

**United States Department of the Interior
Bureau of Land Management
Bakersfield Field Office**

Environmental Assessment

**Berry Petroleum
6 Applications for Permit to Drill in Midway Sunset
DOI-BLM-CA-C060-2024-0054-EA
Programmatic Project #147**

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Chapter 1. Introduction

1.1 Background

On 19 January 2023, the Bureau of Land Management (BLM) Bakersfield Field Office (BKFO) received six (6) Applications for Permit to Drill (APD) from Berry Petroleum (Berry). Berry proposes to install the wells over a 2-year period, three wells per year.

Proposed Wells: Pike 201, Pike 202, Pike 203, Pike 204, Pike 205, and Pike 206

Oilfield: Midway Sunset Oilfield (MWSS) / Pike Lease

Mineral Lease: CAS019360

Section/Township/Range: S28, T32S, R24E, Mount Diablo Base Meridian (MDBM)

County: Kern County, CA

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA); relevant federal and state laws and regulations; and BLM policy¹. The purpose of this document is to analyze and disclose expected environmental consequences of the proposed action.

1.2 Purpose and Need

The BLM's purpose for the proposed action is to respond to the APDs. The BLM's need is created by its responsibility to allow reasonable access to develop federal oil and gas leases. This responsibility is established by the following laws and regulations:

- Mineral Leasing Act of 1920, as amended
- Mining and Minerals Policy Act of 1970
- Federal Land Policy and Management Act of 1976
- National Materials and Minerals Policy
- Research and Development Act of 1980
- Federal Onshore Oil and Gas Leasing Reform Act of 1987

1.3 Conformance with BLM Land Use Plans

Land Use Plan: Bakersfield Resource Management Plan (RMP)

Date Approved: December 22, 2014

¹Executive Order 14154, *Unleashing American Energy* (Jan. 20, 2025), and a Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (Jan. 21, 2025), require the Department to strictly adhere to NEPA, 42 U.S.C. §§ 4321 *et seq.* Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. The BLM verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum.

The BLM has reviewed the proposed action for conformance with the Bakersfield RMP and determined the proposed action is specifically provided for in the following land use plan objective:

MM-O-1 “Facilitate reasonable, economical, and environmentally sound exploration and development of leasable minerals while minimizing impacts to other resources” (BLM, 2014; pg. 75).

The proposed action is located on a lease issued prior to the 2014 Bakersfield RMP. The 2014 Bakersfield RMP recognizes all valid existing rights (BLM, 2014; pg. 1). Therefore, the project conforms to the Bakersfield RMP.

1.4 Relationship to Statutes, Regulations and Related Plans

Oil and Gas Laws and Regulations

The BLM manages lands that contain a number of extractable minerals including oil and gas, which are managed in accordance with the *Mineral Leasing Act* of 1920, as amended; the *Mining and Minerals Policy Act* of 1970; the *Federal Onshore Oil and Gas Leasing Reform Act* of 1987; 43 CFR Part 3160-Onshore Oil and Gas Operations (including Onshore Orders 1, 2, 6, and 7) and 43 CFR Part 3170-Onshore Oil and Gas Production; the *Energy Policy Act* of 2005; and other laws, regulations, orders, and also in accordance with all applicable state, county, and local laws and ordinances. BLM requires existing lessees to strictly adhere to all laws, regulations, and policies that govern oil and gas leases, while at the same time recognizing that existing leases grant the lessee certain rights. No additional requirements can be placed on an existing lessee that conflict with the rights already granted, however the lessee may elect to commit to new measures discussed with BLM.

43 CFR 3171 identifies the requirements necessary for approving proposed oil and gas exploration, development, and servicing of wells on all Federal and Indian oil and gas leases. This includes all components required for the management of fluid minerals including completed Form 3160-3, well plat, drilling plan, surface use plan, bonding, operator certificate, onsite inspection, processing, reclamation, and Sundry Notices. 43 CFR 3171 also identifies processing timelines and the valid period of approvals. 43 CFR 3172 provides requirements and standards for drilling and abandonment. 43 CFR 3173 establishes standards to ensure that oil and gas are properly and securely handled to prevent loss and theft, and to enable accurate measurement and production accountability. 43 CFR 3174 establishes minimum standards for the accurate measurement of all oil. 43 CFR 3175 establishes minimum standards for the accurate measurement of gas. CFR 3176 provides the requirements and standards for conducting oil and gas operations in an environment known to or expected to contain hydrogen sulfide (H₂S) gas. 43 CFR 3177 provides the methods and approvals necessary to dispose of produced water associated with oil and gas operations.

Endangered Species Act

The Endangered Species Act of 1973 (ESA) requires federal agencies to complete consultation with the United States Fish and Wildlife Service (FWS) for actions that “may affect” a federally listed species or designated critical habitat. The ESA also requires federal agencies to use their authorities to carry out programs for the conservation of endangered and threatened species.

Clean Air Act

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has state air quality jurisdiction over the project area. The San Joaquin Valley is classified as non-attainment for ozone and PM_{2.5}. Section 176(c) of the Clean Air Act (CAA), as amended (42 U.S.C. 7401 et seq.) and associated regulations (with respect to conformity of general Federal actions to the applicable State Implementation Plan (SIP)) apply to projects within non-attainment and maintenance areas. Under those authorities “no department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan.” Under CAA 176(c) and associated regulations, a federal agency must make a determination that a federal action conforms to the applicable implementation plan before the action is taken.

National Historic Preservation Act of 1966, as amended

Section 106 of the National Historic Preservation Act (NHPA) requires agencies to make a reasonable and good faith effort to identify historic properties that may be affected by an agency’s undertakings and take those effects into account in making decisions. The BLM process for implementing this NHPA requirement is set forth in the *State Protocol Agreement Among the California State Director of the Bureau of Land Management and the California State Preservation Officer and the Nevada State Historic Preservation Officer (2019)*. Pursuant to 36 CFR 800.8(a), the BLM has coordinated compliance with Section 106 and its implementing regulations at 36 CFR 800 with the steps taken to meet the requirements of NEPA.

Paleontological Resources Preservation Act (PRPA)

This Act was passed as part of the Omnibus Public Lands Management Act of 2009 as directed in 16 USC 470aaa-3 and requires Interior agencies to manage and protect paleontological resources on Federal land. This includes developing plans for the inventory, monitoring, and scientific and educational use of paleontological resources. The Act also describes criteria for issuing permits to collect and study paleontological resources on Federal land.

Clean Water Act

The Clean Water Act of 1977 establishes authority to regulate any action where pollutants may be discharged into waters of the United States. Section 303 of the federal Clean Water Act requires states to adopt water quality standards that “consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses.” In California, these water quality standards and the administrative policies and procedures for protecting state waters are disclosed in regional water quality control board basin plans. These basin plans establish standards for groundwater in addition to surface waters, unlike the federal program.

The Clean Water Act also established the National Pollutant Discharge Elimination System (NPDES) permit program, regulating point source discharges of pollutants into waters of the United States. Section 402 of the Clean Water Act provides that storm water discharges associated with industrial activity and construction must be authorized under a NPDES permit. Clearing, grading, and excavation projects that disturb more than one acre are required to obtain a NPDES storm water discharge permit under United States Environmental Protection Agency (EPA)

regulations, though certain regulations codify exemptions for oil and gas operations. Section 404 of the Clean Water Act establishes the authority to issue permits for dredged or fill material.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) of 1974 regulates the nation's public drinking water supply to protect public health. SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976 establishes a regulatory structure for the management and disposal of solid and hazardous wastes. Solid wastes consist of any discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. Solid wastes include both hazardous and nonhazardous waste. A waste may be considered hazardous if it is ignitable, corrosive, reactive, or contains certain amounts of toxic chemicals. Subtitle C of RCRA creates a cradle-to-grave management system for hazardous waste, governing the generation, transportation, treatment, storage, and disposal of hazardous wastes. Subtitle D regulates the management of nonhazardous solid waste, establishing minimum federal technical standards and guidelines for state solid waste plans to promote environmentally sound management of solid waste.

Oil and gas exploration and production (E&P) wastes that are intrinsically derived from primary field operations are exempt from Subtitle C hazardous waste regulations, although Subtitle D, other federal regulations, and state regulations still apply. Exempt E&P wastes include any produced fluids or waste otherwise generated by contact with the oil and gas production stream during the removal of produced water or other contaminants from the product. Some specific E&P wastes designated as exempt include produced water, drilling fluids, drill cuttings, rig-wash, work-over wastes, and well completion, treatment, and stimulation fluids. Examples of non-exempt wastes include unused fracturing fluids or acids, waste solvents, used equipment lubricating oils, and caustic or acid cleaners.

Chapter 2. Proposed Action and Alternatives

2.1 Alternative 1 (Proposed Action)

Under Alternative 1, BLM would approve the six APDs submitted by Berry. The applications request approval for several activities, including pre-construction clearing and grading (approximately 0.273 acres), expansion of 3 existing well pads, installation of 3 power poles and up to 1,200 feet of pipelines, and drilling six wells in the MWSS Oilfield. The MWSS Oilfield is situated approximately 5 miles southeast of Taft, California. Locations of the proposed wells and well pads are shown in Figures 1-3.

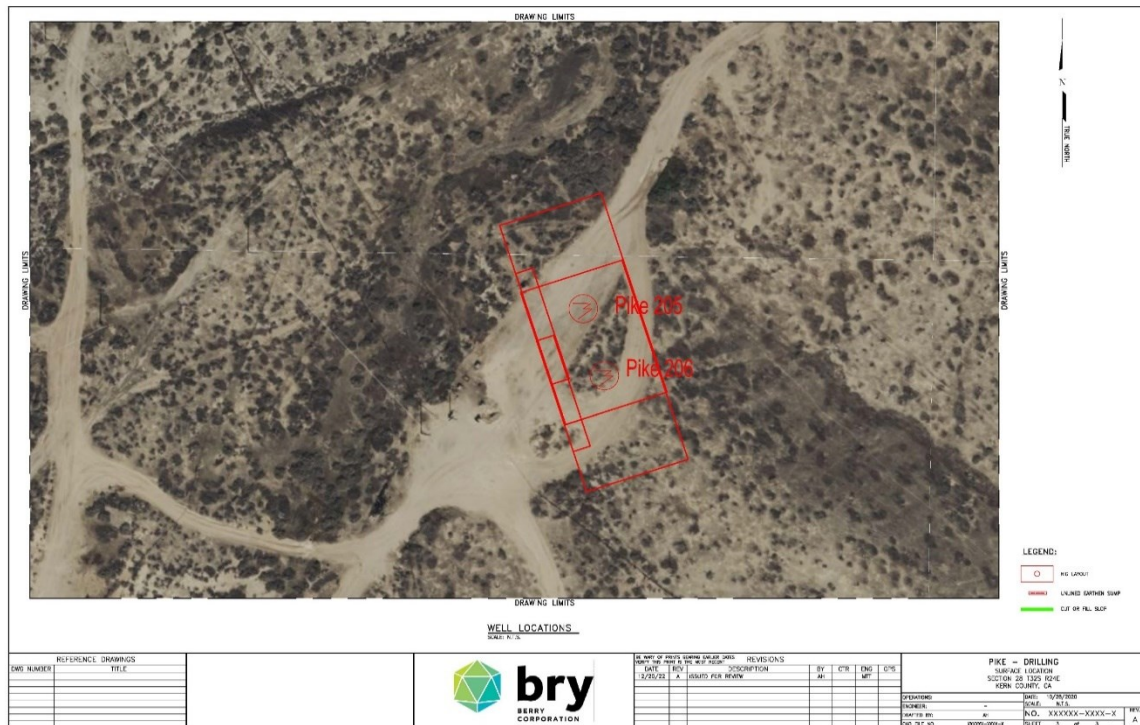


Figure 3

Disturbance and Reclamation

Total new disturbance associated with the proposed action is limited to the 0.273 acres that must be cleared and graded for well pad expansion. Final amounts of disturbance will be provided as part of the post construction compliance report within 60 days of completion.

Berry will use existing, previously disturbed areas for staging equipment and accessing the site to avoid new surface disturbance and minimize potential impacts to listed species. Further, after completion of the new wells, Berry will reclaim unused portions of the project area which are no longer necessary for operation. The well pad and any other permanent disturbances will be reclaimed at the end of the life of the well, prior to lease abandonment. If the well is productive, the portion of the well site to be utilized for the production operations and will be maintained as “vegetation free” and may be surfaced with gravel. Berry will operate and maintain the proposed wells, power lines, and pipelines in good working condition. Berry field operations personnel will monitor flow lines and will inspect and replace worn or damaged segments of pipe as required.

The proposed pipelines will be located within existing pipeline corridors which have been restored. No new access roads will be required for the proposed project. An approved biologist will be present during any off-road travel including during installation of power poles and power distribution wiring as proposed and at any time during construction or subsequent to well completion that installation or maintenance is required and/ or where new surface disturbance will occur.

Temporary off-road travel is not anticipated to install ancillary facilities except as previously noted. Except for the new disturbance described, proposed pipelines will be in existing pipeline corridors and all vehicles used to install the pipelines will travel on existing roads. If off-road travel is necessary, an approved biologist will be present to monitor activities and pipelines will be pushed or pulled into place to minimize disturbance. Existing bluelines within 100 feet of the proposed project areas will be avoided or spanned over at established pipeline crossing points.

If existing access roads are open cut to install pipelines, this work will be scheduled when rain is not anticipated within 24-48 hours of the proposed work. Further, trenches will not be left open greater than 48 hours and after the pipeline is installed, the trench will be backfilled and compacted for use as an oil field lease road. Existing roads will be maintained in the same or better condition as existed prior to the start of operations and said maintenance will continue until final abandonment and reclamation of the well location. No excess dirt will be left on the side of the road or within the road; excess dirt will be compacted within the access road to become part of the active road surface. All practicable measures will be taken to minimize erosion and stabilize disturbed soils. The following types of interim stabilization or similar methods may be used if necessary: jute netting, hydro-mulch, straw wattles, or crimped straw mulch.

At the beginning of construction, topsoil (approximately the top four to six inches of soil) associated with new areas of disturbance will be removed from the project area and stockpiled immediately adjacent to the project site. The stockpiled topsoil will be monitored during drilling and completions activities to ensure that it is protected from wind and water erosion. After well completion, topsoil will be re-applied to the cut and fill slopes. Remaining topsoil will be stockpiled on an existing well pad or other previously disturbed surface and retained for future reclamation. Topsoil will be retained for no more than one year. If topsoil is not redistributed within one year, the operator may receive a Written Order (WO) or Notice of an Incident of Non-Compliance (INC).

Interim reclamation will be limited to the side slopes of the well pads, and existing access roads that are open cut to install the pipelines. Revegetation of side slopes or areas not required for operation and maintenance (O&M) activities will be achieved using native seed specified by the BLM. Reseeding will be performed to coincide with the rainy season (October – April).

Water Use

Berry proposes to use approximately 1,500 bbls of fresh water for drilling and dust abatement per well. Water would be sourced from water station located at the Southwestern lease. Water trucks would be used to transport all water using existing access roads. Storage tanks would be used to minimize road traffic and conserve and reuse water

Non-hazardous, water-based mud would be used in drilling operations. All cuttings will be collected in an 8' x 10' x 60' earth pit. They will remain in the pit and solidified using Soil-Bond Technology, then backfilled with spoils from digging the pit.

Drilling Technology

Berry proposes to use current best available technologies to drill and complete the proposed wells; modern controls and monitoring would be in place to prevent failures of mechanical well integrity. All aspects of well completions and design are conducted according to American Petroleum Institute standards whereby specifications and recommended practices are detailed to ensure mechanical well integrity. For these reasons, well failures are not anticipated. Berry has stated that there is no intention (and is there no authorization to conduct) well stimulation activities regulated by California Senate Bill No. 4 (hydraulic fracturing, matrix or fracture acidization) on the proposed wells.

Design Features

The Design Features of this proposed project are outlined in **Appendix 1**. These Design Features serve as the Conditions of Approval (COAs) addressing various aspects crucial to the project's execution and environmental impact. These COAs encompass considerations for biological, cultural, and paleontological resources, as well as construction and interim reclamation procedures. Additionally, they detail management strategies and outline plans for final reclamation efforts. These COAs ensure that the proposed action adheres to regulatory standards and mitigates potential adverse effects on the surrounding ecosystem and community.

2.2 Alternative 2 (No Action)

Under Alternative 2 (the “no action” alternative), BLM would not approve the six APDs submitted by Berry. By denying the applications, the federal lessee/operator would be denied the opportunity or right to develop and produce the federal mineral estate. Not approving this action would not affect demand for petroleum products. Any new oil and gas development required to meet demand would be carried out by drilling a well or wells in some other location.

Chapter 3. Affected Environment & Environmental Impacts

This chapter includes brief descriptions of the physical and regulatory environment for elements that may be affected by the proposed action as well as an analysis of the environmental impacts of the Proposed Action and No Action Alternatives.

Issues Considered but Eliminated from Further Analysis

The following elements of the human environment were considered but determined to be either not present or unaffected by the proposed action and will therefore not be addressed further in this analysis:

- This project location does not occur within a designated Area of Critical Environmental Concern or within National Conservation Lands.
- The proposed project would not affect recreational experience as it occurs within a BLM administered oil and gas lease that does not currently attract recreational use, nor is it anticipated to attract significant recreational use in the future.

- Visual resources would not be impacted since the project occurs within a Class IV Visual Resource Management area that is not visible from any main access road or highway and is not likely to attract attention.
- Pursuant to Section 106 of the National Historic Preservation Act, BLM Archaeologists conducted an assessment to determine whether the proposed undertaking would adversely affect historic properties. Assessment included a review of Bakersfield Field Office cultural program records. A Class III cultural resources inventory was previously conducted in 2019 and 2020 which included the Area of Potential Effect (APE) for the six proposed well locations (BLM Cultural Resource Inventory Report # 6000-2019-43 & 6000-2021-04). All cultural resources identified within the lease are historic oil & gas related and were determined ineligible for listing on the National Register of Historic Places in 2020 (Bakersfield Field Office Eligibility Memo 2020-04). Therefore, no additional investigation or mitigation required.
- A Certified letter containing maps and a description of development activities that would occur within the project area for the 6 wells was mailed to Native American Tribes affiliated with the project area in 2023 (Tribal Notification Letter 23-16). No recipient provided a response to our inquiry regarding consultation on the proposed wells or project area for the Pike Lease.

Issues for detailed analysis

- How would emissions generated by construction activities (e.g., generation of dust, burning of diesel) and subsequent operation of the well impact air quality?
- How would emissions generated by construction activities, subsequent operation of the well, and downstream use of the produced petroleum contribute to increases in Green House Gases (GHGs) or impact climate change?
- How would construction activities (e.g., drill rig noise, vehicle traffic), ongoing operations (e.g., vehicle traffic) and habitat disturbance impact threatened and endangered species?
- How would construction activities (e.g., grading, drilling) impact paleontological resources?
- How would construction activities (e.g., grading, drilling) impact soil productivity and erodibility?
- How would drilling through aquifers impact drinkable groundwater? How would construction and operations activities (potential for erosion, sediment carry, spills and leaks) impact surface water? How would the use of water for drilling and dust abatement impact availability of fresh water for other beneficial uses?
- How would air quality impacts and climate change contributions from the project affect area residents?

3.1 Air Quality

3.1.1 Affected Environment

Air quality and related health impacts are driven by pollutant concentrations in the air. Pollutant concentrations depend primarily on the rate at which pollutants are emitted within an air basin or its co-located air district or counties. If pollutants are emitted at a higher rate than natural processes (such as rainfall, atmospheric chemical reactions, absorption on surfaces, or respiration) can remove them, air quality decreases.

The air resources analysis area for the proposed project area is the San Joaquin Valley Air Basin. At the state level, CAA regulatory and enforcement duties lie with the California Air Resources Board (CARB) and regional or county air districts. At the federal level, the EPA has statutory authority under the CAA. The San Joaquin Valley Air Pollution Control District (SJVAPCD) is co-located with air basin, and SJVAPCD and CARB have been delegated CAA jurisdiction over it. These agencies have the responsibility to prevent and correct air quality issues in the proposed project area. The BLM does not have any statutory authority under the Clean Air Act and may not overrule agencies that do. Rather, the agency analyzes air resources impacts as part of NEPA analysis to inform approval of projects on Public Lands and to demonstrate compliance with CAA General Conformity regulations.

The federal CAA, as amended, and the California Clean Air Act (CCAA) are the primary laws related to air quality. Provisions of the federal CAA that apply to BLM actions include the National Ambient Air Quality Standards (NAAQS), non-attainment area designation, rules that are part of state implementation plans (SIPs), air permitting including prevention of significant deterioration (PSD) and New Source Review (NSR), air toxics rules, and General Conformity. The EPA, CARB, and regional air districts have all issued rules to implement federal and state Clean Air Acts and SIPs.

EPA has identified seven criteria pollutants as indicators of air quality and has established for each of them a threshold concentration above which adverse effects on human health and the environment may occur. These threshold concentrations are called NAAQS (<https://www.epa.gov/criteria-air-pollutants>). One set of limits (primary standard) protects health; another set of limits (secondary standard) is intended to prevent environmental and property damage. Under the federal CAA, the EPA has established NAAQS for: ozone, respirable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. California has established state Ambient Air Quality Standards for the same criteria pollutants, plus an additional three pollutants (visibility reducing particulates, sulfates, and hydrogen sulfide). A geographic area that meets the primary standard is called an attainment area; areas that do not meet the primary standard are called non-attainment areas (<https://www.epa.gov/clean-air-act-overview>).

The SJVAPCD operates and maintains a network of air monitoring sites throughout the eight counties of the San Joaquin Valley Air Basin so that air quality can be compared to the NAAQS. In addition, CARB, the National Park Service, and tribal nations also operate air monitoring stations. In total, 38 air monitoring sites are currently in operation in the San Joaquin Valley. Data from these stations is used to calculate the EPA air quality index (AQI) within the SJVAPCD so criteria pollutant levels can be reported to the public in real time (<https://www.airnow.gov/>). The

AQI is one way to evaluate how clean or polluted an area’s air is and whether associated health effects could be a concern. When the AQI value is between 0 and 50 (green), air quality is categorized as “good”, and criteria air pollutants pose little or no risk. AQI between 51 and 100 (yellow) indicates moderate air quality posing little risk. An AQI of 100 indicates at least one pollutant is at the NAAQS concentration threshold. AQI values between 101 and 150 (orange) indicates a pollutant concentration above the NAAQS and air quality that might be unhealthy for sensitive groups. AQI values higher than 150 means generally unhealthy (red), very unhealthy (purple), or hazardous (maroon) air quality. 5-year average AQI data for each county in the SJVAPCD for the years 2019-2023 is presented in Table 3.1 below.

Table 3.1 SJVAPCD Air Quality as Shown by AQI, 2019-2023

County	Good Days per year		Moderate Days per year		Unhealthy for Sensitive Groups Days per year		Unhealthy Days per year		Very Unhealthy Days	Hazardous Days
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage		
Fresno	102.0	27.9%	188.2	51.5%	61.6	16.9%	12.0	3.3%	1.4	0
Kern	78.8	21.6%	177.4	48.6%	89.8	24.6%	17.8	4.9%	1	0.4
Kings	111.6	30.6%	205.6	56.3%	41.4	11.3%	5.8	1.6%	0	0.8
Madera	158.4	43.4%	181.0	49.6%	20.4	5.6%	5.0	1.4%	0.4	0
Merced	175.8	48.1%	169.4	46.4%	16.6	4.5%	3.4	0.9%	0	0
San Joaquin	201.2	55.1%	148.6	40.7%	11.8	3.2%	3.4	0.9%	0.2	0
Stanislaus	153.4	42.0%	181.2	49.6%	26.0	7.1%	4.6	1.3%	0	0
Tulare	87.2	23.9%	168.8	46.2%	88.2	24.2%	19.6	5.4%	1.2	0.2

Source: EPA Annual AQI Summary Data by County. https://aqs.epa.gov/aqsweb/airdata/download_files.html#Annual

The data show that low air quality presents some health risk to residents throughout the air district and basin, and air quality in the most impacted counties exceeds at least one NAAQS on about one-third of days. These conditions have resulted in the district being designated as a federal non-attainment area for PM_{2.5} and ozone under the NAAQS. Air quality has improved in some ways over recent years and the district has recently been designated as a federal maintenance area for PM₁₀. Ozone is created in the atmosphere by a reaction involving nitrogen oxides (NO_x), VOCs, and sunlight. Based on the EPA designations, the primary pollutants of concern for the Project area are NO_x and VOC (ozone), PM₁₀, and PM_{2.5}. The remaining criteria pollutants are either unclassified or in attainment with the NAAQS.

There are ongoing efforts to improve air quality in the SJVAPCD led by agencies with Clean Air Act authority. The proposed project area is within the EPA Pacific Southwest Region 9 Planning Area; a SIP has been prepared for the planning area, which identifies sources of emissions and control measures to reduce emissions. The SJVAPCD has implemented these control measures by issuing District rules. In 2016, CARB updated the State Strategy for achieving emissions reductions toward bringing these areas into attainment with federal standards for ozone and PM_{2.5}. A San Joaquin Valley Supplement to the 2016 State Strategy was adopted in October 2018.

District air quality plans that have been adopted and are relevant to the proposed Project include the *SJVAPCD 2016 Ozone Plan*, *2013 Plan for the Revoked 1-Hour Ozone Standard*, *2022 Plan for the 2015 8-Hour Ozone Standard*, *2018 PM_{2.5} Plan*, and *2007 PM₁₀ Maintenance Plan*. The *2022 Plan for the 2015 8-Hour Ozone Standard* will reduce NO_x emissions by 72% between 2018

and 2037, contributing to the Valley's progress toward attainment of the 2015 8-hour ozone standard. In addition, the 2022 Ozone Plan commits the District to explore and implement a variety of stationary source emission reduction opportunities including strengthening rules for Leak Detection and Repair (LDAR) in the oil and gas sector through potential enhancements currently under consideration, including lower leak thresholds, more frequent LDAR inspections, use new leak detection technologies, and other potential changes. EPA reclassified the District to Serious PM_{2.5} non-attainment, effective December 2021. Following the reclassification, the District adopted an initial SIP for the 2012 PM_{2.5} Standard on October 19, 2023 which partially fulfilled SIP elements required by the CAA for Serious PM_{2.5} nonattainment areas. On June 20, 2024, the District adopted the *2024 Plan for the 2012 Annual PM_{2.5} Standard*, which fulfills remaining CAA requirements. These plans outline the strategy for achieving federal air quality standards by specific dates and identify control measures to reduce criteria pollutant emissions. The 2024 PM_{2.5} Plan aims to reduce emissions of PM_{2.5} by 10.8 tons per day (tpd) (16%) and NO_x by 148.7 tpd (66%) by 2030 through the implementation of adopted regulations as well as incentive-based commitments for stationary, area, and mobile sources.

Applicable SJVAPCD Rules to Implement Air Quality Plans

Once air quality attainment demonstration Plans are adopted, the reductions necessary to meet the respective reduction mandates contained in the Plan(s) are achieved through prohibitory rules implemented through the SIP. Compliance with applicable Rules, Regulations, and land use and zoning requirements ensures continued movement towards achieving the SJVAPCD attainment goals. Examples of SJVAPCD rules that may be applicable to the proposed project are described below.

Rule 2280 (Portable Equipment Registration): Certain portable emissions units would be required for well drilling, service or workover rigs, pumps, compressors, generators, and field flares.

Rule 4101 (Visible Emissions): The purpose of this rule is to prohibit the emissions of visible air contaminants to the atmosphere.

Rule 4401 (Steam-Enhanced Crude Oil Production Wells): The purpose of this rule is to limit the VOC emissions from steam-enhanced crude oil production wells.

Rule 4402 (Crude Oil Production Sumps): The purpose of this rule is to limit VOC emissions from sumps.

Rule 4623 (Storage of Organic Liquids): The purpose of this rule is to limit VOC emissions from the storage of organic liquids.

Regulation VIII (Fugitive PM₁₀ Prohibitions): The purpose of Regulation VIII is to reduce ambient concentrations of particulate matter (PM₁₀) by requiring actions to prevent, reduce, or mitigate anthropogenic fugitive dust emissions. Regulation VIII rules pertinent to the proposed project include, but are not limited to, the following:

Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities): This rule limits fugitive dust emissions (PM₁₀) from construction, demolition, excavation, extraction, and other earthmoving activities. This rule applies to any such

activity and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on-site, and travel on access roads to and from the site.

Rule 8031 (Bulk Materials): The purpose of this rule is to limit fugitive dust emissions from the outdoor handling, storage, and transport of bulk materials.

The BLM does not have authority to issue or enforce CAA rules; however, the BLM supports the actions of CAA-authorized agencies and encourages rule compliance on Public Lands.

Air Emission Sources

There are many sources of criteria pollutants in the SJVAPCD. Table 3.2 presents 2020 criteria pollutant emissions as estimated by the EPA, along with the percent contributed by each source category.

Table 3.2 Sources of Criteria Pollutants in the SJVAPCD, 2020

Source	tons per year	%
Wildfire	1,715,443	78.70%
Mobile Sources	250,812	11.51%
Agriculture	108,753	4.99%
Solvent Use	29,293	1.34%
Waste Disposal	25,789	1.18%
Residential Fuel Combustion	21,576	0.99%
Commercial and Industrial Fuel Use	11,014	0.51%
Industrial Processes other than Petroleum and Natural Gas	8,164	0.37%
Oil & Gas Production	5,370	0.25%
Commercial Cooking	2,507	0.12%
Oil & Gas Midstream (transportation, refining, gas stations)	1,142	0.05%
Total	2,179,863	100%

Source: EPA. 2020 National Emissions Inventory (NEI) Online 2020 NEI Data Retrieval Tool. <https://www.epa.gov/air-emissions-inventories/2020-air-emissions-data>

As shown in Table 3.2, fires, mobile sources (cars, trucks, construction equipment), and agriculture caused about 95% of the air pollution in the SJVAPCD in 2020. For comparison, the previous NEI, which inventoried emissions for 2017, showed the same top three categories as sources for about 96% of SJVAPCD emission with wildfire the source of 79%. Oil & Gas Production operations and related Oil & Gas infrastructure were the source of about 0.30% of air pollution. Well construction emissions fall under the Mobile Sources category and the EPA did not separate them out in their analysis. BLM estimates that cumulative criteria pollutant emissions from all well construction approved on BLM California Public Land since the beginning of Fiscal Year 2025 plus the proposed action would equal 61.65 tons, representing about 0.02% of total mobile source criteria pollutant emissions expected for 2025. More information on the relationship between potential air emissions related to the proposed action and total emissions in the SJVAPCD are presented in the cumulative impacts analysis in Section 4.2.1.

Hazardous Air Pollutants

CAA regulations also address the release of hazardous air pollutants (HAPs): chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects, birth defects, or adverse environmental effects. In addition to federally listed HAPs, California also regulates State-identified Toxic Air Contaminants (TACs). HAPS and TACs are referred to as air toxics. EPA currently lists 189 compounds as HAPs, some of which, such as benzene, toluene, and formaldehyde, can be emitted from oil and gas development operations. NAAQS have not been set for HAPs; rather HAP emissions are controlled by source type- or industrial sector-specific regulations through National Emission Standards for Hazardous Air Pollutants (NESHAPs). Hydrogen sulfide (H₂S) gas is not regulated under the NAAQS or as a HAP. However, it is known to be hazardous and is monitored for worker health and safety at oil and gas sites.

Table 3.3 presents 2020 total HAP emissions in the SJVAPCD as estimated by the EPA, along with the percent of total HAPs from each source category.

Table 3.3 Sources of Hazardous Air Pollutants in the SJVAPCD Counties, 2020

Source	tons per year	%
Wildfire	49,160	74.04%
Agriculture	7,561	11.39%
Mobile Sources	5,791	8.72%
Solvent Use	2,494	3.76%
Residential Fuel Combustion	804	1.21%
Waste Disposal	374	0.56%
Oil & Gas Midstream	92	0.14%
Oil & Gas Production	62	0.09%
Industrial Processes other than Petroleum and Natural Gas	40	0.06%
Commercial and Industrial Fuel Use	21	0.03%
Commercial Cooking	0	0.00%
Total	66,398	100%

Source: EPA. 2020 National Emissions Inventory (NEI) Online 2020 NEI Data Retrieval Tool.
<https://www.epa.gov/air-emissions-inventories/2020-air-emissions-data>

Similar to criteria pollutants, the top three categories emitted 94% of all HAPs in 2020, with solvent use making up more than half of the remaining 6%. Oil & Gas Production operations and related Oil & Gas infrastructure were the source of about 0.23% of HAP emissions in the air basin. As with criteria pollutants, well construction HAP emissions are included with mobile sources. HAP emissions from all well construction approved on BLM California Public Land since the beginning of Fiscal Year 2025 totals 0.416 tons. This figure includes projected HAP emissions for the proposed wells, collectively representing an estimated 0.0072% of total mobile source HAP emissions expected for 2025. More information on the relationship between potential HAP emissions related to the proposed action and HAP health risks in the SJVAPCD are presented in Section 4.2.1.

General Conformity

The classification of any area as a federal non-attainment and/or maintenance area brings an additional requirement for federal agencies. Specifically, regulations state that no department, agency or instrumentality of the federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan. This means that under the conformity rules, federal agencies must make a determination that proposed actions in federal non-attainment areas conform to the applicable EPA approved implementation plans (if pertinent) before the action is taken. See the heading General Conformity heading in Chapter 4 below for related analysis.

3.1.2 Environmental Impacts

The proposed project would result in the emission of air pollutants, including the three criteria pollutants (ozone, PM₁₀, and PM_{2.5}) for which the San Joaquin Valley Air Basin has non-attainment or maintenance designations. Project-related emissions are divided into the following categories for purposes of analysis:

- **Well Development** emissions occur on the leased well site during site preparation, well drilling and construction, and production testing. Emission sources include diesel drilling rig engines, drill pad construction equipment (i.e., dozers, backhoe, grader, etc.), equipment trucks, water trucks, drill rig crew trucks/vehicles, and portable lift equipment; worker commuting and material deliveries; and fugitive dust emissions resulting from soil disturbance and vehicle traffic on unpaved surfaces. The proposed wells will not undergo fracking or any other post drilling treatments, and no treatment-related emissions are expected. Well drilling and completion is estimated to require 4 days with a drill rig generator running 24 hours per day, which is reflected in the emissions figures provided.
- **Production** emissions occur at the leased well site and include travel for daily inspections. Criteria pollutants or hazardous air pollutants could also occur through venting or fugitive losses during maintenance, emissions from use of chemicals, and leakage from valves, fittings, piping, and the well head.
- **Mid-Stream** emissions occur away from the well site and include emissions from transportation and processing of produced fluids after they leave the wellhead and before crude oil enters a pipeline to a refinery. For the proposed action, a portion of mid-stream emissions related to the project come from the Berry Petroleum Company facilities (CARB facility ID 104094). The facilities process fluids from multiple wells. They are subject to a set of CAA New Source Review air permits issued by the SJVAPCD. Air emissions from the Berry Petroleum Company facility and other midstream operations farther removed from the proposed well sites are monitored, regulated, limited, and mitigated by the SJVAPCD and CARB through the SIP under EPA oversight. Therefore, midstream emissions related to the proposed action are not expected to affect the NAAQS status of the SJVAPCD.
- **End-Use** emissions come from the refining of crude oil produced from the proposed wells and its eventual consumption as petroleum fuels and other products. Air emissions related to petroleum refining and consumption are regulated by air districts and CARB in California and by EPA and delegated state and local agencies in the rest of the country and

are outside of BLM jurisdiction. There are many possibilities for the processing and consumption of oil produced and the specific transportation, processing, and consumption of any barrel of oil produced are not reasonably foreseeable. Potential end-use emissions related to the proposed action are estimated by representing produced crude oil as the equivalent volume of gasoline refined and consumed in cars in the SJVAPCD as modeled by the Argonne National Laboratory Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) Well-to-Wheels (WTW) calculator.

Air emissions from the six proposed wells are reduced or mitigated by the following factors:

- CARB and SJVAPCD have established and enforce rules and permitting, inspection and monitoring requirements that reduce or mitigate emissions from the proposed wells.
- The proposed wells will not undergo hydraulic fracturing or other well stimulation processes.
- These wells are not expected to produce natural gas.

General Conformity

The General Conformity rule applies to individual decisions, excluding leases, and does not include any provision requiring cumulative analysis. Where the Federal action is a permit, license, or approval for some aspect of a non-Federal undertaking, such as drilling and operating oil wells on Public Land, the relevant activity is the part, portion, or phase of the non-Federal undertaking that requires the Federal permit, license, or approval. General Conformity applicability analysis is required for direct and indirect criteria pollutant emissions meeting the following conditions: 1) they are caused by the Federal action; 2) the agency (BLM) has a practical way to impose controls on them; 3) they are not subject to a CAA new source review permit. Based on these conditions, the BLM has determined that Well Development and Production Operation emissions are subject to General Conformity applicability analysis. Table 3.4 compares subject emissions of non-attainment pollutants with the General Conformity *de minimis* thresholds for the SJVAPCD to complete the applicability analysis.

Table 3.4 - General Conformity Applicability Analysis.

Activity	PM ₁₀	PM _{2.5}	VOC	NO _x
Well Development (Max)	0.03	0.03	0.22	0.86
Well Development (Average)	0.00	0.00	0.01	0.04
Production Operations (Max)	0.00	0.00	0.68	0.00
Production Operations (Average)	0.00	0.00	0.65	0.00
Maximum Annual Total	0.03	0.03	0.89	0.86
Average Year Total	0.00	0.00	0.66	0.05
Federal Conformity De Minimis Threshold	100	70	10	10

Source: Attachment 1 - CA APD Emissions Tool Berry Pike Producers v2024.b

As shown in the table, maximum estimated well development and production emissions from the 6 proposed wells combined are below the *de minimis* threshold for each non-attainment criteria pollutant. This means that project emissions are expected to be consistent with the SIP and that a

formal conformity determination is not required. Since the emissions conform to the SIP, they would not be likely to cause or contribute to an exceedance of the NAAQS or impair the ongoing SIP-based efforts to bring the SJVAPCD into attainment.

Potential for Criteria Pollutant Impacts

Table 3.5 presents estimated highest annual emissions of each criteria pollutant and total HAPs related to the project in the context of emissions of the same pollutants in the SJVAPCD and the State of California.

Table 3.5 Estimated Maximum Annual Emissions related to Well Development, Production Operations, Mid-stream, and End-use with context (tons per year)

Activity	PM ₁₀	PM _{2.5}	VOC	NO _x	CO	SO ₂	HAPs/TACs
Well Development	0.03	0.03	0.22	0.86	1.06	0.002	0.035
Production Operations	0.00	0.00	0.68	0.00	0.02	0.000	0.079
Mid-Stream¹	0.74	0.50	6.78	6.76	4.12	1.9	0.7
Development, Production, and Mid-stream Pollutants of Concern	24.5						
End-Use^{2,4}	2.0	0.4	13.6	4.9	162.6	0.1	1.4
Total	2.8	1.0	21.3	12.5	167.8	2.1	2.1
Context							
SJVAPCD - Annual³	187,145	125,056	365,612	86,815	1,404,148	11,086	130,320
Context Total Pollutants of Concern	764,628						
California - Annual³	867,341	667,424	3,620,907	477,283	8,545,507	60,853	533,537

1 - Midstream emissions estimated as the GREET WTW Calculator Well to Pump (WTP) emissions, minus the average site-specific well operations emissions estimated by BLM for all pollutants except PM₁₀ and PM_{2.5}. These emissions come largely from facilities that require a permit issued by the SJVAPCD or other California air districts under the new source review (NSR) program and the applicable SIP or from vehicles over which BLM has no authority to impose controls. BLM does not have practical control or continuing program responsibility over these emissions.

2 - End use emissions estimated based on an equivalent volume of gasoline used as modeled by Argonne National Laboratory 2022. GREET WTW Calculator (<https://greet.es.anl.gov/tools>). BLM does not have practical control or continuing program responsibility over these emissions. These emissions are related to fuel demand and would be expected to occur regardless of whether the proposed actions were approved or not.

3 - Total annual pollutant emissions for the SJVAPCD, and the State of California reported by EPA in the 2020 National Emission Inventory (<https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data>)

4- End-Use HAP emissions estimated as 1/10th of VOC emissions

As shown in Table 3.5, total emissions of pollutants of concern for the project area (PM₁₀, PM_{2.5}, VOC, and NO_x) would add up to 24.5 tons or less each year. Total 2020 emissions of the same pollutants in SJVAPCD add up to 764,628 tons per year. This means total project-related well development, production related, midstream, and end-use criteria pollutant emissions would make up at most 0.003% of pollutant of concern emissions in SJVAPCD compared to 2020 emissions levels.

In addition to the General Conformity *de minimis* thresholds, the AQI can also illustrate the potential for the proposed emissions to have an impact on air quality. AQI generally increases with increasing pollutant emissions, but the relationship between AQI and emissions is complex, meaning that a change in emissions may not result in the same amount of change in the AQI. However, for purposes of this analysis, the 0.003 percent emissions increase described in the preceding paragraph would cause only a negligible increase in the AQI. In fact, it appears likely

that the AQI change would be less than one point (1% of the AQI at the NAAQS concentration). The AQI is designed so that it takes a 50- or 100-point change to indicate a significant change in health risk. This example illustrates the conclusion that the small pollutant of concern increase related to the project (0.003 percent) would have a negligible effect on air quality or on air-quality-related impacts.

As described in Section 3.1.1, CARB and the SJVAPCD have been delegated CAA authority by the EPA to monitor and manage air quality in California. As previously mentioned in Section 3.1.1, there are several SJVAPCD rules that would minimize air quality impacts related to the proposed action, such as Rules 2280, 4101, 4401, 4402, 8021, and 8031. For example, applicant compliance with Regulation VIII (Rules 8021 and 8031) would minimize particulate emissions by requiring proponents to water unpaved access roads in the project area and to water soils prior to excavation and trenching and during backfilling while compacting. Proponent compliance with Rule 2280 would ensure that ROG/VOC and NO_x emissions from portable units, such as the drilling rig, would be evaluated per the SJVAPCD’s calculation methodologies, and any increase in emissions would be fully offset during the air permitting process. Current and proposed CARB rules limit emissions from cars, trucks, and construction equipment. Implementation of these existing and proposed regulatory requirements would offset the increase in potential emissions related to the proposed project.

Potential for Hazardous Air Pollutant / Toxic Air Contaminant Impacts

As described above, well development and oil production may result in HAP/TAC emissions. The two most prevalent oil well related TACs are hydrogen sulfide and diesel exhaust (diesel particulate matter or DPM). The specific HAP compounds and the amounts of these compounds emitted depend on the HAP content of the produced oil as well as well development and management techniques. The wells proposed in this project will not undergo hydraulic fracturing or other well stimulation procedures and so HAP/TAC emissions are limited to HAPs contained in the produced fluids and emitted by construction and workover equipment.

Estimated representative HAP/TAC emissions from the proposed wells are presented in Table 3.6. HAP/TAC emissions of the same compounds for the SJVAPCD and the State of California from the EPA National Emissions Inventory are also provided as context. Because of the many different transportation, processing, and end use possibilities for crude oil produced in SJVAPCD, it is not feasible to estimate detailed midstream or end-use HAP and TAC emissions related to the proposed action. However, these emissions are presented as total project HAP in Table 3.5 above.

Table 3.6 - Estimated Maximum Air Toxic (HAP/TAC) Emissions from Well Development and Production Operations from proposed wells by Compound with Context (pounds/year)

HAP/TAC ¹	Well Development	Production Operations	SJVAPCD ⁶	State of California ⁶
Diesel Exhaust Particulate ^{2,3,4}	57.00	0.60	not reported	35,770,000.0
Hydrogen Sulfide ⁵	0.00	19.26	not reported	3,177,200.0
1,3 Butadiene	0.05	0.22	1,364,476.0	16,757,041.4
Acetaldehyde	0.93	4.31	12,871,574.3	153,052,607.7

Acrolein	0.11	0.52	2,291,373.7	27,906,697.3
Benzene	5.90	26.23	2,805,163.3	34,948,871.6
Ethyl Benzene	0.36	1.62	381,564.6	5,276,991.9
Formaldehyde	1.44	6.63	18,184,736.0	224,160,324.8
Hexane	0.07	0.33	731,750.7	10,481,703.2
Naphthalene	0.10	0.48	2,217,241.2	27,543,187.3
Polyaromatic Hydrocarbons (PAH)⁷	-	0.94	443,314.3	5,773,741.1
Propylene	3.14	14.49	not reported	not reported
Toluene	0.50	6.88	3,824,867.2	50,895,027.0
Xylenes	0.35	11.03	3,014,582.0	39,317,295.8
Total Pounds	69.96	93.53	48,130,643	635,060,689

1- for more information on the health effects of listed HAPs see: EPA. *Health Effects Notebook for Hazardous Air Pollutants*.

<https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants>

Emission estimates were based on AP-42 Table 3.2 emission factors. Compound emission factors indicated in Table 3.4-2 of EPA - EMISSION FACTOR DOCUMENTATION FOR AP-42 SECTION 3.2, NATURAL GAS-FIRED RECIPROCATING ENGINES.

Alpha-Gamma Technologies, Inc. July 2000 as having emission factors based solely on methode detection limts were excluded as speculative.

2- Diesel Exhaust Particulate (or Diesel Particulate Matter or DPM) is estimated as equal to Well Development PM₁₀ as estimated by CalEEMOD. Diesel Particulate matter includes POM. Diesel particulate matter is identified as a toxic air contaminant in California but is not a federally listed HAP and is not included in the HAP emission totals presented in Tabel 4.1. See CARB, 1998 Health Risk Assessment for Diesel Exhaust for information on DPM health effects.

<https://ww2.arb.ca.gov/sites/default/files/barcu/regact/diesltac/partb.pdf>

3 - Production Operations DPM emissions estimated by proponent based on exected well maintenance and workover activities)

4- CA statewide emissions source: CARB. Almanac 2013 – Chapter 2: Current Emissions and Air Quality, page 2-6. 2013.

<https://ww2.arb.ca.gov/sites/default/files/2021-01/chap213.pdf>

5- H₂S emissions estimated by project proponent. For more information on sulfur dioxide health effects see:

<https://ww2.arb.ca.gov/resources/hydrogen-sulfide-and-health>. H₂S is is not a federally listed HAP and is not included in the HAP emission totals presented in Table 4.1.

6 - Annual HAP emissions for the SJVAPCD, and the State of California reported by EPA in the 2020 National Emission Inventory (<https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data>). Total H₂S emissions for California from the 2010 California Toxic Inventory (cti-2010.xlsx) <https://ww2.arb.ca.gov/sites/default/files/2023-07/cti-2010.xlsx>

7 - PAH emissions from construction equipment and vehicles are included in Diesel Particulate Matter emissions.

For context, maximum annual well development and production operation HAP/TAC emissions (163.5 lbs. per year) are comparable to the emissions from four busy gasoline stations equipped with Phase I & II Enhanced Vapor Recovery (198.4 lbs. per year, not counting emissions from customer cars).

BLM has considered air toxic (HAP and TAC) emissions from the proposed action in several ways to assess their potential for impacts:

- Beginning in the 1990s, EPA studied oil exploration and production operations to determine if oil and gas exploration and production HAP emission impacts were significant enough to require regulation under the National Emission Standards for Hazardous Air Pollutants (NESHAP). Oil and gas production NESHAP rules and rule revisions were promulgated in 1999, 2001, 2007, and 2012. To date, only one type of oil exploration and production equipment, glycol dehydrators, has been identified as a significant source of HAP emissions requiring regulation. No glycol dehydrators or any other new processing operations are proposed as part of the project. BLM reviewed the EPA rulemaking and data on HAP emissions from representative single oil wells and found that in each case HAP emissions were below the threshold requiring controls under the NESHAP.

- The SJVAPCD includes a large number and variety of HAP and TAC emission sources including highways (a major source of diesel exhaust particulate), factories, and chemical facilities (See Table 3.3 above). Estimated direct HAP and TAC emissions from the proposed action are 163.5 pounds per year. That would represent 0.0006% of the 260,640,807 pounds of HAP and TAC emissions reported in the SJVAPCD in 2020. Because emissions from the proposed wells are very small, the estimated wellsite emissions would not be expected to increase current HAP or TAC health impacts in the SJVAPCD.
- The State of California oversees a statewide program required by AB2588 that includes air toxics emissions reporting and health risk assessment covering air toxic sources, including sources in the midstream and end-use supply chain related to the proposed wells. The program includes a computer modeling package designed to allow facility operators to perform a basic air toxics risk prioritization. The package is called the Hotspots Analysis and Reporting Program Emission Inventory Module (HARP). HARP models air toxic concentrations at the nearest receptor to a facility being assessed and provides a prioritization score for use by air districts in determining whether that facility should conduct further risk assessment or further reporting. The SJVAPCD also provides a prioritization score calculator to use for screening analysis and interprets prioritization scores as follows:

Prioritization	Prioritization Score	Outcome
Low Priority	Prioritization \leq 1	Exempt from further requirements
Intermediate Priority	1 < Prioritization \leq 10	Facility updates report every four years
High Priority	10 < Prioritization	Facility required to report a Health Risk Assessment

Well development and production operation emissions from the six proposed wells were each entered into SJVAPCD Air Hot Spots Facility Prioritization Score Calculator (https://ww2.valleyair.org/media/shpextx4/prioritization_2023_air_toxic_hot_spots.xls) and so were analyzed as if originating at a single location. Combining sources into a single location increases the modeled concentration at the receptor which overestimates risk. The prioritization score for the proposed wells combined had a maximum value of 0.266 at the closest receptor located about 1,500 meters from the nearest well site. This score is below the level required for a Health Risk Assessment and indicates that there is no need for further analysis. BLM has reviewed the AB2588 program and concurs that it adequately assesses and informs the public on air toxic health risks.

No Action:

There would be no new impacts to air quality under the No Action Alternative because the proposed wells would not be drilled. Ongoing air quality issues and impacts described in Chapter 3 above would remain the same in the absence of the proposed project.

3.2 Climate Change

3.2.1 Affected Environment

Climate change is a global process that is affected by the sum total of GHGs in the Earth’s atmosphere. The incremental contribution to global GHGs from a single proposed land management action cannot be accurately translated into its potential effect on global climate change or any localized effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources as a result of specific emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to climate change resulting from the accumulation of GHG emissions over time. GHGs influence the global climate by increasing the amount of solar energy retained by land, water bodies, and the atmosphere. GHGs can have long atmospheric lifetimes, which allows them to become well mixed and uniformly distributed over the entirety of the Earth’s surface no matter their point of origin. Therefore, potential emissions resulting from the proposed action can be compared to state, national and global GHG emission totals to provide context of their potential contribution to climate change impacts.

Further discussion of climate change science and predicted impacts, as well as the reasonably foreseeable and cumulative GHG emissions associated with BLM’s oil and gas leasing actions, are included in the *BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends* (BLM, 2023) (hereinafter referred to as the Annual GHG Report). This report presents the estimated emissions of greenhouse gases attributable to development and consumption of fossil fuels produced on lands and mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference as an integral part of this analysis and is available at <https://www.blm.gov/content/ghg/2023/>.

Table 3.7 shows Global, National and State GHG emissions data for 2018 - 2022. GHG emissions include emissions from fossil fuel use across all sectors (residential, commercial, industrial, transportation, and electricity generation) as well as other source categories such as waste management.

Table 3.7 Global and U.S. GHG Emissions 2018 - 2022 (Mt CO₂/yr.)

Scale	2018	2019	2020	2021	2022
Global ¹⁻³	49,200	51,800	52,600	50,800	52,800
U.S. ⁴	5,788	5,990	5,914	5,250	5,586
California ⁵	411	411	405	369	NA

Mt = Megatonnes or million metric tons

NA = Not Available

1 - UNEP Emission Gap Report 2018. <https://www.unep.org/resources/emissions-gap-report-2018>

2 - UNEP Emission Gap Report 2019. <https://www.unep.org/resources/emissions-gap-report-2019>

3 - UNEP Emission Gap Report 2022 for 2020, 2021 and 2022. Table 2.1. <https://www.unep.org/resources/emissions-gap-report-2022>

4 - EPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks. 2023. <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021>

5- CARB. 2000–2021 GHG Emissions Trends Report Data. https://ww2.arb.ca.gov/sites/default/files/2023-12/2000_2021_ghg_inventory_trends.pdf

The continued increase of anthropogenic GHG emissions over the past 60 years has contributed to global climate change impacts. A discussion of past, current, and projected future climate change impacts is described in Chapters 8 and 9 of the Annual GHG Report. These chapters describe

currently observed climate impacts globally, nationally, and in each State, and present a range of projected impact scenarios depending on future GHG emission levels. These chapters are incorporated by reference in this analysis.

Applicable Federal, State, and Local Regulations to Reduce Impacts of Oil and Gas Production on Climate Change

On April 17, 2012, EPA issued Final Air Rules to reduce harmful air pollution from the oil and natural gas industry. In addition, EPA issued final updates to its 2012 VOC performance standard for storage tanks used in crude oil and natural gas production and transmission on August 5, 2013. In addition, on May 12, 2016, EPA issued final rules to reduce emissions of methane, smog-forming volatile organic compounds, and toxic air pollutants from new, reconstructed, and modified oil and gas sources; these final rules established updates to the New Source Performance Standards (NSPS) and the Source Determination Rule. The EPA also requires reporting of greenhouse gases from large GHG emissions sources in the United States through the Greenhouse Gas Reporting Program (GHGRP) (EPA, 2020). The facilities that would be built under the proposed action are not expected to have large enough direct GHG emissions to trigger GHGRP reporting.

The California Legislature passed the California Global Warming Solutions Act of 2006 [Assembly Bill 32 (AB 32)], creating a comprehensive, multi-year program to reduce greenhouse gas emissions in California. AB 32 requires the reporting of GHGs by major sources, applicable to industrial facilities, fuel suppliers, and electricity reporters. In 2022, CARB issued an updated Scoping Plan to address AB 32 and subsequent legislative actions and policies related to climate change. The 2022 Plan lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045, as directed by Assembly Bill 1279. The Plan intends to achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon.

SJVAPCD has developed *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA and District Policy Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA*, intended to be applied to CEQA analysis. Although these policies are only available for CEQA analyses, the air district guidance may be generally applied by land-use agencies for reference. BLM concludes that the SJVAPCD requirement to quantify GHG emissions and to implement SJVAPCD Best Performance Standards to reduce GHG emissions would occur at the APD or Sundry stage, to be analyzed in a site-specific NEPA analysis. Therefore, this environmental assessment includes an analysis of GHG emissions for the proposed action.

3.2.2 Environmental Impacts

Proposed Action:

The proposed action would result in emissions of GHGs that are known to contribute to global climate change. These emissions are associated with combustion sources such as diesel drill and completion/workover rig engines, drill pad construction equipment (i.e., dozers, backhoe, grader,

etc.), equipment trucks, water trucks, drill rig crew trucks/vehicles, and portable lift equipment. Emissions of GHGs could also occur through venting or fugitive losses from valves and fittings, pumps, compressors, and the well head.

There are four general phases of post-lease development that would generate GHG emissions: 1) well development (well site construction, well drilling, and well completion), 2) well production operations, 3) mid-stream (processing, refining, storage, and transport/distribution), and 4) end-use (combustion or other uses) of the fuels produced. While well development and production operation emissions occur on-lease and the BLM has program authority over these activities, mid-stream and end-use emissions typically occur off-lease where the BLM has no program authority.

The amount of oil or gas that may be produced by the proposed wells is not known. For purposes of estimating production and end-use emissions, potential wells are assumed to produce oil and gas in similar amounts to existing nearby wells. BLM received initial production estimates from the project proponents to use as a basis for production estimates. While the BLM has no authority to direct or regulate the end-use of the products, for this analysis, the BLM assumes all produced oil or gas will be combusted (such as for domestic heating or energy production). The BLM acknowledges that there may be additional sources of GHG emissions along the distribution, storage, and processing chains (commonly referred to as midstream operations) associated with production from the lease parcels. These sources may include emissions of methane (a more potent GHG than CO₂ in the short term) from pipeline and equipment leaks, storage, and maintenance activities. The specific details on these sources of emissions are highly speculative, therefore, the BLM has chosen to assume that mid-stream emissions associated with wells for this analysis will be similar to the national level emissions identified by the Department of Energy's National Energy Technology Laboratory (NETL, 2009) (NETL, 2019).

The emission estimates calculated for this analysis were generated using the assumptions previously described above using the BLM APD Emissions Tool. Emissions are presented for each of the four phases of post-lease development described above as follows:

- **Well Development** GHG emissions occur on the leased well site during site preparation, well drilling and construction, and production testing.
- **Production Operations, Mid-stream, and End-Use** emissions occur over the entire production life of a well, which is assumed to be 30 years for this analysis based on the productive life of a typical oil/gas field.
- **Production Operations** emissions result from wellhead operations, fugitives, and vehicle exhaust. Other related emission sources including storage tank breathing and flashing, truck loading, pump engines, heaters and dehydrators, pneumatic instruments or controls, flaring, and fugitives located at the Berry Petroleum Company facilities (CARB facility ID 104094) and other sites. These emission sources are not part of the APD and are considered Mid-stream emissions.
- **Mid-stream** emissions occur from the transport, refining, processing, storage, transmission, and distribution of produced oil and gas. Mid-stream emissions are estimated by multiplying the estimated ultimate recovery (EUR) of produced oil and gas

with emissions factors from NETL life cycle analysis of U.S. oil and natural gas. Additional information on emission factors can be found in the Annual GHG report (Chapter 6, Tables 6-8 and 6-10).

For the purposes of this analysis, **End-Use** emissions are calculated assuming all produced oil and gas is combusted for energy use. End-use emissions are estimated by multiplying the EUR of produced oil and gas with emissions factors for combustion established by the EPA. Additional information on emission factors and EUR factors can be found in the Annual GHG Report (Chapter 6, Figure 6-3).

Table 3.8 presents the estimated direct (well development and production operations) and indirect (mid-stream and end-use) GHG emissions in metric tons (tonnes) for the subject leases over the average 30-year production life of the lease. Total CO₂e emission estimated on either 100-year, or 20-year time frame add up to 0.057 million metric tons (Megatonnes or Mt).

Table 3.8 - Estimated Production Life Emissions from Well Development, Production Operations, Mid-stream, and End-use (Metric tonnes)

Activity	CO ₂	CH ₄	N ₂ O	CO ₂ e (100-yr)	CO ₂ e (20-yr)
Well Development	344	0.014	0.003	345	346
Production Operations	159	10.368	0.009	470	1,017
Mid-Stream	13,108	14.06	0.223	13,587	14,328
End-Use	104,546	4.21	0.84	104,902	105,123
Total (Life of Lease)	118,157	28.65	1.076	119,304	120,814

Source: BLM APD Emissions Tool

GHG emissions vary annually over the production life of a well due to declining production rates over time. Figure 9 below shows the estimated GHG emissions profile over the production life the proposed wells including well development, well production operations, mid-stream, end-use, and gross (total of well development, well production, mid-stream, and end-use) emissions.

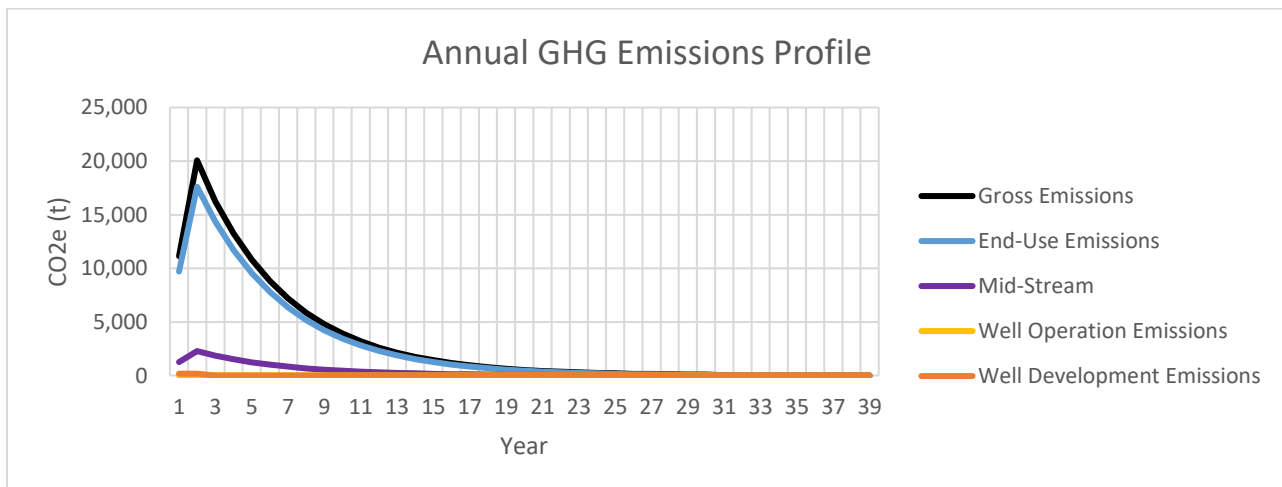


Figure 9. Estimated GHG Emissions Profile over the Production Life of the Proposed Wells

As Figure 9 shows, all categories of GHG emissions related to the proposed wells decrease as oil productions declines. Similar decreases occur for midstream and end-use criteria and HAP/TAC emissions.

To put the estimated GHG emissions for the proposed wells in a relatable context, potential emissions that could result can be compared to other common activities that generate GHG emissions and to emissions at the state and national level. The EPA GHG equivalency calculator can be used (<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>) to express the potential average year GHG emissions on a scale relatable to everyday life. For instance, the projected average annual GHG emissions from potential development (total CO₂e emissions from Table 3.8 divided by 30 years) of the subject lease are equivalent to 829 gasoline-fueled passenger vehicles driven for one year, or the emissions that could be avoided by operating one wind turbine as an alternative energy source or offset by the carbon sequestration of 4,582 acres of forest land.

Table 3.9 compares emission estimates over the 30-year life of the lease compared to the 30-year projected Federal emissions in the state and nation from existing wells, the development of approved APDs, and emissions related to reasonably foreseeable lease actions.

Table 3.9 - Comparison of Proposed APD Emissions to Other Sources (Megatonnes)

Reference	Mt CO ₂ e ¹ (per year)
Lease Emissions (Maximum Year)	0.020
CA Onshore Federal (O&G)²	5.10
CA Total Emissions (all sources)²	393.35
U.S. Onshore Federal (Oil & Gas)²	611.55
U.S. All³ Federal (Oil & Gas)²	1,027.51
U.S. Federal Onshore (Oil, Gas and Coal)³	1,046.33
U.S. Total²	7,260.36

1 - Mt (megatonne) = 1 million metric tons. Estimates are based on 100-GWP values.

2 - Federal values come from the BLM Specialist Report on Annual Greenhouse Gas Emissions. Tables ES-1 and ES-2 and Figure ES-1. U.S. Federal-All includes offshore and onshore oil and gas production.

3 - Total state emissions from all sectors are found in Table 5-2 of the BLM Specialist Report on Annual GHG Emissions

As detailed in the Annual GHG Report (BLM, 2023), which the BLM has incorporated by reference, the BLM also looked at other tools to inform its analysis, including the MAGICC model (see Section 9.0 of the Annual GHG Report). This model run suggests that “federal minerals emissions are predicted to have minimal impacts to future global climate change through the end of the century.” As this is an assessment of what BLM has projected could come from the entire Federal fossil fuel program, including the projected emissions from the proposed action, over the next 30 years, the reasonably foreseeable lease sale emissions contemplated in this EA are not expected to substantially affect the rate of change in climate effects, bring forth impacts that are not already identified in existing literature, or cause a change in the magnitude of impacts from climate change at the state, national, or global scales.

As shown in Table 3.9, the emissions from the proposed action would not significantly change current GHG emissions or the expected course of climate change in the State, given it is reasonably foreseeable that GHG emissions related to oil production in California will decrease.

In addition, The California Energy Commission (CEC), reported that nearly three-quarters of the crude oil refined in California was imported in 2022 (<https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/annual-oil-supply-sources-california>). The fraction of oil imported has increased from half in 2000 to three-quarters today as California production has decreased. Imports are reasonably foreseeable to increase further as California oil production declines and would therefore offset some or all of GHG reductions achieved unless demand for petroleum products is reduced. See section 4.2.1 for further discussion of oil production trends and cumulative impacts related to the proposed action.

No Action:

Under the No Action Alternative, the BLM would not permit the six proposed wells. However, the proponent could apply for application to drill at other locations or at future times. Although no new GHG emissions associated with new Federal oil and gas development for the subject leases would occur under the No Action Alternative in the foreseeable future, the cumulative demand for energy is not expected to differ regardless of BLM decision-making (EIA, 2020) and currently observed and projected climate impacts would be expected to continue. The BLM has no information regarding what energy source could fill the energy demand if development does not occur on the subject leases, see the Energy Substitution heading in Section 10.2 of the Annual Report (BLM, 2023) for a discussion of relative GHG emissions of different potential energy sources. Over the past decade the increasing mix of natural gas has contributed to lower emissions as it has replaced energy produced from coal. In 2022, high prices for natural gas and demand exceeding supply have resulted in some countries reactivating or delaying planned closures of coal fired power plants (Reuters, 2022). In the future, renewable energy is anticipated to become a larger part of the U.S. energy mix and reducing energy related carbon emissions. It has been estimated that with a 35% integration of wind and solar energy into the Western United States electric grid, there would be an additional 25-45% reduction in carbon emissions (BLM 2022). Based on this information there is potential for higher emissions over the short-term and reduced emissions over the long-term. The BLM cannot estimate the net effects across all energy markets to understand the mix of energy resources that will meet demand, and therefore can't provide an estimate for the No Action Alternative.

3.3 Biological Resources

3.3.1 Affected Environment

The 2014 Bakersfield RMP delineated areas known as “Conserved Lands” with the goal of maintaining suitable amounts of habitat largely undisturbed by development activities. Limiting the amount of habitat (and ground) disturbance allows sufficient habitat to remain intact, keep ecosystem processes functioning properly, and connect viable species populations across the landscape (see Bakersfield Proposed RMP/Final EIS, Appendix B, pp. 771-775). Conserved Lands are subdivided into two components: reserve areas (red zones) and habitat corridors (green zones). Reserve areas are managed with a 10% disturbance limit and habitat corridors are managed with a

25% disturbance limit. The proposed wells fall within habitat corridor area as defined in the 2014 Bakersfield RMP.

Federally listed plant species in the southern San Joaquin Valley include Kern mallow (*Eremalche kernensis*), San Joaquin woolly-threads (*Monolopia congdonii*), California jewelflower (*Caulanthus californicus*), and Bakersfield cactus (*Opuntia basilaris* var. *treleasei*). California jewelflower is not known to naturally exist in Kern County, and Bakersfield cactus is endemic to a limited area of central Kern County in the vicinity of the city of Bakersfield. Federally listed animal species include San Joaquin kit fox (*Vulpes macrotis*), blunt-nosed leopard lizard (*Gambelia sila*), giant kangaroo rat (*Dipodomys ingens*), and Tipton kangaroo rat (*Dipodomys nitratooides*). Additionally, this region contains the State listed San Joaquin antelope squirrel (*Ammospermophilus nelsoni*), which BLM treats as a special status species (SSp.) pursuant to its policy of the same name (BLM 6840). There is no designated critical habitat for any threatened or endangered species on the project site or in the vicinity.

Field surveys to identify the potential for the occurrence of these listed species in the general project area were conducted by staff Biologists from Stantec Biological Jared Pratt on 12/22/2022. A project-specific onsite inspection was completed by Natural Resource Specialist Matt Thomas on January 14th, 2025.

The proposed project site is located within non-native annual grassland and valley saltbush scrub habitat that is moderately developed with oilfield infrastructure. Plant species common to lease CAS019384B include Saltbush (*Atriplex* sp.), red brome (*Bromus madritensis* ssp. *Rubens*), ripgut brome (*Bromus diandrus*), Mediterranean hoary mustard (*Hirschfeldia incana*), red stemmed filaree (*Erodium cicutarium*), slender oat (*Avena fatua*), and Russian thistle (*Salsola tragus*). In addition, non-native grassland habitat was observed. Kern mallow, San Joaquin woolly-threads, California jewelflower, and Bakersfield cactus were not observed in or near the project area. Animal species observed on lease CAS019360 include common side-blotched lizard (*Uta stansburiana*), common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), coyote (*Canis latrans*), and black-tailed jackrabbit (*Lepus californicus*). Common side-blotched lizard (*Uta stansburiana*) and California ground squirrel (*Otospermophilus beecheyi*) were observed.

The biological surveys found no evidence of giant kangaroo rat (*Dipodomys ingens*) or Tipton kangaroo rat (*Dipodomys nitratooides nitratooides*) in the vicinity of the project sites, nor were there any observations of San Joaquin antelope squirrel (*Ammospermophilus nelsoni*); these species are not known to occur within the project site. There are no California Natural Diversity Data Base (CNDDDB) records of giant kangaroo rat (*Dipodomys ingens*) or Tipton kangaroo rat (*Dipodomys nitratooides nitratooides*) within the footprint or surrounding areas of the project and the probability of encountering San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) is low. In addition, disturbance levels and density of oilfield development make the project area unlikely habitat for these species. This project would not affect giant kangaroo rat, Tipton kangaroo rat, or San Joaquin antelope squirrel.

Species-specific protocol surveys for blunt-nosed leopard lizard (*Gambelia sila*) were carried out. There are CNDDDB records of blunt-nosed leopard lizard within the surrounding areas. There are burrows suitable for use by blunt-nosed leopard lizard within the proposed project site. Due to disturbance levels and density of oilfield development, and the installation of exclusion fencing

blunt-nosed leopard lizards are not likely to be at the project site. This project would not affect the blunt-nosed leopard lizard.

No species-specific protocol surveys for temblor legless lizard (*Anniella alexanderae*) were carried out. There are no CNDDDB records of temblor legless lizard within the project footprint or surrounding areas. There are no burrows suitable for use by temblor legless lizard within the proposed project site. Due to disturbance levels and density of oilfield development, temblor legless lizards are not likely to occur at the project site. This project would not affect the temblor legless lizard.

San Joaquin Kit Fox, a potential den site was observed during the biological surveys conducted on lease CAS019360. While no San Joaquin kit fox were encountered in the area, there is a potential for breeding and foraging in the project area. Therefore, approved biological monitors must be present for any surface disturbing activity.

3.3.2 Environmental Impacts

Proposed Action:

The proposed project would disturb 0.273 acres of federally listed species potential habitat. Based on field surveys, federally listed plant and animal species and their sign (scat, tracks, etc.) are absent from the project footprint, therefore direct impacts, such as vehicle collisions, entrapment in open trenches or sumps, and ingestion of oil field fluids, would not be expected. Due to the potential for San Joaquin kit fox at the project location, an approved biologist will conduct pre-construction surveys and monitoring as described in Appendix 1. Design Features. Biologists will also be present during surface disturbing activity associated with construction.

Considering the loss of potential habitat, the BLM concluded the project “may affect, likely to adversely affect” listed species. Consultation was completed on a programmatic basis for oil and gas development in the southern San Joaquin Valley in 2017 (2017 Oil and Gas Programmatic Biological Opinion 08ESMF00-2016-F-0683, “2017 BO”). The 2017 BO conservation program includes detailed monitoring, reporting, and survey requirements as well as additional measures to avoid and minimize impacts to listed species. Applicable measures, based on habitat and species potential, are included in Appendix 1 as Design Features (COAs) and as project specific authorization #147 under the 2017 BO. Implementation of these measures would reduce the potential for impacts. Furthermore, the measures require off-site conservation of listed species habitat in perpetuity. Since the project would disturb 0.273 acres of federally listed species potential habitat, a preliminary estimate of compensation is 0.819 compensation acres (0.273 permanent acres compensated at 3:1 = 0.819 acres + 0.273 replacement acres at 1:1 = 1.092 acres).

For non-listed species, the same mechanisms of potential direct and indirect impact discussed in the 2017 BO would apply. Adherence to the provisions of the Design Features and the 2017 BO project specific authorization would result in similar protections for non-listed species.

No Action:

There would be no additional impacts to biological resources from the No Action Alternative. However, there would also be no long-term off-site conservation of listed species habitat.

3.4 Paleontological Resources

3.4.1 Affected Environment

Every geologic unit can be assigned a Potential Fossil Yield Classification (PFYC) class based on the probability and abundance of known vertebrate fossils and scientifically significant invertebrate and plant fossils (BLM 2007). The PFYC scheme ranges from very low (PFYC 1) to very high (PFYC 5) depending on the potential fossil yield (BLM 2016). Unknown fossil potential is assigned to geologic units that do not have a clear PFYC assignment (PFYC U). Typically, paleontological resource compliance is required or recommended for earthwork occurring within PFYC classes 3, 4, 5, or U rock units.

Additionally, pursuant to the Paleontological Resources Protection Act (PRPA), BLM lands were evaluated for potential to contain Paleontological Resources within the Bakersfield Field Office management area. The proposed well APD locations are within Potential Fossil Yield Classification 4 (High) geological formations; very old alluvial deposits (Potential Fossil Yield Classification (PFYC) System). As such, a Paleontological Mitigation Plan as developed for an adjacent lease to the Pike Lease has been attached to the Conditions of Approval

3.4.2 Environmental Impacts

Proposed Action:

No Action:

There would be no direct impacts to paleontological resources under the no action alternative. Any fossils would stay in place, and there would be no ground disturbance in the area. As a result, there would be no opportunity to study depositional environments or collect fossils where there are no natural exposures. Buried fossils do not provide opportunity for scientific investigation. Mitigating for adverse effects to paleontological resources is a management practice that preserves resources and accommodates development. This mitigation is required for all project activities on BLM surface or private lands for which federal paleontological compliance requirements have not been waived.

3.5 Soil Resources

3.5.1 Affected Environment

There is one soil map unit present in the project footprint:

- 442-Elk Hills sandy loam, 5 to 15 percent slopes.

Soil Erosion Factors

Soil Map Unit	Water Erodibility-K Factor	Wind Erodibility Group
442-Elk Hills sandy loam, 5 to 15 percent slopes	0.24 Moderate	6 Low to Moderate

The 442-Elk Hills sandy loam, 5 to 15 percent slopes complex map unit is assigned to wind erodibility group 6 and has a whole soil K factor of 0.24. A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The wind erodibility group provides an indication of how susceptible areas disturbed by construction activities are to wind erosion. Soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. Therefore, there is a low to moderate potential for wind erosion on the proposed project location. The erosion K factor indicates the soil's susceptibility to sheet and rill erosion by water; values range from 0.02 to 0.69, where higher values represent higher susceptibility to sheet and rill erosion by water. Thus, this soil in the proposed project area has a moderate susceptibility to water erosion.

Soils have a moderate level of disturbance across the landscape. Within the oil field, bare ground is pervasive, with small patches of native vegetation occurring within the development matrix. Undisturbed soils within the project area consist of low-density valley saltbush scrub and herbaceous vegetation.

3.5.2 Environmental Impacts

Proposed Action:

Soil disturbance would occur as a result the use of existing roads, well pad expansion and staging site construction, and drilling operations. Topsoil and soil horizons would be removed and/or mixed, changing soil-water dynamics and removing nutrients from the project site. In addition, soils would be compacted, which could lead to surface water runoff, sediment carry, and water erosion concerns. Potential for water erosion is low to moderate (K factor = 0.24), but there is a low to moderate potential for erosion from wind at the project site. Berry would minimize and mitigate these impacts by conducting interim reclamation utilizing site-specific topsoil on the temporary staging areas, cut and fill slopes, and sump(s) subsequent to drilling operations, including all practicable measures to minimize erosion and stabilize disturbed soils. Also, Berry would conduct final reclamation at the project site when the wells are abandoned. In addition, Berry would comply with all relevant federal, and applicable state, and local air quality rules and regulations to reduce emissions of particulate matter originating from soil disturbance at the project site.

Berry is required to comply with all relevant federal, and applicable state, and local laws and regulations, including provisions of pertinent EPA regulations, Oil Pollution Prevention, and BLM California IM CA-92-124, Oil and Gas Guidelines for Undesirable Events (NTL-3A). Nonetheless, the potential remains for hydrocarbon and chemical leaks or spills to occur on the project site and contaminate soils during project implementation. Given the required regulatory

compliance framework, the likelihood of these spills is low, and any impacts to soils from spills would not be significant.

No Action:

There would be no additional impacts beyond existing activities to soil from the No Action alternative because the project would not occur.

3.6 Water Quality and Quantity

3.6.1 Affected Environment

The proposed project is within the Tulare Lake Hydrologic Region, the San Joaquin Basin, and the Kern County Subbasin. This subbasin is bound on the north by the Kern County line, on the east and southeast by granitic bedrock of the Sierra Nevada foothills and Tehachapi Mountains, and on the southwest and west by the marine sediments of the San Emigdio Mountains and Coast Ranges. From oldest to youngest, the intermediate to shallow depth water-bearing deposits include the Olcese and Santa Margarita Formations (drinking water only in northeastern subbasin), the Tulare Formation (western subbasin), the Kern River Formation (eastern subbasin), older alluvium/stream deposits, and younger alluvium and flood basin deposits (DWR, 2006). The aquifers in this subbasin are generally quite thick, commonly exceeding 1,000 feet in depth. The maximum thickness of freshwater-bearing deposits (4,400 feet) occurs at the southern end of the subbasin (DWR, 2003).

There are no perennial rivers or lakes in this project area. No underground source of present or potential future drinking water, as defined by federal code, exists on lease CAS0019360. The Tulare formation extends to the surface and is an exempt aquifer as defined in the 1982 Underground Injection Control Program Memorandum of Agreement (MOA) between California Division of Oil and Gas Resources and the United States Environmental Protection Agency.

Berry proposes to use 1,500 bbls of water per well for drilling and dust abatement. Water would be obtained from a station in the North Kern Water District located at the Southwestern lease. Water trucks would be used to transport all water using existing access roads. Storage tanks would be used to minimize road traffic and conserve and reuse water.

3.6.2 Environmental Impacts

Proposed Action:

Each well would require approximately 1,500 bbls of water for drilling, dust control and pad construction; all water would be obtained from the North Kern Water District located the Southwestern lease.

Groundwater is safeguarded from potential contamination during drilling and production operations through the implementation of multiple protective measures, as mandated by 43 CFR 3172. These measures include the installation of steel casing(s), cement sheath(s), and other mechanical isolation devices as integral components of the well construction process. Moreover,

the impermeable rock formations separating the hydrocarbon producing formation from existing groundwater have served as a natural barrier over millions of years. Well construction procedures adhere strictly to guidelines outlined in 43 CFR 3172 to ensure the prevention of fluid migration and transportation between subsurface layers, thereby minimizing the risk of groundwater contamination.

The Design Features of the proposed action would avoid direct and indirect impacts to underground sources of drinking water and surface waters. Although there is a groundwater aquifer that is not exempt from the waiver system set for by the Regional Water Quality Control Board, engineering controls such as casing and cementing would isolate any sources of groundwater during drilling operations. Surface waters are not expected to be directly or indirectly impacted because Berry would avoid modification to the adjacent drainage. Also, Berry would implement all applicable Design Features to avoid erosion, sediment carry, and other impacts to the adjacent drainage. In addition, water used and produced during the project would be recycled and/or reinjected back into the groundwater aquifer under an Underground Injection Permit issued by CalGEM.

No Action:

There would be no additional impacts to water quality and quantity from the No Action alternative because the project would not occur.

3.7 Socioeconomics

NEPA does not require an agency to quantify project impacts through a specific methodology, such as estimating the “social cost of carbon,” “social cost of methane,” or “social cost of greenhouse gases.” A protocol to estimate what is referenced as the “social cost of carbon” (SCC) associated with GHG emissions was developed by a federal Interagency Working Group on the Social Cost of Greenhouse Gases (IWG).

Executive Order 14154, *Unleashing American Energy* (Jan. 20, 2025), disbanded the IWG and withdrew any guidance, instruction, recommendation, or document issued by the IWG. Section 6(c) of Executive Order 14154 states:

The calculation of the “social cost of carbon” is marked by logical deficiencies, a poor basis in empirical science, politicization, and the absence of a foundation in legislation. Its abuse arbitrarily slows regulatory decisions and, by rendering the United States economy internationally uncompetitive, encourages a greater human impact on the environment by affording less efficient foreign energy producers a greater share of the global energy and natural resource market. Consequently, within 60 days of the date of this order, the Administrator of the EPA shall issue guidance to address these harmful and detrimental inadequacies, including consideration of eliminating the “social cost of carbon” calculation from any Federal permitting or regulatory decision.

Executive Order 14154 further directs agencies to ensure consistency with the guidance in OMB Circular A-4 of September 17, 2003, when estimating the value of changes in greenhouse gas emissions from agency actions.

BLM has not included any estimates for the SCC for the proposed 8 wells for multiple reasons. First, this action is not a rulemaking. Rulemakings are the administrative actions for which the IWG originally developed the SCC protocol. Second, Executive Order 14154 clarifies that the IWG has been disbanded, and its guidance has been withdrawn.

Further, NEPA does not require agencies to conduct a cost-benefit analysis. Including an SCC analysis without a complete cost-benefit analysis, which would include the social benefits of the proposed action to society as a whole and other potential positive benefits, would be unbalanced, potentially inaccurate, and not useful to foster informed decision-making. Any increased economic activity—in terms of revenue, employment, labor income, total value added, and output—that is expected to occur as a result of the proposed action is simply an economic impact, not an economic benefit, inasmuch as any such impacts might be viewed by another person as a negative or undesirable impact due to a potential increase in the local population, competition for jobs, and concerns that changes in population will change the quality of the local community. “Economic impact” is distinct from “economic benefit,” as understood in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from a cost-benefit analysis, which NEPA does not require. In addition, many benefits and costs from agency actions cannot be monetized and, even if monetizable, cannot meaningfully be compared directly to SCC calculations for several reasons, including because of differences in scale (local impacts vs global impacts).

Finally, purported estimates of SCC would not measure the actual environmental impacts of a proposed action and may not accurately reflect the effects of GHG emissions. Estimates of SCC attempt to identify economic damages associated with an increase in carbon dioxide emissions—typically expressed as a one metric ton increase in a single year—and typically includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results across models, over time, across regions and impact categories, and across multiple scenarios. The dollar cost figure arrived at based on consideration of SCC represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. But SCC estimates are often expressed in an extremely wide range of dollar figures, depending on the discount rates used for each estimate, and would provide little benefit in informing BLM’s decision. For these reasons, the Department of the Interior has also rescinded its memorandum of October 16, 2024, entitled, “Updated Estimates of the Social Cost of Greenhouse Gases,” which had directed Interior bureaus to calculate SCC using the methodology contained in the Environmental Protection Agency’s Final Rule of March 8, 2024, 89 Fed. Reg. 16,820.

To summarize, the BLM is not evaluating SCC for the proposed 6 wells because: (1) BLM is not engaged in a rulemaking for which the now-rescinded SCC protocol was originally developed; (2) the IWG has been disbanded and all technical supporting documents and associated guidance have been withdrawn; (3) NEPA does not require agencies to prepare SCC estimates or cost-benefit analyses; (4) costs attributed to GHGs are often so variable and uncertain that they are unhelpful for BLM’s analysis; and (5) the full social benefits of carbon-based energy production have not been monetized, and quantifying only the costs of GHG emissions, but not the benefits, would yield information that is both potentially inaccurate and not useful.

Chapter 4. Cumulative Impacts

A cumulative impact, as defined by NEPA, is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of which agency (federal or non-federal) or person undertakes such other action. The following section provides details of the cumulative impacts analysis conducted on the project for impacted resources.

4.1 Methodology

Spatial and Temporal Bounds

In order to determine the cumulative impact of an alternative on impacted resources, spatial and temporal bounds were defined for each resource. The spatial bounds consist of the geographic area which will be directly and/or indirectly impacted by the action, referred to as the resource study area (RSA). When possible and logical, natural boundaries are preferred for the RSA. Temporal bounds include the timeframe in which past, present, and reasonably foreseeable future actions must be identified and analyzed. The outer limit of the spatial and temporal bounds was defined as the place where effects of the project are no longer meaningful on their own.

Past, Present, and Reasonably Foreseeable Future Actions

Once spatial and temporal bounds were defined, past, present and reasonably foreseeable future actions that will take place within the RSA during the relevant temporal boundary were identified.

Thresholds

Next, thresholds for which to compare the combined effects of the action with past, present, and reasonably foreseeable future actions were identified. A threshold is a legal, administrative, or technical threshold which provides context for the relative significance of an impact when combined with other past, present, and reasonably foreseeable future impacts. A quantitative analysis is provided where possible; where quantification is infeasible, qualitative effects are described.

4.2 Cumulative Impacts Analysis

As discussed previously, cumulative impacts result from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions. Therefore, only resources on which an incremental impact is expected are analyzed for cumulative impacts.

Proposed Action:

The following table summarizes the determination of the need for cumulative impacts analysis for each resource which was analyzed in detail in this assessment.

Table 4.1 Summary of Impacts Expected to Result from Proposed Action

Resource	Direct/Indirect Impacts	Analysis Required?
Air Quality	Minor increase in NAAQS emissions.	Yes
Climate Change	Minor increase in greenhouse gases.	Yes
Biological Resources	Minor habitat loss.	Yes
Paleontological Resources	Potential inadvertent discovery of paleontological materials not expected to cause impacts based on mitigation measures.	No
Soil Resources	Minimization, mitigation, and reclamation efforts eliminate impacts.	No
Water Quality/Quantity	Water quality/quantity not expected to be impacted based on Design Features.	No

Since the project was determined to have no impact on paleontological resources, soil resources, and water quality/quantity, no cumulative impact analysis was required for these resources. The remaining resources on which the project would have incremental impacts were included in the following analysis.

No Action Alternative:

Since the No Action Alternative would have no incremental contribution to past, present, and reasonably foreseeable future actions, no cumulative impact analysis is required.

4.2.1 Air Quality

This analysis considers the incremental effect of the six additional oil wells in the MWSS Oilfield. The RSA for the proposed action (where the effects of the action will be felt) includes the SJVAPCD. As described above, the greatest air quality impacts related to oil production come from use of fuels made from the produced crude oil. These emissions are analyzed in this EA as midstream and end-use emissions. According to the CEC, about three quarters of oil used in California is imported into the State and therefore about three quarters of midstream and end-use emissions in California come from processing and use of imported oil. Of the remaining quarter, one-fifth comes from non-BLM lands. This means that the emissions and impacts from 80% of the crude oil processed and used in California are not related to the proposed action.

The remaining 20% of the crude oil used in California is produced from BLM Public Land. This production is governed by actions of local, state, and Federal agencies including the BLM. As discussed under the General Conformity heading in Chapter 3 above, BLM actions can only affect emissions from oil and gas development and production. Midstream (transportation, storage, processing) and end-use emissions are outside of BLM jurisdiction and practical control. Therefore, SJVAPCD Oil & Gas Production emissions estimated by the EPA in the NEI can represent the current cumulative air emissions, air quality, and climate impacts of past actions regarding oil and gas production. Table 4.2 presents maximum annual pollutant of concern emissions related to the proposed action in context with SJVAPCD emissions from oil & gas production and total SJVAPCD emission. For further context, see a breakdown of relative emissions and impacts from major emission source categories in the SJVAPCD presented in Table 3.2 above. Table 3.2 shows that oil and gas production make up only a small fraction of total criteria emissions in the SJVAPCD, less than 1%. Table 4.2 below shows that oil and gas

production also cause less than 1% of the pollutants of concern that contribute to the SJVAPCD non-attainment status and health concerns.

Table 4.2 - Cumulative Analysis: Project-related Pollutant of Concern Emission Rates in the Context of reasonably foreseeable SJVAPCD Pollutant of Concern Emissions.

Source	tons per year	%
Wildfire	526,804	68.894%
Mobile Sources	84,978	11.113%
Agriculture	81,524	10.662%
Solvent Use	29,293	3.831%
Waste Disposal	11,105	1.452%
Residential Fuel Combustion	8,275	1.082%
Commercial and Industrial Fuel Use	6,575	0.860%
Industrial Processes other than Petroleum and Natural Gas	7,894	1.032%
Oil & Gas Production	4,531	0.593%
Commercial Cooking	2,507	0.328%
Oil & Gas Midstream	1,142	0.149%
Proposed Action Maximum Pollutant of Concern Emissions from Table 3.5	25	0.003%
Total	764,653	100%

Source: EPA. 2020 National Emissions Inventory (NEI) Online 2020 NEI Data Retrieval Tool. <https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data>

Table 4.2 shows that past agency actions, including the many regulations and other actions taken by CARB and SJVAPCD to limit emissions and protect air quality, have kept air pollution and air quality impacts related to oil and gas production relatively low.

Table 4.2 also shows that the proposed action will increase total emissions of non-attainment pollutants or precursors in the SJVAPCD. However, as described above in the discussion of AQI, the increase is very small compared to ongoing emissions from other sources and would not be expected to degrade current air quality in any substantial or even discernable way. A similar analysis applies to HAP emissions. SJVAPCD residents are exposed to a substantial rate of ongoing HAP emissions and related health risks. The proposed wells would increase those emissions; however, as described above, the increase would be too small to cause a discernable change to existing health risks.

BLM California analyzed a total of 60 well APDs prior to this analysis, since the beginning of Fiscal Year 2025. The cumulative increase in Well Development, Production and Mid-Stream pollutant of concern emissions from all FY 2025 wells including the previously approved wells and the current proposed wells would be approximately 441.6 tons per year and would represent 0.001% of the 2020 SJVAPCD total. This small increase would not be expected to have discernable effects on air quality in the SJVAPCD. See Section 3.1.1 for more discussion of this point.

BLM reviewed data available from the CalGEM Well Finder website (<https://www.conservation.ca.gov/calgem/Pages/WellFinder.aspx>) to assess the future pollutant emission trends from the proposed wells. Individual records of a representative sample of wells in the vicinity of the proposed wells show that oil production declines rapidly beginning within weeks of when a new well comes online in the MWSS Oilfield and continues to decrease throughout its

production life. This pattern of production decline, depicted in Figure 9 for GHG emissions, is typical for all emissions related to oil and gas wells. Most of the emissions related to the proposed wells, including all the midstream and end use emissions, are directly related to production volumes, and future criteria and HAP emission rates related to the proposed wells are expected to be lower than the rates analyzed in this EA. Therefore, future environmental and health risks related to these wells are expected to decrease from the levels described in this analysis.

Cumulative oil and gas emissions and related health risks in the air district are similarly related to the total number and age of wells. Both BLM and CalGEM (https://www.bakersfield.com/news/state-takes-credit-for-issuing-23-fewer-oil-drilling-permits/article_b81a116c-5f36-11eb-a28c-937444d34f20.html) records show decreased rates of new drilling and increased rates of well abandonment in recent years. If this trend continues, future total oil and gas production industry criteria, GHG and HAP/TAC emissions would be expected to decline. Current California policy calls for significant reductions in fossil fuel use. Laws, regulation and other government actions have been taken to promote use of electric vehicles and to otherwise reduce the demand for petroleum. To the extent that these policies and actions can be effectively implemented, demand for petroleum products and drilling of new oil wells would be expected to decline and future cumulative air quality impacts, air toxics (HAP and TAC) health risks, and climate impacts related to fossil fuels, will likely be reduced.

4.2.2 Climate Change

The analysis of GHGs contained in this EA includes estimated emissions from the lease as described above. Climate change is a global phenomenon with impacts related to the average concentration of GHGs in the atmosphere. Therefore, the RSA for the proposed action (where the effects of the proposed action will be felt) includes the entire nation. An assessment of GHG emissions from other BLM fossil fuel authorizations, including coal leasing and oil and gas leasing and development, is included in the BLM Specialist Report on Annual GHG Emissions (referred to as Annual Report, see Chapter 7). The Annual Report includes estimates of reasonably foreseeable GHG emissions related to BLM lease sales anticipated during the fiscal year, as well as the best estimate of emissions from ongoing production, and development of parcels sold in previous lease sales. It is, therefore, an estimate of cumulative GHG emissions from the BLM fossil fuel leasing program based on actual production and statistical trends.

The Annual Report provides an estimate of short-term and long-term GHG emissions from activities across the BLM's oil and gas program. The short-term methodology presented in the Annual Report includes a trends analysis of (1) leased federal lands that are held-by-production, (2) approved APDs, and (3) leased lands from competitive lease sales occurring over the next annual reporting cycle (12 months), to provide a 30-year projection of potential emissions from Federal oil and gas lease actions over the next 12 months. The long-term methodology uses oil and gas production forecasts from the Energy Information Administration (EIA) to estimate GHG emissions out to 2050 that could occur from past, present, and future development of Federal fluid oil and gas. For both methodologies, the emissions are calculated using life-cycle-assessment emissions and data factors. These analyses are the basis for projecting GHG emissions from lease parcels that are likely to go into production during the analysis period of the Annual Report and represent both a hard look at GHG emissions from oil and gas leasing and the best available estimate of reasonably foreseeable cumulative emissions related to any one lease sale or set of quarterly lease sales.

Table 4.3 shows the aggregate GHG emissions estimate that would occur from Federal leases, existing and foreseeable, between the years 2022 and 2050, using the methodology described above. The 5-year lease averages include all types of oil and gas leases, including leases granted under the Mineral Leasing Act as well as other authorities, that have been issued over the last five years. As such, the projections made from the 5-year averages represent the potential for all types of future oil and gas development activity, and although not at exact acreages, include emissions that would be associated with the subject lease. However, they may also over-estimate the potential emissions from the 12-month cycle of competitive oil and gas leasing activities if the projected lease sale or development activity does not actually occur or is less than estimated.

Table 4.3 Reasonably Foreseeable Projected Emissions from Federal Lease Development

State (BLM Administrative Unit)	GHG Emissions from Past, Present, and Foreseeable Federal Lease Development (Mt CO ₂ e per year) *
Alabama (ES)	9.34
Alaska	136.9
Arkansas (ES)	9.34
California	51.49
Colorado	243.1
Idaho	0.17
Illinois	0.31
Kansas (ES)	3.32
Kentucky (ES)	0.19
Louisiana (ES)	43.29
Michigan (ES)	1.95
Mississippi (ES)	2.89
Montana	58.82
Nebraska (WY)	0.21
Nevada	2.74
New Mexico	1,939.52
New York	0.01
North Dakota (MT)	379.63
Ohio (ES)	0.37
Oklahoma (NM)	20.43
Pennsylvania	0.46
South Dakota (MT)	2.31
Texas (NM)	49.55
Utah	187.84
Virginia	0.15
West Virginia (ES)	0.45
Wyoming	1,487.65
Total	4,614.81

*Emissions obtained from 2021 Annual Report, Figure 5-1

The most recent short-term energy outlook (STEO) published by the EIA (<https://www.eia.gov/outlooks/steo/>) (EIA, 2023) predicts that the world’s oil and gas supply and consumption will increase over the next 18-24 months. The latest STEO projections are useful for providing context for the No Action discussion as the global forecast models used for the STEO

are not dependent on whether the BLM issues onshore leases but are based on foreseeable short-term global supply and demand and include oil and gas development /operations on existing U.S. onshore leases. The most recent STEO includes the following projections for the next two years:

- U.S. liquid fuels consumption was projected to increase to 20.45 million barrels per day (b/d) in 2023 up from 20.28 million b/d in 2022 and further increase to 20.76 million b/d in 2024.
- U.S. crude oil production was expected to average 11.9 million b/d in 2022 and to rise to 12.4 million b/d in 2023 and 12.63 b/d in 2024.
- U.S. natural gas consumption was expected to average 86.4 Bcf/d in 2023, decreasing from 88.5 Bcf/d in 2022.
- U.S. LNG exports were expected to increase from 10.59 billion cubic feet/day (Bcf/d) in 2022 to 12.07 Bcf/d in 2023 and 12.73 Bcf/d in 2024.
- U.S. Coal production was expected to total 552 million short tons (MMst) in 2023 and 502.6 MMst in 2024 and decrease to 17% of total U.S. electricity generation in 2023 compared to 20% in 2022 driven by on-going retirement of coal-fired generating plants.
- Generation from renewable sources was expected to make up an increasing share of total U.S. electricity generation, rising from 22% in 2022 to 24% in 2023 and 26% in 2024.

Recent events, both domestically and internationally, have resulted in abrupt changes to the global oil and gas supply. EIA studies and recent U.S. analyses (associated with weather impacts, etc.) regarding short-term domestic supply disruptions and shortages or sudden increases in demand demonstrate that reducing domestic supply (in the near-term under the current supply and demand scenario) will likely lead to the import of more oil and natural gas from other countries, including countries with lower environmental and emission control standards than the United States (EIA, 2021). Recent global supply disruptions have also led to multiple releases from the U.S. Strategic Petroleum Reserve to meet consumer demand and curb price surges.

The EIA 2023 Annual Energy Outlook (<https://www.eia.gov/outlooks/aeo/>) projects energy consumption increases through 2050 as population and economic growth outweighs efficiency gains. As a result, U.S. production of natural gas and petroleum and liquids will rise amid growing demand for exports and industrial uses. U.S. natural gas production increases by 15% from 2022 to 2050. However, renewable energy will be the fastest-growing U.S. energy source through 2050 as electricity generation shifts to using more renewable sources, domestic natural gas consumption for electricity generation is expected to decrease by 2050 relative to 2022. As a result, energy-related CO₂ emissions are expected to fall 25% to 38% below 2005 level, depending on economic growth factors. Further discussion of past, present and projected global and state GHG emissions can be found in Chapter 6 of the Annual Report.

Carbon budgets are an estimate of the amount of additional GHGs that could be emitted into the atmosphere over time to reach carbon neutrality while still limiting global temperatures to no more than 1.5°C or 2°C above preindustrial levels. Carbon budgets were originally envisioned as being a convenient tool to simplify communication of a complex issue and to assist policymakers considering options for reducing GHG emissions on a national and global scale. Carbon budgets have not yet been established on a national or subnational scale, primarily due to the lack of

consensus on how to allocate the global budget to each nation, and as such the global budgets that limit warming to 1.5 °C or 2.0 °C are not useful for BLM decision making, particularly at the lease sale stage, as it is unclear what portion of the budget applies to emissions occurring in the United States.

However, stakeholders and members of the public have requested that the BLM consider comparing its predicted emissions in the context of global carbon budgets. Table 7-4 in the 2021 BLM Specialist Report provides an estimate of the potential emissions associated with BLMs fossil fuel authorizations in relation to IPCC carbon budgets. Total Federal fossil fuel authorizations including coal, natural gas and oil represents approximately 1.75 % of a suggested global carbon budget of 400-500 GtCO₂ needed to limit global warming to 1.5°C.

Greenhouse Gas Mitigation Strategies

GHG emissions contribute to changes in atmospheric radiative forcing resulting in climate change impacts. GHGs act to contain solar energy loss by trapping longer wave radiation emitted from the Earth's surface and act as a positive radiative forcing component. The buildup of these gases has contributed to the current changing state of the climate equilibrium towards warming. Chapters 8 and 9 of the Annual Report provides a detailed discussion of climate change science, trends, and impacts. The relationship between GHG emissions and climate impacts is complex, but a project's potential to contribute to climate change is reduced as its net emissions are reduced. When net emissions approach zero, the project has little or no contribution to climate change. Net-zero emissions can be achieved through a combination of controlling and offsetting emissions. Emission controls (e.g., vapor recovery devices, no-bleed pneumatics, leak detection and repair, etc.) can substantially limit the amount of GHGs emitted to the atmosphere, while offsets (e.g., sequestration, low carbon energy substitution, plugging abandoned or uneconomical wells, etc.) can remove GHGs from the atmosphere or reduce emissions in other areas. Chapter 10 of the Annual Report provides a more detailed discussion of GHG mitigation strategies.

Several Federal agencies work in concert to implement climate change strategies and meet U.S. emissions reduction goals all while supporting U.S. oil and gas development and operations. The EPA is the Federal agency charged with regulation of air pollutants and establishing standards for protection of human health and the environment. The EPA has issued regulations that will reduce GHG emissions from any development related to the proposed leasing action. These regulations include the New Source Performance Standard for Crude Oil and Natural Gas Facilities (49 CFR 60, subpart OOOOa) which imposes emission limits, equipment design standards, and monitoring requirements on oil and gas facilities. A detailed discussion of existing regulations and Executive Orders that apply to BLM management of federal lands as well as current Federal and state regulations that apply to oil and gas development and production can be found above and in Chapter 2 of the Annual Report.

4.2.3 Biological Resources

The RSA considered for biological resources is Section 28, T32S, R24E, MDBM, in Kern County, CA, which includes a total of 640 acres. While natural boundaries are preferred, multiple species

with varying habitat needs are included in the cumulative effects assessment for biological resources and no one natural boundary was appropriate for this assessment. Therefore, in this case administrative boundaries were chosen which are large enough to sufficiently include nearby habitat for all species which could be impacted by the project and other projects within the associated oil field that may impact that species' habitat. The time frame for the cumulative impact analysis is 30 years, i.e., the projected life of drilling, production, and abandonment of the proposed wells.

Including all development (roads, well pads, etc.), the RSA has lost a total of 80 acres of habitat since development began, which constitutes about 12.5% of the RSA which is previously disturbed. Due to the nature of the previous development (similar to that of the proposed action), impacts to the 80 acres of previously disturbed area in the RSA are similar to those discussed previously in this EA which would be expected to result from the proposed action. Once the well area is reclaimed, habitat will be restored with time.

Compliance with the Project Specific Provisions of the 2017 Oil and Gas Programmatic Biological Opinion (08ESMF00-2016-F-0683) and other regulatory mechanisms such as pertinent EPA regulations, Oil Pollution Prevention, and BLM California IM CA-92-124, Oil and Gas Guidelines for Undesirable Events (NTL-3A) would effectively minimize direct or indirect effects to habitat and species in the San Joaquin Valley, including listed and sensitive species. Habitat disturbance would be offset by purchasing off-site mitigation acreage for federal oil and gas projects, ensuring that land identified as reserves or corridors be conserved as habitat. Although mitigation acres are located outside of the RSA, the mitigation would positively impact biological resources overall. Finally, once the well is abandoned, the area is committed to be reclaimed and habitat would ultimately be restored in the project area.

Chapter 5. Consultation and Public Involvement

5.1 Biological Consultation

Formal consultation with the U.S. Fish and Wildlife Service was initiated in 2016. The Fish and Wildlife Service issued a “No jeopardy” biological opinion on December 22, 2017 (Programmatic Biological Opinion on Oil and Gas Activities on Bureau of Land Management Lands in the San Joaquin Valley, 08ESMF00-2016-F-0683).

5.2 Persons, groups, and agencies consulted

Ryan Nelson – Berry Petroleum
Jared Pratt – Stantec Biological

5.3 Summary of Public Participation

The BLM posted notification that it was considering these NOSs/APDs on the E-Planning public website on May 3rd, 2024. This notice initiated the 30-day scoping period. The BLM also posted copies of the APD in the front lobby of the Bakersfield Field Office for that 30-day period. Comments from the Center of Biological Diversity and Earth Justice were received. Comments have been addressed in this EA.

5.4 Recipients of Native American Notification Letter (#23-16)

Tule River Indian Tribe
Tejon Indian Tribe
Santa Rosa Rancheria Tachi Yokut Tribe

5.5 List of Preparers

Matthew Thomas, Natural Resource Specialist
Lisa Schwarz, Natural Resources Specialist
Frank Giles, Air Resources Specialist
Rebecca Daniels, Planning and Environmental Coordinator
Zachary Day, Archaeologist, Cultural and Paleontological Resources

Chapter 6. References

Argonne National Laboratory. 2022. GREET_WTW_Calculator.xlsm (<https://greet.es.anl.gov/tools>).

Bureau of Land Management (BLM) 2007. Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands. Instruction Memorandum No. 2008-009, released October 15, 2007.

Bureau of Land Management (BLM), 2016. Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands Instruction Memorandum No. 2016-124, released July 20, 2016.

Bakersfield Resource Management Plan, December 2014. Bakersfield Field Office, Bakersfield, California.

Bureau of Land Management (BLM). 2017. Central Coast Field Office Draft Resource Management Plan Amendment and Draft Environmental Impact Statement for Oil and Gas Leasing and Development. Index No. BLM/CA/PL-2017 /001+1610+1675+1793. Central Coast Field Office, Marina, California. January 5, 2017.

Bureau of Land Management (BLM). 2019. Bakersfield Field Office Hydraulic Fracturing Final Supplemental Environmental Impact Statement. Bakersfield Field Office, Bakersfield, California. November 1, 2019.

Bureau of Land Management Cultural Resource Inventory Report 6000-2014-064. Class III Inventory, Vintage Alta Vedder Well Pads, and NRHP Eligibility Evaluation, Site AV-1, Kern County, California. Peter Carey, Russell Kaldenberg and Jena Rizzi, ASM Affiliates. On file at the Bureau of Land Management Bakersfield Field Office and the San Joaquin Valley Archaeological Information Center.

Bureau of Land Management Cultural Resource Inventory Report CA-160-C/V-769. Class III Inventory of the Main Camp Lease, Midway-Sunset Oil Field, Kern County, California, David W. Whitley, Ph.D., ASM Affiliates, 2011. On file at the Bureau of Land Management Bakersfield Field Office and the San Joaquin Valley Archaeological Information Center.

Bureau of Land Management Cultural Resource Inventory Report 6000-2016-09. LINN Energy 6 and 8-inch Water Pipeline Project, Kern County, California, Russell Kaldenberg, ASM Affiliates, 2016. On file at the Bureau of Land Management Bakersfield Field Office and the San Joaquin Valley Archaeological Information Center.

BLM Notice of Staking and Applications for Permit to Drill Environmental Assessment DOI-BLM-CA-C060-2017-0091-EA. Bakersfield Field Office, Bakersfield, California. May 17, 2017. ([Environmental Assessment \(DOI-BLM-CA-C060-2017-0091-EA\)](#)).

California Air Pollution Control Officers Association. 2022, Gasoline Service Station Industrywide Risk Assessment Technical Guidance, Appendix B

(https://ww2.arb.ca.gov/sites/default/files/202203/Draft%202022%20Gas%20Station%20IWG%20-%20Technical%20Guidance_ADA%20Compliant.pdf)

California Air Resources Board (CARB), 2009. The California Almanac of Emissions and Air Quality–2009 Edition. Available at: <http://www.arb.ca.gov/aqd/almanac/almanac09/almanac09.htm>.

California Air Resources Board (CARB), 2019. California Greenhouse Gas Inventory for 2000-2017, by Category as Defined in the 2008 Scoping Plan. Updated: August 12, 2019.

California Air Resources Board (CARB), 2020. Climate Change Programs. Retrieved from: <http://www.arb.ca.gov/cc/cc.htm>.

California Council on Science and Technology (CCST). 2014. Advanced Well Stimulation Technologies in California. August 28, 2014. <http://ccst.us/publications/2014/2014wstES.pdf>.

California Department of Conservation, Division of Oil, Gas, & Geothermal Resources, 1998. California Oil and Gas Fields, Volume I, Fourth Edition. Sacramento, California.

California Department of Conservation, Division of Oil, Gas, & Geothermal Resources (CCDOGGR), 2015. SB4 Environmental Impact Report. Available at: http://www.conservation.ca.gov/dog/Pages/SB4_Final_EIR_TOC.aspx.

California Council on Science and Technology (CCST), 2015. An Independent Scientific Assessment of Well Stimulation in California, Volume II: Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations. Available at: <http://ccst.us/publications/2015/160708-sb4-vol-II.pdf>.

California Department of Fish and Wildlife, 2008. California Natural Diversity Database. Sacramento, CA.

California Department of Water Resources (DWR), 1996. California's Groundwater – Bulletin 118: San Joaquin Valley Groundwater Basin. Available at: http://www.water.ca.gov/groundwater/bulletin118/tulare_lake.cfm.

California Department of Water Resources (DWR), 2003. California's Groundwater – Bulletin 118, Update 2003: Tulare Lake Hydrologic Region. Available at: http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater_bulletin_118_-_update_2003/_bulletin118_7-tl.pdf.

California Department of Water Resources (DWR) (online), 2014. Water Data Library. Available at: <http://www.water.ca.gov/waterdatalibrary/index.cfm>

California Regional Water Quality Control Board – Central Valley Region (CRWQCB – CVR), 2004. Water Quality Control Plan for the Tulare Lake Basin, Second Edition. Available at: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/tlbp.pdf.

Clean Water Act

33 U.S.C. §1251 et seq. (1972) The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

Intergovernmental Panel on Climate Change (IPCC), 2014. Climate Change 2014 Synthesis Report Summary for Policymakers. Retrieved from: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

King, George E., and Daniel E. King, 2013. Environmental Risk Arising from Well Construction Failure: Differences Between Barrier Failure and Well Failure, and Estimates of Failure Frequency Across Common Well Types, Locations, and Well Age. Society of Petroleum Engineers. Available at: <https://www.onepetro.org/conference-paper/SPE-166142-MS>.

Mitchell, David C., 1989. The Effects of Oilfield Operations on Underground Sources of Drinking Water in Kern County. California Department of Conservation, Division of Oil and Gas.

Resource Conservation and Recovery Act

Safe Drinking Water Act

§300f et seq. (1974) The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources.

San Joaquin Valley Air Pollution Control District (SJVAPCD), 2016. Climate Change Action Plan. Retrieved from: http://www.valleyair.org/programs/CCAP/CCAP_menu.htm.

San Joaquin Valley Air Pollution Control District (SJVAPCD), 2020. Current District Rules and Regulations. Available at: <http://www.valleyair.org/rules/1ruleslist.htm>.

San Joaquin Valley Air Pollution Control District (SJVAPCD), 2010. Annual Report to the Community. Available at: http://www.valleyair.org/General_info/pubdocs/AnnualReport2010-web.pdf.

San Joaquin Valley Air Pollution Control District (SJVAPCD), 2024. 2024 Plan for the 2012 PM2.5 Standard. Available at: <https://www.valleyair.org/rules-and-planning/air-quality-plans/particulate-matter-plans/2024-plan-for-the-2012-pm25-standard/>.

U.S. Department of Agriculture, National Resources Conservation Services, 2009. Soil Survey of Kern County, California, Southwestern Part. Prepared by Soil Conservation Service in cooperation with the regents of the University of California. U.S. Government Printing Office, 2009.

U.S. Department of Agriculture, Soil Conservation Service, 1988. Soil Survey of Kern County, California, Northwestern Part. Prepared by Soil Conservation Service in cooperation with the regents of the University of California. U.S. Government Printing Office, September 1988.

U.S. Environmental Protection Agency (EPA), 2004. Guidance Document Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites. Prepared by Horizon Environmental Services, Inc. April 2004.

U.S. Department of Energy (DOE), 2015. State of California Energy Sector Risk Profile <https://www.energy.gov/sites/prod/files/2015/05/f22/CA-Energy%20Sector%20Risk%20Profile.pdf>.

U.S. Environmental Protection Agency. 2019. "Inventory of U.S. Greenhouse Gas Emissions and Sinks; 1990-2017." <https://www.epa.gov/sites/production/files/2019-04/documents/us-ghg-inventory-2019-main-text.pdf>.

United States Environmental Protection Agency (EPA), 2016. Regulatory Initiatives. Retrieved from: <https://www3.epa.gov/climatechange/EPAactivities/regulatory-initiatives.html>.

U.S. Fish and Wildlife Service (USFWS), 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California.

U.S. Fish and Wildlife Service (USFWS), 2017. Programmatic Biological Opinion on Oil and Gas Activities on Bureau of Land Management Lands in the San Joaquin Valley (08ESMF00-2016-F-0683). December 22, 2017.

BLM. (2022). *2021 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends*. Retrieved from <https://www.blm.gov/content/ghg/2021>.

EIA. (2021, 06 10). *Supply disruptions and rising demand boosted East Coast petroleum product imports in March*. Retrieved 10 01, 2021, from <https://www.eia.gov/todayinenergy/detail.php?id=48316>.

EIA. (2021, 2022, 2023). *U.S. Energy Information Administration - Annual Energy Outlook*. Retrieved from <https://www.eia.gov/outlooks/aeo/>.

EIA. (2023, 3). *Short-Term Energy Outlook*. Retrieved from <https://www.eia.gov/outlooks/steo/>.

EPA. (2022, 4 28). *GHG Equivalency Calculator*. Retrieved from <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

EPA. (2022, 4 28). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020*. Retrieved from <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2020>.

NETL. (2009). *2008 Development of Baseline Data and Analysis of Life Cycle Greenhouse Gas Emissions of Petroleum-Based Fuels. Tables 3-10, 4-55, and 5-10*. DOE/NETL-2009/1346.

NETL. (2019). *Life Cycle Analysis of Natural Gas Extraction and Power Generation. Appendix F, Table F-31*. DOE/NETL-2019/2039.

Reuters. (2022, 10 19). Retrieved from <https://www.reuters.com/business/energy/energy-crisis-revives-coal-demand-production-2022-10-19/>.

Appendix 1. Design Features

The following design features are part of the proposed action:

Berry shall comply with all federal, and applicable tribal, state, and local laws during project implementation.

Biological Resources

This project will be assigned as project number 147 under the 2017 Oil and Gas Programmatic Biological Opinion (08ESMF00-2016-F-0683). The 2017 Oil and Gas Programmatic Biological Opinion provides take coverage for authorization of individual projects occurring on surface and subsurface lands administered by the BLM in Kern County (among others) that disturb less than 10 acres of habitat or that encompass linear actions less than 10 miles long. This project occurs in Kern County and disturbs 0.273 acres of habitat, thus satisfying the requirements for coverage under the 2017 Oil and Gas Programmatic Biological Opinion (PBO). Compliance with the Project Specific Provisions (Attachment 1) of this Opinion is required. The PBO requires species compensation acreage for each acre of disturbance. A preliminary estimate of compensation is 0.819 compensation acres (0.273 permanent acres compensated at 3:1 = 0.819 acres + 0.273 replacement acres at 1:1 = 1.092 acres).

Incorporate All of the “Avoidance & Mitigation Actions” recommended by consulting biologist Jared Pratt (Stantec Biological) in his December 22nd, 2022, Sensitive Species Review Forms into the project design:

- A biological monitor will be present during initial ground disturbance and will be on-call and notified 661-301-1773 if listed species are observed in the project area subsequent to the initial ground disturbance.
- Prior to project initiation, all company and contract personnel should attend a project specific threatened and endangered species orientation and be made aware of threatened and endangered species protection requirements.
- All potential SJKF dens occurring within 100’ of construction footprints should be monitored by a qualified biologist and excavated and/or blocked prior to project initiation.
- All initial ground disturbing activities should be monitored by a qualified biologist.
- Boundaries of work areas should be clearly delineated with staking and flagging prior to project activities.
- A speed limit of 20 miles-per-hour should be implemented on all non-public paved roads. Extra caution should be observed at night because San Joaquin kit fox are primarily nocturnal.
- No vehicles are permitted off lease roads; project personnel shall stay within areas approved by the biological monitor.
- Any holes that will not be filled in within the working day must be covered overnight and inspected prior to beginning work on the following day.

- During the project, all pipe and culverts should be inspected prior to moving or welding to prevent injury or entrapment of wildlife. Pipe which cannot be inspected (due to bends, etc.) should be capped, or otherwise covered. If any wildlife is found entrapped in a pipe section, the pipe should be avoided and the animal(s) left to leave of its own accord, except as otherwise authorized by USFWS and CDFW.
- All steep-walled trenches or excavations should include escape ramps. At least one escape ramp should be provided in any onsite trenches or excavations at no more than a 2:1 slope. Such trenches or excavations should be inspected for wildlife immediately prior to backfilling.
- Rat-holes, well cellars, and other holes for which escape ramps are not practical should be covered with a solid barrier to prevent wildlife entrapment. Installed grating on well cellars should be no larger than one inch.
- All trash must be placed in covered containers and removed from the site promptly; no trash should be on the ground at any time, especially food waste. Feeding of any wildlife is prohibited.

Construction and Interim Reclamation

Once permit(s) have been issued, the Bureau of Land Management **requires** that **notification** be made **24-48 hours before any ground disturbing activity** associated with the proposed well(s). This includes grubbing vegetation on the pad, drilling activities, sump installation or removal, addition of facilities or other sundries, as well as interim and final reclamation. Final amounts of disturbance will be provided as part of the post **construction compliance report to include shapefiles of the project area. The post construction compliance report is to be submitted within 60 days of well completion.**

At the beginning of construction, any topsoil (approximately the top four-six inches of soil) shall be removed from the project area and stockpiled on an existing pad or previously disturbed surface near the project site. After well completion, topsoil will be re-applied to the cut and fill slopes, as well as the sump(s). “Well completion” is a technical term used to describe the final phase of well drilling; “well completion” is not synonymous with the final phase of project implementation. Prior to applying topsoil, the surface will be cleared of trash and debris, ripped to a minimum depth of 12 inches, and re-contoured to match the surrounding topography. Native seed mix approved by the BLM will be used for final site reclamation. Reseeding will coincide with the rainy season (October-April). No fencing will be used for cut and fill slopes. Remaining topsoil will be stockpiled on an existing well pad or other previously disturbed surface and retained for future reclamation. Topsoil will be retained for no more than one year. If the topsoil is not redistributed within one year, the operator may receive a WO or INC.

Berry will operate and maintain the proposed wells, power lines, and pipelines in **good working condition**. Wells will be monitored for leaks and issues detected will be resolved promptly. Berry field operations personnel will inspect flow lines and replace segments of pipe as needed to maintain system integrity. If the well is productive, the portion of the well site to be utilized for the production operations will be maintained as “vegetation free”. In addition, all fencing, netting, grates, guards and secondary containment areas will be maintained to fulfill their purposes and prevent entrapment of wildlife. Wells and chemical storage tanks must have proper signage displayed. All practicable measures will be taken to minimize erosion and stabilize disturbed soils. The following types of interim stabilization or similar methods may be used if necessary: jute netting, hydro-mulch, straw wattles, or crimped straw mulch.

Any off-lease storage, off-lease measurement, or commingling on-lease or off-lease will have prior written approval from the BLM – Bakersfield Field Office. Similarly, Berry will obtain approval for any construction needs beyond those specified herein via the **sundry notice process**.

All permanent above-ground structures (e.g., production equipment, etc.) not subject to safety requirements shall be painted to blend with the natural color of the landscape. The paint used will be a color which simulates “Standard Environmental Colors”. The colors selected for the project location are Covert Green or Carlsbad Canyon.

Management of Noxious Weeds

A site-specific weed control EA and a Pesticide Use Proposal (PUP) must be completed before any use of pesticides on BLM lands. This can be a lengthy process and requires specific information, public notification, and review by the BLM State Office. Currently, the applicant does not have these approvals in place. Therefore, no herbicide treatment is authorized at this time.

Use of Pesticides

Berry shall comply with all federal, tribal, state, and local laws **regulating the use of pesticides** throughout pre-construction, construction, production, and reclamation.

Final Reclamation

Disturbed lands shall be re-contoured to conform with existing undisturbed topography unless the BLM determines that re-contouring would result in negative impacts to special status species. No depressions shall be left that trap water or form ponds. All portions of final reclamation may be subject to additional cultural resources and paleontological inventory and may require a permit. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area and consider location, scale, shape, color, and orientation of major landscape features and meet the needs of the planned post disturbance land use.

Final reclamation shall specifically achieve the following:

1. The reclaimed area shall be stable and exhibit none of the following characteristics:
 - a. Large rills or gullies (greater than 6 inches deep).
 - b. Perceptible soil movement or head cutting in drainages.
 - c. Slope instability on, or adjacent to, the reclaimed area in question.
2. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
3. Vegetation production and species diversity (including shrubs) shall approximate the surrounding undisturbed area (50-150% of the adjacent species composition and cover). The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself. This shall be demonstrated by:
 - a. Successful onsite establishment of species included in the planting mixture or other desirable species.
 - b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
4. Habitat Restoration

- a. Restoration will be required on unused portions, including abandoned, unused, or unnecessary roads, of the project area or oil and gas lease when deemed necessary by the BLM to maintain or improve habitat values. Restoration will be required when reserve area (Red Zone) and habitat corridor (Green Zone) limits are exceeded and when a project or lease is abandoned. Restoration activities will be supervised by an onsite monitoring biologist
- b. The following are examples of actions that may be required as part of restoration:
 - i. All trash will be removed from the site and disposed of properly.
 - ii. All cement, asphalt, gravel, and oil-contaminated soils will be removed from the site and disposed of properly.
 - iii. All pipelines and other oilfield infrastructure no longer in use will be removed from the site and disposed of properly.
 - iv. Topographic contours will be restored to the maximum extent possible.
 - v. Non-compacted soils or areas previously deep ripped will be disced to a depth of approximately 8 inches.
 - vi. Compacted sites will be deep ripped to a depth of 12 to 18 inches.
 - vii. Slopes greater than 30 per cent will be treated by erosion control methods such as disking along the contour, imprinting, mulching, or installing wattles.
 - viii. Sites will be seeded using methods such as drill or broadcast seeding with a site-appropriate seed mix, approved by the BLM Botanist. Exact seeding mixes and rates will depend on the site characteristics, the species chosen, and the current availability of native seed. Seed mixes will include dominant shrubs and native grasses and herbs compatible with the adjacent plant community. The best time for seeding is generally late summer to early fall prior to the onset of the rainy season.
 - ix. Sites will be considered restored when it can be documented that they support functional, native habitat. Evidence of attainment of this goal will be provided by the project applicant. Restoration in drainages, streambeds, and similar habitats where water is a substantial component may require conformance with conditions of a CDFW Streambed Alteration Agreement or other state or local permit. Demonstration of restoration may include documentation of:
 1. Visual continuity or similarity with adjacent native, undisturbed habitat or a designated reference site.
 2. Topography that follows natural contours and allows for the natural flow of water across the landscape.
 3. Indiscernible boundary lines or areas between the disturbed and undisturbed areas.
 4. Presence of habitat that supports threatened and endangered species.
 5. Vegetation community composition within the normal or desired range. Ratios of native and non-native plants within normal or desired parameters. Presence and abundance of reproducing plants. Presence and abundance of biological soil crusts.

6. Evidence or presence of animals or animal sign on the site. Presence and abundance of desired species. Evidence, presence, and abundance of reproducing species.
7. Evidence of species diversity for both plants and animals.
8. Evidence of soil stability (minimal erosion).
9. Absence of signs of vehicle or other trespass. Absence of trash and contaminated soils.

Cultural Resources

In the event of inadvertent discovery of cultural resources during project implementation, the BLM Field Office Cultural Staff and Field Manager (661-391-6000) shall be immediately notified by personnel responsible for the project. All work at the site of discovery, and in any other locations where damage to the cultural resource could occur, shall also cease until written approval to proceed is issued by the BLM.

If human remains are inadvertently discovered on BLM, all activity will immediately cease surrounding the unanticipated discovery. The holder will ensure that the discovery is secured and protected and will immediately notify the BLM Field Manager (661-391-6000). The BLM will adhere to current regulations regarding the treatment of human remains (Native American Graves Protection and Repatriation Act, 43 CFR 10). Access and use of the area can proceed with written approval from the Field Manager once the appropriate level of review has been determined and completed.

Paleontological Resources

Pursuant to the Paleontological Resources Protection Act (PRPA), BLM lands were evaluated for potential to contain Paleontological Resources within the Bakersfield Field Office management area. The proposed well APD locations are within Potential Fossil Yield Classification 4 (High) geological formations; very old alluvial deposits (Potential Fossil Yield Classification (PFYC) System). As such, a Paleontological Mitigation Plan as developed for an adjacent lease to the Pike Lease has been attached to the Conditions of Approval.

Appendix 2. Headwaters Report

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