 2,820	0.5631	$ 1,587.98
30	$ 107,582	$ 21,516	$ 129,098	0.5521	$ 71,271.47
Total Estimated Net Present Value					**$ 372,851**

Notes:

1 Real Interest Rate published in OMB Circular No. A-94, Appendix C (February 2023).

2 Discount Factor = $1 / (1 + i)^t$ where i = interest rate and t = year.

3 Present Value of Costs = Discount Factor x Total Estimate

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE
DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: OPERATING ENGINEER (HEAVY AND HIGHWAY WORK) [#]

Determination:
NC-23-63-1-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 25, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Locality:
All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

AREA 1 - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba Counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties. (Portions of counties falling in each area detailed below)

Wages and total hourly rates (including employer payments) (Area 1):

Classification (Journeyperson) Classification Group [a]	Basic Hourly Rate	Hours[b]	Total Hourly Rate	Daily/Saturday Overtime Hourly Rate (1½ X) [c]	Sunday/Holiday Overtime Hourly Rate (2X)
Group 1	$55.92	8	$88.65	$116.61	$144.57
Group 2	$54.39	8	$87.12	$114.32	$141.51
Group 3	$52.91	8	$85.64	$112.10	$138.55
Group 4	$51.53	8	$84.26	$110.03	$135.79
Group 5	$50.26	8	$82.99	$108.12	$133.25
Group 6	$48.94	8	$81.67	$106.14	$130.61
Group 7	$47.80	8	$80.53	$104.43	$128.33
Group 8	$46.66	8	$79.39	$102.72	$126.05
Group 8-A	$44.45	8	$77.18	$99.41	$121.63
ALL CRANES & ATTACHMENTS: Group 1	$57.55	8	$90.28	$119.06	$147.83
Truck Crane Assistant to Engineer	$50.58	8	$83.31	$108.60	$133.89
Assistant to Engineer	$48.29	8	$81.02	$105.17	$129.31
Group 1-A	$56.80	8	$89.53	$117.93	$146.33
Truck Crane Assistant to Engineer	$49.83	8	$82.56	$107.48	$132.39
Assistant to Engineer	$47.54	8	$80.27	$104.04	$127.81
Group 2-A	$55.04	8	$87.77	$115.29	$142.81
Truck Crane Assistant to Engineer	$49.57	8	$82.30	$107.09	$131.87

Classification (Journeyperson) Classification Group [a]	Basic Hourly Rate	Hours[b]	Total Hourly Rate	Daily/Saturday Overtime Hourly Rate (1½ X) [c]	Sunday/Holiday Overtime Hourly Rate (2X)
Assistant to Engineer	$47.33	8	$80.06	$103.73	$127.39
Group 3-A	$53.30	8	$86.03	$112.68	$139.33
Truck Crane Assistant to Engineer	$49.33	8	$82.06	$106.73	$131.39
Hydraulic	$48.94	8	$81.67	$106.14	$130.61
Assistant to Engineer	$47.05	8	$79.78	$103.31	$126.83
Group 4-A	$50.26	8	$82.99	$108.12	$133.25

AREA 2 - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties. (Portions of counties falling in each area detailed below)

Wages and total hourly rates (including employer payments) (Area 2):

Classification (Journeyperson) Classification Group [a]	Basic Hourly Rate	Hours[b]	Total Hourly Rate	Daily/Saturday Overtime Hourly Rate (1½ X) [c]	Sunday/Holiday Overtime Hourly Rate (2X)
Group 1	$57.92	8	$90.65	$119.61	$148.57
Group 2	$56.39	8	$89.12	$117.32	$145.51
Group 3	$54.91	8	$87.64	$115.10	$142.55
Group 4	$53.53	8	$86.26	$113.03	$139.79
Group 5	$52.26	8	$84.99	$111.12	$137.25
Group 6	$50.94	8	$83.67	$109.14	$134.61
Group 7	$49.80	8	$82.53	$107.43	$132.33
Group 8	$48.66	8	$81.39	$105.72	$130.05
Group 8-A	$46.45	8	$79.18	$102.41	$125.63
ALL CRANES & ATTACHMENTS: Group 1	$59.55	8	$92.28	$122.06	$151.83
Truck Crane Assistant to Engineer	$52.58	8	$85.31	$111.60	$137.89
Assistant to Engineer	$50.29	8	$83.02	$108.17	$133.31
Group 1-A	$58.80	8	$91.53	$120.93	$150.33
Truck Crane Assistant to Engineer	$51.83	8	$84.56	$110.48	$136.39
Assistant to Engineer	$49.54	8	$82.27	$107.04	$131.81
Group 2-A	$57.04	8	$89.77	$118.29	$146.81
Truck Crane Assistant to Engineer	$51.57	8	$84.30	$110.09	$135.87
Assistant to Engineer	$49.33	8	$82.06	$106.73	$131.39
Group 3-A	$55.30	8	$88.03	$115.68	$143.33
Truck Crane Assistant to Engineer	$51.33	8	$84.06	$109.73	$135.39
Hydraulic	$50.94	8	$83.67	$109.14	$134.61
Assistant to Engineer	$49.05	8	$81.78	$106.31	$130.83
Group 4-A	$52.26	8	$84.99	$111.12	$137.25

Employer Payments:

Type of Fund	**Amount per Hour**
Health and Welfare	$13.38
Pension	$10.78
Vacation and Holiday[d]	$5.87
Training	$1.12
Other	$1.58

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE
DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: OPERATING ENGINEER (HEAVY AND HIGHWAY WORK) #
(SPECIAL SINGLE AND SECOND SHIFT)

Determination:
NC-23-63-1-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 25, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Locality:
All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

AREA 1 - Alameda, Butte, Contra Costa, Kings, Marin, Merced, Napa, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Yolo and Yuba Counties; and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties. (Portions of counties falling in each area detailed below)

Wages and total hourly rates (including employer payments) (Area 1):

Classification (Journeyperson) (Special Single and Second Shift) Classification Group [a]	Basic Hourly Rate	Hours	Total Hourly Rate	Daily/Saturday Overtime Hourly Rate (1 ½ X) [c]	Sunday/Holiday Overtime Hourly Rate (2X)
Group 1	$61.25	8	$93.98	$124.61	$155.23
Group 2	$59.52	8	$92.25	$122.01	$151.77
Group 3	$57.86	8	$90.59	$119.52	$148.45
Group 4	$56.30	8	$89.03	$117.18	$145.33
Group 5	$54.88	8	$87.61	$115.05	$142.49
Group 6	$53.38	8	$86.11	$112.80	$139.49
Group 7	$52.10	8	$84.83	$110.88	$136.93
Group 8	$50.83	8	$83.56	$108.98	$134.39
Group 8-A	$48.32	8	$81.05	$105.21	$129.37
ALL CRANES & ATTACHMENTS: Group 1	$62.98	8	$95.71	$127.20	$158.69
Truck Crane Assistant to Engineer	$55.15	8	$87.88	$115.46	$143.03
Assistant to Engineer	$52.56	8	$85.29	$111.57	$137.85
Group 1-A	$62.23	8	$94.96	$126.08	$157.19

Classification (Journeyperson) (Special Single and Second Shift) Classification Group [a]	Basic Hourly Rate	Hours	Total Hourly Rate	Daily/Saturday Overtime Hourly Rate (1 ½ X) [c]	Sunday/Holiday Overtime Hourly Rate (2X)
Truck Crane Assistant to Engineer	$54.40	8	$87.13	$114.33	$141.53
Assistant to Engineer	$51.81	8	$84.54	$110.45	$136.35
Group 2-A	$60.24	8	$92.97	$123.09	$153.21
Truck Crane Assistant to Engineer	$54.11	8	$86.84	$113.90	$140.95
Assistant to Engineer	$51.58	8	$84.31	$110.10	$135.89
Group 3-A	$58.28	8	$91.01	$120.15	$149.29
Truck Crane Assistant to Engineer	$53.84	8	$86.57	$113.49	$140.41
Hydraulic	$53.38	8	$86.11	$112.80	$139.49
Assistant to Engineer	$51.27	8	$84.00	$109.64	$135.27
Group 4-A	$54.88	8	$87.61	$115.05	$142.49

AREA 2 - Modoc, and portions of Alpine, Amador, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Lake, Lassen, Madera, Mariposa, Mendocino, Monterey, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Tulare, Tuolumne and Trinity Counties. (Portions of counties falling in each area detailed below)

Wages and total hourly rates (including employer payments) (Area 2):

Classification (Journeyperson) (Special Single and Second Shift) Classification Group [a]	Basic Hourly Rate	Hours	Total Hourly Rate	Daily/Saturday Overtime Hourly Rate (1½ X) [c]	Sunday/Holiday Overtime Hourly Rate (2X)
Group 1	$63.25	8	$95.98	$127.61	$159.23
Group 2	$61.52	8	$94.25	$125.01	$155.77
Group 3	$59.86	8	$92.59	$122.52	$152.45
Group 4	$58.30	8	$91.03	$120.18	$149.33
Group 5	$56.88	8	$89.61	$118.05	$146.49
Group 6	$55.38	8	$88.11	$115.80	$143.49
Group 7	$54.10	8	$86.83	$113.88	$140.93
Group 8	$52.83	8	$85.56	$111.98	$138.39
Group 8-A	$50.32	8	$83.05	$108.21	$133.37
ALL CRANES & ATTACHMENTS: Group 1	$64.98	8	$97.71	$130.20	$162.69
Truck Crane Assistant to Engineer	$57.15	8	$89.88	$118.46	$147.03
Assistant to Engineer	$54.56	8	$87.29	$114.57	$141.85
Group 1-A	$64.23	8	$96.96	$129.08	$161.19
Truck Crane Assistant to Engineer	$56.40	8	$89.13	$117.33	$145.53
Assistant to Engineer	$53.81	8	$86.54	$113.45	$140.35
Group 2-A	$62.24	8	$94.97	$126.09	$157.21
Truck Crane Assistant to Engineer	$56.11	8	$88.84	$116.90	$144.95
Assistant to Engineer	$53.58	8	$86.31	$113.10	$139.89
Group 3-A	$60.28	8	$93.01	$123.15	$153.29
Truck Crane Assistant to Engineer	$55.84	8	$88.57	$116.49	$144.41
Hydraulic	$55.38	8	$88.11	$115.80	$143.49
Assistant to Engineer	$53.27	8	$86.00	$112.64	$139.27
Group 4-A	$56.88	8	$89.61	$118.05	$146.49

Employer Payments:

Type of Fund	Amount per Hour
Health and Welfare	$13.38
Pension	$10.78
Vacation and Holiday[d]	$5.87
Training	$1.12
Other	$1.58

CLASSIFICATIONS

GROUP 1

Drill Equipment, over 200,000 lbs
Operator of Helicopter (when used in erection work)
Hydraulic Excavator 7 cu yds and over
Power Shovels, over 7 cu yds

GROUP 2

Highline Cableway
Hydraulic Excavator 3 1/2 cu yds up to 7 cu yds
Licensed Construction Work Boat Operator, On Site
Microtunneling Machine
Power Blade Operator (finish)
Power Shovels, (over 1 cu yd and up to and including 7 cu yds m.r.c.)

GROUP 3

Asphalt Milling Machine
Cable Backhoe
Combination Backhoe and Loader over ¾ cu yds
Continuous Flight Tie Back Machine
Crane Mounted Continuous Flight Tie Back Machine, tonnage to apply
Crane Mounted Drill Attachments, Tonnage to apply
Dozer, Slope Board
Drill Equipment, over 100,000 lbs up to and including 200,000 lbs
Gradall
Hydraulic Excavator up to 3 1/2 cu yds
Loader 4 cu yds and over
Long Reach Excavator
Multiple Engine Scrapers (when used as push pull)
Power Shovels, up to and including 1 cu yd
Pre-Stress Wire Wrapping machine
Side Boom Cat, 572 or larger
Track Loader 4 cu yds and over
Wheel Excavator (up to and including 750 cu yds per hour)

GROUP 4

Asphalt Plant Engineer/Boxman
Chicago Boom
Combination Backhoe and Loader up to and including ¾ cu yds
Concrete Batch Plants (wet or dry)
Dozer and/or Push Cat
Drill Equipment, over 50,000 lbs up to and including 100,000 lbs
Pull-Type Elevating Loader
Gradesetter, Grade Checker (GPS, mechanical or otherwise)
Grooving and Grinding Machine
Heading Shield Operator
Heavy Duty Drilling Equipment, Hughes, LDH, Watson 3000 or similar
Heavy Duty Repairman and/or Welder
Lime Spreader
Loader under 4 cu yds
Lubrication and Service Engineer (mobile and grease rack)
Mechanical Finishers or Spreader Machine (asphalt, Barber-Greene and similar)
Miller Formless M-9000 Slope Paver or similar
Portable Crushing and Screening plants
Power Blade Support
Roller Operator, Asphalt
Rubber-Tired Scraper, Self-Loading (paddle-wheels, etc)
Rubber-Tired Earthmoving Equipment (Scrapers)
Slip Form Paver (concrete)
Small Tractor with Drag
Soil Stabilizer (P&H or equal)
Spider Plow and Spider Puller
Timber Skidder
Track Loader up to 4 yards
Tractor Drawn Scraper
Tractor, Compressor Drill Combination
Tubex Pile Rig
Unlicensed Construction Work Boat Operator, On Site
Welder
Woods-Mixer (and other similar Pugmill equipment)

GROUP 5

Cast-In Place Pipe Laying Machine
Combination Slusher and Motor Operator
Concrete Conveyor or Concrete Pump, Truck or Equipment Mounted
Concrete Conveyor, Building Site
Concrete Pump or Pumpcrete Guns

Drilling Equipment, Watson 2000, Texoma 700 or similar
Drilling and Boring Machinery, Horizontal (not to apply to waterlines, wagon drills or jackhammers)
Concrete Mixers/all
Man and/or Material Hoist
Mechanical Finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types)
Mechanical Burm, Curb and/or Curb and Gutter Machine, Concrete or Asphalt
Mine or Shaft Hoist
Portable Crushers
Power Jumbo Operator (setting slip-forms, etc., in tunnels)
Screedman (automatic or manual)
Self Propelled Compactor with Dozer
Tractor with boom, D6 or smaller
Trenching Machine, maximum digging capacity over 5 ft. depth
Vermeer T-600B Rock Cutter or similar

GROUP 6

Armor-Coater (or similar)
Ballast Jack Tamper
Boom-Type Backfilling Machine
Asst. Plant Engineer
Bridge and/or Gantry Crane
Chemical Grouting Machine, truck mounted
Chip Spreading Machine Operator
Concrete Barrier Moving Machine
Concrete Saws (self-propelled unit on streets, highways, airports, and canals)
Deck Engineer
Drill Doctor
Drill Equipment, over 25,000 lbs up to and including 50,000 lbs
Drilling Equipment Texoma 600, Hughes 200 series or similar up to and including 30 ft. m.r.c.
Helicopter Radioman
Hydro-Hammer or similar
Line Master
Skidsteer Loader, Bobcat larger than 743 series or similar (with attachments)
Locomotive
Rotating Extendable Forklift, Lull Hi-Lift or similar
Assistant to Engineer, Truck Mounted Equipment
Pavement Breaker, Truck Mounted, with compressor combination
Paving Fabric Installation and/or Laying Machine
Pipe Bending Machine (pipelines only)
Pipe Wrapping Machine (Tractor propelled and supported)
Screedman, (except asphaltic concrete paving)
Self-Loading Chipper
Self Propelled Pipeline Wrapping Machine
Tractor

GROUP 7

Ballast Regulator
Cary Lift or similar
Combination Slurry Mixer and/or Cleaner
Coolant/Slurry Tanker Operator (hooked to Grooving/Grinding Machine)
Drilling Equipment, 20 ft and under m.r.c.
Drill Equipment, over 1,000 lbs up to and including 25,000 lbs
Fireman Hot Plant
Grouting Machine Operator
Highline Cableway Signalman
Stationary Belt Loader (Kolman or similar)
Lift Slab Machine (Vagtborg and similar types)
Maginnes Internal Full Slab Vibrator
Material Hoist (1 Drum)
Mechanical Trench Shield
Partsman (heavy duty repair shop parts room)
Pavement Breaker with or without Compressor Combination
Pipe Cleaning Machine (tractor propelled and supported)
Post Driver
Roller (except Asphalt), Chip Seal
Self Propelled Automatically Applied Concrete Curing Machine (on streets, highways, airports and canals)
Self Propelled Compactor (without dozer)
Signalman
Slip-Form Pumps (lifting device for concrete forms)
Super Sucker Vacuum Truck
Tie Spacer
Trenching Machine (maximum digging capacity up to and including 5 ft depth)
Truck Type Loader

GROUP 8

Bit Sharpener
Boiler Tender
Box Operator
Brakeman
Combination Mixer and Compressor (shotcrete/gunite)
Compressor Operator
Deckhand
Fireman
Generators
Gunite/Shotcrete Equipment Operator
Heavy Duty Repairman Helper
Hydraulic Monitor
Ken Seal Machine (or similar)

Mast Type Forklift
Mixermobile
Assistant to Engineer
Pump Operator
Refrigerator Plant
Reservoir-Debris Tug (Self-Propelled Floating)
Ross Carrier (Construction site)
Rotomist Operator
Self Propelled Tape Machine
Shuttlecar
Self Propelled Power Sweeper Operator (Includes Vacuum Sweeper)
Slusher Operator
Surface Heater
Switchman
Tar Pot Fireman
Tugger Hoist, Single Drum
Vacuum Cooling Plant
Welding Machine (powered other than by electricity)

GROUP 8-A
Articulated Dump Truck Operator
Elevator Operator
Mini Excavator under 25 H.P. (Backhoe-Trencher)
Skidsteer Loader, Bobcat 743 series or Smaller and similar (without attachments)

ALL CRANES AND ATTACHMENTS:
GROUP 1
Cranes over 350 tons
Derrick over 250 tons
Self Propelled Boom Type Lifting Device over 250 tons

GROUP 1-A
Clamshells and Draglines over 7 cu yds
Cranes over 100 tons
Derrick, over 100 tons
Derrick Barge Pedestal mounted over 100 tons
Self Propelled Boom Type Lifting Device Over 100 tons
Tower Cranes

GROUP 2-A
Clamshells and Draglines over 1 cu yds up to and including 7 cu yds
Cranes over 45 tons up to and including 100 tons
Derrick Barge 100 tons and under
Mobile Self-Erecting Tower Crane (Potain) over 3 stories
Self Propelled Boom Type Lifting Device over 45 tons

GROUP 3-A
Clamshells and Draglines up to and including 1 cu yd
Cranes 45 tons and under
Mobile Self-Erecting Tower Crane (Potain), 3 stories and under
Self Propelled Boom Type Lifting Device 45 tons and under

GROUP 4-A
Boom Truck or dual-purpose A-Frame Truck, Non-Rotating over 15 tons.
Truck Mounted Rotating Telescopic Boom Type Lifting Device, Manitex or similar (Boom Truck -over 15 tons)
Truck-Mounted Rotating Telescopic Boom Type Lifting Device, Manitex or Similar (Boom Truck), under 15 tons

DESCRIPTIONS FOR AREAS 1 AND 2:

Area 1 is all of Northern California within the following Township, State and/or county Boundaries:

Commencing in the Pacific Ocean on the extension of the Southerly line of Township 19S, of the Mount Diablo Base and Meridian,
Thence Easterly along the Southerly line of Township 19S, to the Northwest corner of Township 20S, Range 6E,
Thence Southerly to the Southwest corner of Township 20S, Range 6E,
Thence Easterly to the Northwest corner of Township 21S, Range 7E
Thence Southerly to the Southwest corner of Township 21S, Range 7E
Thence Easterly to the Northwest corner of Township 22S, Range 9E,
Thence Southerly to the Southwest corner of Township 22S, Range 9E,
Thence Easterly to the Northwest corner of Township 23S, Range 10E,
Thence Southerly to the Southwest corner of Township 24S, Range 10E,
Thence Easterly to the Southwest corner of Township 24S, Range 31E,
Thence Northerly to the Northeast corner of Township 20S, Range 31E,
Thence Westerly to the Southeast corner of Township 19S, Range 29E,

Thence Northerly to the Northeast corner of Township 17S, Range 29E,
Thence Westerly to the Southeast corner of Township 16S, Range 28E,
Thence Northerly to the Northeast corner of Township 13S, Range 28E,
Thence Westerly to the Southeast corner of Township 12S, Range 27E,
Thence Northerly to the Northeast corner of Township 12S, Range 27E,
Thence Westerly to the Southeast corner of Township 11S, Range 26E,
Thence Northerly to the Northeast corner of Township 11S, Range 26E,
Thence Westerly to the Southeast corner of Township 10S, Range 25E,
Thence Northerly to the Northeast corner of Township 9S, Range 25E,
Thence Westerly to the Southeast corner of Township 8S, Range 24E,
Thence Northerly to the Northeast corner of Township 8S, Range 24E,
Thence Westerly to the Southeast corner of Township 7S, Range 23E,
Thence Northerly to the Northeast corner of Township 6S, Range 23E,
Thence Westerly to the Southeast corner of Township 5S, Range 20E,
Thence Northerly to the Northeast corner of Township 5S, Range 20E,
Thence Westerly to the Southeast corner of Township 4S, Range 19E,
Thence Northerly to the Northeast corner of Township 1S, Range 19E,
Thence Westerly to the Southeast corner of Township 1N, Range 18E,
Thence Northerly to the Northeast corner of Township 3N, Range 18E,
Thence Westerly to the Southeast corner of Township 4N, Range 17E,
Thence Northerly to the Northeast corner of Township 4N, Range 17E,
Thence Westerly to the Southeast corner of Township 5N, Range 15E,
Thence Northerly to the Northeast corner of Township 5N, Range 15E,
Thence Westerly to the Southeast corner of Township 6N, Range 14E,
Thence Northerly to the Northeast corner of Township 10N, Range 14E,
Thence Easterly along the Southern line of Township 11N, to the California/Nevada State Border,
Thence Northerly along the California/Nevada State Border to the Northerly line of Township 17N,
Thence Westerly to the Southeast corner of Township 18N, Range 10E,
Thence Northerly to the Northeast corner of Township 20N, Range 10E,
Thence Westerly to the Southeast corner of Township 21N, Range 9E,
Thence Northerly to the Northeast corner of Township 21N, Range 9E,
Thence Westerly to the Southeast corner of Township 22N, Range 8E,
Thence Northerly to the Northeast corner of Township 22N, Range 8E,
Thence Westerly to the Northwest corner of Township 22N, Range 8E,
Thence Northerly to the Southwest corner of Township 27N, Range 8E,
Thence Easterly to the Southeast corner of Township 27N, Range 8E,
Thence Northerly to the Northeast corner of Township 28N, Range 8E,
Thence Westerly to the Southeast corner of Township 29N, Range 6E,
Thence Northerly to the Northeast corner of Township 32N, Range 6E,
Thence Westerly to the Northwest corner of Township 32N, Range 6E,
Thence Northerly to the Northeast corner of Township 35N, Range 5E,
Thence Westerly to the Southeast corner of Township 36N, Range 3E,
Thence Northerly to the Northeast corner of township 36N, Range 3E,
Thence Westerly to the Southeast corner of Township 37N, Range 1W,
Thence Northerly to the Northeast corner of Township 38N, Range 1W,
Thence Westerly to the Southeast corner of Township 39N, Range 2W,
Thence Northerly to the Northeast corner of Township 40N, Range 2W,
Thence Westerly to the Southeast corner of Township 41N, Range 4W,
Thence Northerly to the Northeast corner of Township 42N, Range 4W,
Thence Westerly to the Southeast corner of Township 43N, Range 5W,
Thence Northerly to the California/Oregon State Border,
Thence Westerly along the California/Oregon State Border to the Westerly Boundary of Township Range 8W,

Thence Southerly to the Southwest corner of Township 43N, Range 8W,
Thence Easterly to the Southeast corner of Township 43N, Range 8W,
Thence Southerly to the Southwest corner of Township 42N, Range 7W,
Thence Easterly to the Southeast corner of Township 42N, Range 7W,
Thence Southerly to the Southwest corner of Township 41N, Range 6W,
Thence Easterly to the Northwest corner of Township 40N, Range 5W,
Thence Southerly to the Southwest corner of Township 38N, Range 5W,
Thence Westerly to the Northwest corner of Township 37N, Range 6W,
Thence Southerly to the Southwest corner of Township 35N, Range 6W,
Thence Westerly to the Northwest corner of Township 34N, Range 10W,
Thence Southerly to the Southwest corner of Township 31N, Range 10W,
Thence Easterly to the Northwest corner of Township 30N, Range 9W,
Thence Southerly to the Southwest corner of Township 30N, Range 9W,
Thence Easterly to the Northwest corner of Township 29N, Range 8W,
Thence Southerly to the Southwest corner of Township 23N, Range 8W,
Thence Easterly to the Northwest corner of Township 22N, Range 6W,
Thence Southerly to the Southwest corner of Township 16N, Range 6W,
Thence Westerly to the Southeast corner of Township 16N, Range 9W,
Thence Northerly to the Northeast corner of Township 16N, Range 9W,
Thence Westerly to the Southeast corner of Township 17N, Range 12W,
Thence Northerly to the Northeast corner of Township 18N, Range 12W,
Thence Westerly to the Northwest corner of Township 18N, Range 15W,
Thence Southerly to the Southwest corner of Township 14N, Range 15W,
Thence Easterly to the Northwest corner of Township 13N, Range 14W,
Thence Southerly to the Southwest corner of Township 13N, Range 14W,
Thence Easterly to the Northwest corner of Township 12N, Range 13W,
Thence Southerly to the Southwest corner of Township 12N, Range 13W,
Thence Easterly to the Northwest corner of Township 11N, Range 12W,
Thence Southerly into the Pacific Ocean and Commencing in the Pacific Ocean on the extension of the Humboldt Base Line,
Thence Easterly to the Northwest corner of Township 1S, Range 2E,
Thence Southerly to the Southwest corner of Township 2S, Range 2E,
Thence Easterly to the Northwest corner of Township 3S, Range 3E,
Thence Southerly to the Southwest corner of Township 5S, Range 3E,
Thence Easterly to the Southeast corner of Township 5S, Range 4E,
Thence Northerly to the Northeast corner of Township 4S, Range 4E,
Thence Westerly to the Southeast corner of Township 3S, Range 3E,
Thence Northerly to the Northeast corner of Township 5N, Range 3E,
Thence Easterly to the Southeast corner of Township 6N, Range 5E,
Thence Northerly to the Northeast corner of Township 7N, Range 5E,
Thence Westerly to the Southeast corner of Township 8N, Range 3E,
Thence Northerly to the Northeast corner of Township 9N, Range 3E,
Thence Westerly to the Southeast corner of Township 10N, Range 1E,
Thence Northerly to the Northeast corner of Township 13N, Range 1E,
Thence Westerly into the Pacific Ocean, excluding that portion of Northern California contained within the following lines:
Commencing at the Southwest corner of Township 12N, Range 11E, of the Mount Diablo Base and Meridian,
Thence Easterly to the Southeast corner of Township 12N, Range 16E,
Thence Northerly to the Northeast corner of Township 12N, Range 16E,
Thence Westerly to the Southeast corner of Township 13N, Range 15E,
Thence Northerly to the Northeast corner of Township 13N, Range 15E,
Thence Westerly to the Southeast corner of Township 14N, Range 14E,

Thence Northerly to the Northeast corner of Township 16N, Range 14E,
Thence Westerly to the Northwest corner of Township 16N, Range 12E,
Thence Southerly to the Southwest corner of Township 16N, Range 12E,
Thence Westerly to the Northwest corner of Township 15N, Range 11E,
Thence Southerly to the point of beginning at the Southwest corner of Township 12N, Range 11E,
Area 2 shall be all areas not part of Area 1 described above.

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).
[a] For classifications within each group, see Pages 5 – 7.
[b] When three shifts are employed for five (5) or more consecutive days, seven and one-half (7½) consecutive hours (exclusive of meal period), shall constitute a day of work, for which eight (8) times the straight time hourly rate shall be paid at the non-shift wage rate for the second shift. The third shift shall be seven (7) hours of work for eight (8) hours of pay at the non-shift wage rate.
[c] Saturday in the same work week may be worked at straight-time if a job is shut down during the normal work week due to inclement weather.
[d] Includes an amount for supplemental dues.

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE
DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: LABORER AND RELATED CLASSIFICATIONS[#]

Determination:
NC-23-102-1-2023-1

Issue Date:
February 22, 2023

Expiration date of determination:
June 25, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Marin, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

AREA 1 - Alameda, Contra Costa, Marin, San Francisco, San Mateo, And Santa Clara Counties.

AREA 2 - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo And Yuba Counties.

WAGE RATES AND TOTAL HOURLY RATES (AREA 1):

Classification[a] (Journeyperson)	Basic Hourly Rate[b]	Hours[c]	Total Hourly Rate	Daily/ Saturday Overtime Hourly Rate[d]	Sunday/ Holiday Overtime Hourly Rate
Construction Specialist	$35.95	8	$63.26	$81.24	$99.21
Group 1; Group 1(B)[e]	$35.25	8	$62.56	$80.19	$97.81
Group 1 (A)	$35.47	8	$62.78	$80.52	$98.25
Group 1 (C)	$35.30	8	$62.61	$80.26	$97.91
Group 1 (E)	$35.80	8	$63.11	$81.01	$98.91
Group 1 (G)	$35.45	8	$62.76	$80.49	$98.21
Group 2	$35.10	8	$62.41	$79.96	$97.51
Group 3; Group 3 (A)	$35.00	8	$62.31	$79.81	$97.31
Group 4; Group 6 (B)	$28.69	8	$56.00	$70.35	$84.69
Group 6	$36.21	8	$63.52	$81.63	$99.73
Group 6 (A)	$35.71	8	$63.02	$80.88	$98.73
Group 6 (C)	$35.12	8	$62.43	$79.99	$97.55
Group 6 (D)	$35.83	8	$63.14	$81.06	$98.97
Group 6 (E)	$34.85	8	$62.16	$79.59	$97.01
Group 7 – Stage 1 (1st 6 months)	$24.50	8	$51.81	$64.06	$76.31
Group 7 – Stage 2 (2nd 6 months)	$28.00	8	$55.31	$69.31	$83.31
Group 7 – Stage 3 (3rd 6 months)	$31.50	8	$58.81	$74.56	$90.31

WAGE RATES AND TOTAL HOURLY RATES (AREA 2):

Classification (Journeyperson)	Basic Hourly Rate[b]	Hours[c]	Total Hourly Rate	Daily/ Saturday Overtime Hourly Rate[d]	Sunday/ Holiday Overtime Hourly Rate
Construction Specialist	$34.95	8	$62.26	$79.74	$97.21
Group 1; Group 1(B)[e]	$34.25	8	$61.56	$78.69	$95.81
Group 1 (A)	$34.47	8	$61.78	$79.02	$96.25
Group 1 (C)	$34.30	8	$61.61	$78.76	$95.91
Group 1 (E)	$34.80	8	$62.11	$79.51	$96.91
Group 2	$34.10	8	$61.41	$78.46	$95.51
Group 3; Group 3 (A)	$34.00	8	$61.31	$78.31	$95.31
Group 4; Group 6 (B)	$27.69	8	$55.00	$68.85	$82.69
Group 6	$35.21	8	$62.52	$80.13	$97.73
Group 6 (A)	$34.71	8	$62.02	$79.38	$96.73
Group 6 (C)	$34.12	8	$61.43	$78.49	$95.55
Group 6 (D)	$34.83	8	$62.14	$79.56	$96.97
Group 6 (E)	$33.85	8	$61.16	$78.09	$95.01
Group 7 – Stage 1 (1st 6 months)	$23.80	8	$51.11	$63.01	$74.91
Group 7 – Stage 2 (2nd 6 months)	$27.20	8	$54.51	$68.11	$81.71
Group 7 – Stage 3 (3rd 6 months)	$30.60	8	$57.91	$73.21	$88.51

EMPLOYER PAYMENTS:

Type of Fund	Amount per Hour Worked
Health & Welfare	$9.60
Pension	$13.86
Vacation and Holiday	$3.05
Training	$0.50
Other	$0.30

GENERAL PREVAILING WAGE DETERMINATION MADE BY THE
DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE
PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1
FOR COMMERCIAL BUILDING, HIGHWAY, HEAVY CONSTRUCTION AND DREDGING PROJECTS

Craft: LABORER AND RELATED CLASSIFICATIONS (Special Single and Second Shift)[#]

Determination:
NC-23-102-1-2023-1A

Issue Date:
February 22, 2023

Expiration date of determination:
June 25, 2023** The rate to be paid for work performed after this date has been determined. If work will extend past this date, the new rate must be paid and should be incorporated in contracts entered into now. Contact the Office of the Director - Research Unit for specific rates at (415) 703-4774.

Localities:
All localities within Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Marin, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, and Yuba Counties.

AREA 1 - Alameda, Contra Costa, Marin, San Francisco, San Mateo, And Santa Clara Counties.

AREA 2 - Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Lassen, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo And Yuba Counties.

WAGE RATES AND TOTAL HOURLY RATES (AREA 1):

Classification[a] (Journeyperson)	Basic Hourly Rate[b]	Hours	Total Hourly Rate	Daily/ Saturday Overtime Hourly Rate[d]	Sunday/ Holiday Overtime Hourly Rate
Construction Specialist	$38.95	8	$66.26	$85.74	$105.21
Group 1; Group 1(B)[e]	$38.25	8	$65.56	$84.69	$103.81
Group 1 (A)	$38.47	8	$65.78	$85.02	$104.25
Group 1 (C)	$38.30	8	$65.61	$84.76	$103.91
Group 1 (E)	$38.80	8	$66.11	$85.51	$104.91
Group 1 (G)	$38.45	8	$65.76	$84.99	$104.21
Group 2	$38.10	8	$65.41	$84.46	$103.51
Group 3; Group 3 (A)	$38.00	8	$65.31	$84.31	$103.31
Group 4; Group 6 (B)	$31.69	8	$59.00	$74.85	$90.69
Group 6	$39.21	8	$66.52	$86.13	$105.73
Group 6 (A)	$38.71	8	$66.02	$85.38	$104.73
Group 6 (C)	$38.12	8	$65.43	$84.49	$103.55
Group 6 (D)	$38.83	8	$66.14	$85.56	$104.97
Group 6 (E)	$37.85	8	$65.16	$84.09	$103.01
Group 7 – Stage 1 (1st 6 months)	$27.50	8	$54.81	$68.56	$82.31
Group 7 – Stage 2 (2nd 6 months)	$31.00	8	$58.31	$73.81	$89.31
Group 7 – Stage 3 (3rd 6 months)	$34.50	8	$61.81	$79.06	$96.31

WAGE RATES AND TOTAL HOURLY RATES (AREA 2):

Classification[a] (Journeyperson) Group	Basic Hourly Rate[b]	Hours	Total Hourly Rate	Daily/ Saturday Overtime Hourly Rate[d]	Sunday/ Holiday Overtime Hourly Rate
Construction Specialist	$37.95	8	$65.26	$84.24	$103.21
Group 1; Group 1(B)[e]	$37.25	8	$64.56	$83.19	$101.81
Group 1 (A)	$37.47	8	$64.78	$83.52	$102.25
Group 1 (C)	$37.30	8	$64.61	$83.26	$101.91
Group 1 (E)	$37.80	8	$65.11	$84.01	$102.91
Group 2	$37.10	8	$64.41	$82.96	$101.51
Group 3; Group 3 (A)	$37.00	8	$64.31	$82.81	$101.31
Group 4; Group 6 (B)	$30.69	8	$58.00	$73.35	$88.69
Group 6	$38.21	8	$65.52	$84.63	$103.73
Group 6 (A)	$37.71	8	$65.02	$83.88	$102.73
Group 6 (C)	$37.12	8	$64.43	$82.99	$101.55
Group 6 (D)	$37.83	8	$65.14	$84.06	$102.97
Group 6 (E)	$36.85	8	$64.16	$82.59	$101.01
Group 7 – Stage 1 (1st 6 months)	$26.80	8	$54.11	$67.51	$80.91
Group 7 – Stage 2 (2nd 6 months)	$30.20	8	$57.51	$72.61	$87.71
Group 7 – Stage 3 (3rd 6 months)	$33.60	8	$60.91	$77.71	$94.51

EMPLOYER PAYMENTS:

Type of Fund	Amount per Hour Worked
Health & Welfare	$9.60
Pension	$13.86
Vacation and Holiday	$3.05
Training	$0.50
Other	$0.30

CLASSIFICATIONS

Construction Specialist

ASPHALT IRONERS AND RAKERS
CHAINSAW
CONCRETE DIAMOND CHAINSAW
LASER BEAM IN CONNECTION WITH LABORER'S WORK
MASONRY AND PLASTER TENDER
MECHANICAL PIPE LAYER-ALL TYPES REGARDLESS OF TYPE OR METHOD OF POWER
CAST IN PLACE MANHOLE FORM SETTERS
PRESSURE PIPELAYERS
DAVIS TRENCHER – 300 OR SIMILAR TYPE (AND ALL SMALL TRENCHERS)
STATE LICENSED BLASTERS AS DESIGNATED
DIAMOND DRILLERS
DIAMOND CORE DRILLER
MULTIPLE UNIT DRILLS
HIGH SCALERS (INCLUDING DRILLING OF SAME)
HYDRAULIC DRILLS
CERTIFIED WELDER

GROUP 1 (FOR CONTRA COSTA COUNTY ONLY, USE GROUP 1 (G) FOR SOME OF THE FOLLOWING CLASSIFICATIONS)
ASPHALT SPREADER BOXES (ALL TYPES)
BARKO, WACKER AND SIMILAR TYPE TAMPERS
BIOHAZARD CLEANUP WORKER
BUGGYMOBILE
CAULKERS, BANDERS, PIPEWRAPPERS, CONDUIT LAYERS, PLASTIC PIPE LAYERS
CERTIFIED ASBESTOS AND MOLD REMOVAL WORKER
CERTIFIED HAZARDOUS WASTE WORKER (INCLUDING LEAD ABATEMENT)
COMPACTORS OF ALL TYPES
CONCRETE AND MAGNESITE MIXER AND ½ YARD
CONCRETE PAN WORK
CONCRETE SANDERS, CONCRETE SAW
CRIBBERS AND/OR SHORING
CUT GRANITE CURB SETTER
DRI PAK-IT MACHINE
FALLER, LOGLOADER AND BUCKER
FORM RAISERS, SLIP FORMS
GREEN CUTTERS
HEADERBOARD MEN, HUBSETTERS, ALIGNERS BY ANY METHOD
HIGH PRESSURE BLOW PIPE (1-1/2" OR OVER, 100 LBS. PRESSURE/OVER)
HYDRO SEEDER AND SIMILAR TYPE
JACKHAMMER OPERATORS
JACKING OF PIPE OVER 12 INCHES
JACKSON AND SIMILAR TYPE COMPACTORS
KETTLEMEN, POTMEN, AND MEN APPLYING ASPHALT, LAY KOLD, CREOSOTE, LIME, CAUSTIC AND SIMILAR TYPE MATERIALS (APPLYING MEANS APPLYING DIPPING, OR HANDLING OF SUCH MATERIALS)
LAGGING, SHEETING, WHALING, BRACING, TRENCH-JACKING, LAGGING HAMMER
MAGNESITE, EPOXY RESIN, FIBER GLASS AND MASTIC WORKERS (WET/DRY)
NO JOINT PIPE AND STRIPPING OF SAME, INCLUDING REPAIR OF VOIDS
PAVEMENT BREAKERS AND SPADERS, INCLUDING TOOL GRINDER
PERMA CURBS
PRECAST-MANHOLE SETTERS
PIPELAYERS (INCLUDING GRADE CHECKING IN CONNECTION WITH PIPELAYING)
PRESSURE PIPE TESTER
POST HOLE DIGGERS-AIR, GAS, AND ELECTRIC POWER BROOM SWEEPERS
POWER TAMPERS OF ALL TYPES, EXCEPT AS SHOWN IN GROUP 2
RAM SET GUN AND STUD GUN
RIPRAP-STONEPAVER AND ROCK-SLINGER, INCLUDING PLACING OF SACKED CONCRETE AND/OR SAND (WET OR DRY) AND GABIONS AND SIMILAR TYPE
ROTARY SCARIFIER OR MULTIPLE HEAD CONCRETE CHIPPING SCARIFIER
ROTO AND DITCH WITCH
ROTOTILLER
SAND BLASTERS, POTMEN, GUNMEN, AND NOZZLEMEN
SIGNALING AND RIGGING
SKILLED WRECKER (REMOVING AND SALVAGING OF SASH, WINDOWS, DOORS, PLUMBING AND ELECTRIC FIXTURES)
TANK CLEANERS
TREE CLIMBERS
TRENCHLESS TECHNOLOGY LABORER- PIPE INSTALLATION, BURSTING, RELINING, OR SIMILAR
TRENCHLESS LABORER'S WORK, CAMERA CONTROLLER, CCTV
TURBO BLASTER
VIBRA-SCREED-BULL FLOAT IN CONNECTION

WITH LABORER'S WORK
VIBRATORS

GROUP 1 (A)
ALL WORK OF LOADING, PLACING AND BLASTING OF ALL POWDER & EXPLOSIVES OF WHATEVER TYPE, REGARDLESS OF METHOD USED FOR LOADING AND PLACING
JOY DRILL MODEL TWM-2A
GARDENER-DENVER MODEL DH 143 AND SIMILAR TYPE DRILLS
TRACK DRILLERS
JACK LEG DRILLERS
WAGON DRILLERS
MECHANICAL DRILLERS-ALL TYPES REGARDLESS OF TYPE OR METHOD OF POWER
BLASTERS AND POWDERMAN
TREE TOPPER
BIT GRINDER

GROUP 1 (B) -- SEE GROUP 1 RATES
SEWER CLEANERS (ANY WORKMEN WHO HANDLE OR COME IN CONTACT WITH RAW SEWAGE IN SMALL DIAMETER SEWERS) SHALL RECEIVE $4.00 PER DAY ABOV GROUP 1 WAGE RATES. THOSE WHO WORK INSIDE RECENTLY ACTIVE, LARGE DIAMETER SEWERS, AND ALL RECENTLY ACTIVE SEWER MANHOLES SHALL RECEIVE $5.00 PER DAY ABOVE GROUP 1 WAGE RATES.

GROUP 1 (C)
BURNING AND WELDING IN CONNECTION WITH LABORER'S WORK
SYNTHETIC THERMOPLASTICS AND SIMILAR TYPE WELDING

GROUP 1 (D)
SEE FOOTNOTE A ON PAGE 8

GROUP 1 (E)
WORK ON AND/OR IN BELL HOLE FOOTINGS AND SHAFTS THEREOF, AND WORK ON AND IN DEEP FOOTINGS (DEEP FOOTINGS IS A HOLE 15 FEET OR MORE IN DEPTH)
SHAFT IS AN EXCAVATION OVER FIFTEEN (15) FEET DEEP OF ANY TYPE

GROUP 1 (G) APPLIES ONLY TO WORK IN CONTRA COSTA COUNTY
PIPELAYERS (INCLUDING GRADE CHECKING IN CONNECTION WITH PIPELAYING), CAULKERS, BANDERS, PIPEWRAPPERS, CONDUIT LAYERS, PLASTIC PIPE LAYER, PRESSURE PIPE TESTER, NO JOINT PIPE AND STRIPPING OF SAME, INCLUDING REPAIR OF VOIDS, PRECAST MANHOLE SETTERS, CAST IN PLACE MANHOLE FORM SETTERS IN CONTRA COSTA COUNTY ONLY

GROUP 1(H)
SEE FOOTNOTE A ON PAGE 8

GROUP 2
ASPHALT SHOVELERS
CEMENT DUMPERS AND HANDLING DRY CEMENT OR GYPSUM
CHOKE-SETTER AND RIGGER (CLEARING WORK)
CONCRETE BUCKET DUMPER AND CHUTEMAN
CONCRETE CHIPPING AND GRINDING
CONCRETE LABORERS (WET OR DRY)
DRILLERS HELPER, CHUCK TENDER, NIPPER (ONE CHUCKTENDER ON SINGLE MACHINE OPERATION WITH MINIMUM OF ONE CHUCKTENDER FOR EACH TWO MACHINES ON MULTIPLE MACHINE OPERATION. JACKHAMMERS IN NO WAY INVOLVED IN THIS ITEM.)
GUINEA CHASER (STAKEMAN), GROUT CREW
HIGH PRESSURE NOZZLEMAN, ADDUCTORS
HYDRAULIC MONITOR (OVER 100 LBS. PRESSURE)
LOADING AND UNLOADING, CARRYING AND HANDLING OF ALL RODS AND MATERIALS FOR USE IN REINFORCING CONCRETE CONSTRUCTION
PITTSBURGH CHIPPER, AND SIMILAR TYPE BRUSH SHREDDERS
SEMI-SKILLED WRECKER (SALVAGING OF OTHER BUILDING MATERIALS) – SEE ALSO SKILLED WRECKER (GROUP 1)
SLOPER
SINGLEFOOT, HAND HELD, PNEUMATIC TAMPER
ALL PNEUMATIC, AIR, GAS AND ELECTRIC TOOLS NOT LISTED IN GROUPS 1 THROUGH 1 (F)
JACKING OF PIPE-UNDER 12 INCHES

GROUP 3
CONSTRUCTION LABORERS INCLUDING BRIDGE LABORERS, GENERAL LABORERS AND CLEANUP LABORERS
DEMOLITION WORKER
DUMPMAN, LOAD SPOTTER
FLAGPERSON/PEDESTRIAN MONITOR
FIRE WATCHER
FENCE ERECTORS, INCLUDING TEMPORARY FENCING
GUARDRAIL ERECTORS
GARDENER, HORTICULTURAL AND LANDSCAPE LABORERS (SEE GROUP 4, FOR LANDSCAPE MAINTENANCE ON NEW CONSTRUCTION DURING PLANT ESTABLISHMENT PERIOD)
JETTING
LIMBERS, BRUSH LOADERS, AND PILERS
PAVEMENT MARKERS (BUTTON SETTERS)
PAVERS/INTERLOCKING PAVERS (ALL TYPES) AND INTERLOCKING PAVER MACHINES
MAINTENANCE, REPAIR TRACKMEN AND ROAD BEDS
STREETCAR AND RAILROAD CONSTRUCTION TRACK LABORERS
TEMPORARY AIR AND WATER LINES, VICTAULIC OR SIMILAR
TOOL ROOM ATTENDANT (JOBSITE ONLY)
TREE REMOVAL
WHEELBARROW, INCLUDING POWER DRIVEN

GROUP 3 (A) -- SEE GROUP 3 RATES
COMPOSITE CREW PERSON (OPERATION OF VEHICLES, WHEN IN CONJUNCTION WITH LABORER'S DUTIES)

GROUP 4
ALL FINAL CLEANUP OF DEBRIS, GROUNDS AND BUILDINGS NEAR THE COMPLETION OF THE PROJECT INCLUDING BUT NOT LIMITED TO STREET CLEANERS (NOT APPLICABLE TO ENGINEERING OR HEAVY HIGHWAY PROJECTS)
CLEANING AND WASHING WINDOWS (NEW CONSTRUCTION ONLY), SERVICE LANDSCAPE LABORERS (SUCH AS GARDENER, HORTICULTURE, MOWING, TRIMMING, REPLANTING, WATERING DURING PLANT ESTABLISHMENT PERIOD) ON NEW CONSTRUCTION
BRICK CLEANERS (JOB SITE ONLY)
MATERIAL CLEANERS (JOB SITE ONLY)

NOTE: AN ADDITIONAL DETERMINATION FOR LANDSCAPE MAINTENANCE WORK AFTER THE PLANT ESTABLISHMENT PERIOD OR WARRANTY PERIOD IS PUBLISHED IN THE NORTHERN CALIFORNIA LANDSCAPE MAINTENANCE LABORER DETERMINATION.

GROUP 6
STRUCTURAL NOZZLEMAN

GROUP 6 (A)
NOZZLEMAN (INCLUDING GUNMAN, POTMAN)
RODMAN
GROUNDMAN

GROUP 6 (B) -- SEE GROUP 4 RATES GUNITE TRAINEE (ONE GUNITE LABORER SHALL BE ALLOWED FOR EACH THREE (3) JOURNEYMAN (GROUP 6, 6A, 6C, OR GENERAL LABORER) ON A CREW. IN THE ABSENCE OF THE JOURNEYMAN, THE GUNITE TRAINEE RECEIVES THE JOURNEYMAN SCALE.).
NOTE: THIS RATIO APPLIES ONLY TO WORK ON THE SAME JOB SITE.

GROUP 6 (C)
REBOUNDMAN

GROUP 6 (D)
ALIGNER OF WIRE WINDING MACHINE IN CONNECTION WITH GUNITING OR SHOT CRETE

GROUP 6 (E)
ALIGNER HELPER OF WIRE WINDING MACHINE IN CONNECTION WITH GUNITING OR SHOT CRETE

GROUP 7
ENTRY LEVEL LANDSCAPE LABORER (RATIO FOR ENTRY LEVEL IS ONE IN THREE. AT LEAST ONE SECOND PERIOD ENTRY LEVEL AND AT LEAST ONE THIRD PERIOD ENTRY LEVEL MUST BE EMPLOYED BEFORE EMPLOYING ANOTHER FIRST PERIOD TRAINEE).
NOTE: THIS RATIO APPLIES ONLY TO WORK ON THE SAME JOB SITE

Recognized holidays:
Holidays upon which the general prevailing hourly wage rate for Holiday work shall be paid, shall be all holidays in the collective bargaining agreement, applicable to the particular craft, classification, or type of worker employed on the project, which is on file with the Director of Industrial Relations. If the prevailing rate is not based on a collectively bargained rate, the holidays upon which the prevailing rate shall be paid shall be as provided in Section 6700 of the Government Code. You may obtain the holiday provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Holiday provisions for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

Travel and/or subsistence payment:
In accordance with Labor Code Sections 1773.1 and 1773.9, contractors shall make travel and/or subsistence payments to each worker to execute the work. You may obtain the travel and/or subsistence provisions for the current determinations on the Director's General Prevailing Wage Determinations Website (http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm). Travel and/or subsistence requirements for current or superseded determinations may be obtained by contacting the Office of the Director – Research Unit at (415) 703-4774.

[#] Indicates an apprenticeable craft. The current apprentice wage rates are available on the Prevailing Wage Apprentice Determinations Website (http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageStart.asp).

[a] GROUP 1(D) - MAINTENANCE OR REPAIR TRACKMEN AND ROAD BEDS AND ALL EMPLOYEES PERFORMING WORK COVERED BY THIS CLASSIFICATION SHALL RECEIVE $0.25 PER HOUR ABOVE THEIR REGULAR RATE FOR ALL WORK PERFORMED ON UNDERGROUND STRUCTURES NOT SPECIFICALLY COVERED HEREIN. THIS SHALL NOT APPLY TO WORK BELOW GROUND LEVEL IN OPEN CUT. THIS SHALL APPLY TO CUT AND COVER WORK OF SUBWAY CONSTRUCTION AFTER TEMPORARY COVER HAS BEEN PLACED.

GROUP 1(H) - ALL LABORERS WORKING OFF OR WITH OR FROM BOS'N CHAIRS, SWINGING SCAFFOLDS, BELTS RECEIVE $0.50 PER HOUR ABOVE THEIR APPLICABLE WAGE RATE. THIS SHALL NOT APPLY TO LABORERS ENTITLED TO RECEIVE THE WAGE RATE SET FORTH IN GROUP 1(A).

[b] ZONE PAY AT THREE DOLLARS ($3.00) PER HOUR, FACTORED AT THE APPLICABLE OVERTIME MULTIPLE, WILL BE ADDED TO THE BASE RATE FOR WORK PERFORMED OUTSIDE THE FREE ZONE DESCRIBED BY THE BOUNDARIES ALONG TOWNSHIP AND RANGE LINES. PLEASE SEE TRAVEL AND SUBSISTENCE PROVISION FOR MAP DESCRIPTION AND EXCEPTIONS.

[c] WHEN THREE SHIFTS ARE EMPLOYED FOR FIVE (5) OR MORE CONSECUTIVE DAYS, SEVEN AND ONE-HALF (7 ½) CONSECUTIVE HOURS (EXCLUSIVE OF MEAL PERIOD), SHALL CONSTITUTE A DAY OF WORK, FOR WHICH EIGHT (8) TIMES THE STRAIGHT TIME HOURLY RATE SHALL BE PAID AT THE NON-SHIFT WAGE RATE FOR THE SECOND SHIFT. THE THIRD SHIFT SHALL BE SEVEN (7) HOURS OF WORK FOR EIGHT (8) HOURS PAY AT THE NON-SHIFT WAGE RATE.

[d] RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS WORKED ON MONDAY THROUGH FRIDAY AND THE FIRST 12 HOURS WORKED ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE. SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER, MAJOR MECHANICAL BREAKDOWN OR LACK OF MATERIALS BEYOND THE CONTROL OF THE EMPLOYER.

[e] GROUP 1(B) RECEIVES AN ADDITIONAL AMOUNT EACH DAY. SEE PAGE 6 FOR DETAILS

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

THE DIRECTOR

February 17, 2023

M-23-12

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Shalanda D. Young

SUBJECT: 2023 Discount Rates for OMB Circular No. A-94

On October 29, 1992, OMB issued a revision to OMB Circular No. A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs." That revision established new discount rate guidelines for use in benefit-cost and other types of economic analysis and specified certain discount rates that will be updated annually when the interest rate and inflation assumptions in the Budget are changed. These discount rates are found in Appendix C of the Circular, which is included as an attachment to this memorandum and provides for discount rates that will be in effect for the calendar year 2023.

The rates presented in Appendix C do not apply to regulatory analysis or benefit-cost analysis of public investment. They are to be used for lease-purchase and cost-effectiveness analyses, as specified in the Circular.

Attachment

APPENDIX C
(Revised December 12, 2022)

DISCOUNT RATES FOR COST-EFFECTIVENESS, LEASE PURCHASE, AND RELATED ANALYSES

Effective Dates. This appendix is updated annually. This version of the appendix is valid for calendar year 2023. A copy of the updated appendix can be obtained in electronic form through the OMB home page at https://www.whitehouse.gov/wp-content/uploads/2023/02/Appendix-C.pdf. The text of the Circular is found at www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A94/a094.pdf, and a table of past years' rates is located at https://www.whitehouse.gov/wp-content/uploads/2023/02/discount-history.pdf. Updates of the appendix are also available upon request from OMB's Office of Economic Policy (a94@omb.eop.gov).

Nominal Discount Rates. A forecast of nominal or market interest rates for calendar year 2023 based on the economic assumptions for the 2024 Budget is presented below. These nominal rates are to be used for discounting nominal flows, which are often encountered in lease-purchase analysis.

Nominal Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
4.0	3.8	3.8	3.9	4.2	4.2

Real Discount Rates. A forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2024 Budget is presented below. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.

Real Interest Rates on Treasury Notes and Bonds of Specified Maturities (in percent)

3-Year	5-Year	7-Year	10-Year	20-Year	30-Year
1.2	1.3	1.4	1.5	2.0	2.0

Analyses of programs with terms different from those presented above may use a linear interpolation. For example, a four-year project can be evaluated with a rate equal to the average of the three-year and five-year rates. Programs with durations longer than 30 years may use the 30-year interest rate.