**UNITED STATES**
**DEPARTMENT OF THE INTERIOR**
**BUREAU OF LAND MANAGEMENT**
**BAKERSFIELD FIELD OFFICE**
**ENVIRONMENTAL ASSESSMENT**

**September 12, 2012 Oil and Gas Lease Sale**
**Environmental Assessment DOI-BLM-CA-C060-2012-0072**

# Chapter 1. Purpose and Need

## INTRODUCTION

The Bureau of Land Management (BLM), California State Office has received expressions of interest (EOIs) to offer approximately 8,350.09 acres of Federal mineral estate for lease to develop oil and gas resources located within the Bakersfield Field Office. These areas are located within Kern, Kings, and Ventura Counties, California.

The Secretary of the Interior is responsible under the *Mineral Leasing Act of 1920*, as amended, for leasing and managing Federal oil and gas resources on public land. Acting for the Secretary, BLM periodically conducts mineral estate lease sales for lands that are managed by the federal government, whether managed by the Department of the Interior, (BLM, Bureau of Indian Affairs, Fish and Wildlife Service, Park Service), Department of Agriculture (Forest Service), or other Departments.

*Federal Onshore Oil and Gas Leasing Reform Act of 1987 Sec. 5102(a)(b)(1)(A)* (FOOGLRA) directs the BLM to conduct quarterly oil and gas lease sales within each state whenever eligible lands are available for leasing. By conducting a lease sale of the Federal mineral estate, it provides for a potential increase of energy reserves for the U.S., it provides a steady source of significant income, and at the same time meets the requirements identified in the *Energy Policy Act, Sec. 362(2), Mining and Minerals Policy Act of 1970*, and the *Mineral Leasing Act of 1920, Sec. 17*. BLM policy is to offer, as expeditiously as possible, those lands available for oil and gas exploration and possible development, consistent with the *Federal Land Policy and Management Act (FLPMA) of 1976, the National Environmental Policy Act (NEPA) of 1969*, and other applicable laws, regulations, and policies.

## PURPOSE AND NEED

The BLM's purpose for offering parcels and subsequent issuance of leases in the September 2012 lease sale is to provide, as expeditiously as possible, areas for the potential exploration and development of additional oil and gas resources to help meet the nation's current and expanding need for energy sources. California is a major source of oil production in the continental United States. The offering for sale and subsequent issuance of oil and gas leases is needed to meet the requirements of the Mineral Leasing Act, FLPMA, and the mineral management objectives in the Caliente Resource Management Plan (RMP). Oil and gas leasing provides oil and gas companies the opportunity to expand existing areas of production and to locate previously undiscovered oil and gas resources to help meet the public's energy demand.

Decisions to be made based on this analysis include which of the EOI parcels would be offered for lease, which parcels would be deferred from the September 2012 lease sale, which parcels are not available for leasing, and what stipulations will be placed on the parcels that would be offered for lease.

## CONFORMANCE WITH BLM LAND USE PLANS

The 1997 Caliente Resource Management Plan RMP identifies all of these lands as open to oil and gas leasing, subject to certain environment controls indicated in the plan, Ch. 5 page 34. Consequently, this action is in conformance with the Plan. Most importantly, because every parcel is within potential threatened and endangered species and sensitive species habitat; all parcels would contain both Controlled Surface Use –Protected Species, and Controlled Surface Use – Sensitive Species stipulations. These stipulations would ensure through a site specific biota survey and NEPA analysis that all protected or sensitive species issues were addressed prior to any surface disturbance. Additional stipulations for the protection of known, as well as unrecorded cultural and paleontological resources are also required. This would ensure protection of the resources and also provide notification to the lessee that further consultation and mitigation/compensation might be necessary prior to authorization of surface disturbance.

## RELATIONSHIP TO STATUTES, REGULATIONS AND OTHER PLANS

### National Environmental Policy Act

This Environmental Assessment (EA) is tiered to the Caliente Resource Management Plan/Final Environmental Impact Statement (RMP/FEIS), approved May 5, 1997, and is consistent with NEPA and regulations at 43 CFR Subtitle A, part 46. The RMP describes the activities related to oil and gas leasing, development, production, and restoration, which includes special lease stipulations, standard engineering practices, and standard operating practices (Chapter 5, pages 33-47). The FEIS describes the impacts anticipated from oil and gas development in the Field Office and concludes that leasing of lands for oil and gas development is not expected to result in a substantial loss of biological (FEIS, page 75) or cultural resources (FEIS, page 68).

### Oil and Gas Laws and Regulations

The Valley Management Area of the Bakersfield Field Office contains a number of extractable minerals including oil and gas. These minerals are managed in accordance with the Mineral Leasing Act of 1920, as amended; the Mining and Minerals Policy Act of 1970; the Reform Act; 43 CFR, Onshore Orders 1-8; the Energy Policy Act of 2005; and other federal laws, regulations, orders.

### Federal Land Policy and Management Act

The Federal Land policy and Management Act of 1976 (FLPMA), as amended, directs that the public lands be managed "on the basis of multiple-use and sustained yield"…"in manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values" …and "which recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands…". The act further defines "public lands" as "any land and interest in land owned by the United States…and administered by the Secretary of Interior through the BLM.

The BLM has the responsibility for managing the public lands and federal mineral estate included in this lease sale offering.

### Clean Air Act

The BLM has air resource program responsibilities through its permitting programs and Clean Air Act (CAA) requirements. Section 176(c) of the CAA, as amended (43 U.S.C. 7401 et seq.), and regulations

under 40 CFR part 93 subpart W, apply to projects within nonattainment and maintenance areas. Under those authorities "no department, agency or instrumentality of the Federal Government shall engage in, support any way or provided financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan." Under CAA 176(c) and 40 CFR part 93 subpart W, a Federal agency must make a determination that a Federal actin conforms to the applicable implementation plan before the action is taken. As a federal agency, the BLM is responsible for completing a conformity determination; however, the San Joaquin Valley air Pollution Control District (APCD) has air quality jurisdiction over the area where the parcels occur.

Secretarial Order 3289
Secretarial Order 3289 addresses current and future impacts of climate change on America's land, water, wildlife, cultural-heritage, and tribal resources. On September 14, 2009, Secretary Ken Salazar launch a Department-wide approach for apply scientific tools to increase the understanding of climate change; the Order establishes a framework for Bureaus to coordinate climate change science and resource management strategies (http://www.blm.gov). This approach includes the development of Climate Change Response Council and eight DOI Regional Climate Change Response Centers which will work to synthesize and share climate change impact science and management strategies. In addition, through a network of Landscape Conservation Cooperatives, bureaus, agencies, partners, and the public will coordinate landscape-level strategies for managing climate change impacts regionally.

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

BLM completed formal consultation with the FWS for the Caliente RMP; the FWS issued their no jeopardy Biological Opinion (1-1-97-F-64) on March 31, 1997. The proposed action is in accordance with provisions of the Caliente RMP and Biological Opinion.

BLM utilizes a double review process for leasing and development of oil and gas. At the leasing stage a comprehensive NEPA and Biological Opinion addresses leasing and potential development. The March 31, 1997 Caliente RMP Biological Opinion serves as the comprehensive Biological Opinion for leasing, including the proposed action. Should a development proposal actually be submitted, BLM then completes a site specific NEPA and ESA review. If the development proposal may affect listed species, a secondary formal consultation is completed before approving the development of the lease. Additional Biological Opinions for oil and gas development include; Oil and Gas Programmatic Biological Opinion (1-1-01F-0063).

## BLM Oil & Gas Leasing and Lease Management

As part of the September 2012 lease sale preparation process the BLM California State Office submitted the draft parcel list to the Bakersfield Field Office for review and processing. An Interdisciplinary Team (IDT) was convened to review the legal descriptions of the parcels to determine if they are in areas open to leasing; if appropriate stipulations have been included or additional stipulations are needed; whether or not new information is available since the land use plan was approved; if appropriate consultations have been conducted or if additional consultations are needed; and if there are special resource conditions of which potential bidders should be made aware. This Environmental Assessment (EA) has been prepared by the Bakersfield Field Office to document this review, as well as to disclose the affected environment, the anticipated impacts, and proposed mitigation of impacts.

The review process required before oil and gas drilling can occur is described in detail in Title 43 Code of Federal Regulations Part 3100 and BLM Manual 3100. In summary, BLM offers lands for oil and gas lease to the highest qualified bidder in a competitive auction. The lease term is 10 years, and for as long thereafter as oil and gas can be produced in paying quantities, and the maximum lease size offered by BLM is 2,560 acres, (see FOOGRA of 1987 Sec. 5102(b)(1)(A)). BLM conducts and documents an environmental analysis at the lease issuance stage, unless an adequate analysis was included in an existing environmental document.

After obtaining an oil and gas lease and prior to drilling any well, a lessee and/or operator submits an Application for Permit to Drill (APD), indicating the specific location of the drilling site. BLM conducts and documents additional environmental analysis at the APD stage. BLM may require reasonable mitigation measures in the APD, consistent with the lease terms and stipulations.

At the leasing stage, a more generalized study is appropriate because it is not yet known which, if any, of the parcels will actually be developed, and the site specific analysis is more appropriately deferred to when development is proposed. This phased approach for NEPA compliance has been determined by the Ninth Circuit Court of Appeals to be a valid method to comply with applicable laws and regulations. "Uncertainty is inherent in multi-staged projects and a phased analysis for both environmental and cultural (is appropriate)" (Ninth Circuit Court of Appeals, Northern Alaska Environmental Center et al vs. Kempthorne, 2006).

## Directional drilling from adjacent land to a federal lease

On occasion, it may be desirable or necessary to drill a well from a surface location that is not directly above the drilling target. This is known as directional drilling. Even though the surface location may not be within the federal mineral lease, BLM has the authority to regulate drilling from adjacent, non-federal land if federal minerals are involved by requiring a drilling application. Such directional drilling is subject to applicable environmental laws, including NEPA, the National Historic Preservation Act of 1966 (as amended), and the Endangered Species Act of 1973 (ESA), as amended. BLM will process this type of application in the same manner as for an application on leased lands.

The BLM manages subsurface mineral estate, including areas where the surface is privately owned (split estate). BLM can lease the federal mineral estate beneath both public land (BLM administered surface) and split estate lands where the surface estate is owned by another party. For parcels considered in this EA that are split estate, the lessee and/or operator would be responsible not only for adhering to BLM requirements, but also for reaching an agreement with the private surface landowner regarding access, surface disturbance and reclamation.

The BLM has split estate guidance (Washington Instruction Memorandum No. 2003-131) and a recent Instruction Memorandum No. 2009-184, Courtesy Notification of Surface Owners When Split Estate Lands are Included in an Oil and Gas Notice of Competitive Lease Sale. This Instruction Memorandum establishes a BLM requirement to notify surface owners, as a courtesy to inform surface owners when their lands are included in a list of lands to be offered for competitive sale.

Parties filing an Expression of Interest (EOI) to offer lands at a competitive oil and gas lease sale are required to provide the BLM with names and addresses, including the Assessor Parcel Number of any surface owners where split estate lands are included in their EOI.

## Lease terms and stipulations

A lease for oil and gas gives a lessee (holder of the lease) the right to drill and produce, subject to the lease terms, any special stipulations, other reasonable conditions, and approval of an Application for

Permit to Drill (APD). The regulations at 43 CFR 3101.1-2 define the reasonable measures which BLM can require of a lessee. Generally, the BLM cannot deny a lessee the right to drill once a lease is issued unless the action is in direct conflict with another existing law. Stipulations such as the Controlled Surface Use – Protected Species, Controlled Surface Use – Sensitive Species and No Surface Use (Appendix B) are appropriate where sensitive and significant values exist which could be impacted by development of the oil and gas lease.

Any surface disturbing activity requires prior approval of the BLM. Such approval would include a site-specific evaluation and compliance with NEPA requirements.

Where the lessee/operator is unable to reach a surface use agreement with the private surface owner, the lessee/operator can file a surface owner protection bond. This bond should be in an amount sufficient to protect against damages to the surface as allowed in the statute that reserved the mineral rights to the Federal government. However, the minimum of the surface owner protection bond is $1,000.00.

### SCOPING

Internal BLM scoping determined the parcels individually or collectively contain special status species plants and/or animals or their habitat. The draft parcel list includes some parcels that fall within the range of California condor; these parcels will be deferred from leasing at this time. The potential for the presence of cultural resources was also identified.

Public participation will be invited when the EA is posted on the BLM Bakersfield website for a 30-day public comment period. As required by BLM leasing policy, where parcels are split estate, a notification letter soliciting EA review and comments will be sent to the appropriate surface owner based on the surface owner information provided by the party submitting the Expressions of Interest.

## Chapter 2. Proposed Action and Alternatives

A total of 27 lease parcels (8,350.09 acres) were originally nominated and proposed for inclusion in the September 12, 2012 Competitive Oil and Gas Lease Sale.

### ALTERNATIVE 1: PROPOSED ACTION

The proposed action is that of the Bureau of Land Management (BLM) to conduct a quarterly competitive oil and gas lease sale of the unleased federal mineral estate. A total of 8,350.09 acres of federal minerals were analyzed for competitive lease. After a review of the 8,350.09 acres, BLM determined that 5,499.43 acres of those 8,350.09 would be offered. The public is reminded that at the leasing stage, BLM cannot predict whether or not any of the parcels will actually be sold, if they are sold and a lease is issued whether or not they will actually be developed, and if development does occur what the development level would be.

The proposed action is to offer 5,499.43 acres of unleased federal minerals estate identified by the parcel number referenced on Appendix A for oil and gas competitive lease to develop the federal mineral estate. A total of 5,139.43 acres of Federal mineral estate land that are considered for leasing, are split-estate (private surface with Federal subsurface minerals). The public land embraces 360.00 acres. All parcels would be subject to special leasing stipulations that would protect both endangered species and sensitive species and their habitat, as well as cultural, tribal and paleontological resources. All of the federal

subsurface minerals are within the jurisdiction of the Bureau of Land Management, Bakersfield, California. All parcels are within Kern and Kings Counties. There are six parcels that are all or partly within the administrative boundaries of existing oil fields; however, all parcels are within 0.5-5 miles of the administrative boundaries of existing oil fields.

Fifteen of the parcels are private surface overlying federal minerals, known as "split-estate." There are three additional parcels that contain both private and public surface. The BLM has split estate guidance, (Washington Instruction Memorandum No. 2003-131) effective April 2003. The guidance addresses the purpose and the action that must be completed prior to any approval for new drilling. It also explains the rights, responsibilities, and opportunities of the BLM, lessee/operator, and the private surface owner. In addition, Onshore Order No. 1 also contains details about permits issued on split estate lands.

## ALTERNATIVE 2: NO ACTION

Under the No Action alternative, BLM California would not offer any of the 18 parcels available for lease at the September 2012 lease sale. In the case of a lease sale, this would mean that the EOIs to lease (parcel nomination) would be denied or rejected and all 18 available lease parcels would be withdrawn from lease sale. It is not expected that demand for energy, including oil and gas, will go down; choosing the No Action alternative would not prevent future leasing in these areas consistent with land use planning decisions and subject to appropriate stipulations identified in the RMP. Therefore it is fully anticipated that these parcels would be nominated and offered at a future date. While future leases may contain more restrictive lease terms, it is reasonable to assume that a substantial portion of the development possible under current planning decisions would also be possible under future leases.

## ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

An alternative was considered that would offer the 2,850.66 acres in Ventura County and within the range of the California condor. This alternative was deleted from detailed analysis because it does not meet the purpose and need of expeditiously providing areas for the potential exploration and development of additional oil and gas resources to help meet the nation's current and expanding need for energy sources. These parcels will be deferred from leasing until the Bakersfield RMP has been approved and a Biological Opinion for that RMP has been issued.

In lieu of leasing, the mineral estate (split estate lands) under BLM jurisdiction could be considered potentially suitable for disposal through exchange under Section 206 of FLPMA. The mineral estate could also be considered for sale under Section 209 of FLPMA. Either of these actions would privatize the mineral rights, as opposed to merely leasing them for a set period of time, as in the proposed action. Analyzing the potential sale or exchange of these nominated lands and the associated policy implications are beyond the scope of this document. Therefore, an exchange or sale alternative will not be further analyzed because it does not meet the purpose and need. This option will be more fully addressed in the new Bakersfield RMP, slated for completion in 2012.

The parcels descriptions in Appendix A will be re-parcelized for the Lease Sale Notice, which will combined parcels or create additional parcels. Fifteen parcels proposed for leasing are split-estate (private surface with Federal subsurface minerals) and three parcels embrace private and public land. All parcels would be subject to special leasing stipulations that would protect both endangered species and sensitive species and their habitat, as well as cultural, tribal and paleontological resources.

# Chapter 3. Affected Environment

## Socio-Economic

The current Federal oil and gas leases in California produced about 20 million barrels of oil and more than 5 billion cubic feet of gas in 2010. According to the Office of Natural Resources Revenue (*formerly* Minerals Management Service) statistics, the value of these products was $1.4 billion, generating royalties and other related revenue of more than $122 million. This revenue was split 50:50 with the State of California. Approximately 80-90% of this production comes from Kern County.

## Visual Resource Management

No previous Visual Resources Management (VRM) objectives have been set for the field office. The Bakersfield Resource Management Plan will remedy this, however, in the interim and as directed by BLM Manual-8400 (Visual Resource Management) the affected environment is described using the existing inventory and the proposed Visual Resource Management (VRM) classes from the draft Bakersfield Resource Management Plan are used to guide the interim visual resource management.

All parcels are within areas inventoried as Class IV areas where the characteristic landscape has had major modifications and the level of change in the basic landscape elements (line, form, color texture) due to management activities is high and these activities dominate the landscape and are the major focus of viewer's attention. All of these areas are proposed for classification as VRM Class IV by the draft Bakersfield Resource Management Plan allows such modifications to continue.

Visual Resource Management is applied to both federally managed surface and federal actions on private surface (i.e. split-estate management).

## Recreation

Recreation opportunities and experiences managed for by the BLM are only available on federally managed surface. There are three federally managed surface parcels (360 acres) proposed for competitive lease that are located adjacent to each other with limited legal public access (i.e. no public easements or rights-of-way across private property). The remaining 5,139 acres parcels are located on split estate lands (private surface overlying federal mineral estate). The U.S. Government has no legal access on those parcels nor authority to allow recreation use on those lands.

## Air and Atmospheric Values

### Air Quality

The parcels proposed for lease are located in Kern and Kings Counties, California, and within the San Joaquin Valley Air Basin. Although air pollution levels in the state have improved significantly in the past few decades, Californians experience the worst air quality in the nation (U.S. Global Change Research Program 2009). As recognized by the California Air Resources Board (CARB), California's climate and geography are conducive to the formation and accumulation of air pollution, especially in the Central Valley, (CARB 2007) where the proposed lease parcels occur. As emissions have been reduced to historically low levels in the San Joaquin Valley, meteorology has become the predominant controlling factor in causing exceedances of ozone standards (SJVAPCD 2011).

At the federal level, regulatory duties lie with the U.S. Environmental Protection Agency (EPA), Region IX. At the state level, regulatory duties are delegated to the CARB. CARB regulates air pollution from mobile (cars, trucks, and buses) and other sources, while local air districts have authority to regulate mainly stationary sources (e.g. businesses and industrial facilities). Oversight authority for air quality rests at the county level with the San Joaquin Valley Unified Air Pollution Control District (*SJVUAPCD*). The BLM has air program responsibilities through its permitting programs and Clean Air Act (CAA) requirements to analyze all actions for conformity to air quality plans. This EA incorporates an analysis of potential contributions of the proposed action to criteria pollutant and greenhouse gas (GHG) emissions, and includes a general discussion of potential impacts to climate.

The first comprehensive federal air pollution legislation was the Clean Air Act (CAA) of 1970. Among the most important provisions of the CAA are the sections relating to the establishment of National and State Ambient Air Quality Standards (NAAQS), nonattainment areas, the development of state implementation plans (SIPs), and federal conformity. The U.S. EPA has established NAAQS for seven criteria pollutants: ozone, respirable particulate matter ($PM_{10}$), fine particulate matter ($PM_{2.5}$), carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. Criteria pollutants are defined as those pollutants for which the federal and state governments have established ambient air quality standards for concentrations in order to protect public health. One set of limits (primary standard) protects health; another set of limits (secondary standard) is intended to prevent environmental and property damage.

The California Clean Air Act (CCAA) was enacted on September 30, 1988, and became effective January 1, 1989. The purpose of the CCAA is to achieve the more stringent health-based state clean air standards at the earliest practicable date. California has established state air quality standards for the same criteria pollutants, plus additional pollutants (visibility reducing particulates, sulfates, hydrogen sulfide, and vinyl chloride). Although more stringent, the State standards have no specific dates to attain, unlike federal standards. Current federal and state ambient air quality standards (Primary) are listed in Table AQ-1. It is important to note that increasingly stringent NAAQS are under consideration; the EPA recently proposed several changes to the ozone and $PM_{2.5}$ NAAQS. The anticipated NAAQS approach naturally occurring background concentrations in the Valley; under the revised standards, even some of the cleanest counties in the Valley could begin to record violations, despite improving air quality (SJVAPCD 2011).

**Table AQ-1. Current (2012) Ambient Air Quality Standards (Primary)**

| Pollutant | Averaging Time | Federal Standard | California Standard |
|---|---|---|---|
| Ozone ($O_3$) | 8 Hour | 0.075 ppm (147 $\mu g/m^3$)[a] | 0.070 ppm (137 $\mu g/m^3$) |
| | 1 Hour | — | 0.09 ppm (180 $\mu g/m^3$) |
| Particulate Matter ($PM_{10}$) | Annual | — | 20 $\mu g/m^3$ |
| | 24 Hour | 150 $\mu g/m^3$ | 50 $\mu g/m^3$ |
| Fine Particulate Matter ($PM_{2.5}$) | Annual | 15 $\mu g/m^3$ | 12 $\mu g/m^3$ |
| | 24 Hour | 35 $\mu g/m^3$ | No Separate State Standard |
| Carbon Monoxide (CO) | 8 Hour | 9 ppm (10 $mg/m^3$) | 9.0 ppm (10 $mg/m^3$) |
| | 1 Hour | 35 ppm (40 $mg/m^3$) | 20 ppm (23 $mg/m^3$) |
| Nitrogen Dioxide ($NO_2$) | Annual | 53 ppb (100 $\mu g/m^3$)[b] | 0.03 ppm (57 $\mu g/m^3$) |
| | 1 Hour | 100 ppb (188 $\mu g/m3$)[b] | 0.18 ppm (339 $\mu g/m^3$) |
| Sulfur Dioxide ($SO_2$) | 24 Hour | — | 0.04 ppm (105 $\mu g/m^3$) |
| | 3 Hour | — | — |
| | 1 Hour | 75 ppb (196 $\mu g/m^3$)[c]— | 0.25 ppm (655 $\mu g/m^3$) |
| Sulfates ($SO_4$) | 24 Hour | — | 25 $\mu g/m^3$ |
| Lead (Pb) | 30 Day Average | — | 1.5 $\mu g/m^3$ |
| | Calendar Quarter | 1.5 $\mu g/m^3$ | — |

| | | | |
|---|---|---|---|
| Hydrogen Sulfide ($H_2S$) | 1 Hour | No Federal Standards | 0.03 ppm (42 µg/$m^3$) |
| Vinyl Chloride (chloroethene) | 24 Hour | | 0.01 ppm (26 µg/$m^3$) |
| Visibility Reducing Particulates | 8 Hour | | In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%. |

[a]The 1997 8-hour standard is 0.08 ppm.
[b]The U.S. EPA is in the process of implementing this new standard(effective January 22, 2010). Note the EPA standard is in units of parts per billion (ppb) and California standards are in the units of parts per million (ppm). This standard is based on the 3-year average of the 98$^{th}$ percentile of the yearly distribution of 1-hour daily maximum concentrations.

[c]The U.S. EPA established new 1-hour $SO_2$ standard, effective August 23, 2010. EPA also revoked the existing 24-hour $SO_2$ standard of 0.14 ppm and the annual primary $SO_2$ standard of 0.030 ppm. Note the new EPA standard is in units of parts per billion (ppb).

Sources: http://www.epa.gov/air/oaqps/greenbk/index.html

http://www.arb.ca.gov/research/aaqs/aaqs2.pdf

Criteria pollutant concentrations are measured at a number of compliance monitoring networks throughout the State. Emissions inventory data from these monitoring networks are utilized to determine if areas meet primary federal standards (NAAQS). A geographic area that meets or exceeds the primary standard is called an attainment area; areas that do not meet the primary standard are called nonattainment areas (http://www.epa.gov/air/caa/peg/). Standards for 8-hour ozone and $PM_{10}$ use a nonattainment area classification system based on severity (marginal, moderate, serious, severe, and extreme). Areas with more severe air quality problems have later attainment dates and progressively more requirements; marginal areas have the least amount of time to attain the standard whereas extreme areas have the most time. The $PM_{2.5}$ standard does not use a classification system, which simplifies the attainment year and planning requirements. Areas that are classified as nonattainment by the EPA are required to prepare and implement a State Implementation Plan (SIP) that identifies and quantifies sources of emissions and presents a comprehensive strategy to control and reduce locally generated emissions.

Several criteria pollutant concentrations currently meet NAAQS in the San Joaquin Valley Air Basin. However, based on the current EPA standards and designations, the primary pollutants of concern in the southern San Joaquin Valley are 8-hour Ozone and $PM_{2.5}$ (Table AQ-2). Kern County (San Joaquin Valley portion) is classified as non-attainment for 8-hour Ozone and $PM_{2.5}$ under federal standards. The area is also designated as maintenance for $PM_{10}$ and carbon monoxide (CO).

Table AQ-2. Attainment status of the San Joaquin Valley Air Basin

| POLLUTANT | PLANNING AREA NAME | FEDERAL DESIGNATION |
|---|---|---|
| Ozone (8-hour) | San Joaquin Valley, CA | Nonattainment[1] Extreme[2] |
| $PM_{2.5}$ | | Nonattainment[3] |
| $PM_{10}$ | | Attainment[4] |
| CO | | Maintenance[5] |

[1]On April 30, 2007 the Governing Board of the San Joaquin Valley Air Pollution Control District voted to request EPA to reclassify the San Joaquin Valley Air Basin as extreme nonattainment for the federal 8-hour ozone standard. The California Air Resources Board, on June 14,

2007, approved this request. This request must be forwarded to EPA by the California Air Resources Board and would become effective upon EPA final rulemaking after a notice and comment process; it is not yet in effect.
[2]EPA classification (e.g. Moderate Extreme, or Severe,) establishes the required attainment date of the federal standard for Ozone and $PM_{10}$.
[3]The Valley is designated nonattainment for the 1997 federal $PM_{2.5}$ standards. EPA released final designations for the 2006 PM $_{2.5}$ standards in December 2008 (effective in 2009), designating the Valley as nonattainment for the 2006 $PM_{2.5}$ standards.
[4] On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the $PM_{10}$ National Ambient Air Quality Standard (NAAQS) and approved the $PM_{10}$ maintenance plan. For purposes of general conformity, the area is treated as a Maintenance Area.
[5] All CO areas were redesignated as Maintenance Areas by the EPA , September 29, 2010.

Within the San Joaquin Valley Air Basin, Kern County's exceedances of the NAAQ's for 8-hour ozone have been episodic in nature; the numbers of violations of the NAAQS for ozone has continued to decline. According to the SJVAPCD Annual Report to the Community (2011), the summer of 2011 was one of the cleanest on record in the Valley, continuing the 20 plus year trend. Exceedances of the ozone standard set in 1997 (84 parts per billion) have been reduced by 62 percent over the last decade alone; exceedances of the 2008 ozone standard (75 ppb) have been reduced by 42 percent over the last decade. "Unhealthy" air quality days, and the number of "Good" days has continued to increase since 2000. Rules establishing controls for ozone precursor emissions have been implemented, but the air basin continues to be impacted by mobile source emissions, primarily from vehicle use.

In 2007, CARB adopted the *State Strategy* for achieving emissions reductions toward bringing these areas into attainment with federal standards for ozone and $PM_{2.5}$. CARB's strategy was updated in the *2009 State Strategy Progress Report*, using revised emissions inventories reflecting recent economic downturn. California employs a comprehensive strategy aimed at reducing pollutants from a variety of sources of air pollution. Reactive Organic Gases (ROG) and oxides of nitrogen (NOx) from all sources have been reduced by 68 percent and 39 percent, respectively since 1980 (CAPCOA 2011). These emissions reductions have resulted in significant improvements in ambient concentrations of ozone and particulate matter, in spite of dramatic increases in population, vehicles, and the number of miles driven.

The SIPs mainly addresses stationary sources that have been identified as major contributors affecting regional air quality, such as power plants, facilities, etc. District air quality plans outline the strategy for achieving federal air quality standards and identify control measures to reduce criteria pollutant emissions and are included in the SIP. The applicable implementation plans include: the *San Joaquin Valley Air Pollution Control District 2007 Ozone Plan*, the *San Joaquin Valley Air Pollution Control District 2007 $PM_{10}$ Maintenance Plan and Request for Redesignation*, and the *San Joaquin Valley Air Pollution Control District 2008 $PM_{2.5}$ Plan.*

Nonattainment area designations were made for the new 8-hour ozone standard in April 2004 and the *San Joaquin Valley 2007 8-hour Ozone Plan* was approved by the CARB in June 2007. The *8-hour Ozone Plan* calls for a 75% reduction of NOx (already reduced by 50% as of plan date) and full plan implementation will reduce VOCs by 25% as a result of regulatory measures. All of the proposed local measures in this plan were proposed for adoption by 2012. However, since 80% of the Valley's total NOx emissions are from mobile sources, the bulk of necessary reductions must come from state and federal control measures for mobile sources, such as land use and transportation policies that reduce the number of vehicle miles traveled.

$PM_{10}$ levels in the Valley have declined, since all control measure commitments have been adopted by the SJVAPCD and CARB. The Valley's improvement in $PM_{10}$ air quality was due to permanent and enforceable emission reductions achieved through District and ARB rules and regulations. The EPA re-designated the San Joaquin Valley to attainment of the NAAQS for $PM_{10}$ and approved the *2007 $PM_{10}$ Maintenance Plan*. The *$PM_{10}$ Maintenance Plan* includes an attainment emissions inventory, detailed conformity calculations, and demonstrates maintenance and verification of continued attainment by modeling. In addition, the plan evaluates future emissions growth and control up to 2020.

In 1997, the EPA set two $PM_{2.5}$ standards, a 24-hour standard and an annual standard. Based on data from 2004 to 2006, the San Joaquin Valley complied with the 24-hour standard. In 2006, EPA revised the 24-hour standard to a lower level. Attainment plans for this new standard will be required; however, the *2008 $PM_{2.5}$ Plan* focuses on the strategy to attain the 1997 annual standard. The *2008 $PM_{2.5}$ Plan (proposed March 13, 2008)* builds upon the strategy adopted in the *2007 8-Hour Ozone Plan* to bring the Valley into attainment of the 1997 NAAQS. A SIP for the 2006 $PM_{2.5}$ standard is due to the EPA 2012-2013. Based on the $PM_{2.5}$ Plan, $PM_{2.5}$ levels have decreased nearly 20% in the Valley from 1999-2007. The plan outlines a strategy that includes a comprehensive and exhaustive list of regulatory and incentive based measures to further reduce direct $PM_{2.5}$ emissions and ozone precursor emissions (NOx and SOx). Confirmed by CARB modeling, analysis shows that the Valley can attain the annual $PM_{2.5}$ NAAQS by 2014.

***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 created and enforced by the local air quality board. Compliance with applicable Rules, Regulations, and land use and zoning requirements ensures continued movement towards achieving the SJVAPCD attainment goals.

Comprehensive lists of local air district rules and regulations are located on the California Air Resources Board district database (http://www.arb.ca.gov/drdb/drdb.htm). The following section describes several of the pertinent SJVAPCD rules that may apply to oil and gas development subsequent to leasing.
*Rule 2010 (Permits Required):* This rule requires that any project constructing, altering, replacing, or operating any source operation, the use of which emits, may emit, or may reduce emissions, to obtain an Authority to Construct (ATC) and a Permit to Operate (PTO). This rule applies to the construction of the proposed renovations and operation of the new processes and equipment to be installed.

*Rule 2201 (New and Modified Stationary Source Review):* This rule applies to all new and modified stationary sources that would emit, after construction, a criteria pollutant for which there is an established federal or state AAQS. The rule provides mechanisms including emission trade-offs by which an ATC can be granted without interfering with the Basin's attainment with ambient air quality standards. These mechanisms offer methods to generate no net increases in emissions of nonattainment pollutants and their precursors over specific thresholds as detailed in the rule and the imposition of best available control technology for all emission increases.

*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 Well Vents):* The purpose of this rule is to limit the volatile organic compound (VOC) emissions from steam-enhanced crude oil production wells.

*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 $PM_{10}$ Prohibitions):* The purpose of Regulation VIII is to reduce ambient concentrations of particulate matter ($PM_{10}$) 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 ($PM_{10}$) 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.

*Rule 4305 (Boilers, Steam Generators, and Process Heaters – Phase 2):* The purpose of this rule is to limit emissions of oxides of nitrogen (NOx), and carbon monoxide (CO) from boilers, steam generators, and process heaters with a rated heat input of greater than 5 million Btu per hour.

*Rule 4306 (Boilers, Steam Generators, and Process Heaters – Phase 3):* The purpose of this rule is to limit emissions of oxides of nitrogen (NOx), and carbon monoxide (CO) from boilers, steam generators, and process heaters with a rated heat input of greater than 5 million Btu per hour.

In addition, the SJVAPCD document *Best Available Control Measures/Technology and Reasonable Available Control Measures/Technology Demonstration for Sources of $PM_{10}$ and $PM_{2.5}$ Precursors in the San Joaquin Valley Air Basin* indicates current control measures recognized by SJVAPCD. These attainment demonstration and maintenance plans include sections on emissions inventory and control strategies and include discussions on oil and gas development. The oil and gas industry is highly regulated by the Districts; air plans are implemented through rule making which include a number of categories including permitting, equipment requirements and performance standards, dust and precursor emissions (NOx and $SO_2$) control, and several others. Any oil and gas activities authorized by the BLM would be required to comply with all applicable air quality rules and regulations, and air permit requirements. Nearly all activities that have the potential to emit criteria pollutants are regulated by local, state, and federal air regulatory agencies.

**General Conformity**

As a federal agency, BLM is required to comply with all applicable air quality laws, regulations, standards, and implementation plans (Section 118). The classification of any area as a federal nonattainment or maintenance area brings an additional requirement for federal agencies. Section 176(c) of the CAA, as amended (42 U.S.C. 7401 et seq.), and regulations under 40 CFR, part 93, subpart W, 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 CAA 176(c) and 40 CFR, part 93, subpart W (conformity rules), federal agencies must make a determination that proposed actions in federal nonattainment areas conform to the applicable EPA approved implementation plans (if pertinent) before the action is taken. Geographic areas that meet NAAQS are exempt from determining conformity with SIPs.

Because the parcels proposed for competitive leasing occur within a designated nonattainment area, general conformity regulations are applicable. However, since the proposed action to lease parcels for fluid mineral development does not represent a project, a conformity determination will not be completed at the leasing stage. Appropriately, a conformity determination will be made at the project level.

## Climate and Meteorology

The Central Valley is one of the dominant features in the California landscape. The valley extends nearly 500 miles in length, while the width of the floor is approximately 45 miles. The San Joaquin Valley is surrounded by the Sierra Nevada Mountains to the east, the Pacific Coast range to the west, and the Tehachapi Mountains to the south. At the south end of the Valley, Bakersfield is approximately 400 feet in elevation.

California lies within the zone of prevailing westerlies and on the east side of the semi-permanent high pressure area of the northeast Pacific Ocean. The basic flow in the free air above the State, therefore, is from the west or northwest during most of the year. Within the State, several mountain chains are responsible for deflecting these winds and wind direction is likely to be more a product of local terrain than it is of prevailing circulation. Isotherms run mostly north-south, parallel to the contours of the mountains, instead of east-west as is common in most parts of the temperate zone. The climate and geography of the Valley create optimal conditions for forming and trapping air pollution. The San Joaquin Valley is particularly vulnerable to air pollution formation because of its topography, climate, and growing population. In addition, the Valley's hot summer temperatures promote the formation of harmful ground-level ozone, a major component of smog (www.valleyair.org).

The northern Central Valley has a hot Mediterranean climate while the southern portions in rain shadow zones are dry enough to be considered low-latitude desert. It is hot and dry during the summer and cool and damp in the winter, when frequent ground fog known regionally as "tule fog" can obscure visibility. Summer daytime temperatures are generally in the 90 degree F range, and heat waves may bring temperatures in excess of 104 ºF. The rainy season occurs mid-autumn to spring and the northern half of the Valley receives greater precipitation than the arid southern half. The region is seasonably dry, as are most parts of the West; normal annual precipitation in the Bakersfield area is 5.83 inches (http://www.wrcc.dri.edu/).

## Climate Change

Climate change refers to any significant change in measures of climate (e.g., temperature or precipitation) lasting for an extended period of time (decades or longer). Climate change may result from natural processes, such as changes in the sun's intensity; natural processes within the climate system (such as changes in ocean circulation); and/or human activities that change the atmosphere's composition (such as burning fossil fuels) and the land surface (such as urbanization) (IPCC 2007).

Some greenhouse gases (GHGs), such as carbon dioxide, occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The primary GHGs that enter the atmosphere as a result of anthropogenic activities include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_20$), and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These synthetic gases are powerful GHGs that are emitted from a variety of industrial processes including production of refrigeration/cooling systems, foams and aerosols. Fluorinated gases are not primary to the activities authorized by the BLM and will not be discussed further in this document. The major GHG compounds emitted from the oil and gas sector are carbon dioxide, methane, and nitrous oxide (CARB 2011).

GHGs are generally discussed in terms of their global warming potential (GWP), which is used as a means of comparing the effects of greenhouse gases to trap heat in the atmosphere relative to another gas. By definition, GWP time horizon is 100 years and emissions are presented in terms of carbon dioxide

($CO_2$) equivalents, using units of million metric tons of carbon dioxide equivalents (MMT $CO_2$Eq). The IPCC has published reference values for GWPs of several greenhouse gases. While revised estimates for GWPs are listed in the IPCCs Third Assessment Report (TAR), EPA analyses continue to use the 100-year GWPs as listed in the IPCC's Second Assessment Report (SAR) to be consistent with international standards under the United Nations Framework Convention on Climate Change (UNFCCC) (IPCC 1996). The GWP of carbon dioxide is 1; the GWP value of methane and nitrous oxide are 21 and 305, respectively.

Ongoing scientific research has identified the potential impacts of anthropogenic greenhouse gas (GHG) emissions and changes in biological sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions) industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming. The Intergovernmental Panel on Climate Change recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20$^{th}$ century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations (IPCC 2007)."

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Average temperatures in the United States have risen 1.5 F over the last 50 years (USGRCP 2009). Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24°N) have exhibited temperature increases of nearly 2.1° F since 1900, with nearly a 1.8°F increase since 1970 alone. If emissions proceed at a medium to high rate, temperatures in California are expected to rise 4.7 to 10.5° F by the end of the century; a lower emissions rate would keep the projected warming of the state to 3 to 5.6° F (Luers *et al*. 2006). Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5° to 10.4° F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions. Recent analyses of global climate model predictions indicate that southern California will become hotter and drier (Christensen *et al*. 2007). Higher temperatures are projected to increase the frequency, intensity, and duration of conditions conducive to air pollution formation, potentially increasing the number of days conducive to air pollution by 75 to 85 percent in the San Joaquin Valley, under a higher emissions scenario, and by 25 to 35 percent under a lower emissions scenario (California Climate Action Team 2006). Based on the California Climate Action Team "Climate Scenarios" analysis, the projected temperature increases in California would result in widespread consequences including:

A 70-90 percent reduction of Sierra Nevada snowpack;

Range expansion in many species, range contractions in other species with significant populations already established;

A likely shift in the ranges of existing invasive plants and weeds; and

Up to a 55 percent increased risk of large wildfires.

In light of these projections, the DOI is taking the lead in protecting our nation's resources from these impacts and in managing our public lands to mitigate the effects of climate change. Secretarial Order 3289 addresses the impacts of climate change on America's water, land, wildlife, and cultural heritage resources. The Order established a framework for bureaus to coordinate climate-change science and resource management strategies (http://www.doi.gov/whatwedo/climate/index.cfm). The Climate Change Response Council, eight DOI Regional Climate Science Centers, and a network of Landscape Conservation Cooperatives (including Interior and other agencies) are working to communicate data and coordinate our response to the impacts of climate change within and among our bureaus. The BLM recognizes that the public lands are facing increasingly complex and widespread environmental challenges that transcend traditional management boundaries. These challenges include managing wildfire; controlling weeds; providing for energy development; and addressing impacts from the effects of climate change. The BLM is developing a landscape-scale management approach that offers a way to integrate the BLM's conservation, restoration, and development programs (www.blm.gov).

The first draft national strategy was released in January 2012 to aid decision makers and resource managers in preparing for and reducing the impacts of climate change on species, ecosystems, and the people and economies that depend on them (http://www.doi.gov/news/pressrelease/National-Strategy-Proposed-to-Respond-to-Climate-Change's-Impacts-on-Fish-Wildlife-Plants_January 19, 2012). The *draft National Fish, Wildlife and Plants Climate Adaptation Strategy* represents a framework that will guide the nation's efforts during the next five years to respond to current and future climate change impacts including species distributions and migration patterns, the spread of invasive species and wildlife diseases, changes in sea level, changes in freshwater availability, etc. (www.wildlifeadaptationstrategy.gov). The strategy is intended to provide a roadmap for use in considering climate change implications to their ongoing wildlife and habitat management activities. It does not prescribe mandatory activities that agencies must take nor suggest regulatory actions; the Strategy is expected to become final May/June 2012.

With enactment of the California Global Warming Solutions Act of 2006 (AB 32; Stats. 2006, chapter 488), the California Air Resources Board (CARB) was tasked with several new responsibilities to help address the threat of global warming. AB 32 requires that California's greenhouse gas emissions be reduced to 1990 levels by 2020, which represents a 25% reduction under a business as usual scenario. Pursuant to AB 32, the CARB adopted their *Climate Change Scoping Plan* to reduce the state's GHG emissions to 1990 levels by 2020 (CARB 2008). The Scoping Plan will guide the CARB in developing detailed strategies to implement all of the recommended measures that must be in place by 2012 to reduce GHG emissions by 2020. Two of these new responsibilities, greenhouse gas emissions inventory and mandatory reporting, are complementary efforts undertaken by CARB to assess and monitor California's progress toward greenhouse gas (GHG) emissions quantification and mitigation. The first effort established the California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit. The second effort led to the adoption by the CARB of a regulation to require the mandatory reporting and verification of greenhouse gas.

On October 30, 2009, the U.S. EPA published a rule for the mandatory reporting of greenhouse gases from large GHG emissions sources in the United States. Implementation of 40 CFR Part 98 is referred to as the Greenhouse Gas Reporting Program (GHGRP). In general, the threshold for reporting is 25,000 metric tons or more of carbon dioxide equivalent ($CO_2e$) per year, at the facility level. This rule was revised November 30, 2010 to include the requirement to report fugitive and vented GHG emissions from crude petroleum and natural gas systems. Comprehensive, nationwide emissions data will provide a better understanding of GHG sources and will guide development of the policies and programs to reduce emissions (http://www.epa.gov/climatechange/emissions/ghgrulemaking.html).

The 2011 U.S. Emissions Inventory (U.S. Inventory Report) presents anthropogenic GHG emission trends from 1990-2009, organized by IPCC sector. In general, recalculations are made to the U.S. GHG emission estimates either to incorporate new methodologies or, most commonly, to update recent historical data. The U.S. Inventory Report indicates total GHG emissions rose 7.3 percent since 1990 (EPA 2012). Since 1990, U.S. emissions have increased at an average annual rate of 0.4 percent. The primary GHG emitted by human activities in the United States was $CO_2$, representing approximately 83.0 percent of total GHG emissions. The largest source of $CO_2$, and of overall greenhouse gas emissions, was fossil fuel combustion. $CH_4$ emissions, which have increased by 1.7 percent since 1990, resulted primarily from natural gas systems, enteric fermentation associated with domestic livestock, and decomposition of wastes in landfills. Agricultural soil management and mobile source fuel combustion were the major sources of $N_2O$ emissions. Overall, nitrous oxide emissions decreased 6.2 percent, while methane emissions increased 1.7 percent over the last inventory.

Total $CH_4$ and $CO_2$ emissions from petroleum systems in 2009 were 30.9 Tg $CO_2$ Eq. and 0.5 Tg $CO_2$ Eq., respectively. Since 1990, $CH_4$ emissions from this source have declined by 13 percent, due to industry efforts to reduce emissions and a decline in domestic oil production. $CO_2$ emissions from this source have also declined by 17 percent since 1990 for similar reasons.

To improve CARB's estimates of GHG emissions in California, they conducted an Oil and Gas Industry Survey in 2009 to accurately quantify equipment and operation processes for the 2007 calendar year. The *2007 Oil and Gas Industry Survey Results, Draft Report* was posted for public review and comment in August 2011 (http://www.arb.ca.gov/cc/oil-gas/oil-gas.htm). The survey was completed by 325 companies, representing approximately 97% of the crude oil and gas production in California. Total emissions for equipment covered under this survey are estimated to be 18.8 million metric tons of $CO_2$; combustion sources (equipment burning fuel for energy) account for 87 percent of the total $CO_2$ emissions, while the remaining 13 percent of the $CO_2$ emissions come from vented and fugitive sources (CARB 2011). Based on this survey, nearly 76% of the statewide total $CO_2$ emissions for these operations occur in the San Joaquin Valley APCD. The statewide total $CO_2$ emissions from oil and gas industry represent approximately **0.004 percent** of the total US $CO_2$ emissions from petroleum systems.

The emissions data will be used to create a sector specific baseline inventory and to develop a control measure to reduce GHG emissions from the crude oil and natural gas production, processing, and storage sector (http://www.arb.ca.gov/cc/ghgsectors/ghgsectors.htm). Furthermore, CARB is in the process of developing protocols to quantify fugitive and vented emissions from upstream oil and gas operations. The two protocols under development are 1) quantification of methane, carbon dioxide, and VOC emissions from crude oil and produced water separation and storage tank systems; and 2) quantification of fugitive and vented carbon dioxide, and VOC emissions from crude oil and natural gas processes and equipment.

A number of other *Scoping Plan* measures have already been approved and/or adopted by CARB, including the Heavy-Duty Vehicle GHG Emission Reduction, Low Carbon Fuel Standard, Landfill Methane Control Measure, Tire Pressure and Tread Programs, Cool Car Standards and Test Procedures, and Port Ship Electrification. These measures and efforts will contribute to the goal of achieving emissions reductions, as outlined in the AB 32 Implementation Timeline (http://www.arb.ca.gov/cc/scopingplan/sp_measures_implementation_timeline.pdf).

Specific emission limits have not yet been established; there are no federal significance thresholds for carbon dioxide equivalent ($CO_2e$) emissions. Additionally, there is no technically defensible methodology for predicting potential climate changes from a project's GHG emissions. As a result, GHG emissions that may occur subsequent to leasing as a result of the RFD scenario cannot be determined at this time. Consequently, climate change analysis for the purpose of this document is limited to a

qualitative account and disclosure of factors that contribute to climate change and the anticipated regional effects. Quantitative evaluation is included where appropriate and practicable.

## Soil Resources

A soil map unit represents a delineated area dominated by one or more (complex) type of soil. Soils are identified and named according to taxonomic classification; soil types are based on defined properties and characteristics. The United States Department of Agriculture, Natural Resource Conservation Service (NRCS) soil surveys provide maps and detailed map unit descriptions that are useful tools for land management. These surveys and NRCS websites provide data (e.g. slope, soil pH range, salinity, clay content, and hydrological group) that are used to evaluate soil erosion and reclamation potential. The erosion potential of a soil is directly related to the slopes on which it is found. Typically, soils found on steeper slopes have a higher erosion hazard than those found on gentler slopes. According to the USDA-NRCS (2004), all soils occurring on slopes greater than 40% have poor reclamation potential based upon their high erosion rates. Any project that disturbs one or more acres of soil is required to obtain coverage under the State Water Resources Control Board (SWRCB) General Permit for Discharges of Storm Water Associated with Construction Activity (SWRCB Order No. 2009-0009-DWQ). This permit is based on a project's overall risk and requires measures to prevent erosion and reduce sediment and other pollutants in their discharges.

Soils within the parcels proposed for leasing are described in three NRCS Soil Surveys: 1) Kern County, California, Northwestern Part;2) Kern County, Northeastern Part and Southeastern Part of Tulare County, California; and 3) Kings County, California. A total of 22soil map units were identified on the parcels proposed for leasing. For discussion purposes, soils are described by lease parcel and grouped by geographic "unit".

**Pyramid Hills Unit (Parcels 1-4)** A total of five soil map units occur on these parcels. Soils identified on parcels 1-3 include Panoche loam, Wasco sandy loam, 0 to 5 percent slopes, Delgado sandy loam, 5 to 15 percent slopes, Mercey loam, 5 to 15 percent, and Mercey-Delgado-Kettleman association, 15 to 30 percent slopes. Soils on these parcels are generally well drained with low available water capacity. According to NRCS soil interpretations, these soils are rated as moderately to severely limited for the potential erosion hazard based on slope and/or erodibility. Delgado and Mercey loam soils are rated a poor source of topsoil material, on slopes ranging from 8-12 percent and in excess of 15 percent, respectively. No other applicable NRCS ratings or interpretations have been identified as limiting factors.

Bitterwater-Delgado association, 9 to 30 percent slopes, and Carollo-Twisselman saline-alkali association, 2 to 15 percent slopes, occur on Parcel 4. On slopes in excess of 15 percent, Bitterwater soils are considered a poor source of topsoil material. Both Bitterwater and Carollo soil associations are rated as severely limited in the potential erosion hazard for roads based on slope/erodibility.

**Shale Unit (Parcels 5-8)** Five soil map units were identified on Parcels 5-8: Kettleman-Delgado-Rock outcrop complex, 15 to 50 percent slopes occurs on parcels 5, 6, and 7; Panoche clay loam, 2 to 5 percent slopes, occurs on parcels 6 and 8; and Lewkalb, saline alkali-Milham-Kimberlina complex, 0 to 5 percent slopes, and Polonio loam, 2 to 9 percent slopes, are on parcel 7. Since soils on parcels 5, 6, and 7 may occur on slopes that exceed 40 percent, these soils may be considered limited based on slope alone. However, Panoche and Polonio soils are generally rated as a good source of topsoil material and have a slight to moderate potential erosion hazard for roads, respectively. No other applicable NRCS ratings or interpretations have been identified as limiting factors.

**Devil's Den Unit (Parcel 9)**

Panoche clay loam and Twisselman clay, 0 to 2 percent slopes, occur on Parcel 9. Panoche clay loams are rated a good source of construction material (topsoil), however the Twisselman soils are considered a poor source based on clay content greater than 40 percent. These soils have a slight potential erosion hazard on roads.

**West Camp Unit (Parcel 10)**

Twisselman clay, 0 to 2 percent slopes occurs on parcel 10. Twisselman soils are considered a poor source of topsoil based on clay content greater than 40 percent, and these soils have a slight potential erosion hazard on roads.

**Santa Maria Unit (Parcel 11)**

Aramburu very shaly clay loam, 30 to 50 percent slopes, occurs on this parcel. On slopes in excess of 15 percent, these soils are considered a poor source of topsoil material. In addition, they are rated as severely limited in the potential erosion hazard for roads based on slope/erodibility.

**Agriculture Unit (Parcels 12-15)**

Five soil map units occur on these parcels. Milham sandy loam, 0 to 2 percent slopes occurs on parcels 12 and 14; Garces silt loam is on parcels 13 and 14; Kimberlina fine sandy loam, 0 to 2 percent slopes is on parcels 12 and 14; Jerryslu loam is on parcel 14; and Premier coarse sandy loam, 2 to 5 percent slopes is on parcel 15. Pits are also identified on the eastern half of parcel 15; pits are not rated for their suitability as construction material, nor are they rated for their potential hazard of erosion. Kimberlina, Milham, and Premier soils are generally rated as a fair to good source of construction (topsoil) material; however, they have a slight potential erosion hazard for roads. No other applicable NRCS ratings or interpretations have been identified as limiting factors.

**Poso Unit (Parcels 16-18)**

Two soil map units occur on these parcels; Chanac-Pleito complex, 5 to 30 percent slopes, and Chanac-Pleito-Premier association, 20 to 60 percent slopes. Chanac soils are generally characterized as well drained, and have a moderate to high available water capacity. On slopes in excess of 15 percent, these soils are considered a poor source of topsoil material and Chanac soils are rated as severely limited in the potential erosion hazard for roads based on slope/erodibility.

## Water Resources

There are no rivers, lakes, or streams on the proposed lease sale parcels that contain surface water year round; however, parcel 7 is bisected by Bitterwater Creek, a named, intermittent stream. In addition, unnamed intermittent streams occur on parcels 2, 5, 6, 7, 8, 12, 13, 15, and 17.

The Clean Water Act (CWA) of 1977 provides the statutory basis for regulating discharges of pollutants into waters of the United States and regulating water quality for surface waters. The CWA in California is administered by the U.S. EPA, the U.S. Army Corps of Engineers (ACOE), the State Water Resources Control Board (SWRCB), and Regional Water Quality Control Boards (RWQCB). Sections 401, 402 and 404 of the CWA pertain to development on public lands subsequent to leasing. Regulatory authority for Section 401of the CWA has been delegated by the EPA to the State; RWQCBs generally have the responsibility for reviewing and approving requests for 401 certification. Generally all ACOE issues 404 permits are conditioned on the approval and receipt of a 401 Certificate, to ensure that the discharge complies with applicable provisions of the CWA, including water quality standards.

Under the authority of Section 404 of the Clean Water Act, any project that proposes the discharge of dredge or fill material into waters of the United States will require ACOE authorization prior to commencing work. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps (http://water.epa.gov/lawsregs/guidance/wetlands/upload/wous_guidance_4-2011.pdf).

Section 402 of the CWA regulates the discharge of stormwater runoff generated from industrial sites and large construction projects (disturbing five acres or more of land) through the National Pollutant Discharge Elimination System (NPDES) permitting process. Any project that disturbs one or more acres of soil is required to obtain coverage under the State Water Resources Control Board (SWRCB) General Permit for Discharges of Storm Water Associated with Construction Activity (SWRCB Order No. 2009-0009-DWQ). This permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) and is based on a project's overall risk; a SWPPP requires measures to prevent erosion and reduce sediment and other pollutants discharges. Small linear underground/overhead projects disturbing at least 1 acre but less than 5 must be covered by the Small LUP General Permit.

The proposed lease sale parcels occur in areas that are underlain by groundwater basins. All parcels are within watersheds governed by basin plans subject to federal and state Clean Water Acts. BLM will require full compliance with all applicable federal, state, and local laws, policies, rules and regulations to protect both surface and groundwater.

## Biological Resources Including Riparian and Wetlands

To facilitate discussion, the eighteen properties included in this action have been divided into seven Biological Units, i.e., groupings of adjacent parcels with similar ecological values. Unit names reflect some aspect of local geography. Information presented for each Biological Unit includes general topography, notable disturbance, vegetation, common animals, and potential sensitive species. For some units, particular characteristics of individual parcels are also noted. Most of these parcels are split estate, where private lands overlie Federally-owned mineral rights.

Many of the lease sale parcels are located within specially designated habitat zones, as identified in the Caliente RMP and the Draft Kern County Habitat Conservation Plan. Most of the parcels are within habitat corridors (green zone) where the emphasis is on maintaining connections between habitat reserves and in providing additional native habitat. Surface disturbance can go as high as 25% in green zones. Generally, existing land use meets these objectives; however, some privately-owned, green and red zone lands have been developed for agriculture and are no longer suitable habitat.

Special Status Species includes federally listed, state listed and BLM California sensitive species. Each unit discussion includes a discussion of Special Status Species. Information on potential rare plants for these parcels comes from CNDDB, the CNPS Rare Plant Inventory, and the Consortium of California Herbaria.

**Pyramid Hills Unit (Parcels 1-4)**

The Pyramid Hills Unit consists of 600 acres located on the west side of the San Joaquin Valley, in the vicinity of the Pyramid Hills of Kings and Kern Counties. Parcel 3 is just north of the Pyramid Hills Oilfield. Elevations range from 630 to 880 feet. Topography is flat to gently sloping hills. Currently, parcel 1 is in agriculture, some sort of annual crop. For parcels 2-4, soils tend to be thin and the underlying marine shales are exposed in many areas. These parcels are used for grazing and are crossed

by roads and livestock trails. In parcel 4, there is a row of trees planted along the southern boundary, a stock tank in the southwest corner, and about 300 feet of an ephemeral stream channel in the northwest corner. All of the acreage is Federal mineral estate, there is no public surface. All of these parcels are located within the habitat corridor (green zone) identified in the Caliente RMP and Kern County Habitat Conservation Plan (HCP).

Vegetation in the non-agricultural parcels of the Pyramid Hills Unit includes non-native grassland and saltbush scrub. The shrub component includes bladderpod (*Isomeris arborea*), California buckwheat (*Eriogonum fasciculatum*), common saltbush (*Atriplex polycarpa*), and alkali goldenbush (*Isocoma acradenia* var. *bracteosa*). Vegetation is sparse in some areas and there are areas of naturally bare shale. The grassland is dominated by the non-native red brome and filaree, but also contains native wildflower genera such as *Amsinckia, Crypthantha, Camissonia, Eschscholtzia, Eriogonum, Phacelia, Lupinus,* and *Lepidium*. Overall, the habitat is quite xeric. Potential weeds on these parcels include saltcedar (*Tamarix* spp.), horehound (*Marrubium vulgare*), tree tobacco (*Nicotiana glauca*), and Russian thistle (*Salsola* spp.).

Potential wildlife in the area includes reptiles such as side-blotched lizard, western whiptail, gopher snake, and western diamondback rattlesnake. Potential birds include turkey vulture, golden eagle, sharp-shinned hawk, Cooper's hawk, northern harrier, red-tailed hawk, American kestrel, prairie falcon, mourning dove, greater roadrunner, burrowing owl, black-chinned hummingbird, Costa's hummingbird, western kingbird, Say's phoebe, ash-throated flycatcher, horned lark, scrub jay, common raven, rock wren, Bewick's wren, northern mockingbird, California thrasher, loggerhead shrike, lark sparrow, sage sparrow, white-crowned sparrow, dark-eyed junco, western meadowlark, Lawrence goldfinch, and house finch. Potential mammal species include California myotis, western pipistrelle, big brown bat, pallid bat, Mexican free-tailed bat, desert cottontail, black-tailed hare, California ground squirrel, Bottas' pocket gopher, Heerman kangaroo rat, western harvest mouse, deer mouse, desert woodrat, coyote, long-tailed weasel, striped skunk, badger, bobcat, and mule deer.

The federally listed San Joaquin kit fox, giant kangaroo rat, and blunt-nosed leopard lizard, and the state listed San Joaquin antelope squirrel are known to occur in the general area. BLM sensitive species that may occur in the area include short-nosed kangaroo rat, Leconte's thrasher, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse and pallid bat.

A number of rare plants have the potential to be found in the Pyramid Hills unit. The area is within the historical range of the federally endangered California jewelflower (*Caulanthus californicus*) and San Joaquin wooly-threads (*Monolopia congdonii*). Plants keying out to the endangered Kern mallow (*Eremalche kernensis*) have been collected in the general area. The unit also has potential habitat for a number of BLM sensitive plant species from the Temblor region: pale-yellow layia (*Layia heterotricha*), Munz's tidy tips (*Layia munzii*), showy madia (*Madia radiata*), Hall's tarplant (*Deiandra halliana*), Mason's neststraw (*Stylocline masonii*), Lemmon's jewelflower (*Caulanthus coulteri* var. *lemmonii*), Temblor buckwheat (*Eriogonum temblorense*), straight-awned spineflower (*Chorizanthe rectispina*), San Benito spineflower (*Chorizanthe biloba* var. *immemoria*), recurved larkspur (*Delphinium recurvatum*), round-leaved filaree (*California macrophylla*), shining navarretia (*Navarretia nigelliformis* ssp. *radicans*), Panoche peppergrass (*Lepidium jaredii* spp. *album*), and San Bernardino aster (*Symphyotrichum defoliatum*).

**Shale Unit (Parcels 5-8)**

The Shale Unit consists of 1,520 acres located in the Bitterwater Valley area on the west side of the San Joaquin Valley. Parcel 7 straddles Bitterwater Creek, while the remaining parcels are within the

surrounding shale hills. The Shale Unit is southwest of the Shale Point Gas Field. Elevations range from 1,040 to 1,340 feet. Topography is relatively flat to moderate to gently sloping hills. The soils in parcels 5, 6, and 8 tend to be thin and the underlying marine shales are exposed in many areas. These parcels are used for grazing and are crossed by roads and livestock trails. Bitterwater Valley Road runs through the middle of parcel 7. Judging from images visible on air photos, there appears to be a considerable amount of surface disturbance associated with past mining prospects in the parcel hills, especially parcel 6. The Shale Unit includes 360 acres of public surface. All of these parcels are located within the habitat corridor (green zone) identified in the Caliente RMP and Kern County Habitat Conservation Plan (HCP).

Vegetation in the Shale Unit consists primarily of non-native grassland, with areas of sparsely vegetated shale on the hill slopes. There may be scattered shrubs in some areas. Bitterwater Creek runs through parcel 7, here present as a deeply incised, ephemeral drainage. The channel also appears to be used as a livestock trail. The grassland is dominated by introduced species such as red brome (*Bromus madritensis* ssp. *rubens*), Arabian grass (*Schismus* spp.), red-stemmed filaree (*Erodium cicutarium*), and, possibly, wild oats (*Avena barbata*). Native species include various buckwheats (*Eriogonum*), fiddleneck (*Amsinckia* sp.), lupine (*Lupinus* spp.), popcorn flower (*Crypthantha* spp.), peppergrass (*Lepidium* spp.), goldfields, (*Lasthenia* spp.), layia (*Layia* spp.), hillside daisy (*Monolopia lanceolata*), California poppy (*Eschscholtzia californica*), and red maids (*Calandrinia ciliata*). Shrubs that may be present include bladderpod (*Isomeris arborea*), California buckwheat (*Eriogonum fasciculatum*), common saltbush (*Atriplex polycarpa*), and alkali goldenbush (*Isocoma acradenia* var. *bracteosa*).

Weeds to be expected include horehound (*Marrubium vulgare*), Russian thistle (*Salsola tragus*), tocalote (*Centaurea melitensis*), tree tobacco (*Nicotiana glauca*) and saltcedar (*Tamarix* sp.).

Wildlife typical of the non-native grasslands within the Shale Unit include side-blotched lizards, western whiptail, blunt-nosed leopard lizard, coachwhip, gopher snake, common kingsnake, western diamondback rattlesnake, turkey vulture, northern harrier, red-tailed hawk, American kestrel, mountain plover, long-billed curlew, mourning dove, greater roadrunner, barn owl, burrowing owl, horned lark, common raven, northern mockingbird, water pipit, loggerhead shrike, lark sparrow, sage sparrow, white-crowned sparrow, western meadowlark, desert cottontail, black-tailed hare, San Joaquin antelope squirrel, California ground squirrel, San Joaquin pocket mouse, Heerman's kangaroo rat, giant kangaroo rat, short-nosed kangaroo rat, deer mouse, Tulare grasshopper mouse, coyote, San Joaquin kit fox, badger, and bobcat.

Special status animal species with the potential to occur on the Shale Unit includes blunt-nosed leopard lizard, giant kangaroo rat, San Joaquin kit fox, San Joaquin antelope squirrel, burrowing owl, short-nosed kangaroo rat, LeConte's thrasher, mountain plover, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat, pallid bat and fringed myotis. Although the California tiger salamander is known from the from Grant Lake approximately 1.75 miles away, the species is not expected to occur on the Shale Unit parcels as there is no suitable breeding habitat on or near any of the parcels.

Rare plants in the area of the Shale Unit include the federally endangered *Monolopia congdonii* (San Joaquin wooly-threads) and *Eremalche kernensis* (Kern mallow), and the recently delisted *Eriastrum hooveri* (Hoover's woollystar). BLM Sensitive Plant species with the potential to occur on the parcels include *Atriplex vallicola* (Lost Hills crownscale), *Eriogonum temblorense* (Temblor buckwheat), *Layia heterotricha* (pale-yellow layia), *Lepidium jaredii* subsp. *jaredii* (Jared's pepper-grass), and *Madia radiata* (showy golden madia). Although within the range of *Tropidicarpum* (*Twisselmannia*) *californica* (Kings gold), the unit does not contain the necessary chenopod scrub habitat. Other rare plants found in the area include *Androsace elongata* subsp. *acuta* (California androsace), *Amsinckia vernicosa* var. *furcata* (forked fiddleneck), and *Atriplex coronata* var. *coronata* (crownscale).

**Devil's Den Unit (Parcel 9)**

The Devil's Den Unit consists of about 40 acres located on the west side of the San Joaquin Valley, in an agricultural area near Devil's Den. The single parcel is north and east of the Devil's Den oil field, between Barker Road and Hwy 33. Elevations range from 490 to 500 feet. Topography is flat. The parcel is in annual crop agriculture. All of the acreage is Federal mineral estate; there is no public surface. The parcel is located within the habitat corridor (green zone) identified in the Caliente RMP and Kern County Habitat Conservation Plan (HCP).

Wildlife on the cultivated parcels would be limited to mobile species that wander onto the edges of the cultivated fields. Parcels under active cultivation may only provide potential foraging habitat for San Joaquin kit fox, coyote, burrowing owl, mountain plover, horned lark, and other common birds. Special status animal species that occur in the general area include blunt-nosed leopard lizard, short-nosed kangaroo rat, San Joaquin kit fox, San Joaquin antelope squirrel, mountain plover, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat and pallid bat.

**West Camp Unit (Parcel 10)**

The West Camp Unit consists of 480 acres located just south of West Camp on the west side of the San Joaquin Valley. The single parcel is north and east of the Northwest Lost Hills Oil Field and just east of the California aqueduct. Elevations range from 280 to 305 feet. Topography is flat. The parcel is entirely planted in tree crops, most likely pistachios. All of the acreage is Federal mineral estate; there is no public surface. No part of this unit is located within habitat corridor or reserves.

Wildlife on the agricultural parcels would be limited to mobile species that wander through, such as skunk, opossum, coyote, and kit fox. Tree crops may only provide potential foraging habitat for species such as crows and other common birds. Because of the use of chemicals and the high amount of ground disturbance associated with grove maintenance, there would not be resident native animals. Special status animal species that occur in the general area include blunt-nosed leopard lizard, short-nosed kangaroo rat, Tipton kangaroo rat, San Joaquin kit fox, San Joaquin antelope squirrel, mountain plover, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat and pallid bat.

**Santa Maria Unit (Parcel 11)**

The Santa Maria Unit consists of about 40 acres located on the west side of the San Joaquin Valley, on the southwestern slopes of the Little Santa Maria Valley. The single parcel is within the Belgian Anticline Oilfield. Elevations range from 2,000 to 2,300 feet. Topography is moderately sloping hills. Currently, the parcel is used for grazing livestock and trailing is evident in some of the arroyos. All of the acreage is Federal mineral estate; there is no public surface. This parcel is located within the habitat corridor (green zone) identified in the Caliente RMP and Kern County Habitat Conservation Plan (HCP).

Vegetation in the Santa Maria Unit is non-native grassland. The grassland is dominated by introduced species like red brome (*Bromus madritensis* ssp. *rubens*), Arabian grass (*Schismus* spp.), and red-stemmed filaree (*Erodium cicutarium*). Native species include various annual buckwheats (*Eriogonum* spp.), fiddleneck (*Amsinckia* sp.), lupine (*Lupinus* spp.), popcorn flower (*Crypthantha* spp.), peppergrass (*Lepidium* spp.), goldfields, (*Lasthenia* spp.), layia (*Layia* spp.), hillside daisy (*Monolopia lanceolata*), California poppy (*Eschscholtzia californica*), and red maids (*Calandrinia ciliata*). A few shrubs may be present; species such as alkali goldenbush (*Isocoma acradenia* var. *bracteosa*) and snakeweed

(*Gutierrezia californica*). Weeds to be expected include horehound (*Marrubium vulgare*), Russian thistle (*Salsola tragus*), tocalote (*Centaurea melitensis*), and mustards (various Brassicaceae).

Wildlife typical of the Santa Maria Unit include desert cottontail, black-tailed hare, San Joaquin antelope ground squirrel, California ground squirrel, Botta's pocket gopher, San Joaquin pocket-mouse, short-nosed kangaroo rat, Heerman's kangaroo rat, deer mouse, Tulare grasshopper mouse, coyote, San Joaquin kit fox, badger and bobcat. Bat species, such as pallid bat, Mexican free-tail bat and western pipistrelle, forage in the open habitat. Characteristic bird species include turkey vulture, northern harrier, red-tailed hawk, American kestrel, California quail, mourning dove, roadrunner, barn owl, burrowing owl, horned lark, raven, mockingbird, loggerhead shrike, lark sparrow, sage sparrow, white-crowned sparrow and western meadowlark. Reptile species include side-blotched lizard, southern alligator lizard, western whiptail, coachwhip, gopher snake, common kingsnake and western rattlesnake.

Special status animal species that occur in the general area include blunt-nosed leopard lizard, short-nosed kangaroo rat, San Joaquin kit fox, San Joaquin antelope squirrel, LeConte's thrasher, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat, pallid bat and fringed myotis.

Rare plants in the area include the federally endangered San Joaquin wooly-threads (*Monolopia congdonii*) and Kern mallow (*Eremalche kernensis*), and the recently delisted Hoover's woollystar (*Eriastrum hooveri*). BLM sensitive species which may be present include Temblor buckwheat (*Eriogonum temblorense*), recurved larkspur (*Delphinium recurvatum*), diamond-petaled California poppy (*Eschscholtzia rhombifolia*), pale yellow layia (*Layia heterotricha*), Lemmon's jewelflower (*Caulanthus coulteri* var. *lemmonii*), and oil neststraw (*Stylocline citroleum*).

**Agriculture Unit (Parcels 12-15)**

The Agricultural Unit consists of about 1,120 acres in 4 parcels dispersed across the San Joaquin Valley. Parcel 14 is within the Bowerbank oil field and parcel 15 is within the Kern Front oil field. Elevations range from 245 to 650 feet. Topography is flat. These parcels are or have been used for agriculture or industrial development. Parcel 12 is planted with pistachios. Parcel 13 and 14 are used to grow row crops, with the northern half of 13 recently fallow. Parcel 15 is about 1/3 almonds, 1/3 industrial, and 1/3 sand and gravel pit. All of the acreage is Federal mineral estate; there is no public surface. No part of this unit is located within habitat corridor or reserves.

Wildlife on the agricultural parcels would be limited to mobile species that wander through, such as skunk, opossum, coyote, and kit fox. The orchards may only provide potential foraging habitat for species such as crows and other common birds. Cultivated fields may only provide potential foraging habitat for San Joaquin kit fox, coyote, burrowing owl, mountain plover, horned lark, and other common birds. Because of the use of chemicals and the high amount of ground disturbance associated with agriculture, there would not expected to be resident native animals within the active fields and orchards. Fallow fields may provide some habitat, depending on how much initial disturbance there was, how long the fallow period, and if there is a nearby source of immigrant animals. All four parcels have natural habitat in the vicinity. Special status animal species that occur in the general area include blunt-nosed leopard lizard, short-nosed kangaroo rat, Tipton kangaroo rat, San Joaquin kit fox, San Joaquin antelope squirrel, mountain plover, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat and pallid bat.

**Poso Unit (Parcels 16-18)**

The Poso Unit consists of 1,700 acres located in the Sierran foothills on the east side of the San Joaquin Valley, north of Bakersfield. All three parcels are within the Poso Creek watershed and the Mount Poso Oilfield. Elevations range from 1,050 to 1,350 feet. Topography ranges from moderately to steeply sloped hills. These parcels are used for grazing; a barn and corrals are evident on parcel 18. Granite Road runs through parcel 18 and all three parcels have a number of dirt roads and livestock trails. Judging from images visible on air photos, there appears to be some surface disturbance associated with past mining prospects. All of the acreage is Federal mineral estate; there is no public surface. Parcel 16 and half of parcel 17 are located within the habitat corridor (green zone) identified in the Caliente RMP and Kern County Habitat Conservation Plan (HCP).

Vegetation consists primarily of non-native annual grassland, with occasional shrub elements. The grassland is dominated by introduced species such as red brome (*Bromus madritensis* ssp. *rubens*), red-stemmed filaree (*Erodium cicutarium*), and foxtail fescue (*Vulpia myuros*). Native wildflowers include species such as fiddleneck (*Amsinckia* sp.), lupine (*Lupinus* sp.), pepper grass (*Lepidium* sp.), popcorn flower (*Crypthantha* sp.), milkweed (*Asclepias* sp.), locoweed (*Astragalus* sp.), and lotus (*Lotus* sp.). Shrubs that may be present include goldenbush (*Isocoma acradenia* var. *bracteosa*), snakeweed (*Gutierrezia californica*), common saltbush (*Atriplex polycarpa*), interior goldenbush (*Ericameria linearifolia*), and bladderpod (*Isomeris aborea*). Weedy species in the area include horehound (*Marrubium vulgare*), Russian thistle (*Salsola tragus*), tree tobacco (*Nicotiana glauca*), and white horse-nettle (*Solanum elaegnifolium*).

Wildlife typical of the area includes species such as black-tailed hare, desert cottontail, California ground squirrel, Botta's pocket gopher, coyote, kit fox, American badger, red-tailed hawk, mourning dove, western kingbird, common raven, white-crowned sparrow, western meadow lark, side-blotched lizard, and western rattlesnake. Heerman's kangaroo rat and western whiptail may also be present.

Special status animal species that occur in the general area include blunt-nosed leopard lizard, San Joaquin kit fox, burrowing owl, white-tailed kite, golden eagle, Swainson's hawk, San Joaquin pocket mouse, Tulare grasshopper mouse, western mastiff bat and pallid bat.

Potential listed plants for this parcel include the federally endangered Bakersfield cactus (*Opuntia basilaris* var. *treleasei*) and the federally threatened San Joaquin adobe sunburst (*Pseudobahia peirsonii*). BLM sensitive species that may have potential of being in this area include oil neststraw (*Stylocline citroleum*), striped adobe lily (*Fritillaria striata*), and recurved larkspur (*Delphinium recurvatum*).

**Riparian and Wetland Habitat**

There is only a very limited amount of riparian habitat within these parcels. A stock tank and about 300 feet of an ephemeral stream channel are within parcel 4. About one mile of Bitterwater Creek runs through parcel 7. This is a deeply-incised channel, with only ephemeral water and no apparent riparian vegetation. Drainages in the Poso Unit are part of the Poso Creek watershed, but do not support riparian vegetation. Other than that, the parcels support only dry washes or ephemeral drainages where water flows only in direct response to rainfall events, and no riparian vegetation occurs.

## Impacts to Biological Resources from Climate Change

Climate models predict that, as a result of global warming, Southern California will tend to be hotter and drier in the future, with an increase in the frequency and duration of drought (Christensen et al. 2007). Drier conditions for the San Joaquin Valley means that overall, there will be less vegetative growth. A shift in vegetation zones is also expected. Oak and Juniper woodlands will give way to scrublands, and

scrublands to grasslands. Future grasslands will have more areas of bare soil and vegetation will be sparser. Woodlands may disappear from some portions of the San Joaquin Valley and become restricted to the higher elevations of the San Joaquin Valley and surrounding foothills. Plant communities and animal guilds may migrate upward or northward in elevation, as the general area becomes drier. With a slight drying, the wild oat grasslands in the northern part of the San Joaquin Valley would be expected to shift to brome-dominated grasslands. As precipitation levels and recharge decline, some springs will dry up, while others will diminish in flow. This may have consequences for those plants and animals depending on these water sources.

The result of this change in the southern San Joaquin Valley may result in conditions that are similar to those currently experienced during a series of drought years when very little rain falls in the region. During current drought conditions, herbaceous vegetation cover and production decreases, while the amount of bare ground increases. In some locations, individual plants and stands of perennial shrubs become dormant or even die due to increased stress.

A more arid environment would have varied effects on the San Joaquin Valley suite of species. Currently, during a series of extremely low rainfall years when annual plant production is reduced or absent and food resources become scarce, populations of blunt-nosed leopard lizards and small mammals, including giant kangaroo rat, Tipton kangaroo rat and San Joaquin antelope squirrel, tend to decline (Germano and Williams 2005, Rathbun 1998, Williams et. al. 1993). The decline continues until more widespread germination of annual plants resumes (Germano and Williams 2005, Rathbun 1998, Williams et. al. 1993). In the predicted more arid climate, during years with a low to average rainfall, herbaceous plant production would be reduced, and grass cover would be sparser and less persistent than what currently occurs during average rainfall years. Annual vegetation that is lower and sparser may partially benefit the small mammals and lizards of the San Joaquin Valley since persistent non-native plant cover reduces habitat suitability for these species (Germano et. al. 2001). Population levels of these species will reflect the benefits of a more open structure versus the liabilities of decreased food resources.

Since San Joaquin Valley animal species have evolved under desert conditions they may be better able to persist in a more arid climate than other species. During drought conditions, populations decline but do not completely disappear. Populations recover once rainfall sufficient for germination occurs. So long as future drought periods do not exceed the time period that source animals can persist, the San Joaquin Valley suite of species are expected to persist. A more arid climate may also promote a more open and sparser vegetation pattern that these species favor. The non-native grasses and filaree that have invaded the region over the past two hundred years may become less persistent and dense, favoring a habitat structure the San Joaquin Valley species prefer.

## Cultural Resources

The lease parcels within all of the units identified in this document fall within the traditional territories of the various tribes of the Yokuts Indians (Latta 1977: 201). These groups inhabited the shores and sloughs of Tulare and Buena Vista Lakes as well as the foothills of the Sierra Nevada Mountains. In addition to the rich lake environments, they also exploited specialized resources found in the foothills of the Temblor Mountains to the west and the Sierra foothills to the east. Native American heritage sites common to this region include bedrock mortar and millingstone food processing stations, lithic scatters and quarries, large village sites and smaller camps. During Anglo historical period occupation of the region and into modern times, all of the lease parcels have been part of large-scale oil production development or livestock and agricultural operations. Oil exploration became commercially productive in the area as early as the 1890s (Rintoul 1976: 4). Historical period sites occurring in the area primarily include facilities associated with the early phases of this agricultural and oil field development.

Native American Values

As indicated above, the lease parcels are all located within the traditional territories of several different Yokuts tribal groups. Members of these Native American communities still reside in the surrounding San Joaquin Valley. These include both the federally recognized Tachi Yokuts of the Santa Rosa Rancheria, members of the Tule River Indian Reservation and the Tejon Indian Tribe as well as several non-recognized tribal groups and individuals. Culturally significant remains associated with Native American ancestral occupation of this region are scattered throughout the area and there are often considerable tribal heritage values associated with them. Traditional values are also associated with specific places in the landscape in the form of spiritual sites or special resource gathering locations. Federal lands management regulation and policy requires that Tribes be consulted regarding potential impacts to places of cultural or religious importance as a result of actions occurring on federal lands. The procedures and results for Native American consultation conducted for the September 2012 lease sale are discussed in the impacts section below.

## Paleontological Resources

The level of sensitivity for the occurrence of paleontological resources for each of the lease parcels will be determined during project specific assessments. The results of these assessments and the nature of the proposed project will determine if paleontological monitoring or other forms of mitigation will be required. Paleontological assessment and mitigation requirements are subject to land surface owner discretion for split estate lands.

## Livestock Grazing

The public land in parcels 5, 6 and 7 for which BLM owns the surface estate, are also leased by the BLM for livestock grazing. The federal surface lands in parcels 5, 6 and 7 make up portions of the Shale Hills pasture of grazing allotment #00065 (Packwood). The lands in this pasture are authorized for grazing of cattle annually as resource conditions allow.

## Lands

The lands proposed for competitive leasing of the federal mineral estate are mainly scattered split estate mineral parcels (private surface overlying federal minerals) under the jurisdiction of BLM. There are three parcels with full fee estate (surface + mineral estate) under the jurisdiction of BLM. For the split estate parcels, the United States not only owns any minerals in the land, but also surface entry rights that 'float' over the entire parcel.

Parcels 1 thru 3 are located on 'split estate' land (private surface overlying federal mineral estate) located near Ketteleman Hills, Hwy. 33 and 41. The lands are surrounded by private land. There appears to be dirt roads through parcel 2 and 3; however, The U.S. Government has no legal access.

Parcel 4 is located on 'split estate' land (private surface overlying federal mineral estate) located northeast of Antelope Valley. There appears to be a dirt road that goes through the parcel. The parcel is surrounded by private lands. The U.S. Government has no legal access.

Parcels 5 thru 8are all located in the same area. Parcels 5-8 have both public land and split estate land (private surface overlying federal mineral estate); in Parcel 5 in Sec. 11 E½SE¼; Parcel 6 in Sec. 12

SE¼NE¼, SW¼SW¼; Parcel 7 in Sec. 13 NW¼NW¼, N½N½. Parcel 8 is located on 'split estate.' These parcels are located near Antelope Hills. There appears to be a road that goes through each parcel; however, on those private lands the U.S. Government has no legal access. A road right-of-way may be required on the Federal surface.

Parcel 9 is on split-estate (private surface overlying federal mineral estate) located on the west side of the San Joaquin Valley near Devil's Den between Barker Road and Hwy. 33. The land appears to be agriculture surrounded by private land. The U.S. Government has no legal access.

Parcel 10 is on split estate (private surface overlying federal mineral estate) located on the west side of the San Joaquin Valley. The parcel is north and east of the Northwest Lost Hills oil field. The California Aqueduct is adjacent to this parcel in the southwest corner. The parcel is surrounded by private land and appears to be agriculture land. The U.S. Government has no legal access.

Parcel 11 is on split estate (private surface overlying federal mineral estate) located on the west side of the San Joaquin Valley within the Belgian oil field. There appears to be dirt roads north and south of the parcel on private land; however, the U.S. Government has no legal access.

Parcel 12 is on split estate (private surface overlying federal mineral estate). The parcel is located southeast of Lost Hills. The parcel is agriculture land surrounded by private land. The U.S. Government has no legal access.

Parcel 13 is on split estate (private surface overlying federal mineral estate). Part of the parcel is used for agriculture. There appears to be dirt roads through the S½N½ of the parcel. The U.S. Government has no legal access.

Parcel 14 is on split estate (private surface overlying federal mineral estate). The land is used for agriculture. The parcel is surrounded by private lands and there is no access. The U.S. Government has no legal access.

Parcel 15 is on split estate (private surface overlying federal mineral estate). The parcel is located north of Bakersfield off of James Road. The land is being used as agriculture on the west end; there are some industrial buildings, and on the east end of the parcel, there appears to be a cement facility. There is also vacant land on this parcel. The U.S. Government has no legal access to this parcel.

Parcels 16 thru 18 are on split estate (private surface overlying federal mineral estate) located near Mt. Poso oil field, and are all surrounded by private lands. The U.S. Government has no legal access to these parcels.

## Farmland

Prime farmland is of major importance in meeting our Nation's short and long term needs for food and fiber. As defined by the USDA, this land has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and is available for these uses. Soils classified as farmland are either used for producing food and fiber, or are available for these uses. However, urban or built up land, public land, and water areas cannot be considered prime farmland. Although public land cannot be considered farmland, the USDA classifications apply to split-estate parcels.

No soils classified as Prime Farmland were identified on the parcels proposed for lease. However, soil map units that have been identified by the USDA-NRCS as Prime farmland, if irrigated, do occur on

parcels 1, 2, 7, 8, 9, 10, 12, 14, and 15. Soils classified as Farmland of Statewide Importance occur on parcels 13 and 14.

## Oil and Gas Resources

The parcels are in Kings and Kern Counties. All of them are classified as having high potential for occurrence of hydrocarbons. This is one of the oldest oil districts in the United States, and has been extensively developed in the anticlinal trends along the east and west sides of the Valley since the 1870's.

Most reservoirs in the area are sandstones which have adequate porosity and permeability for the migration of oil and gas. Some reservoirs in the area are fractured siliceous organic shales of the Monterey formation. The Monterey formation is both the source and reservoir rock. Compression and diagenesis severely degrade reservoir quality at depths exceeding 12,000 feet to the extent that only dry gas is produced from greater depths.

The following statistics are from the California Division of Oil, Gas, and Geothermal Resources (CDOGGR) website shown below. There are over 75 oil and gas fields in the Valley, including several giant fields (more than 100 million barrels of oil each) and super giants (more than 1 billion barrels each). As of the end of 2008, cumulative production in the area was about 12.4 billion barrels of oil equivalent. In recent years, the Valley has accounted for about 85-90% of California's development completions. Over 90% of the wells are on private leases. Between 2005 and 2009, there were a total of 11,530 wells drilled in DOGGR District 4, which is mainly Kern County. In the same 5 years, there were a total of 1,153 federal wells drilled throughout California. Approximately 90% of those wells were in Kern County. The ratio of federal wells to total wells has remained relatively constant at 6-10% throughout time, although the exact numbers are not readily available.

The San Joaquin Valley is expected to continue as the primary source of oil in California's oil and gas development. Additional information such as the number of existing wells and expected drilling, completion and abandonment rates is in the section on Environmental Consequences.

Sources: ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2008/PR06_Annual_2008.pdf for 2008
Similar for other years 2004 - 2009. As of September 30, 2011, 2009 is the most recent year for which DOGGR statistics are available.

# Chapter 4. Environmental Impacts

## Analysis Assumptions – Reasonable Foreseeable Oil and Gas Development (RFD) Scenario

### General Discussion

Exploration activities within the area will generally focus on oil and not natural gas. The mid to southern San Joaquin Basin is primarily an oil province with small amounts of natural gas as an associated product. Less commonly, non-associated gas is also found. Exploration will use such tools as geophysical surveys (usually this means running seismic lines), and drilling exploration wells. A brief summary of these activities follows. In all cases, a site specific NEPA document would be prepared prior to approval of any

application to conduct surface disturbing activities  Detailed descriptions of typical oil and gas activities may be found in the Caliente Resource Management Plan, December 1996, Ch. 5 page 45.

### Exploration Activities

After seismic and/or detailed stratigraphic basin studies are made, an APD may be submitted. Because of the location of nearly all of the lands within this EA, any APDs would likely be for exploration drilling, which includes drilling to discover entirely new fields, or discovery of previously untapped reservoirs within existing fields. Drilling to discover new fields is of greatest concern in this EA because in most cases it would be more likely to involve disturbances of previously undisturbed lands. Historically in the San Joaquin Valley, only about 10-15% of wildcat wells have been successfully completed as producers. In fact, between 1990 and 2007, 64 total exploratory wells were drilled, both federal and private (source: personal email from Mark Gamache, CDOGGR, to Jeff Prude, BLM, dated 3-27-07), and only two relatively small fields, the Rose Field and North Shafter Field, were discovered.[1] The remaining 85-90% of the wells are non-producers which are immediately plugged and abandoned (P&A'd), so any disturbance associated with the drilling of these P&A'd wells would be temporary. It should be noted that only six exploratory (wildcat) wells have been drilled on federal leases issued in the last ten years.

### Development Drilling

Development wells include step-out or field extension wells, enhanced oil recovery wells, or other infield wells. Even though the drilling of development wells will be adjacent to or actually within areas of current production, it still may require some disturbance on previously undisturbed lands.

Based on the data for the past 10 years, up to 40,000 wells are projected to be drilled on Federal, state and private lands in the San Joaquin Valley in the next 10 years. If historical trends continue, (and there is no data to suggest otherwise), an estimated 4,000 of those will be on federal mineral estate. Nearly all of these will be within the same general area of the state as lands covered by this EA. The vast majority (up to 90% or more) of these wells will be on private mineral estate.

Approximately 95-97% of the wells projected to be drilled during the next ten years will be development wells (as opposed to exploratory wells). An estimated 95+% of the development wells will be successful, while the remainder will be unsuccessful and will be plugged and abandoned upon completion of drilling.

Most new leases in California are never drilled, and only a very few result in producing wells. In fact, from lease sales in this general area (Kern and Kings County) in the past 10 years (March 1, 2002, through March 1, 2012), only 5% of all leases offered have had any wells drilled (12 out of 237). The average number of wells drilled was 1 well per 3,020 acres (46 wells on 138,901 acres). See Table 1 – Activity on New Leases from Past 10 Years Lease Sales.

**TABLE 1 - Activity on New Leases from Past 10 Years Lease Sales (Sales 3-1-2002 through 3-1-2012)**

| | **Kern County** |
|---|---|
| Number of Lease Sales with Parcels in Kern and Kings County since 3-1-2002 | 20 |
| Leases Offered/Issued in Kern/Kings County | 237/186 |
| Total Wells Drilled (may include wells in "drilling" status) | 46 (approx. 41 productive) |
| Acres Offered/Leased | 138,901/101,480 |

[1] A new field discovery, reportedly near the Elk Hills field in Kern County, was reported by Oxy in July 2009. No further details are available as of press date.

| | |
|---|---|
| Leases w/ Wells Drilled | 12 of 237 |
| Leases with Successful Producing Wells | 6 of 237 |
| Lease Sales w/ at Least 1 Well Drilled on New Leases | 9 of 20 |
| | |
| Total New Surface Disturbance for all wells, including roads (acres) | 35 |
| Avg. Disturbance per Well (acres) **(Note: even if the single lease that accounts for more than half of the wells is not included, the average disturbance is still 1 acre/well)** | <1 |

The total number of Federal mineral estate in the San Joaquin Valley is about 440,000 acres. The total number of acres in the parcels to be offered in this lease sale is 5,499.43 acres, slightly more than 1% of the total. From the 20 lease sales conducted in this general area (Kern and Kings County) during the past 10 years, (3-1-2002 through 3-1-2012), BLM has offered 237 leases covering approximately 138,901 acres, and issued 186 leases covering approximately 101,480 acres. Only 12 of the leases have had any wells drilled on them. Ten leases had 1-2 wells, one lease had 3 wells, and one lease had 27 wells, for a total of 46 wells. Approximately 90% of the wells were productive. Nearly all of the dry holes and several that were productive only for a short time have already been plugged, and the well sites are in various states of reclamation, depending on how long it has been since abandonment.

Nine of the 20 lease sales conducted during 2002, 2004, 2006, 2007, 2008, and 2010 had at least one lease that had drilling. Of those, five years had a sale with at least one successful well drilled (2002, 2004, 2006, 2007, and 2010), and four years had no leases with any successful drilling. The most wells drilled on any parcel were twenty seven, on a lease in the Edison Field on the eastern edge of Bakersfield. See Appendix D – Oil and Gas Activity on Leases from Recent Lease Sales.

Lands considered in this EA are all within five miles of existing oil fields, and they are all in areas classified as "high potential." However, virtually all of the lands that were leased in the past also met the same criteria, and most were never developed.

This 10 year time frame includes periods with both very high and very low oil and gas prices; on average, it is a relevant base period from which reasonable projections can be made. Because prices are significantly higher now than in the past, there is a possibility that drilling on new leases will increase. However, the new leases offered herein still represent only a small fraction of lands already leased and available for drilling, so we do not expect these particular parcels to see anomalous levels of drilling. Data to suggest otherwise is not available. As mentioned earlier, only one new lease within the past 10 years has had more than three wells drilled on it, and there is no data to suggest that these parcels are likely to have more wells than that. Based strictly on the historic levels of activity on new federal leases in California within the last 10 years, during a wide range of product prices, we would expect no more than one to two wells total on all of these parcels, with no particular area being more likely than another to be drilled. However, based on the sustained increase in oil prices, significantly higher lease bonus bids (now routinely several hundred to as much as several thousand dollars per acre), along with an increase in 3-D seismic and more activity in deeper zones, we expect a slow increase in the number of leases that are actually developed. Consequently, we expect up to four wells to be drilled on leases in this lease sale.

## Hydraulic fracturing

Hydraulic fracturing is a common and important process to stimulate oil and gas well production, and it has been used more than 1 million times for many years all over the world. Fracturing fluid is pumped

under high pressure down the wellbore and into the reservoir rock to create fractures (i.e., cracks) in order to increase the immediate production rate and ultimate total recovery of oil and natural gas over the economic life of the well. In a typical frac job, approximately 99.5% of what is injected is water and sand.

In FY 2010, the last year for which data was available, only about 5 percent of the federal wells drilled in California (approx. 15 out of 300+) employed fracturing. None of these used diesel as the frac fluid, a source of concern to the public. In addition, none of these were in areas where there were fresh water aquifers, another area of concern.

In response to increased public interest, the Bureau of Land Management (BLM) recently proposed a draft rule to regulate hydraulic fracturing (HF) on public land and Indian land. The rule would (1) provide disclosure to the public of chemicals used in hydraulic fracturing on public land and Indian land, (2) strengthen regulations related to well-bore integrity, and (3) address issues related to flowback water. This rule is necessary to provide useful information to the public and to assure that hydraulic fracturing is conducted in a way that adequately protects the environment. Comments from the public are being accepted for 60 days, ending July 10, 2012.

According to industry sources, it is likely that more California wells in the future will be fractured because of recent interest in deep shale prospects. Although Federal regulations currently require no special reviews or approvals for routine fracturing, assuming prudent operating practices are employed and no new surface disturbance occurs, it is expected that the rule will be finalized before this lease sale. Consequently, future HF wells will likely be subject to whatever final regulation is passed. For non-routine fracturing, the operator already needs prior approval.

A typical well in California that is hydraulically fracked (HF) has little to no resemblance to a typical well that is fracked elsewhere in the country. Nearly all of the recent growth in HF wells across the country is in horizontally drilled wells in shale gas reservoirs. In contrast, the parcels in this region of the state are virtually all in areas dominated by oil reservoirs, not gas, and the use of long horizontal wells is not prevalent in California as it is elsewhere. Consequently, the issues related to methane emissions elsewhere are not currently relevant in California. Regardless of whether the wells encounter oil or gas, and regardless of whether a well is HF, all operations are subject to strict air, water, and endangered species related requirements.

Historically, a typical HF well in California uses only a small fraction of the water used elsewhere. Recent examples show less than 500,000 gals of water used, about 1.5 acre ft of water. By contrast, water consumption by agriculture in Kern County alone is more than 1 million acre-ft per year. Even if all four projected wells are HF (possible but not likely), and even if much larger volumes are used, they would be virtually unmeasurable when compared to the large amounts of water used for other purposes in the project area. In any event, BLM continues to encourage operators to reduce water use wherever possible, reuse those fluids that can be reused, and recycle the flowback fluids where feasible.

As mentioned above. BLM is seeking ways to reassure the American public that fracturing on BLM land is safe and has begun discussions with interested parties on the practice and regulation of fracturing on BLM land. To that end, BLM California will be working closely with the California Division of Oil and Gas and Geothermal Resources (CDOGGR), other Federal and California State agencies, and industry trade groups (such as the Western States Petroleum Association (WSPA), California Independent Petroleum Association (CIPA), and the Independent Oil Producers' Agency ( IOPA) to address the issue. When current studies are complete, BLM will implement any new regulations that may be issued, and those new regulations will be incorporated into our standard Conditions of Approval for new wells and workovers of existing wells.

It should be noted here, as elsewhere in this EA, that no operations are approved in this document. All on the ground operations will be required to go through a site specific NEPA process once a permit application is received.

Location of Parcels and Past Drilling Activity

All parcels are within 5 miles of the administrative boundaries of existing oil fields. In addition, there are six parcels (parcels 11 and 14-18) that are located within the administrative boundaries of existing oil fields (Belgian Anticline, Bowerbank, Kern Front, and Mt. Poso), with a total of 2,220 acres within those field boundaries. One-two dry holes were drilled on parcels 6 and 7 and 18 dry holes on parcels 17 and 18 (a total of 21 dry holes). There were a total of twenty wells on parcels 15, 17, and 18 that were originally producers, but now are plugged.

Although it could be argued that some areas are closer to known production, and therefore more likely to see development, it is also possible that those areas have been more effectively "condemned" by the unsuccessful exploratory wells that were drilled in the past. Overall, there is not enough data to make more accurate projections of where activity might occur, and whether it would be successful.

Although the range of wells drilled per lease sale during the last ten years has ranged from none to 27, nearly all of the leases issued in the past 10 years have not seen any drilling (174 out of 186). In addition, the average density of wells per acre was one well per 3,020 acres offered for lease (46 wells on 138,901 acres). Therefore, it is reasonable to project up to four wells for this lease sale. Any future development on parcels in this lease sale would therefore represent only a very small portion of the total wells drilled on the federal mineral estate, and is well within the scope of activities which have been previously analyzed in the Caliente Resource Management Plan and the Reasonable Foreseeable Oil and Gas Development. The total expected number of wells expected on these parcels, one, is insignificant in comparison to the total number of wells and other activities expected in the area.

For details on the projected disturbance, see Table 2 below.

**Table 2. Expected new surface disturbance on September 12, 2012, lease sale tracts with Preferred Alternative Lease with Controlled Surface Use - Protected Species (CSU - Protected Species) and Controlled Surface Use – Sensitive Species (CSU – Sensitive Species) Stipulations - Proposed Action).**

| SURFACE ACTIVITY | NUMBER | ACRES | | | |
|---|---|---|---|---|---|
| | | PERMANENT | TEMPORARY | TRANSIENT | TOTAL |
| Wells Drilled, incl. roads and facilities | 4 wells | <4 | | | <4 |

The acres of disturbance were based on the total new disturbance of approximately 35 acres for the 46 wells drilled on leases issued at the last 10 years of lease sales. See Appendix D – "Oil and Gas Activity on Leases from Recent Lease Sales" for details on previous disturbance. Significant efforts will be made to use existing roads, rights of way, and to minimize disturbance wherever possible. In addition, no seismic exploration (vibroseis/shot holes, roads, etc.) was projected because seismic activities are not a result of leasing activities; in other words, seismic activities can occur regardless of whether or not the lands are leased.

### Ongoing Reclamation of Existing Disturbed Surfaces

The potential disturbance of less than one acre will be considered to be permanent disturbance. Although new wells continue to cause surface disturbance, recent trends have shown that the total acres of newly disturbed land are being significantly offset by the large numbers of wells that are being abandoned in this area. According to the CDOGGR, during the last 5 years for which records are available (2005-2009), there were 11,530 wells drilled in Kern County, of which approximately 10,101 were completed. However, during that same period, 8,769 wells were abandoned (87% of the number of newly completed wells.). It is reasonable to assume that this trend will continue. (Data from the California Department of Conservation, Division of Oil and Gas).

Source: ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2008/0101summary3_08.pdf.

## Proposed Action Alternative – Direct and Indirect Impacts

### Social-Economic

The proposed action will potentially allow new development of these parcels for oil and gas production. Due to the very small amount of development expected on these lands, it is not likely that there will be any measurable impact to the local economy.

### Visual Resources

Potential impacts from oil and gas development include changes to the basic landscape elements of form, line, color and texture. These changes result from installation of new structures (e.g. oil wells, power lines, tanks etc.) and earthwork associated with well pads, roads and other developments. In the areas identified for management for VRM Class IV objectives these changes are an acceptable impact to the existing landscape as other resource values outweigh the scenic aspects of the environment.

All development will implement, BLM Best Management Practices for Visual Resource Management in Oil and Gas Development. This includes, but is not limited to, proper site selection, minimizing disturbance, selecting colors that blend with the background, and reclaiming areas that are not in active use.

### Recreation

Since there are no recreational opportunities on public lands where split estate 5,139 acres (federal mineral private surface) is involved, there are no impacts to recreation. Although the remaining 360 acres include public lands surface, the U.S. Government has no legal access on those parcels nor authority to allow public access on those lands, as such there are no anticipated impacts on recreation.

### Air and Atmospheric Values

*Air Quality Analysis Assumptions*
Although the proposed action to offer parcels for competitive oil and gas leasing does not in itself result in emissions that effect air quality or climate change, the BLM acknowledges that emissions may result as in indirect effect of development subsequent to leasing, if and when the leases were developed. Emissions associated with fluid mineral development (direct, indirect, and cumulative effects) on the proposed lease sale parcels would be considered at the project level in a subsequent NEPA analysis. In

spite of this, criteria pollutant emissions are estimated based on the RFD scenario. A degree of uncertainty exists as to the exact development schedules, well location(s), the number of wells that would be drilled, and a number of other factors which are addressed in the RFD. This analysis is based on the same assumptions discussed in the RFD; these wells would incrementally contribute a small percentage of the total emissions (including GHG's) from oil and gas activities in California.

State Implementation Plans (SIPs) are prepared (and adopted) for most of the federal nonattainment areas. These SIPs are implemented through a series of rules and regulations and are designed to result in compliance with the NAAQS by federally imposed deadlines. Provisions and commitments in SIPs are federally enforceable. In addition, air quality is highly regulated by a number of additional federal, state and regional rules and regulations. These rules and regulations apply to many of the activities that may occur as a result of the proposed action. Any lease development activities would be required to be conducted in compliance with current and future SJVAPCD, CARB, and US EPA Rules and Regulations. As new air plans are developed, or existing plans are updated, activities would be conducted in compliance with those plans also. In accordance with BLM fluid mineral lease requirements, a federal oil and gas lessee and/or operator is responsible for obtaining required air permits and compliance with permit and emissions reporting requirements of air regulatory agencies.

*Impacts to Air Quality*

At the leasing stage, it is extremely difficult to generate a meaningful estimate of emissions associated with an unknown well type, an unknown target depth, in an unknown location, with an unknown lessee, operator, drilling contractor, etc. Since current federal oil and gas operators utilize various drilling contractors and construction companies, modeling at this time would be hypothetical. Details on fleet (vehicle and equipment make, model, engine size, etc.), trip length, project acreage, and the construction schedule are among several variables required to generate meaningful emissions estimates. Combined, these factors determine the intensity, duration, and characteristics of associated pollutants. Furthermore, the degree of impact will also vary according to the characteristics of the geologic formations from which production occurs.

The proposed action could potentially result in a number of activities which generate criteria pollutant emissions (and GHG emissions) at the development stage. Impacts would be in the form of gaseous and particulate matter that is emitted into the air as a result of the activities associated with oil and gas lease development and production. Project emissions could include direct emissions of nitrogen oxides (NOx), sulfur oxides (SOx), and Volatile organic compounds (VOCs) (which are precursor emissions for ozone and $PM_{2.5}$), carbon monoxide (CO), particulate matter smaller than 10 microns ($PM_{10}$), and particulate matter smaller than 2.5 microns ($PM_{2.5}$). Generically, these emissions are associated with combustion and fugitive sources associated with exploration, drilling, production and abandonment such as seismic exploration/diesel drill rig engines, drill pad construction equipment (e.g., dozers, backhoe, grader, etc.), temporary production flares, remedial well work, equipment trucks, hauling of liquids, drill rig crew trucks/vehicles, portable lift equipment, portable testing equipment, temporary and permanent production facilities.

Particulate emissions will result from vehicle and equipment travel, mainly from the ingress and egress of vehicles on any unpaved access roads. In addition, $PM_{10}$ will be released during the drill pad construction phase. The primary emission sources during any new construction would be from heavy equipment exhaust and fugitive dust. Other emission sources will occur during lease operation and maintenance. These sources include oil facilities, gas facilities, operator vehicle traffic, and gas powered oil well pumping units.

According to the CARB, emission factors for VOCs (volatile organic compounds), $NO_x$ (nitrogen dioxide), $SO_x$ (sulfur dioxide), $PM_{10}$ and $PM_{2.5}$ are not available for individual wells, but can be calculated using total emission per day calculations that have been obtained from the California Air Resources Board website (http://www.arb.ca.gov/app/emsinv/emssumcat_query). These emissions totals for the San Joaquin Valley Unified APCD are included in Table 4.

**Table 4. 2010 Estimated Annual Average Emissions from Oil and Gas Production, San Joaquin Valley Unified APCD and Statewide**

| SOURCE | TOG (TONS/DAY) | ROG (TONS/DAY) | CO (TONS/DAY) | $NO_x$ (TONS/DAY) | $SO_x$ (TONS/DAY) | $PM_{10}$ (TONS/DAY) | $PM_{2.5}$ (TONS/DAY) |
|---|---|---|---|---|---|---|---|
| Oil and Gas Production | 46.28 | 26.65 | 0.73 | 0.33 | 0.07 | 0.02 | 0.02 |
| Oil and Gas Production (combustion) | 20.19 | 6.97 | 11.46 | 11.23 | 1.87 | 1.75 | 1.75 |
| Total Oil and Gas(tons/day) SJVUAPCD | 66.47 | 33.62 | 12.19 | 11.56 | 1.94 | 1.77 | 1.77 |
| TOTAL Oil and Gas (tons/day) Statewide | 119.88 | 51.50 | 21.73 | 23.79 | 2.61 | 2.30 | 2.28 |

This table illustrates the emissions for oil and gas production sources reported by the SJVUAPCD relative to the statewide totals, in tons of pollutants per day. Oil and gas production is defined as any source used in the production of oil and gas, including but not limited to wells, pumps, tanks, roads, maintenance traffic, and heaters. Steam generators are calculated separately and are represented on the table as oil and gas production (combustion). For purposes of this analysis, these numbers are summed to get the total amount of pollutants emitted by oil and gas production in the SJVUAPCD.

In regards to both $PM_{10}$ and $PM_{2.5}$, the SJVUAPCD does not have a standard for calculating emissions for individual wells (source: conversation 2007 with Leonard Scandura, SJVUAPCD). The SJVAPCD does not permit individual wells; generally a facility such as a tank setting that serves a number of wells is the permitted stationary source. However, wells in California are subject to Fugitive Inspection and Maintenance, Rule 4409.

An emission formula and emission factor was provided by Air Quality Engineer Leonard Scandura of the SJVAPCD. The formula is E = A x EF where E= emissions, A= activity or source, and EF is the constant emission factor. Criteria pollutant emissions were calculated for one well based on the 2010 SJVUAPCD Annual Emissions from Oil and Gas Production; these calculations are included in Appendix F.

Subsequent development of any leases issued would contribute small incremental increase in overall emissions. For one well, estimated emissions of $PM_{2.5}$, $PM_{10}$, and SOx range from approximately 29-32 pounds (lbs) per year. Per well, $NO_x$ emissions are estimated at 187 lbs/year and 543lbs/year of VOCs. Based on the RFD scenario of four wells, these estimated emissions would be multiplied by a factor of four. It is important to note the difference in unit of measurement; the statewide and air district emission inventory data are indicated in tons per day, while the emissions estimates for the proposed action are expressed in pounds per year. This range of pollutant emissions represents 0.005% - 0.02% of the total

emissions from oil and gas production in the San Joaquin Valley air basin and 0.002% - 0.02% of the total emissions from oil and gas production statewide. The expected emissions from development based on the RFD scenario incidental to the proposed action would be low both in relation to the overall activity in the region, and by itself. When compared to regional, statewide, national, or global emissions, the amount released as a result of potential production from the proposed lease parcels would have a negligible effect.

As detailed in the affected environment, the San Joaquin Valley Air Basin is designated nonattainment for ozone and $PM_{2.5}$. The District's adopted ozone and $PM_{10}$ plans are already providing benefits for $PM_{2.5}$ and ozone levels. The District attributes the Valley reaching attainment of $PM_{10}$ standards ahead of schedule to the control strategies set forth in the 2003 $PM_{10}$ Plan and the 2006 $PM_{10}$ Plan (SJVAPCD 2008).

BLM requires that the lessee/operator assume responsibility for ensuring that all operations are properly permitted with the appropriate agencies, and that the operations are in compliance with all mobile and stationary source guidelines. This is consistent with the SJVUAPCD requirements; the District holds the owner/operator responsible for obtaining permits, or ensuring that the proper permits are in place for their contractors (Personal communication, Homero Ramirez, SJVUAPCD). Mitigation measures are imposed by the air permitting authority and would include such items as use of low-emission construction equipment, use of low sulfur fuel, and/or use of the existing power transmission facilities, where available, rather than temporary power generators. The failure of the lessee/operator to follow the air quality rules and permit requirements will result in penalties and potentially lead to the loss of and air district and the BLM authorizations.

The State and local air districts have air quality primacy; BLM may however choose to implement control measures to reduce effects on air quality. BLM may apply Best Management Practices (BMPs) and implement adaptive management practices to reduce particulate matter emissions even though air quality standards would not be violated without implementation of such measures. BLM *Best Management Practices and Options for Air Quality Control for Specific Activities* would be applied. For oil and gas activities, BLM may impose controls on engines (drilling rigs), roads, monitoring devices, haul vehicles, noise, and sources of VOCs (condensate tanks, dehydrators, separators). Controls on engines can directly impact (lower) visibility impacts, which are often a leading concern. To reduce fugitive dust on roads, watering, graveling, applying surfactants, paving, inducing speed limits, and/or restricting vehicle access are control measures commonly implemented by BLM. Graveling can provide up to 85% reduction in fugitive dust; paving can provide even more. A reduction in levels of fugitive dust, particulate and combustion emissions can be achieved by imposing a combination of control measures and technologies.

The SJVUAPCD requires all construction work (earth moving) to follow rule eight which details requirements for $PM_{10}$, $PM_{2.5}$, and fugitive dust minimization. Dust control measures discussed in Regulation VIII Rules, include (but are not limited to) frequent watering, paving of access roads, and periodic road washing in construction areas. More specifically under rule 8021, any project that is over 5 acres in non-residential areas will need to have a dust control plan that details particulate matter minimization (www.valleyair.org).

Projects less than 5 acres are considered by the SJVUAPCD as insignificant in regards to $PM_{10}$ and $PM_{2.5}$ emissions. Based on the RFD associated with the proposed action, total disturbance will be, up to 4.0 acres (approximately 1.0 acre per well); therefore the proposed action will not result in particulate emissions levels that substantially impact air quality. According to the SJVAPCD, implementation of and compliance with Regulation VIII will effectively reduce emissions and air quality impacts from the project. In addition, implementation of existing regulatory requirements (SJVAPCD Rule 2201) requires any emission increases above specified levels to be offset. Therefore, by complying with existing regulatory requirements and implementing BMPs to reduce emissions, development subsequent to leasing the proposed parcels would not result in a substantial increase in emissions. Potential impacts to air quality from oil and gas development subsequent to leasing would be considered by air regulatory agencies in their emission budget and air quality planning, therefore any emissions contribution would not be expected to prevent timely attainment of federal air quality standards.

## Climate Change

*Climate Change Analysis Assumptions*

No GHG emissions will result from the proposed action, which is administrative in nature; however, the BLM recognizes that GHG emissions are a potential indirect effect of fluid mineral exploration and/or development subsequent to leasing. As a result, the analysis is limited to a qualitative description of pollutants associated with oil and gas development and production and describes how the proposed action potentially contributes to climate change through the release of GHGs. Although the EPA recently revised GHG emission factors used to estimate emissions from oil and gas development and production, it would be a highly speculative exercise to quantify estimates of GHG emissions at the leasing stage. Any potential effects would occur if and/or when the leases were developed. While it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed parcels available for leasing, some general assumptions can be made: offering the proposed parcels may contribute to drilling new wells. Subsequent development of any leases issued would contribute a small incremental increase in overall GHG emissions. When compared to statewide, national, or global emissions, the amount released as a result of potential production from the proposed lease parcels would not have a measurable effect on global climate.

*Climate Change Impacts*

As described in Chapter 3, the DOI is exploring whether global and regional climate modeling can be scaled to the point that it can be used to manage parks and refuges.[2] Secretarial Order 3289 was issued in 2009[3] which directs each bureau to:

"consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, and/or when making major decisions affecting DOI resources."

The California Global Warming Solutions Act of 2006 (AB 32) is one of the first laws in the United States that mandates regulation of greenhouse gases at a state level. In April 2009, the U.S. Supreme Court ruled that the EPA has the authority to regulate GHGs under the Clean Air Act (Massachusetts vs. EPA, 05-1120). It is anticipated that, as more information becomes available, and as California continues

[2] GAO-07-863, 2007

[3] Secretary of the Interior Order 3289, September 14, 2009

to implement the greenhouse gas regulations under the California Global Warming Solutions Act of 2006 (AB-32), additional restrictions will be placed on all activities, including those associated with the drilling and production of oil wells in the Southern San Joaquin Valley. All current and future operations on federal lands will be subject to those requirements.

As described in Chapter 3, the primary sources of greenhouse gases associated with oil and gas exploration and production are carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$). In addition, nitrous oxide and VOCs are indirect air pollutants that contribute to ozone production and aid in prolonging the life of methane in the atmosphere. With respect to climate change, climate plays a significant role in the production of ozone. Sunlight and high temperatures are a major catalyst in reactions between VOCs and NOx in the production of ozone. With an increase in overall temperature, we can expect to have more hot days and less precipitation that will lead to a higher production of ozone.

GHGs are produced and emitted by various sources during phases of oil and gas exploration, well development, production, and site abandonment. The American Petroleum Institute (API) categorizes sources of emissions from all oil and gas operations into the following classifications[4]:

### Direct Emissions

Combustion Sources – includes stationary devices (boilers, heaters, internal combustion engines, flares, burners) and mobile devices (barges, railcars, and trucks for material transport; vehicles for personnel transport; forklifts, construction equipment, etc.)

Process Emissions and Vented Sources - includes process emissions from glycol dehydrators, stacks, vents, ducts; maintenance/turnaround; and non-routine activities such as pressure relief valves, emergency shut-down devices, etc.

Fugitive Sources- includes fugitive emissions from valves, flanges, pumps, connectors, etc.; and other non-point sources from wastewater treatment

### Indirect Emissions

Emissions associated with company operations, such as off-site generation of electricity, hot water or steam, and compression for on-site power, heat and cooling.

Direct and indirect GHG emissions may occur from various sources during each phase of exploration and development. During exploration and development, emissions are generated from well pad and access road construction, rigging up/down, drilling, well completion, and testing phases. GHG emissions for these phases are mainly $CO_2$ emissions from fuel in internal combustion engines of diesel trucks, equipment, and rigs. However, as Zahniser (date unknown) noted in the *Characterization of Greenhouse Gas Emissions Involved in Oil and Gas Exploration and Production Operations, Review for the California Air Resources Board*, an additional one-time and potentially long term effect could include carbon sinks lost due to surface and vegetation disturbance associated with well site development. In the first phase of a national assessment, USGS found that the conterminous U.S. presently stores an estimated 73 billion metric tons of carbon in soils (USGS 2009); soils could serve as a sink, by removing additional quantities of carbon dioxide ($CO_2$) from the atmosphere, as a means to mitigate climate change.

[4] American Petroleum Institute, Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry; August 2009.

There are currently no established thresholds of significance for GHG, but the EPA has used a reporting threshold of direct GHG emissions of 25,000 tons per year of carbon dioxide equivalent (74 FR 56260, October 30, 2009). As such, there is no generally accepted guidance for determining significance of project specific GHG impacts (SJVAPCD, 2009a). The SJVAPCD recognizes that project proponents, lead agencies, the District and the public need clear guidance; therefore, the District Board has recently directed staff to develop guidance for addressing GHG impacts. The District proposes that projects not implementing Best Performance Standards (BPS) must quantify GHG emissions and reduce or mitigate GHG emissions (by 29% to be less than significant). Developing Performance Based Standards will streamline the significance determination process. The policy for addressing GHG emissions impacts for stationary source projects indicates that the need to quantify project specific impacts is negated if emissions reductions are achieved by implementing BPS (SJVAPCD 2009b). This approach is based on the use of BPS and their associated, pre-quantified GHG emission reduction effectiveness.

As part of CARB's efforts to establish a baseline GHG emissions inventory, they are still in the process of developing protocols to quantify fugitive and vented emissions. At this time there are emissions calculations for $CO_2$ and $CH_4$ from well workovers, cleanups, and maintenance activities. However, there are currently no calculations or emissions factors for determining GHG emissions from new wells drilled or well completions (CARB 2011). Consequently, no estimates of GHG emissions are provided for the proposed action based on the RFD at the leasing stage.

For this analysis, the RFD predicts that up to four wells will be drilled as a result of the proposed action. The current leasing proposal represents less than 0.05 percent of the annual new well activity for the area and a much smaller fraction of the existing well population. Emissions from the construction of four new wells would be expected to be lower than the national average because of vapor recovery systems and other pollution controls (Best Performance Standards) mandated by the San Joaquin Valley APCD; levels of GHG emissions are expected to follow a similar pattern. Thus, direct GHG emissions from development subsequent to leasing would be undetectable on a nationwide basis and would be expected to have a negligible influence on global climate change. This is consistent with the SJVAPCD conclusion that existing science is inadequate to support quantification of impacts that project level GHG emissions would have on global climate change (SJVAPCD 2009b).

Pursuant to Title 17 California Code of Regulations, Sections 95100-95133, an operator will be responsible for reporting its GHG emissions inventory annually to the state CARB to track progress in reaching statewide GHG emission reduction goals by 2020. A federal lessee will be responsible for implementation of a VOC Leak Standards program, pursuant to SJVAPCD Rule 4401. This Inspection and Maintenance (I&M) program is designed to control fugitive VOC emissions at components such as fittings and valves associated with production and processing equipment. In addition, a lessee is responsible for the operation of its steam generators in compliance with SJVAPCD Rules 4305 and 4306. Controlling fugitive VOC emissions and combustion generated VOC emissions will also control and reduce the amount of potential fugitive methane and combustion related methane emissions associated with the production streams, and thereby reduce potential GHG emissions.

In addition to the mandatory GHG reporting requirement and regulatory requirements to reduce GHGs, the BLM encourages federal oil and gas lessees and/or operators to implement "Best Management Practices (BMPs)" that reduce GHG emissions. As identified in the EPA Inventory of US Greenhouse Gas Emissions and Sinks, the BLM holds regulatory jurisdiction over portions of natural gas and petroleum systems. Exercise of this regulatory jurisdiction has led to development of BMPs designed to reduce emissions from field production and operations. Analysis and approval of future development would include applicable BMPs as Conditions of Approval (COAs) in order to reduce or mitigate GHG emissions. Additional measures developed at the project development stage would be incorporated as COAs in the approved APD, which is binding on the operator.

Such mitigation measures may include, but are not limited to:

- Flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion through the use of multi-chamber combustors;
- "Green" (flareless) completions;
- Water dirt roads during periods of (high) use in order to reduce fugitive dust emissions;
- Require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored;
- Installation of liquids gathering facilities or centralized production facilities to reduce the total number of sources and minimize truck traffic;
- Use of natural gas fired or electric drill rig engines;
- The use of selective catalytic reducers on diesel-fired drilling engines; and,
- Re-vegetate areas of the drilling pad(s) not required for production to reduce the amount of dust from the pad(s).

Measures to reduce GHG emissions include the EPA's Natural GasSTAR program and additional BMPs that are located on the BLM Washington Office webpage (www.blm.gov/bmps). The EPA US Inventory data show that industry's implementation of BMPs proposed by the EPA's Natural GasStar energy program has reduced emissions from oil and gas exploration and development. The BLM Bakersfield Field Office would work with industry to facilitate the use of relevant BMPs for operations proposed on federal leases where such mitigation is consistent with agency policy.

## Impacts to Soil Resources

Although there would be no direct effects to soils from the proposed lease sale, there may be indirect effects based on the RFD scenario (four wells, up to approximately four acres). Direct impacts to soils as a subsequent result of leasing may include topsoil removal, mixing, grading, filling, and compaction; all of which reduce soil quality. Erosion is an offsite impact that may present potential water quality issues as a result of increased sediment and/or nutrient transport. Indirect impacts associated with any lease development may include the potential for accelerated erosion following well pad and/or access road construction on slopes and/or other unstable geography. Soils identified on parcels 5, 6, 7, 11, 16, and 18 may occur on slopes that exceed 40 percent. Since the potential hazard of erosion increases as slope increases, the risk of erosion on and adjacent to lease parcels is of greatest concern on those parcels.

These site-specific impacts will be considered and mitigated on a case-by-case basis using proper well placement and by implementing best management practices (BMPs) at the application stage. To minimize new or additional disturbance and impacts to soil quality, wells and access roads may be sited in areas that are disturbed by past and/or current land use. Overall soil compaction may be reduced by restricting vehicle and equipment use to limited, perhaps previously disturbed areas. Simple erosion control practices will apply, such as minimizing slope gradient, clearing smaller areas of vegetation, and vigilant scheduling of any excavation to avoid rainfall periods. Road(s) designed in accordance with the BLM standards (Manual 9113) will decrease erosion effects, particularly in areas where soil limitations are identified. Soil impacts may be further reduced by identifying and protecting biological soil crusts; when soil crusts are present these will be conserved and stockpiled to encourage interim restoration subsequent to drilling. Regardless of crust presence or absence, topsoil conservation and replacement is generally used by the BLM as a Best Management Practice (BMP) to minimize impacts to soil and habitat, thereby increasing the efficiency and success of interim and final site reclamation.

Any oilfield construction project that disturbs 1.0 acre of soil or more is subject to the State of California Water Quality Control Board (SWQCB) notification and General Permit requirements for Construction; therefore, development associated with the RFD would be subject to compliance with these regulatory requirements. Compliance with SWQCB permit requirements would be expected to reduce impacts to soil resources on a landscape level by minimizing the potential for sedimentation, soil erosion and/or loss. Furthermore, the intensity of both onsite and offsite effects of soil disturbance will be minimized by implementing basic principles of erosion control on construction sites, such as BLM BMPs, State approved Management Measures (MM's), or EPA's *Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites* (http://cfpub.epa.gov/npdes/stormwater/oilgas.cfm).

Subsequent to lease development, impacts to soils from spills or contamination could cause a long term reduction or loss in site productivity. Some of these direct and indirect impacts can be minimized or avoided through proper design, construction, and maintenance, and by implementing BMPs. In California, oil and gas operators are required to comply with State spill reporting requirements, per the California Office of Emergency Services (OES) and the CDOGGR. In addition, Federal lessees are required to comply with BLM spill reporting and clean up requirements. Any soil contamination resulting from an undesirable event will be removed and/or mitigated upon discovery; clean up may follow the *Guidelines for Clean-up of Heavy Crude on Federal Leases*.

## Impacts to Water Quality

Although there are no rivers, lakes, or streams on the parcels that contain water year round, Bitterwater Creek bisects federal surface in parcel 7. In addition, unnamed, intermittent creeks bisect or cross parcels 2, 5, 6, 7, 8, 12, 13, 15, and 17. These creeks may support water seasonally, and are otherwise expressed as dry drainages.

There would be no direct impacts to water resources from the proposed lease sale, which is administrative in nature. The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to water quality. Subsequent development of the lease can lead to surface disturbance from the construction of well pads, access roads, pipelines, and powerlines, which can result in degradation of surface water quality and groundwater quality from nonpoint source pollution, point source pollution including spills, increased soil losses, and increased gully erosion.

Consistent with Lease Notice 1, surface disturbing activities are restricted within 500 feet of surface water and/or riparian areas to protect the water and riparian resources. As a result, no direct effects to Bitterwater Creek or other intermittent streams are expected during development because BLM will recommend avoiding direct surface disturbance in such areas. A well location and/or access road would be sited in a manner that avoids direct impact or alteration (under BLM standard lease stipulations, a proposed well can be offset up to 200 meters), and every effort would be made to avoid features which require the discharge of dredge or fill materials into the waters of the United States. Furthermore, in the event that any "blue line" drainage cannot be avoided, California Department of Fish and Game notification and/or a Lake and Streambed Alteration Agreement (Section 1600) may be required by the lessee/operator. Indirect impacts to water quality from erosion and increased sediment would be minimized by implementing basic principles of erosion control, consistent with the basin plan.

The proposed lease sale parcels are in areas that are generally underlain by groundwater basins. Petroleum products and other chemicals could potentially result in groundwater contamination through a variety of operational sources including but not limited to pipelines, well construction, and spills. Similarly, improper construction and management of reserve pits could degrade ground water quality through leakage and leaching. Groundwater (aquifers) will be fully protected by using standard oil field practices and BLM BMPs such as requiring a string of casing to be cemented across all fresh water aquifers, at a

depth below all usable water zones; consequently impacts to groundwater quality are not expected. Furthermore, BLM authorizations at the development stage require compliance with all laws, regulation, and BLM policies, including State and Federal Clean Water Act(s), and Regional Water Quality Control Board requirements that relate to surface and groundwater protection.

At the development stage, impacts to water quality from the RFD would be limited to the localized area of the reasonably foreseeable development scenario (four wells, up to approximately four acres). Since no direct impacts to surface water or groundwater are anticipated, indirect impacts to water quality would be avoided or minimized by implementing standard oilfield practices, BLM best management practices (BMPs) and State approved BMPs (Management Measures) to protect water resources. Furthermore, any oil field construction project 1.0 acre or greater in size would be subject to the California Regional Water Quality Control Board General Permit (SWRCB Order No. 2009-0009-DWQ) requirements to prevent or reduce non-point source pollution; therefore, development associated with the RFD for the proposed action would be subject to compliance with these regulatory requirements. Since no direct or indirect effects are anticipated from the proposed action, the project will not result in cumulative impacts to water resources at the basin or watershed level.

Where there is a threat to water quality or where water quality does not meet state standards, coordination must occur with the regional water quality control board(s). All parcels that contain any water bodies (streams, lakes, springs, etc.) must have adopted BMPs for all activities associated with oil and gas operations that could affect water quality. A list of exempted aquifers is in Volumes I, II, and/or III of California Oil and Gas Fields, published by the California Conservation Division. As stated previously, additional site-specific NEPA analysis will be conducted in the event a development proposal is submitted for one or more of the parcels addressed in this EA. Conditions of approval (COAs) will be attached to BLM permit approvals that require protective measures to be taken where spills or other contamination are potentially a concern to surface or ground water.

### Floodplains

Parcel number 1 is within Zone A; areas of 100 year floods. Parcels 2, 3, 6, 8-17, and the N½ of Parcel 18 are within Zone C; areas of minimal flooding. Parcel 9 is surrounded by Zone A in the SW¼. Parcel 4, 5, and 7 are within Zone A; areas of 100 year floods.

Regardless of where on the parcel development may be proposed, site-specific NEPA analysis would identify measures to minimize the risk of flood damage to oil and gas facilities/wells and oil spills or other contaminations entering any streams.

### Biological Resources Including Riparian and Wetlands

There will be no direct effects to biological resources from offering the parcels for lease.

If a parcel is leased and developed, there could be indirect effects to biological resources from offering the parcels for lease. From the 237 parcels offered in the past 10 years, 186 parcels have been leased. Of the 186 parcels leased, 46 wells have been drilled on 12 leases. Of the 46 wells drilled, 39 wells on 9 leases were drilled in native habitat. It is estimated that four wells could be drilled as a result of offering the parcels for lease. Development of a lease can result in impacts to habitat and species.

All development proposals will be subject to site specific NEPA and ESA review. Species and habitat surveys will be required. Project design criteria, mitigation measures and compensation, similar to those detailed in **Attachment Biology 1. Sample Oil and Gas Programmatic Biological Opinion Provisions**

will be required. The CSU Sensitive Species and CSU Protected Species stipulations reserve to BLM the right to delay processing; move, modify or seasonally restrict activities; or prohibit surface disturbing activities on all or a portion of the lease to protect biological resources. In addition to project specific measures to avoid or minimize impacts to biological resources, BLM has established landscape safeguards for public surface (360 acres in this lease sale). Public land within reserves would be managed to maintain 90% of the habitat, and BLM land within corridors would be managed to maintain 75% of the habitat.

Although the effects disclosed below can result from oil and gas development, the likelihood and extent of such potential impacts from leasing the subject parcels would be reduced because of BLM's site specific NEPA and ESA review. BLM and FWS meet annually to review the effectiveness of project design criteria, mitigation and compensation associated with the BLM administered oil and gas leases. Based on these meetings, changes are made to the BLM program. FWS remains satisfied that BLM is meeting its obligation under the Caliente RMP Biological Opinion and Section 7 of the ESA.

***Impacts to Habitat from Oil and Gas Activities***

It is estimated that four wells may be developed on the offered lease parcels. Development of the four wells and any associated road and facilities could result in permanent impacts to four acres of habitat (Table 2). This potential loss of habitat amounts to < 10% of the smallest parcels (parcels #9 and 11 with 39 acres of private surface) and < 0.7% of the largest parcel (parcel #17 with 640 acres of private surface). These estimates of habitat loss or alteration are within the range expected and analyzed in the Caliente RMP, EIS Ch. 4 and Biological Opinion.

Of the 5,500 acres, about 2/3 are presently native or recovered lands (mining exploration scars present in parcels 2, 3, 6, 17 & 18; disturbance from livestock in parcels 2, 3, 4, 7, & 8); 1,800 acres are under cultivation or have industrial development. If the potential well was developed on native lands this would amount to less than 1% of the native lands offered under this lease sale.

Measures to minimize impacts, such as those contained in **Attachment Biology 1. Sample Oil and Gas Programmatic Biological Opinion Provisions** would be employed to reduce the amount of habitat impacted. In addition, compensation, in the form of additional habitat protected, would be required. The rate of compensation would range from 1.1 acre (temporary impact) to 4 acres (permanent impact) for every acre disturbed. For new leases offered in the past 10 years of lease sales, 46 wells have been drilled. Twenty-three of these wells were located in native habitat and resulted in 35.11 acres of disturbance. The 35.11 acres of disturbance was compensated with 97.36 acres of compensation habitat.

Impacts to habitat on native lands would depend on the native vegetation type and the topography of the lease parcels. Native vegetation on the lease parcels is primarily grassland with a minor amount of saltbush and other shrub species. Habitat disturbance in grasslands generally has less of an impact than disturbance in shrublands since shrubs take longer to become re-established. Shrublands also support a greater diversity and number of wildlife species as shrubs provide a high variety of food and cover. As the diversity of habitat structure increases from grassland to shrubland, so does the wildlife species richness. Thus, there is more potential for impacts to wildlife in shrubland, than in grassland communities. The impacts associated with well pads and roads, however, would be very site-specific and are not expected to affect these habitats at the community scale. The footprint of the disturbance is also expected to be a small proportion of the habitat area.

Topography can play a role in the amount of surface disturbance that results from well and road construction. Flat areas will require little or no cut and fill, and road routes are not constrained by topography. In hilly areas, cut and fill may be required which disturbs additional land. Roads routes may have to travel longer distances to meet engineering requirements and may also require cut and fill. Areas

lacking roads near potential drilling sites will have more disturbance, as the entire access route will need to be constructed rather than just a short spur route from an existing road.

All of the 1,800 acres in agriculture or industrial development are flat. Of the remaining 2,700 acres (native habitat), approximately 800 acres are with moderate to steep slopes. The remaining 1,900 acres have gentle to moderate slopes. There are existing roads on all parcels. The hilly portions of the parcels are likely to require new road construction to access well pads unless the wells are located adjacent to existing roads. While many of these lease parcels have one or more existing roads, it is likely that new roads would be required to reach the proposed well pad locations. As the terrain becomes steeper and hilly, more side slope, cut and fill construction may be required. Restoration of side slope, cut and fill pads and roads is more difficult. Impacts in such areas, even if the well is abandoned and the road restored, may persist as altered, but functional, habitat, for several decades or longer.

Habitat restoration also takes longer in shrublands as opposed to grasslands. Grassland habitats may resemble their pre-project conditions in 2 to 5 years, although there may be loss of certain species. Shrublands may require 5 to 15 years. The parcels in this lease sale are mostly grassland habitats that return to their pre-project aspect and structure relatively easily and quickly. If soils are lost, this may take much longer; some restored areas may look similar, but have lower native diversity and different soils properties. Certain type of soils and exposures may take longer to restore. Vegetation on exposed, dry shale areas may be slow to recover. Old minerals prospects persist on the landscape, many decades after the initial disturbance. Such areas, however, have naturally sparse vegetation and much exposed soil.

Although the impacts described above can occur as a result of oil and gas development, it is estimated that indirect effect will be limited to four wells with four acres of habitat loss. This would have a localized, moderate effect on habitat in the immediate vicinity of the well and access road, but a negligible to minor impact on habitat within the Southern San Joaquin Valley.

***Impacts to Species from Oil and Gas Activities***

If a well is developed on the offered lease parcels, impacts to plant and animal species may occur. Measures to minimize impacts, such as those contained in **Attachment Biology 1. Sample Oil and Gas Programmatic Biological Opinion Provisions** would be employed to reduce the amount of impact, but not all impacts would be avoided.

Potential impacts to plants include direct mortality from earth excavation or crushing by vehicles. Adverse impacts could also result from soil erosion resulting in loss of the supporting substrate for plants, or from soil compaction resulting in reduced germination rates. Impacts to plants occurring after seed germination but prior to seed set could be particularly harmful as both current and future generations would be adversely affected. Weeds which are introduced and/or promoted by soil disturbing activities compete against and displace native vegetation.

Development associated with oil and gas activities has the potential to affect rare plants. Soil disturbing activities directly affect species by destroying habitat, churning soils, impacting biological crusts, disrupting seedbanks, burying individual plants, and generating sites for undesirable weedy species. Weeds may be introduced during construction and operation of the lease. Roads generate weedy habitat along their edges, as well as avenues for weed invasion into unoccupied territory. Dust generated by construction activities and travel along dirt roads can affect nearby plants by depressing photosynthesis, disrupting pollination, and reducing reproductive success. Oil or other chemical spills could contaminate soils as to render them temporarily unsuitable for plant growth until cleanup measures were fully implemented. If cleanup measures were less successful, longer term impacts could be expected.

A variety of project design features and minimization measures are typically employed to reduce impacts to plant species and populations. Typical measures are contained in **Attachment Biology 1. Sample Oil and Gas Programmatic Biological Opinion Provisions**. Previously disturbed lands are used as much as

possible and the project footprint is minimized. Shrubs and sensitive plant species populations are avoided whenever possible. If sensitive areas cannot be avoided, work is completed after seed set and before germination.

Potential impacts to animals, including listed species, include direct mortality or injury, loss of dens or burrows, displacement, and human disturbance. Direct mortality or injury could result from vehicle strikes, or from collapsed dens and burrows resulting in animals being crushed or entombed. Burrows and dens could be destroyed or damaged by vehicle traffic, particularly heavy equipment. Animals could be displaced during project activities. Such displacement of animals into unfamiliar areas could increase the risk of predation and increase the difficulty of finding required resources such as food and shelter. Human disturbance could result in displacement of animals, even though dens and burrows may not be directly impacted. Human disturbance also might alter the behavior of animals (e.g., activity periods, space use) resulting in increased predation risk, reduced access to resources, and reduced breeding success. Project activities during the spring breeding season could increase the potential for adverse impacts. Animals could also become entrapped in oil spills, leaks, sumps or improperly maintained well cellars or other facilities.

A variety of project design features and minimization measures are typically employed to reduce impacts to individual animals and populations. Typical measures are contained in **Attachment Biology 1. Sample Oil and Gas Programmatic Biological Opinion Provisions**. Speed limits and employee education are employed to reduce the likelihood of vehicle strikes. Dens are monitored and when vacant, excavated or temporarily blocked to prevent entrapment of animals. Pipes and culverts are searched before being moved or sealed. Biological monitors are required to assist crews and trouble shoot unexpected situations.

Roads and large areas of disturbance can be a barrier to movement for some animal species. Animals in the San Joaquin Valley suite of sensitive animal species, however, generally do not have difficulty crossing roads or disturbed areas. It is not unusual to observe kangaroo rats, kit foxes, antelope squirrels or blunt-nosed leopard lizards using and- crossing roads. This tendency does expose these animals to vehicle strikes, especially on paved roads with higher vehicle speeds. The impact of roads, large areas of disturbance, barriers and vehicle strikes is within the range analyzed in the Caliente RMP, EIS Ch. 4 and the Caliente RMP Biological Opinion.

Structures such as utility poles, buildings, and pumping units may provide perches for raptors. Addition of such structures in flat terrain may increase predation rates on small mammals and other prey species. The types of structures typically found in oil fields, however, do not tend to provide nesting structures for raptors, including ravens. Introducing nesting structures can have a greater impact on prey species since much more prey is taken by raptors that are rearing young, and the nest site is continuously occupied for the season increasing the duration and frequency of the predation effect. The effect of introducing structures that will only serve as perches is not expected to be significant as such perches are likely to only occasionally be used for hunting.

If a project may affect listed species, a secondary consultation will be required. In 2001 BLM completed the Oil and Gas Programmatic Biological Opinion (O&G Programmatic BO). Development projects which meet certain criteria may be authorized under the O&G Programmatic BO. If the project does not meet the O&G Programmatic BO criteria, a separate consultation will be completed. The requirements of the separate consultation are likely to be similar to those contained in the O&G Programmatic BO.

Under the Oil and Gas Programmatic Biological Opinion, listed species and habitat surveys are required prior to BLM authorizations and surface disturbing activities. Habitat features used by listed plants and animals, special status plant populations, and important habitats are avoided as required in the O&G Programmatic BO. Direct incidental take is avoided for San Joaquin kit fox and blunt-nosed leopard lizards, and direct take is avoided to the greatest extent practicable for the other listed animals species (rarely resulting in direct take). Impacts to the habitats supporting these species are mitigated through the

O&G Programmatic BO's requirement that "compensation habitat" be acquired and managed as habitat in perpetuity in an agency-approved off-site location. The O&G Programmatic BO requires that three acres be acquired for each acre subject to permanent disturbance and 1.1 acres be acquired for each acre of temporary disturbance. Beginning in October 2008, BLM also agreed to require a 4:1 compensation ratio for permanent habitat disturbance within the Western Kern County Kit Fox Core Area. The O&G Programmatic BO also requires that each acre of BLM listed species habitat on federally owned surface be "replaced," acre for acre, since the BLM lands are considered conserved lands by the Recovery Plan and Draft Kern Valley Floor Habitat Conservation Plan. Typical survey requirements, project design criteria, mitigation and compensations requirements for BLM authorized projects are included in **Attachment Biology 1. Sample Oil and Gas Programmatic Biological Opinion Provisions**.

In addition to site- specific NEPA and ESA review, all new oil and gas leases would be subject to the "Controlled Surface Use – Protected Species" and "Controlled Surface Use – Sensitive Species" stipulations. The CSU Sensitive Species and CSU Protected Species stipulations reserve to BLM the right to delay processing; move, modify or seasonally restrict activities; or prohibit surface disturbing activities on all or a portion of the lease to protect biological resources. Leasing of lands under these constraints will provide strong protection for protected species and special status species.

Although the impacts described above can occur as a result of oil and gas development, it is estimated that indirect effects will be limited to four wells with four acres of habitat loss. This would have a localized, moderate effect on individual animals in the immediate vicinity of the well and access road, but a negligible to minor impact on populations within the Southern San Joaquin Valley. These potential impacts are within the range analyzed in the Caliente RMP, EIS Ch. 4 and the Caliente RMP Biological Opinion.

***Effects to Federally Listed and Proposed Species, and Critical Habitat***

Several federally listed species (San Joaquin wooly-threads, California jewelflower, Kern mallow, San Joaquin adobe sunburst, Bakersfield cactus, blunt-nosed leopard lizard, giant kangaroo rat, Tipton kangaroo rat and San Joaquin kit fox) may occur on or in the vicinity of all of the parcels. In addition, the recently delisted Hoover's woollystar may also occur on or in the vicinity of some parcels. If exploration or development occurs on one of these parcels, the proposed action may affect listed species.

Section 7 of the Endangered Species Act requires a federal agency to complete Formal Consultation with the USFWS prior to undertaking an action which may affect a listed species. Formal Consultation addressing the impacts of oil and gas leasing, exploration and development, to these species, was completed on March 31, 1997 (Caliente RMP Biological Opinion 1-1-97-F-64). The U.S. Fish and Wildlife Service concluded that oil and gas leasing, exploration and development, as proposed by the Caliente RMP, was not likely to jeopardize the continued existence of these species. As a condition of the Caliente RMP and other biological opinions, BLM and FWS meet annually. Based on these meetings, changes are made to how BLM administered its programs to comply with the various biological programs and its responsibilities under the Endangered Species Act. FWS remains satisfied that BLM is meeting its obligation under the Caliente RMP Biological Opinion and Section 7 of the ESA.

The proposed action is in compliance with the Caliente RMP, and thus, is consistent with the March 31, 1997 Caliente RMP BO. Should an exploration or development proposal be submitted for any of these leases, it will be subject to additional site specific ESA review as described above.

There will be no effect to critical habitat as none of the parcels include designated or proposed critical habitat.

***Relationship to San Joaquin Valley Endangered Species Recovery***

The conservation and recovery strategy outlined in the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998) defines a system of reserves and corridors. In the Caliente RMP, BLM committed to managing all BLM lands within these reserves and corridors as part of the conservation and recovery system. These lands are managed to maintain 90% of the habitat in reserves and 75% of the habitat in the corridors. Restoration is undertaken on lands that do not meet the habitat maintenance goal before new development is authorized. BLM also requires mitigation and compensation for development activities. Disturbance of habitat is compensated at a rate of 1.1 acre for every acre temporarily disturbed, and 3 acres for every acre permanently disturbed. In addition, disturbance to public land requires an additional replacement factor of 1 acre for every acre disturbed and disturbance within the Western Kern County Kit Fox Core Area requires a 4:1 compensation ratio. Species surveys, avoidance of habitat features and implementation of measures to minimize take are also standard requirements. These requirements were put in place to implement the Recovery Plan and to meet the BLM's obligation under Sections 7(a)1 and 2(c) of the Endangered Species Act to conserve listed species.

BLM's program for the management of reserve and corridor lands has been reviewed and approved by the USFWS as part the Caliente RMP Biological Opinion 1-1-97-F-64 and more recently in the Oil and Gas Programmatic Biological Opinion 1-1-01-F-0063. In these Biological Opinions, the Service concluded that the BLM's program was not likely to jeopardize the continued existence of a listed species and is in compliance with Section 7(a)2 of the Endangered Species Act.

Of the lands offered in this sale, 3,097.83 acres are within corridors (green zone). The RFD estimates that four wells with four acres of habitat disturbance could result from this lease sale. Any disturbance would be subject to the survey, avoidance, mitigation, compensation and replacement requirements described above. Any disturbance within corridors would be subject to the 75% habitat maintenance objective. The Santa Maria Unit is within the Western Kern County core kit fox population. Given these restrictions, the limited amount of habitat that will be disturbed (4 acres), and the localized nature of the impact (immediate vicinity of four wells and access roads), indirect effects associated with this lease sale are expected to be compatible with the Recovery Plan and conservation and recovery strategy.

***Species Specific Impacts***

Table Biology 1 and Table Biology 2 lists the Federally listed, state listed and BLM sensitive species with the potential to occur on the offered lease parcels.

***Federally and State Listed Species***

**San Joaquin wooly-threads.** There is potential for San Joaquin wooly-threads to be found within the Pyramid Hills, Shale, and Santa Maria Units. To the greatest extent possible, BLM would require populations to be avoided. Otherwise, measures, such as delaying surface disturbance until after seed set, collection of seed, reseeding, and stockpiling of topsoil, may be required to minimize impacts. This is currently required by the O&G Programmatic BO and would likely be required in any separate consultation.

**California jewelflower.** The Pyramid Hills Unit is within the historic range of California jewelflower, but no extant populations are known within Kern County. Under the Oil and Gas Programmatic BO, any populations discovered will be avoided by a 50-foot buffer. Jewelflower plants can be identified during flowering season, typically February to March. Since the populations would be avoided, the impacts would be avoided or would be negligible to populations and at the landscape scale.

**Bakersfield cactus.** Bakersfield cactus may occur within the Poso Unit and could be adversely impacted by development. The species is easily identified at all times of the year, thus populations should easily be avoided and there would be no impacts to the species.

**Kern mallow.** There is a possibility that Kern mallow could be encountered in the Pyramid Hills, Shale, and Santa Maria Units. Under the Oil and Gas Programmatic B.O., populations are to be avoided, to the greatest extent possible, otherwise, measures, such as delaying surface disturbance until after seed set, collection of seed, reseeding, and stockpiling of topsoil, may be required to minimize impacts.

Kern mallow was listed as Federally endangered in 1990 and included in the subsequent San Joaquin Valley Recovery Plan. No critical habitat has been designated. The recovery plan indicated that "populations of Kern mallow that are predominately white-flowered are the object of conservation concern…" The choice of limiting the circumscription of the species to only the white-flowered populations in the Lokern area is in conflict with the original listing, the Jepson treatment at the time, and more recent molecular and systematic investigations. These investigations form the basis for the current Jepson treatment and results in a wider distribution for Kern mallow, including populations in the western San Joaquin Valley (Kern Co.) and adjacent Carrizo Plain National Monument (San Luis Obispo Co.). The Jepson Manual indicates that Kern mallow has a smaller calyx and that some plants may only have pistillate flowers. Parry's mallow has bisexual flowers only.

**San Joaquin adobe sunburst.** San Joaquin adobe sunburst occurs in the foothills of the Sierra Nevada and has the possibility of occurring within the Poso Unit. This species was not included in the oil and gas programmatic biological opinion, thus, any development with the potential to impact the adobe sunburst would have to acquire a new biological opinion from FWS. Population avoidance measures would have to be incorporated into any development plan. Formal consultation will occur before approving drilling permits in this area if there is a possibility that sunburst populations may be affected by the permit.

**Hoover's woollystar.** Hoover's woollystar may be found within the Shale and Santa Maria Units. Hoover's woollystar could be adversely impacted by earth excavation, off-road vehicle traffic, erosion and spills. It is projected that the post-leasing activities will result in temporary or transient habitat disturbance. Hoover's woollystar can quickly colonize disturbed areas and is expected to re-colonize temporary or transient disturbance areas. Survey and avoidance measures will also be implemented for Hoover's woolystar to further minimize impacts to this species. Thus, the impacts would be avoided or would be negligible to populations and at the landscape scale.

**Blunt-nosed leopard lizard**. Blunt-nosed leopard lizards may occur within all units. They are less likely to occur in the Devil's Den, West Camp and Agriculture Units as these units contain no native habitat. Potential impacts to blunt-nosed leopard lizards include direct mortality, loss or alteration of habitat, and harassment. Blunt-nosed leopard lizards are active during the day, which enhances the threat of some impacts, such as vehicle strikes. Project activities could destroy burrows used by blunt-nosed leopard lizards. Lizards can become entrapped or buried inside destroyed burrows as well. Discharge of waste water could drown lizards using drainages. Lizards can become entrapped or drown in oil or tarry substances. Improperly covered well cellars, buried valve boxes, buckets and vertical pipe sections can act as pitfall traps and entrap lizards. BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for these impacts. Example measures include, installing flashing around the project footprint, protocol level survey prior to habitat disturbance and burrow destruction, escorting vehicles through blunt- nosed leopard lizard activity areas, and scheduling activities for time periods when blunt-nosed leopard lizards are not active. Such measures are currently required by the O&G Programmatic BO and would likely be required in any separate consultation. BLM lease operating standards (e.g. waste water discharge policies, proper maintenance of equipment and facilities, etc.) will also reduce the potential for these impacts.

**Giant kangaroo rat**. Giant kangaroo rats may occur within the Pyramid Hills and Shale Units. Potential impacts to this species include direct mortality, loss of burrow systems, loss or alteration of habitat, and harassment. The construction and maintenance of wells pads, access roads, pipelines, and other oil field

structures may trap or bury kangaroo rats in their burrows. Kangaroo rats can also drown or become entrapped in spilled oil or tarry substances. Kangaroo rats may be killed by vehicles. Burrows can be damaged or destroyed by project activities. Some habitat may be lost or altered. Studies conducted by Spiegel (1996) indicated that kangaroo rat abundance was lower in oilfield-developed sites compared to undeveloped sites. This was attributed to lower carrying capacity due to habitat alteration and fragmentation. However, the amount of oilfield habitat disturbance was much greater (in excess of 70%) than is expected to result from the leasing of these parcels (less than 1% surface disturbance).

Because giant kangaroo rats have the potential to occur in some units, BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for impacts. Examples include, trapping to temporarily remove animals from the construction site, and designing project footprints to avoid burrows when possible. Such measures are currently required by the O&G Programmatic BO and would likely be required in any separate consultation. Pre-construction surveys and implementation of mitigation measures that are part of the Oil and Gas Programmatic Biological Opinion will reduce the potential for impacts. Giant kangaroo rats are mostly active at night and most vehicle traffic is expected during daylight hours. This combination will reduce the chances of a vehicle strike. Giant kangaroo rats would be avoided and the low amount of habitat disturbance would have negligible affects to any kangaroo rat species inhabiting the area.

**Tipton kangaroo rat**. Tipton kangaroo rats may have historically occurred in the West Camp and Agriculture Units. They are unlikely to occur in the unit at this time. Should they recolonize the area, impacts to Tipton kangaroo rat would be similar to those described for the giant kangaroo rat.

**San Joaquin kit fox**. San Joaquin kit fox may occur within all units. Potential impacts to San Joaquin kit fox include direct mortality from vehicle strikes, accidental entombment, drowning or entrapment in spilled oil or sumps, entrapment in pipes, and entrapment in old well cellars. Construction of well pads, roads, pipelines, and facilities result in alteration and fragmentation of habitat, loss of den sites and features, and loss of habitat to support prey species. Oil fields are often places of continual human disturbance from well drilling, maintenance, and monitoring, operation of production facilities, transportation of produced oil, and associated industrial activities. There is also exposure to oil field chemicals around production facilities and from unintentional events (e.g., spills, well head and pipeline leaks, well blow-outs). However, the incidence of these causes of mortality, sickness, and habitat loss are avoided and ameliorated by the implementation of biological surveys prior to new authorizations, take avoidance, project mitigation, terms and conditions of biological opinions, best management practices, spill avoidance and cleanup measures, and habitat restoration of disturbed sites. For example, new well pads, roads and pipelines locations and routes are surveyed for kit fox dens and these projects may be moved to a distance approved by the FWS and CDFG to preserve the den site and minimize disturbance to foxes that may be present. The projects may be relocated onto previously disturbed sites to minimize habitat alteration. Facilities are inspected to ensure that oil leaks are remediated, well cellars are covered, and sumps are covered or removed. Speed limits are posted, and enforced under company health and safety standards. Employee training of endangered species features, habitat, avoidance and mitigation measures, required conservation measures, and reporting are included in employee and contractor project orientation.

Studies of San Joaquin kit fox in oil field landscapes in western Kern County have evaluated the effects of oil and gas land uses on this species. Spiegel (1996) compared several life history traits of San Joaquin kit fox (e.g., den characteristics, diet, spatial ecology and habitat use, reproduction, mortality, relative abundance, and prey relative abundance) in undeveloped, moderately developed and intensively developed oil fields. The moderately developed site was had variable amounts of disturbance from 0% to 50% disturbance, with the intensively disturbed site having >70% disturbance. This study, conducted between 1989 and 1993, found that the abundance of San Joaquin kit fox was 50% higher in undeveloped areas compared to the moderate development and high intensity oilfield sites. The relative abundance and biomass of prey species was also greater in the undeveloped site. Within the oil field sites, prey species

were more diverse than in the undeveloped site. Kangaroo rats were more frequently used in undeveloped sites but rabbits/hares, pocket mice, deer mice, and house mice were used more frequently in the developed sites. The diets were reflective of prey availability of the different areas. Atypical dens (pipes, culverts, woodpiles) accounted for 50% of the den sites in the developed sites, while only 15% were atypical dens in the undeveloped site. Dens in developed sites were usually <5 meters from a human-related disturbance. Habitat features associated with den locations were typical of those most available. Activities associated with oil field production did not appear to affect kit fox survivorship or reproduction. Reproductive success and litter sizes did not differ between developed and the undeveloped sites. However, the cumulative survivorship of young foxes was higher in the undeveloped area. Predation accounted for 88.9% of deaths during this study, with only one death attributable to oil-related activities. The mortality risk to kit foxes from exposure to oil in the developed area was considered minimal. There was a lack of vehicle-related mortality during the study which was attributed to reduced speed limits in the developed area. This study also found that foxes in the developed areas were able to maintain smaller home ranges than foxes from the undeveloped site, presumably due to the availability of human-derived food sources widely dispersed throughout the oilfield. Disturbed sites were used in proportion to that available which was attributed to the presence of prey adapted to disturbed sites. Denning ranges and high activity areas in the developed site contained disturbed habitat in amounts greater to that available, which was likely related to the extensive use of pipe dens. This study concluded that the opportunistic nature of kit foxes allows them to persist in oil-developed areas, provided that adequate foraging resources and denning opportunities exist. The most significant effect of oil development on kit fox populations appears to be lower carrying capacity for populations of both foxes and their prey from reduction of habitat (about 28% vegetative cover) and fragmentation of habitat caused by oilfield-related construction and maintenance activities.

A more extensive and longer term kit fox study in an oil field landscape was conducted at the Naval Petroleum Reserves, California (NPRC) from 1980 to 1985. At this study, a site was considered developed if disturbance was >15%; the undeveloped sites averaged 7.8% disturbance and the developed sites averaged 25.8% disturbance. Cypher et. al. (2000) found that kit fox capture rates were higher in the undeveloped areas than in the developed area, but these rates exhibited similar trends and were related. Survival rates were higher in developed areas during 1980 -1986, but rates declined in both areas during that period. Deaths attributed to various causes were similar in developed and undeveloped areas. Juvenile survival rates were similar in developed and undeveloped areas as were the causes of deaths. Of 712 dead foxes, 43 died from oilfield-related causes; of these 35 hit by vehicles, 1 accidentally entombed, 3 drowned in spilled oil, 1 drowned in an oil sump, 2 entrapped in pipes, and 2 died entrapped in a well cellar. Reproductive success among adult and juvenile kit fox and litter size did not differ between developed and undeveloped areas. The abundance of rabbits and hares (leporids) was always lower in the undeveloped areas while the mean capture of all rodents and kangaroo rats was higher in the undeveloped areas. In both the developed and undeveloped areas the kit fox use of leporids declined while the use of kangaroo rats increased. The use of leporids was higher in developed areas with the use of kangaroo rats higher in undeveloped areas. Predators were the primary cause of mortality at NPRC. Vehicles did not appear to be a significant source of mortality due to the relatively low percentage of occurrence. Oil field activities did not appear to significantly affect the population dynamics of kit foxes at NPRC. Fox abundance was usually lower in developed areas, but trends in developed and undeveloped areas were similar, indicating that the same factors were influencing population dynamics in both areas. Relatively few foxes died on NPRC as a direct result of oil field activities. The majority of these animals were accidentally hit by vehicles, but the frequency is probably similar to that on roads off-site and was possibly lower due to reduced speed limits. The exposure to toxic chemicals was detected among some kit foxes, but levels and occurrence rates were not considered to negatively impact the population. Hematological values did not differ between foxes in developed and undeveloped areas. Individual foxes used an average of 11.8 dens each year and over 1,000 dens were located on NPRC, so den availability is probably not a limiting factor. Den use patterns were similar among developed and undeveloped areas.

Space-use patterns of foxes were not affected by oilfield activities. Nightly movements and home range patterns were similar in developed and undeveloped areas. Disturbances associated with oil field activities did not appear to affect kit foxes which were observed around facilities and frequently man-made structures as dens. Dens were frequently located near disturbances (roads, pipelines, disturbed habitat). This study concluded that in general, kit foxes appear to be tolerant of human activity and exhibit an ability to coexist with humans, even in areas of intense disturbance. The most significant impact to foxes from oilfield activities probably is habitat loss associated with facility construction and concomitant reduction in carrying capacity. Based on results from NPRC and elsewhere, kit foxes are able to adapt to oil field activities and persist in areas of oil development.

Both studies indicated that while many of the kit fox population and life history characteristics were similar between areas developed for oil and gas and those undeveloped, there were fewer foxes or captures in the developed areas. This is likely due to reduced carrying capacity that is the result of habitat alteration and fragmentation. Both of the oil and gas developed study sites were at levels of disturbance far in excess of what is projected to result from this lease sale. Considering the small amount of habitat disturbance projected to occur as a result of leasing these parcels and the site-specific NEPA analysis and ESA compliance measures, the risk of impacts to an individual San Joaquin kit fox is very unlikely. BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for these impacts. Example measures include monitoring of potential dens prior to excavation, complete avoidance of natal dens during the pupping season, speed limits, trash containment and removal, and checking pipes and culverts prior to moving. Such measures are currently required by the O&G Programmatic BO and would likely be required in any separate consultation. Thus, with implementation of avoidance and mitigation measures required at the site-specific project stage, little impact is likely to occur to individual kit foxes and no effects would be likely at the population level as a result from the oil and gas activities on these leases.

The Santa Maria Unit is within the Western Kern County core kit fox population. The U.S. Fish and Wildlife Service identified three core populations as important for kit fox recovery. One goal for the core populations is to protect natural lands with appropriate land use and management. The U.S. Fish and Wildlife Service has indicated that they are concerned about the low amount of habitat conserved within the Western Kern County core population. All of the 40 acres in the Santa Maria Unit are native lands. It is estimated that four wells and four acres could be developed. This could result in localized and limited disturbance to kit fox habitat. As described above, disturbance to kit fox habitat is compensated at a rate of 1.1 acre for every acre temporarily disturbed, and 3 acres for every acre permanently disturbed. In addition, disturbance to BLM surface requires an additional replacement factor of 1 acre for every acre disturbed and disturbance within the Western Kern County Kit Fox Core Area requires a 4:1 compensation ratio. Compensation would not be required for the cultivated farm lands. Species surveys, standard kit fox mitigation measures, avoidance of habitat features are also standard requirements. Survey and take avoidance measures would be implemented on the farm lands to ensure that kit fox dens that may occur on the margins of the farm fields or within fallowed farm fields would be avoided. The habitat loss of four acres is not expected to conflict with recovery plan goals. In addition, individual projects are expected to be relatively small (less than one acre on average) compared to the home range of a kit fox (average 1,144 acres) and widely dispersed over space and time.

**San Joaquin Antelope Squirrel.** San Joaquin antelope squirrel have the potential to occur in all units except the Poso Unit. They are less likely to occur in the Devil's Den, West Camp and Agriculture Units as these units contain no native habitat. Impacts to the San Joaquin antelope squirrel would be similar to those described for the giant kangaroo rat. Antelope squirrels are, however, more widely distributed and are more likely to occur on or near a project site than giant kangaroo rats. BLM would require pre-construction surveys and implementation of mitigation measures to reduce the potential for these impacts. Example measures include monitoring for antelope squirrel activity patterns, avoidance of potential burrows, hand removal of shrubs to increase visibility, checking below vehicles and equipment, and

destruction of potential burrows only when animals are observed to be away from the burrow. Such measures are currently recommended to operators as part of the O&G Programmatic BO. These measures are currently being reviewed by the California Department of Fish and Game (CDF&G). Compliance with these measures will minimize impacts to antelope squirrel.

**BLM Sensitive Animal Species**

**Burrowing Owl**. The burrowing owl has the potential to occur in all units. Potential impacts to burrowing owls include loss of burrows, entrapment in burrows, and collision with vehicles. Burrowing owl burrows would be treated like potential kit fox dens. Such dens would be monitored for use before destruction or plugging, allowing detection of burrowing owl use. If owl use if detected and the burrow cannot be avoided, burrow destruction or plugging would occur only after the owl has vacated the site. As a result some burrows sites may be lost, but individual owls should avoid becoming entrapped inside burrows.

**LeConte's thrasher**. LeConte's thrasher has the potential to occur in the Pyramid Hills, Shale and Santa Maria Units. Light and moderate oil field development that maintains saltbush between wells and facilities, and tall saltbush along drainages provides suitable habitat for LeConte's thrasher. Measures to retain saltbush stringers and minimize the removal of saltbush are typically included in BLM oil authorizations. Such measures are currently required under the O&G Programmatic BO. The combination of the development limits within reserve and corridors, and saltbush conservation measures are expected to maintain LeConte's thrasher habitat.

**Mountain plover**. Wintering mountain plovers have the potential to make use of open lands in the Shale, Devil's Den, West Camp, and Agriculture Units. The agricultural lands may provide transitory, foraging habitat. Potential impacts to mountain plover include temporary displacement by human activities associated with oil field construction. Plovers are opportunistic in their foraging and would likely make use of some other foraging area. Any development would have a negligible impact on mountain plovers.

**White-tailed kite, Golden eagle and Swainson's hawk.** These raptor species may have forage within all units, including agricultural lands. Potential impacts include temporary displacement by human activities associated with oil field construction. These species are opportunistic in their foraging and would likely make use of some other foraging area. The small amount of habitat loss (4 acres) would have a negligible impact on the amount of foraging habitat available for these species in the general area.

**San Joaquin pocket mouse and Tulare grasshopper mouse**. The San Joaquin pocket mouse and the Tulare grasshopper mouse have the potential to occur on all units. Impacts to these species would be similar to those described for the giant kangaroo rat. Burrows of small mammals would be avoided to the extent practicable, but some impacts to these two species would likely occur. Considering the small amount of habitat expected to be disturbed during the construction of one well, the site-specific impacts would be minor and the impacts to populations would be negligible.

**Short-nosed kangaroo rat**. Impacts to short-nosed kangaroo rats would be similar to those described for the giant kangaroo rat. Short-nosed kangaroo rats are also widely distributed, and like the antelope squirrel, are more likely to occur on or near a project site than giant kangaroo rats. Short-nosed kangaroo rats have the potential to occur in the Pyramid Hills, Shale, and Santa Maria Units. They are less likely to occur in the Devil's Den Unit as this unit contains no native habitat.

**Western mastiff, Pallid bat and Fringed myotis.** The western mastiff bat and pallid bat has the potential to occur in the all units. The fringed myotis has the potential to occur in the Shale and Santa Maria Units. Impacts to these bats species are not expected as roost sites (rocky grottos, caves, cliffs,

buildings, mines) are not expected to be impacted by development activities and very little foraging habitat would be altered.

**BLM Sensitive Plant Species**.

Two of the 19 BLM sensitive plants identified as having the potential to occur are annual species. As such, populations are not always easy to identify, especially given the high yearly variation in precipitation and the annual plants' response. Because of this, a single year's survey may not adequately identify existing population boundaries and, thus, development may inadvertently destroy existing, but unidentified sensitive plant habitat and populations (i.e., seed banks). Impacts would be dependent on the location of the disturbance relative to populations of the species in question. The construction of roads, well pads, and similar development could destroy plants or disrupt continuity between populations. New weedy species could be introduced and weeds would benefit from the additional moisture generated by runoff from roads and pads. To minimize impacts to BLM sensitive species, mitigation measures would consider the type of impact, the rareness of the species, the population size and distribution, and the species' response to disturbance. Heavy grazing on some parcels may further complicate the identification of rare plant population boundaries.

***Indirect Effects to Biological Resources as a result of Climate Change***

Since the level of greenhouse gas associated with the proposed action (possible 4 wells) is not expected to detectably influence climate change, indirect effects to biological resources are not expected. The effects to biological resources from climate change are discussed instead under cumulative effects.

**RIPARIAN AND WETLAND HABITAT**

Because there is only a very limited amount of riparian habitat within these units, any development would be positioned to avoid sensitive areas. Because of this, there would be no impacts to riparian habitat as a result of this lease sale.

## Cultural Resources

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 for fluid mineral leasing is set forth in the *Supplemental Procedures for Fluid Minerals Leasing*, an amendment to 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 (2007)*. These Supplemental Procedures state that a Class I record search and tribal coordination and consultation will be considered adequate inventory and identification methodology for the purposes of fluid minerals decisions at the leasing stage. A BLM Class I record search consists of a review of all available cultural resource archival material related to the specific lease parcel locations, including any information regarding known Tribal values or sensitivity, archaeological site records and survey reports. Completion of the Class I record search and coordination and consultation with Tribes and tribal communities allows for the identification of cultural sites that, due to their size, spacing and/or sensitivity, cannot be adequately considered or protected following issuance of a lease.

This proposal and analysis deal only with the action of leasing, and does not consider ground disturbing activities. Any subsequent realty or oil and gas projects or development will be subject to a separate National Environmental Policy Act (NEPA) document and compliance with Section 106 of the National Historic Preservation Act. As oil and gas development actions or associated realty actions are proposed

for the lease parcels, the areas of potential effect (APE) will be defined and assessments of the impacts upon cultural resources will be undertaken. NEPA and NHPA compliance will be completed on all undertakings. In the event that cultural resources are identified within a project area, an evaluation of significance will occur and steps will be taken to mitigate impacts to that resource. Mitigation most frequently involves site avoidance, but may include data recovery though excavation. It should be noted that BLM has discretional control over mitigation stipulations and/or avoidance measures imposed on a project. Although a lessee has a right to develop a lease, BLM may require development activities to be moved up to 200 meters in any direction. This should allow nearly all sites to be avoided. Should development uncover subsurface sites, the lessee is required to halt all work until the site can be evaluated and proper avoidance or mitigation measures are identified. In cases where Native American heritage sites may be impacted, formal Tribal coordination and consultation regarding the development of appropriate mitigation measures will be conducted.

A Class I record search for the occurrence of any known prehistoric or historical period cultural sites was completed for all eightteen of the proposed lease parcels. None of the lease parcels have been previously surveyed for the presence of archaeological remains, and there are no known archaeological sites within the boundaries of the proposed lease parcels. As described above, prior to any future development within these proposed lease parcels, a BLM Class III complete coverage field survey for project APEs will be completed for those areas not previously inventoried or those which have been judged inadequately surveyed in the past. Impacts as a result of proposed project activities to any sites identified during the course of these inventories will be addressed through the procedures outlined above.

## Native American Values

On January 13, 2012, certified letters containing a description of the proposed September 2012 oil and gas lease sale and maps showing parcel locations were mailed to members of the Native American community and federally recognized tribes known to have ancestral ties to the lease parcel areas. The BLM received receipt confirmation for all of the addressees of this letter. In this letter, the BLM requested information and invited the initiation of formal government-to-government consultation regarding sites of traditional cultural or religious value which may lie within the boundaries of the listed lease sale parcels. The mailing list is provided below. Two follow-up phone calls were made to the recipients of these letters, the first to confirm the receipt of this letter and the second to illicit or clarify any responses. During the second phone contact, Ms. Kerri Vera, Environmental Director for the Tule River Indian Reservation requested to view the cultural resources section of the draft NEPA document and asked questions regarding the leasing process. Ms. Vera was provided with a copy of this document for review and comment. No comments were provided as a result of this coordination.

No formal government-to-government Tribal consultation was initiated for the proposed action and no concerns were expressed by these groups or individuals as a result of this Tribal contact and coordination.

Where no significant cultural sites or places of significance to the Tribes, tribal communities, or other interested parties are identified, then "No Adverse Effect" shall be the appropriate determination for the fluid mineral lease undertaking. The results of the BLM Class I record search and the Tribal coordination has resulted in this determination, therefore, there are no known potentially adverse impacts to places of traditional cultural and religious importance to Native Americans or to cultural sites as a result of the September 2012 oil and gas lease sale.

## Paleontological Resources

The act of leasing does not permit any ground surface disturbing activities; as a result, there will no impacts to paleontological resources from the proposed action.

Several laws, regulations including NEPA, FLPMA and NHPA, require that potential impacts to significant paleontological resources be considered as a result of federally authorized actions. When project level proposals are submitted for all of the proposed lease parcels, a detailed geological records assessment in order to determine the potential for the occurrence of significant paleontological deposits will be required. Paleontological field assessments of the proposed project area will also be required for those areas with a moderate to high potential, BLM PFYC 4 and 5, for the occurrence of paleontological resources. Project monitoring may also be required for projects proposed for those areas where field survey has indicated that significant subsurface paleontological resources are likely to occur. If significant paleontological remains are discovered during the course of field surveys or project construction, all work will be halted until plans for avoidance or mitigation can be addressed.

Paleontological assessment and mitigation on split estate lands are subject to the discretion of the land surface owner.

## Livestock Grazing

There are no direct or indirect impacts anticipated to livestock grazing operations or opportunities from leasing the parcels for oil and gas development because such grazing use could occur concurrently. Should development activities on the surface lands leased under this action be proposed, subsequent site-specific NEPA documentation will address any site specific impacts and affected federal grazing lessees would be notified.

## Lands

Leasing BLM lands for oil/gas exploration and production does not typically impact land uses in this area, because the chances of a successful new find are so slim. However, leasing can sometimes cause conflicts with other surface uses that may be taking place on the lands. This is especially possible if the leased lands are split estate, where the surface estate is privately owned and the mineral estate is federally owned and under the jurisdiction of BLM. Surface owners are often not aware of the Federal ownership of the mineral estate, or are not aware of the implications of the Federal ownership.

The surface owners will be notified that the Federal mineral estate underneath their surface is proposed for oil and gas competitive leasing.

Although there may be local or state laws that require the lease holder (lessee) to compensate the surface owners for any crop loss or damage caused by the development of leased lands; the only compensation provided by federal law on these split estate lands is the value of loss of crops and tangible improvements that are related to stock-raising; such as corn, hay, barn and fences for livestock. Crops include those for feeding domestic animals such as grasses, hay, and corn, but not plants unrelated to stock-raising. Tangible improvements include those relating to domestic, agriculture, and stock-raising uses, such as barns, fences, ponds or other works to improve the utilization of water, but not those associated with nonagricultural development.

Along with the ownership of the minerals the Federal government retains the right to use any part of the surface for exploration or development. These “surface entry rights” can cause distress for private surface owners who do not wish to see new roads and well pads on their land. Adjacent private lands can also be impacted due to leasing, in that new road access to the leased areas is sometimes necessary. Although the responsibility for obtaining access to leased areas is the lessee’s and not BLM’s, leasing can sometimes cause an indirect impact to adjacent lands due to the need for road access.

Any surface disturbing activity requires BLM approval. For those parcels that are split estate (private surface overlying Federal minerals), the BLM requires the lessee/operator to make a good faith effort to obtain an agreement with the private surface owner prior to access on the leased land issued through competitive bid.

Where the lessee/operator is unable to reach an agreement with the private surface owner, the lessee/operator can file a surface owner protection bond. This bond should be in an amount sufficient to protect against damages to the surface as allowed in the statute that reserved the mineral rights to the Federal government. However, the minimum amount of the surface owner protection bond is $1,000.00. More information regarding the rights and responsibilities of the landowner, the BLM, and the mineral lessee is covered in a pamphlet available on the internet, and in selected local BLM Field Offices.[5]

## Oil and Gas and Other Mineral Exploration and Development

This alternative will have a beneficial effect on mineral exploration and development, since the land will be offered for competitive sale. The practical utilization of the lands will have a positive local effect in the generation of long term jobs and revenues to the State and county. The royalties and rentals from competitive sales are also a dependable source of long term income for the Federal government. The impacts from this particular sale may be small, including an unknown (but probably relatively small) amount of new reserves, due to the small amount of acreage offered. However, the positive action of the sale would provide the industry with increased opportunity for exploration, potentially resulting in increased stability and profitability of domestic companies.

In most instances, application of the CSU – Protected Species and CSU – Sensitive Species stipulations would not prevent surface occupancy for the entire lease. That is, an alternative site or other mitigation or compensation measure would probably be available that would still allow the lessee to drill and develop the lease.

## Farmland

Based on the RFD scenario, development subsequent to leasing the proposed parcels may result in up to 4.0 acres of disturbance for four wells. As described in Chapter 3, soils considered Prime farmland, if irrigated occur on parcels1, 2, 7, 8, 9, 10, 12, 14, and 15. Soils classified as Farmland of Statewide Importance occur on parcels 13 and 14.. Subsequent to leasing, any development that occurs on these split-estate parcels would result in the direct conversion or loss of soils classified as Prime farmland, if irrigated or Farmland of Statewide Importance.

# CUMULATIVE IMPACTS

## Proposed Action Alternative – Cumulative Impacts

In the Caliente Resource Management Plan and EIS, published December 1996, BLM analyzed the overall effects of oil and gas activities in the area. The analyses and conclusions contained in those documents are still valid and, to date, impacts from oil and gas leasing and development are still significantly under the level of cumulative impacts that were projected/analyzed in those documents. See Table 2 - Oil and Gas Surface Disturbance Projected in Existing Caliente RMP/EIS, below.

[5] http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/split_estate.html

| TABLE 2 –Oil and Gas Surface Disturbance Projected in Existing Caliente RMP/EIS (acres) (Valley Planning area, 10 years) | | |
|---|---|---|
| | Projected | Actual |
| Total Fed Wells Drilled (All leases, new + existing) | 1459-2200 | 1564 |
| Habitat Disturbance | 147 acres/year | 48 |
| Total Habitat Disturbance Projected on New Lease Sales EAs Past 10 Years | >500 | 25.5 |

The existing RMP/EIS projected and analyzed the impacts from permanent new disturbance in habitat of up to 147 acres per year. In fact, between July 99 and October 2009, a total of only 480 acres was disturbed throughout the entire Bakersfield Field Office area, a larger area than considered in this sale. This amounts to only 48 acres per year, not the 147 acres that was analyzed. There have not been and are not expected to be any additional impacts in the parcels covered in this EA that would change those conclusions. In addition, as mentioned previously, there have been 20 lease sales in this area in the past 10 years (since 10-1-2001), each of which projected various numbers of wells, both exploratory and development, as well as other types of activities that would cause surface disturbance. However, out of 239 leases that have been issued in this area since October 1, 2001, only 12 leases have seen any drilling at all. Only 30 acres of temporary or permanent disturbance has occurred, which means nearly of all the projected disturbance on those leases never occurred. In addition, as shown elsewhere in this document, nearly all of the other impacts (air, soil, etc.) also never occurred.

### Cumulative Impacts to Minerals

Only a small portion of the land in the project area is managed by the BLM (less than 10%). Nearly all of the mineral estate managed by the BLM that is most prospective for oil and gas (i.e., within the boundaries of existing producing areas) is already leased. In addition, all (or virtually all) of the private minerals within the project area where there is likelihood for development is already leased. There are many opportunities for development both on private and public minerals and more than 11,000 wells have been drilled in western Kern County in the past 5 years alone. Since the Caliente RMP/EIS was completed, permitting requirements have become increasingly stringent, especially regarding minimizing impacts to air quality and endangered species habitat. This has resulted in an unknown (probably small to moderate) number of wells not being drilled. However, the significant rise in oil prices since then has resulted in an increase in the number of wells drilled. In any event, the extremely small amount of development projected for this sale, although positive for oil and gas development, is considered to be negligible from a cumulative impact viewpoint.

For a more complete discussion of the types of activities associated with exploration, drilling, and production, in addition to the environmental consequences to Minerals and the cumulative impacts on Minerals see the Caliente RMP/EIS, Ch. 5 Pg. 33 to which this document is tiered. These discussions include Reasonable Foreseeable Development scenarios (RFDs) and impacts, both general and cumulative. Many of these activities are also described in Appendix C.

### Cumulative Impacts to Air Quality

The cumulative impact analysis area for air resources occurs in EPA Region IX and includes the San Joaquin Valley Air Basin. This area also includes the San Joaquin Valley, CA – Extreme 8-hr Ozone Nonattainment Area, the San Joaquin Valley, CA – $PM_{2.5}$ Nonattainment Area, and the San Joaquin Valley, CA $PM_{10}$ and CO Maintenance Areas. The air analysis considers potential impacts over the life of lease parcels, which is 10 years.

As opposed to other environmental impacts, emissions into the air are very short term. The air is constantly moving causing dilution and dispersal. For this reason, single small short term releases of pollutants have very little to do with overall regional pollution levels. Small scale projects that have minimal impacts that are of short-duration would not likely contribute significantly to cumulative impacts (EPA 315-R-99-002; May 1999). Regional pollution levels are the combined result of all pollutant sources in a region and those transported into the region; these pollutant concentrations represent the cumulative impact on air within the region. As indicated in emission inventories, existing emissions sources that contribute to cumulative air impacts include vehicle and equipment use, construction (residential, non-residential, and industrial), energy and mineral development, fuels management, road maintenance, recreation, pesticide use, and agriculture, including confined animal husbandry.

Based on the California ARB Almanac of Emissions and Air Quality (2009), air quality in the San Joaquin Valley shows dramatic improvement. Since 1990, ozone levels have decreased approximately 10% in the San Joaquin Valley (CARB 2009). According to the SJVAPCD Annual Report to the Community (2010), the San Joaquin Valley experienced the best air quality on record continuing a 20 year trend. All nonattainment pollutant levels are nearly half or less of what they were four years ago. Expected emissions from the oil and gas RFD scenario are low in relation to the overall activity in the region and statewide. The expected emission levels are within attainment demonstration levels in the SIPs and are not likely to result in or contribute to exceedances of the National Ambient Air Quality Standards. Furthermore, since existing and new stationary and mobile source emissions are permitted by the local air pollution control district (APCD) and the California ARB, respectively, projected emissions must be balanced with emission budgets for air quality planning.

### Cumulative Impacts to Climate Change

As described in the analysis of environmental consequences, the proposed action may contribute to the effects of climate change through GHG emissions. However, it is not currently possible to associate any of these particular actions with the creation of any specific climate-related environmental effects. The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts.

For this analysis, the RFD predicts that up to four wells will be drilled as a result of the proposed action. GHG emissions from such wells represent an incremental contribution to the total regional and global GHG emission levels. , However, there is no generally accepted guidance for determining significance of project specific GHG impacts (SJVAPCD, 2009a). Subsequent to leasing, emissions from the construction of up to four wells would be expected to be lower than the national average because of vapor recovery systems and other pollution controls (Best Performance Standards) mandated by the San Joaquin Valley Air Pollution Control District. Values for GHG emissions are expected to follow a similar pattern. Thus, direct GHG emissions from the proposed action would be undetectable on a nationwide basis and would be expected to have a very minor influence on global climate change. This is consistent with the SJVAPCD conclusion that existing science is inadequate to support quantification of impacts that project level GHG emissions would have on global climate change (SJVAPCD 2009b). The U.S. Global Change Research Program recognizes that further work is needed on how to quantify cumulative uncertainties across spatial scales, and the uncertainties associated with complex intertwined natural and social systems (Karl *et al*. 2009).

However, the effects of project specific GHG emissions are cumulative, and without mitigation their incremental contribution to global climatic change could be considered cumulatively considerable (SJVAPCD 2009a). The SJVAPCD's best approach in addressing cumulative impacts would be to require all projects to reduce their GHG emissions, through project design elements or mitigation. As oil

and gas production technology continues to improve in the future, one assumption is that it may be feasible to further reduce GHG emissions. By reducing GHG emissions, project impacts are not anticipated to cumulatively influence climate on a global scale.

**Cumulative Impacts to Biological Resources**

The cumulative impacts analysis area for biological resources is the southern San Joaquin Valley, loss, degradation and fragmentation of habitat have resulted in population declines for many San Joaquin Valley species. Development for agriculture, energy production, and urban areas, and recreational activities such as off-highway vehicles, has resulted in loss of habitat. Development at key locations, roads, trails and water canals have fragmented habitat. Incompatible land uses, such as trash dumping and heavy grazing has degraded habitat. Invasion of non-native weeds, and increases in predators, such as ravens and red fox, also contribute to habitat degradation. Large landscape fires have replaced mature shrub communities with non-native grasslands that can persist for one or more decades. The conservation and recovery strategy for San Joaquin Valley species is a system of reserves and corridors. In the Caliente RMP, BLM committed to managing all BLM lands within reserves and corridors as part of the conservation and recovery system. The Bakersfield RMP is likely to do the same. These lands are managed to maintain 90% of the habitat in reserves and 75% of the habitat in the corridors. Restoration is undertaken on lands that do not meet the habitat maintenance goal before new development is authorized. Beginning in about the early 1990's, compensation has been required for most new development. For every acre permanently disturbed, 3 acres must be set aside, and for every acre temporarily disturbed 1.1 acres must be set aside. In addition, if the land being disturbed is already part of the conservation and recovery system, an additional acre must be set-aside to replace the conserved acre. This increases the ratio to 4:1 or 2.1 to 1 for lands that are already part of the reserve and corridor system. This compensation requirement helped to establish large mitigation banks, such as Coles Levee, Semitropic Ridge, and Kern Water Bank. Numerous other entities have also secured or pledged lands in various locations to the reserve and corridor system. Energy companies and conservation organizations have added reserve and corridor lands to the system in such areas as Lokern, Kettleman Hills, Buena Vista Valley and Buena Vista Hills. Future development is likely to require compensation and more lands are likely to be added to the reserve and corridor system.

Habitat loss, fragmentation and degradation are likely to continue as a threat to species conservation and recovery in the San Joaquin Valley. However, the requirement for compensation and replacement acres will help secure lands for the reserve and corridor system. As habitat is incrementally disturbed, habitat will also be incrementally conserved, helping to prevent significant habitat losses. This will allow the conservation and recovery strategy for the San Joaquin Valley species to be implemented and offset impacts from development. The cumulative effect of compensating and replacing habitat as development occurs will slow down rate of habitat loss, degradation and fragmentations.

**Cumulative Impacts to Cultural Resources**

There would be no direct or indirect effects to cultural resources as a result of the proposed action; therefore there will be no cumulative effects.

**Cumulative Impacts to Native American Values**

There would be no direct or indirect effects to Native American Values as a result of the proposed action; therefore there will be no cumulative effects.

**Cumulative Impacts to Paleontological Resources**

There would be no direct or indirect effects to paleontological resources as a result of the proposed action; therefore there will be no cumulative effects.

## No Action Alternative – Direct, Indirect and Cumulative Impacts

Should the No Action alternative be selected, these lands would not be leased for oil and gas at the present time. They would remain available for competitive leasing in the future, should circumstances change to make that option worth re-considering. If these parcels are not leased, then foreseeable future resources and uses, as well as their current rates of change, would remain as described in the Affected Environment. Cumulative impacts of management activities with the no action alternative on public lands would remain as they exist presently and as described in the Affected Environment section of this document.

***Socio-Economic*** – No additional impacts would occur.

***Visual Resources –*** No additional impacts would occur.

***Recreation –*** No additional impacts would occur.

***Air, Soil, and Water –*** There would be no additional impacts to air, soil, and water since these parcels would not be offered for lease. Under the no action alternative, the San Joaquin Valley Air Basin would continue to be in nonattainment of federal and state air quality standards for ozone and $PM_{2.5}$.

***Biological Resources –*** No additional impacts would occur.

***Cultural Resources –*** No additional impacts would occur.

***Livestock Grazing –*** No impacts would occur.

***Lands and Farmland –*** No additional impacts would occur.

***Oil and Gas –*** The no action alternative would represent a fundamental change in the decisions of the Caliente RMP and would not comply with *Mineral Leasing Act of 1920* and subsequent amendments, The *Federal Oil and Gas Royalty Management Act of 1976 (Public Law 94-579),* the *Energy Policy Act of August 5, 2005*, and current regulations and policies to manage lands for multiple uses. Failure to make these lands available for leasing and subsequent development would also result in the loss of potential additional reserves of oil and/or gas. The amount and value of lost reserves would be difficult to predict at this time without additional data.

# Chapter 5. Consultation and Public Involvement

## PERSONS, GROUPS, AND AGENCIES CONSULTED

List groups, Tribes, individuals, agencies contacted

| Name | Title | Organization |
|---|---|---|
| Mr. Ryan Garfield | Chairperson | Tule River Indian Reservation |
| Ms. Kerri Vera | Environmental Program Lead | Tule River Indian Reservation |
| Mr. Ruben Barrios, Sr. | Chairperson | Santa Rosa Rancheria |

| | | |
|---|---|---|
| Mr. Hector Franco | Cultural Resource Specialist | Santa Rosa Rancheria |
| Ms. Kathryn Morgan | Chairperson | Tejon Indian Tribe |
| Ms. Gloria Morgan | Cultural Resource Specialist | Tejon Indian Tribe |

## SUMMARY OF PUBLIC PARTICIPATION

The scoping process took place on January 10, 2012. A brief review of the parcels and discussion of the areas were conducted to identify any concerns relating to plants or animal species. This EA will be published to the BLM Bakersfield website for a period of 30 days to allow the public to comment within the 30 day period. Also, copies of the EA are mailed out to the Counties where the parcels are located, environmental groups, the public, and landowners for review and comment within the 30 day public comment period.

### LIST OF PREPARERS

| ID Team Member | Title | Organization |
|---|---|---|
| Lisa Ashley | Natural Resource Specialist | BLM |
| Nora DeDios | Realty Specialist, Project Lead | BLM |
| Peter De Witt | Outdoor Recreation Planner | BLM |
| Karen Doran | Rangeland Management Specialist | BLM |
| Amy Girado | Archaeologist | BLM |
| Denis Kearns | Botanist | BLM |
| Amy Kuritsubo | Wildlife Biologist | BLM |
| Jeff Prude | Petroleum Engineer | BLM |
| Susan Porter | Planning and Environmental Coordinator | BLM |
| Tamara Whitley | Archaeologist | BLM |

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Reference for Floodplains

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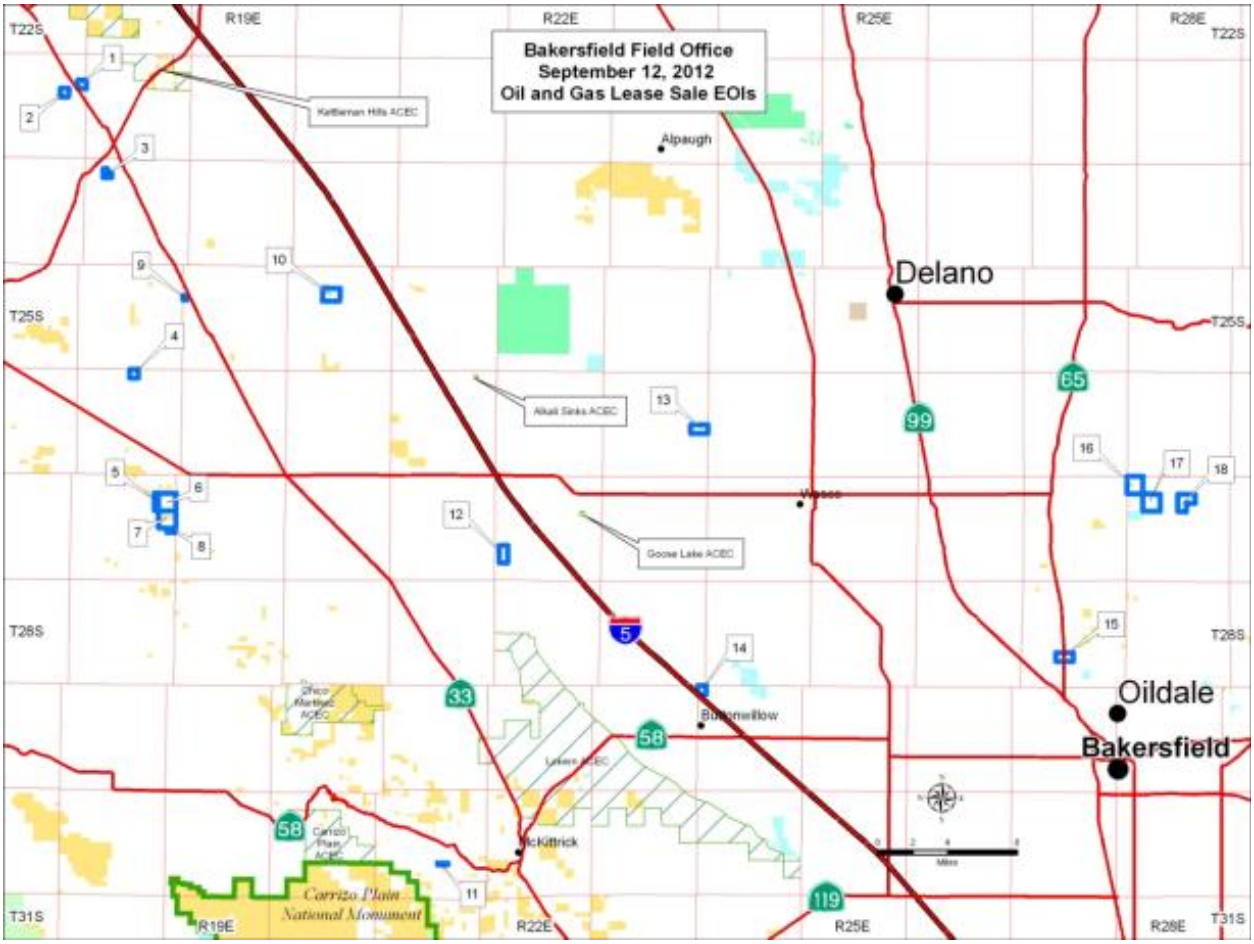
# APPENDIX A - Description of Lease Sale Parcels

Following is a map showing the general location of the parcels analyzed in this EA.
You must zoom in to view the parcels

Map of the proposed oil and gas lease sale parcels, located in Kern County, California. This map shows areas reviewed for the September 12, 2012 Competitive Lease Sale.
This map cannot be made Section 508 compliant. For help with its data or information, please contact the Bakersfield Field Office at (916) 978-4401 and reference the DOI-BLM-CA-C060-2012-0072 Environmental Assessment.



The following public domain lands all located within the Bakersfield Field Office administered lands, are subject to filings in the manner specified in the applicable portions of the regulations at 43 CFR, Subpart 3120. These parcel numbers will be different from those on the actual Lease Sale Notice, and officially parcelized for the day of the lease sale.

**Table 1. September 12, 2012 Oil and Gas Competitive Lease Sale Parcels**

| NO. | LOCATION | COUNTY | ACRES | TYPE |
|---|---|---|---|---|
| 1 | T. 23 S., R. 17 E., MD Mer., Sec. 12, SE¼; | Kings | 160.00 | Split Estate Land Subject to Special Stipulations |
| 2 | T. 23 S., R. 17 E., MD Mer., Sec. 14,NE¼; | Kings | 160.00 | Split Estate Land Subject to Special Stipulations |
| 3 | T. 24 S., R. 18 E., MD Mer., Sec. 5, NW¼SW¼, S½SW¼; | Kings | 120.00 | Split Estate Land Subject to Special Stipulations |
| 4 | T. 26 S., R. 18 E., MD Mer., Sec. 3, Lots 3, 4, S½NW¼; | Kern | 160.72 | Split Estate Land Subject to Special Stipulations |
| 5 | T. 27 S., R. 18 E., MD Mer., Sec. 11, E½E½; | Kern | 160.00 | Public and Split Estate Lands Subject to Special Stipulations |
| 6 | T. 27 S., R. 18 E., MD Mer., Sec. 12, All; | Kern | 640.00 | Public and Split Estate Lands Subject to Special Stipulations |
| 7 | T. 27 S., R. 18 E., MD Mer., Sec. 13, All; | Kern | 640.00 | Public and Split Estate Lands Subject to Special Stipulations |
| 8 | T. 27 S., R. 18 E., MD Mer., Sec. 24, N½NE¼; | Kern | 80.00 | Split Estate Land Subject to Special Stipulations |
| 9 | T. 25 S., R. 19 E., MD Mer., Sec. 7, S½ of Lot 2 of SW¼; | Kern | 38.63 | Split Estate Land Subject to Special Stipulations |
| 10 | T. 25 S., R. 20 E., MD Mer., Sec. 9, S½N½, S½; | Kern | 480.00 | Split Estate Land Subject to Special Stipulations |
| 11 | T. 30 S., R. 21 E., MD Mer., Sec. 22, Lots 2, 3, 4; | Kern | 38.76 | Split Estate Land Subject to Special Stipulations |
| 12 | T. 27 S., R. 22 E., MD Mer., Sec. 30, Lots 1 of NW¼, Lot 1 of SW¼. W½NE¼, W½SE¼; | Kern | 320.00 | Split Estate Land Subject to Special Stipulations |
| 13 | T. 26 S., R. 23 E., MD Mer., Sec. 24, N½; | Kern | 320.00 | Split Estate Land Subject to Special Stipulations |
| 14 | T. 29 S., R. 24 E., MD Mer., Sec. 6, Lots 1, 2 of NW¼; | Kern | 161.60 | Split Estate Land Subject to Special Stipulations |
| 15 | T. 28 S., R. 27 E., MD Mer., Sec. 28, N½; | Kern | 320.00 | Split Estate Land Subject to Special Stipulations |
| 16 | T. 27 S., R. 28 E., MD Mer., Sec. 6, Lots 1, 2 of NE¼, Lots 1, 2 of NW¼, Lots 1, 2 of SW¼, SE¼; | Kern | 579.72 | Split Estate Land Subject to Special Stipulations |
| 17 | T. 27 S., R. 28 E., MD Mer., Sec. 8, All; | Kern | 640.00 | Split Estate Land Subject to Special Stipulations |
| 18 | T. 27 S., R. 28 E., MD Mer., Sec. 10, N½, SW¼; | Kern | 480.00 | Split Estate Land Subject to Special Stipulations |

# APPENDIX B - Special Lease Stipulations

**Stipulation No. 1** - Controlled Surface Use - Protected Species: All or a portion of this lease is within the range of one or more plant or animal species that are either listed as threatened or endangered, or are proposed for such listing by the U.S. Fish and Wildlife Service (USFWS).

The lessee is notified that time frames for processing applications may be delayed beyond established standards to allow for species surveys, and consultation or conferencing with the USFWS. Notice is also given that surface-disturbing activities may be moved or modified, and that some activities may be prohibited during seasonal time periods. Surface-disturbing activities will be prohibited on the lease only where:

a. The proposed action is likely to jeopardize the continued existence of a listed or proposed species, or
b. The proposed action is inconsistent with the recovery needs of a listed species as identified in an approved USFWS Recovery Plan.

Prior to the authorization of any surface-disturbing activities, a preliminary environmental review will be conducted to identify the potential presence of habitat for these species. Authorizations may be delayed until completion of the necessary surveys during the appropriate time period for these species. The lessee should be aware that the timing of the surveys is critical, in that some species can only be surveyed during a brief period each year.

The Bureau of Land Management (BLM) may need to initiate consultation or conference with the USFWS if the site inspection concludes that a listed or proposed species may be affected by the proposed activity. The lessee should be aware that the USFWS has up to 135 days to render their biological opinion, and that there are provisions for an additional 60-day extension. Offsite habitat protection or enhancement for wildlife or vegetation (compensation) may be required by the USFWS when habitat is disturbed. The consultation may also result in some restrictions to the lessee's plan of development, including movement or modification of activities, and seasonal restrictions. Surface-disturbing activities will be prohibited on the lease if the consultation or conference concludes that either of the conditions identified in a or b above exist.

**Stipulation No. 1** - Controlled Surface Use - Sensitive Species: All or a portion of this lease is within the range of one or more plant or animal species that are either Federal candidates for listing as threatened or endangered (Federal Candidate), or are listed by the State of California as threatened or endangered (State Listed), or are designated by the Bureau of Land Management (BLM) as Sensitive (Bureau Sensitive).

The lessee is notified that time frames for processing applications may be delayed beyond established standards to allow for species surveys and coordination with the USFWS and California Department of Fish and Game. Notice is also given that surface-disturbing activities may be relocated beyond the standard 200 meters but not more than 1/4 mile and that surface disturbing activities may be prohibited during seasonal time periods.

Prior to the authorization of any surface-disturbing activities, a preliminary environmental review will be conducted to identify the potential presence of habitat for these species. Authorizations may be delayed until completion of the necessary surveys during the appropriate time period for these species. The lessee should be aware that the timing of the surveys is critical, in that some species can only be surveyed during a brief period each year. The BLM may need to coordinate with the USFWS or the California Department of Fish and Game if the site inspection concludes that a Federal Candidate, State Listed, or Bureau

Sensitive species may be affected by the proposed activity. Coordination may delay application processing beyond established time frames.

To prevent or reduce disturbance to Federal Candidate, State Listed, or Bureau Sensitive species, surface operations may be moved up to 1/4 mile and surface-disturbing activities may be prohibited during seasonal time periods.

**Table Biology 1.** Federal and State Listed, and BLM Sensitive animal species with potential to occur on the Sept 2012 lease parcels.

| Species | Blunt-nosed leopard lizard | Giant kangaroo rat | Tipton & Short-nosed kangaroo rats | San Joaquin kit fox | San Joaquin antelope squirrel | LeConte's thrasher | Mountain plover | Burrowing owl | White-tailed kite, Golden eagle, Swainson's hawk | San Joaquin pocket mouse & Tulare grasshopper mouse | Pallid & Western mastiff bats | Fringed myotis |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Status** | **FE, SE** | **FE, SE** | **FE, SE & BLM Sensitive** | **FE, ST** | **ST, BLM Sensitive** | **BLM Sensitive** | **BLM Sensitive** | **BLM Sensitive** | **BLM Sensitive** | **BLM Sensitive** | **BLM Sensitive** | **BLM Sensitive** |
| **Pyramid Hills** | X | X | X | X | X | X | | X | X | X | X | |
| **Shale** | X | X | X | X | X | X | X | X | X | X | X | X |
| **Devils Den** | AG | | AG | X | AG | | X | X | X | AG | X | |
| **West Camp** | AG | | AG | X | AG | | X | X | X | AG | X | |
| **Santa Maria** | X | | X | X | X | X | | X | X | X | X | X |
| **Agriculture** | AG | | AG | X | AG | | X | X | X | AG | X | |
| **Poso** | X | | | X | | | | X | X | X | X | |

AG – within species range but current land use is agriculture.

Status

FE – Federally Endangered
FT – Federally Threatened
SE – State Endangered
ST – State Threatened
BLM Sensitive – BLM California Sensitive Species

**Table Biology 2.** Federally Listed & BLM sensitive plants with potential to occur on the September 2012 lease parcels. The three units currently in agriculture (Devils Den, West Camp, and Santa Maria) are omitted from the table.

| Species | Status | Pyramid Hills* | Shale | Santa Maria | Poso |
|---|---|---|---|---|---|
| San Joaquin woolythreads (*Monolopia congdonii*) | FE5 | X | X | X | |
| California jewelflower (*Caulanthus californica*) | FE | X | | | |
| Bakersfield cactus (*Opuntia basilaris* var. *treleasei*) | FE | | | | X |
| Kern mallow (*Eremalche kernensis*) | FE | X | X | X | |
| San Joaquin adobe sunburst (*Pseudobahia peirsonii*) | FT | | | | X |
| Hoover's woollystar (*Eriastrum hooveri*) | FD | | X | X | |
| Lost Hills crownscale (*Atriplex vallicola*) | BLM SS | | X | | |
| Temblor buckwheat (*Eriogonum temblorense*) | BLM SS | X | X | X | |
| recurved larkspur (*Delphinium recurvatum*) | BLM SS | X | | X | X |
| diamond-petaled California poppy (*Eschscholzia rhombifolia*) | BLM SS | | | X | |
| oil neststraw (*Stylocline citroleum)* | BLM SS | | | X | X |
| Mason's neststraw (*Stylocline masonii*) | BLM SS | X | | | |
| Lemmon's jewelflower (*Caulanthus coulteri* var. *lemmonii*) | BLM SS | X | | X | |
| pale yellow layia (*Layia heterotricha*) | BLM SS | X | X | X | |
| Munz's layia (*Layia munzii*) | BLM SS | X | | | |
| showy madia (*Madia radiata*) | BLM SS | X | X | | |
| Hall's tarplant (*Deiandra halliana*) | BLM SS | X | | | |
| straight-awned spineflower (*Chorizanthe rectispina*) | BLM SS | X | | | |
| San Benito spineflower (*Chorizanthe biloba* var. *immemoria*) | BLM SS | X | | | |
| round-leaved filaree (*California macrophylla*) | BLM SS | X | | | |

| | | | | | |
|---|---|---|---|---|---|
| shining navarretia (*Navarretia nigelliformis* ssp. *radicans*) | BLM SS | X | | | |
| Jared's pepper-grass (*Lepidium jaredii* subsp. *jaredii*) | BLM SS | X | X | | |
| San Bernardino aster (*Symphyotrichum defoliatum*) | BLM SS | X | | | |
| striped adobe lily (*Fritillaria striata*) | BLM SS | | | | X |

* Does not include one parcel converted to agriculture.

Status

FE – Federally Endangered
FT – Federally Threatened
FD – Federally Delisted
BLM SS – BLM California Sensitive Species

# APPENDIX C – Oil & Gas Management Guidelines

## Oil and Gas Leasing Availability Categories

The Caliente Resource Management Plan describes the various categories of land availability for leasing for oil and gas. A determination has been made that the lands covered by this EA are open to leasing for oil and gas. In addition, the plan identifies the appropriate stipulations to be associated with each new lease.

Public lands that are closed to leasing separate into two groups. Tracts that have been closed by previous legislation or secretarial policy form one group of lands and are known as non-discretionary closures. The second group of closed lands, consisting of those that would possibly be proposed for closure under this plan, is called proposed discretionary closures.

Lands open to oil and gas leasing separate into the following groups: open to leasing under standard lease terms and conditions; open to leasing under a no surface use stipulation; and open to leasing under a controlled surface use stipulation. The standard oil and gas lease form includes those preprinted lease terms and conditions that apply to all leases. Other stipulations developed in this plan are applied in lease areas with special resource concerns, and supersede any inconsistent provisions of the standard lease form. The special stipulations proposed in this plan address Controlled surface use for areas with resource protection needs slightly different from the standard lease stipulation. The Controlled Surface Use (CSU) stipulation provides additional protection for Federally Proposed and Listed Species; Proposed and Designated Critical Threatened and Endangered Species Habitat; and Federal Candidate, State Listed and Bureau Sensitive Species. Three additional special stipulations were contained in the Caliente RMP that are not applicable to any of the land in the subject parcels. Those special stipulations are: No surface use for areas where very unique resources exist, CSU – Department of Defense lands, and CSU – Coast (for management of Coast Area ACEC's/SMA's).

## Lands Open to Oil and Gas Leasing

All public land and federally reserved mineral estate within the area covered under this EA are open for oil and gas leasing activities. The process of nominating a federal parcel for this lease sale was initiated when a letter of interest in oil and gas leasing was submitted to the Sacramento Office of the Bureau of Land Management. The RMP was used to determine the applicability of lease stipulations attached to the parcels in this sale. There are three categories of lease stipulations, described in detail below, and they are:

--Offer for lease with a Standard Lease stipulation
-Offer for lease with a No Surface Use stipulation
--Offer for lease with a Controlled Surface Use stipulation

All new leases covered by this EA would be offered with Controlled Surface Use Stipulation(s) (CSU). If new leases expire or terminate and the lands are re-leased, they will also be leased with Controlled Surface Use Stipulation(s).

### Leasing with Standard Lease Stipulation

The Standard Lease stipulation includes the terms and conditions that are the national standards printed on Bureau of Land Management lease forms (Form 3100-11, October 2008).

Under standard terms, a proposed exploration and development operation can be modified by the operator and Bureau to minimize impacts of the project's operation design. Modifications are limited to moving the proposed operation less than 200 meters and delaying the project less than 60 days in one lease year.

No lands covered by this EA are proposed to have this stipulation.

## Additional Information

Application. The No Surface Use stipulation is intended for use when adequate protection of surface resources cannot be provided through mitigation, and there are no suitable sites for development anywhere on the entire lease. Mineral development of the lease from an off-site location is recommended.

Review Process. If conditions change so that the NSU stipulation becomes necessary for lands to be leased at a future date, the No Surface Use stipulation would be applied at the time of a lease sale. An exception or modification to the stipulation may be approved if it can be demonstrated that operations can be conducted without causing unacceptable impacts to the critical cultural or natural values or to the other pre-existing use. Any decision to grant an exception or modification would be based on field inspection and inventory and the NEPA review process. The lessee should be aware that the timing of the surveys is critical, in that some species can only be surveyed during a brief period each year. The stipulation may be waived if a determination is made by the Bureau that the resource or other use no longer exists on the leased lands.

Although there may be specific discrete areas within the parcels under this EA where No Surface Use is allowed due to pre-existing conditions, there are no leases where the entire surface is precluded from development.

### Leasing with the Controlled Surface Use Stipulation

Special stipulations may be proposed for use to protect unique resources or values where it may be necessary to modify surface activities beyond authorities contained under the standard lease terms (43 CFR 3103.1-3). The Controlled Surface Use Stipulation allows BLM, in consultation with the applicant, to extend modification of development proposals beyond the standard 200 meters and 60-day conditions. By reserving the additional leeway in siting facilities, the BLM and applicant can generally use the combination of increased siting and timing flexibility to modify development proposals to entirely avoid or significantly minimize surface-disturbing effects associated with lease development. The Controlled Surface Use stipulation thus allows BLM to offer for lease parcels known to or suspected to contain unique resources or values and resolve any potential conflicts at the time when the lessee is prepared to design development proposals.

This stipulation also advises prospective lessees that they are considering the purchase of a lease in areas known or suspected to contain unique resources or values and advises them of potential constraints and development options available. Historically, the BLM in cooperation with the lessee has been able to find sufficient flexibility in designing lease development proposals, even in the most sensitive of locations, to facilitate development without adversely affecting either the resource values of concern or the oil and gas lease.

Special conditions that may be attached to new leases issued in the area managed by the Bakersfield Field Office are collectively referred to as the Controlled Surface Use stipulation (CSU) and supersede any inconsistent provisions of the standard lease form. The wording of the Controlled Surface Use stipulation has been adjusted to address two differing resource concerns (there were six in the Caliente RMP, but

four are not currently applicable because the resource values or other pertinent criteria do not exist in the subject parcels). The Controlled Surface Use Stipulation would be applied to parcels offered in this lease sale.

This stipulation has been developed to be utilized over the life of the plan without the need for further plan amendments. The CSU stipulation has been worded to allow for adjusting the geographic locations where they would be applied based on the resource condition at the time of the lease sale offering.

### Controlled Surface Use Stipulations

a. Federally Proposed and Listed Species (CSU - Protected Species)
b. Federal Candidate, State Listed and Bureau Sensitive Species (CSU - Sensitive Species)

The following CSU categories from the Caliente RMP are shown for informational purposes only – there are currently no lands in the parcels covered by this EA area subject to these stipulations. However, if a determination is made in the future that one or more of the following stipulations would be appropriate, then the stipulation(s) would be applied according to the criteria in the Caliente RMP.

c. Proposed Critical Habitat and Designated Critical Habitat (CSU - Critical Habitat) N/A for the parcels in this EA
d. Raptor (CSU - Raptor) N/A for the parcels in this EA
e. Department of Defense lands (CSU – Defense) – N/A for the parcels in this EA
f. Coast Management Area (LSU – Coast, for management of Coast Area ACEC's/SMA's) – N/A for the parcels in this EA

### Waivers, Modification, Exceptions and Deferral to Other Plans

The Authorized Officer may grant a waiver, modification, or exception to the Controlled Surface Use stipulation if the factors leading to the stipulation's inclusion in the lease have changed or if new information has been made available. If the protection provided by the stipulation is no longer necessary or can be adequately mitigated and the proposed operation on a lease would not cause unacceptable impacts, a waiver would be evaluated (see 43 CFR 3101.1-4).

The Authorized Officer may also defer the addition of the Controlled Surface Use stipulation referred to under b, c, and d above to requiring compliance with other existing approved plans. Those plans may include Habitat Conservation Plans, Programmatic Consultations, Conservation Agreements or others that provide for adequate protection and conservation of resources and compliance with all Federal and State laws.

As an example, once completed, the Kern County Valley Floor Habitat Conservation Plan and associated BLM Programmatic Section 7 Consultation on oil and gas development activities will provide adequate protection for resources identified in b, c, and d above for lands within CDOG administrative boundaries and for all federally reserved mineral estate in Kern County. Future lease sales covering parcels in those areas would defer the addition of a Controlled Use Stipulation to notation that compliance with the above approved programs or plans is required.

## *Controlled Surface Use Stipulation* - Federally Proposed and Listed Species (CSU - Protected Species)

All or a portion of this lease is within the range of one or more plant or animal species (a list of species would be included with the stipulation for each lease) that are either listed as threatened or endangered, or are proposed for such listing by the U.S. Fish and Wildlife Service.

The lessee is notified that time frames for processing applications may be delayed beyond established standards to allow for species surveys, and consultation or conferencing with the U.S. Fish and Wildlife Service. Notice is also given that surface-disturbing activities may be moved or modified, and that some activities may be prohibited during seasonal time periods. Surface disturbing activities will be prohibited on the lease only where:
the proposed action is likely to jeopardize the continued existence of a listed or proposed species, or
the proposed action is inconsistent with the recovery needs of a listed species as identified in an approved U.S. Fish and Wildlife Service Recovery Plan.

Prior to the authorization of any surface disturbing activities, a preliminary environmental review will be conducted to identify the potential presence of habitat for these species. Authorizations may be delayed until completion of the necessary surveys during the appropriate time period for these species. The lessee should be aware that the timing of the surveys is critical, in that some species can only be surveyed during a brief period each year.

The BLM may need to initiate consultation or conference with the U.S. Fish and Wildlife Service if the site inspection concludes that a listed or proposed species may be affected by the proposed activity. The lessee should be aware that the U.S. Fish and Wildlife Service has up to 135 days to render their biological opinion, and that there are provisions for an additional 60 day extension. Offsite habitat protection or enhancement for wildlife or vegetation (compensation) may be required by the U.S. Fish and Wildlife Service when habitat is disturbed. The consultation may also result in some restrictions to the lessee's plan of development, including movement or modification of activities, and seasonal restrictions. Surface disturbing activities will be prohibited on the lease if the consultation or conference concludes that either of the conditions identified in 1. or 2. above exists.

## Additional Information

Application. The Controlled Surface Use - Federally Proposed and Listed Species (CSU - Protected Species) stipulation would be attached, at the time of lease sale, to leases within the range of certain federally listed or proposed species, or to leases containing, or adjacent to, documented locations of certain federally listed or proposed species. (A list of species would be included with the stipulation for each lease.)

Documented locations for currently proposed species will be used to determine current applicability of the CSU - Protected Species stipulation for proposed species. If additional species become proposed, or new location information becomes available, the species and parcel lists will be modified and all subsequent lease sales will be evaluated against the modified parcel list.

Review Process. Generally, the following process will be used to approve surface disturbing activities on leases with the CSU - Protected Species stipulation. The proposed activity would be reviewed to determine if listed or proposed species would be affected. This review may involve site-specific surveys for plant and animal species, conducted according to established methodologies that may specify certain

seasons or other conditions. In some cases, this may mean that a survey cannot be completed until the next growing season for some plant species or after seasonal appearance for some animal species. If the review determines that listed or proposed species will not be affected, approval of the application will normally be granted within 30 days of the review.

If the review determines that listed or proposed species may be affected, but in a beneficial, insignificant or benign manner, and written concurrence is received from the U.S. Fish and Wildlife Service, approval of the application will normally be granted within 30 days of receiving U.S. Fish and Wildlife Service concurrence.

If it is determined that a listed or proposed species may be adversely affected, the BLM will work with the applicant to modify the proposal to minimize impacts. Modifications may include movement of activities, seasonal restrictions, mitigation and/or compensation. Modified proposals will be developed cooperatively with the applicant to ensure that the modified project still meets the applicant's objective. If the modified project may still adversely affect a listed or proposed species, BLM will initiate formal consultation or conference with the U.S. Fish and Wildlife Service.

Coordination with the U.S. Fish and Wildlife Service on Listed Species. Currently there are two options for meeting the formal consultation requirement. A new consultation may be initiated or a previously completed formal consultation may be utilized.

If a new consultation is initiated, the U.S. Fish and Wildlife Service will issue a document, called the Biological Opinion. The U.S. Fish and Wildlife Service has up to 135 days to complete a Biological Opinion and they may request an additional 60-day extension. Extensions beyond 195 days require the consent of any applicant.

A previously completed formal consultation may also be used to meet the formal consultation requirement. An example of a previously completed consultation that may be used is the San Joaquin Valley Oil and Gas Programmatic Biological Opinion.

Upon completion of a new consultation or determination that a previously completed consultation can be used, approval of the application will normally be granted within 30 days. If the new consultation concludes that a listed species may be jeopardized, then surface disturbance will be prohibited on the lease. Surface disturbance will also be prohibited if the consultation concludes that the proposed action is inconsistent with the recovery needs of the listed species as identified in an approved U.S. Fish and Wildlife Service Recovery Plan.

Coordination with the U.S. Fish and Wildlife Service on Proposed Species. Bureau policy requires a conferencing with the U.S. Fish and Wildlife Service on any action that may adversely affect proposed species. Depending on the complexity of the situation, a conference may be completed in a single telephone conversation or may require the time frames of a consultation. Generally, upon completion of the conference, approval of the application will be granted within 30 days. If the conference concludes that a proposed species may be jeopardized, surface-disturbing activities will be prohibited on the lease.

Final Approval. Final approval of applications that will have no effect on listed or proposed species will normally be granted within 30 days of the review.

Final approval for projects that may affect listed or proposed species in a beneficial, insignificant or benign manner will normally be granted within 30 days of receiving U.S. Fish and Wildlife Service written concurrence. The U.S. Fish and Wildlife Service generally responds to requests for concurrence in 30 days.

For projects that require consultation or conference with the U.S. Fish and Wildlife Service, final approval will normally be granted within 30 days of consultation or conference completion. Conditions of approval will include any conditions specified by the BLM or U.S. Fish and Wildlife Service for minimizing impacts.

## *Controlled Surface Use* - Federal Candidate, State Listed and Bureau Sensitive Species (CSU - Sensitive Species)

All or a portion of this lease is within the range of one or more plant or animal species (see attached list) that are either Federal candidates for listing as threatened or endangered (Federal Candidate), are listed by the State of California as threatened or endangered (State Listed), or are designated by the Bureau of Land Management as Sensitive (Bureau Sensitive).

The lessee is notified that time frames for processing applications may be delayed beyond established standards to allow for species surveys and coordination with the U.S. Fish and Wildlife Service and California Department of Fish and Game. Notice is also given that surface-disturbing activities may be relocated beyond the standard 200 meters but not more than 1/4 mile and that surface disturbing activities may be prohibited during seasonal time periods.

Prior to the authorization of any surface disturbing activities, a preliminary environmental review will be conducted to identify the potential presence of habitat for these species. Authorizations may be delayed until completion of the necessary surveys during the appropriate time period for these species. The lessee should be aware that the timing of the surveys is critical, in that some species can only be surveyed during a brief period each year.

The Bureau of Land Management may need to coordinate with the U.S. Fish and Wildlife Service or the California Department of Fish and Game if the site inspection concludes that a Federal Candidate, State Listed or Bureau Sensitive species may be affected by the proposed activity. Coordination may delay application processing beyond established time frames.

To prevent or reduce disturbance to Federal Candidate, State Listed or Bureau Sensitive species, surface operations may be moved up to 1/4 mile and surface disturbing activities may be prohibited during seasonal time periods.

## Additional Information

The Controlled Surface Use - Federal Candidate, State Listed and Bureau Sensitive Species (CSU - Sensitive Species) stipulation would be attached to leases that are either within the range of certain species, or that contain or are adjacent to a documented location of a certain species. A list of species would be included with the stipulation for each lease.

The current list of parcels or potential geographic area for each species will be maintained in the Bakersfield Field Office. As species are added or removed from special designation, or new location information becomes available, the species list, parcel lists and geographic area lists will be modified. All subsequent lease sales will be evaluated against the modified species list, parcel list or geographic area list.

Generally the following process will be used to approve surface disturbing activities on leases with the CSU - Sensitive Species stipulation. The proposed activity would be reviewed to determine if special

status species would be affected. This review may involve site-specific surveys for plant and animal species, conducted according to established methodologies that may specify certain seasons or other conditions. In some cases this may mean that a survey cannot be completed until the next growing season for some plants or after seasonal appearance for some animal species.

If the review determines that a special status species may be adversely affected, then surface disturbing activities may be relocated up to 1/4 mile and certain surface disturbing activities may be prohibited during seasonal periods. Bureau policy may also require coordination with the U.S. Fish and Wildlife Service or California Department of Fish and Game.

## *Controlled Surface Use Stipulation* - Proposed Critical Habitat and Designated Critical Habitat (CSU - Critical Habitat)

Although there is not currently any Proposed or Designated Critical Habitat within the areas that are identified for lease in this sale, should Proposed or Critical Habitat be designated within these lands in the future, the following stipulation would apply:

All or a portion of this lease lies within an area that is designated as critical habitat, or is proposed for designation as critical habitat (see attached species and parcel list) by the U.S. Fish and Wildlife Service.

The lessee is notified that time frames for processing applications may be delayed beyond established standards to allow for species surveys, and consultation or conferencing with the U.S. Fish and Wildlife Service. Notice is also given that surface disturbing activities may be moved or modified and that some activities may be prohibited during seasonal time periods. Surface disturbing activities will be prohibited on the lease only where:

1. the proposed action is likely to destroy or adversely modify critical habitat or proposed critical habitat, or
2. the proposed action is inconsistent with the recovery needs of a listed species as identified in an approved U.S. Fish and Wildlife Service Recovery Plan.

Prior to the authorization of any surface disturbing activities, a preliminary environmental review will be conducted to identify the potential presence of habitat for these species. Authorizations may be delayed until completion of the necessary surveys during the appropriate time period for these species. The lessee should be aware that the timing of the surveys is critical, in that some species can only be surveyed during a brief period each year.

The Bureau of Land Management may need to initiate consultation or conference with the U.S. Fish and Wildlife Service if the site inspection concludes that designated or proposed critical habitat may be affected by the proposed activity. The lessee should be aware that the U.S. Fish and Wildlife Service has up to 135 days to render their biological opinion, and that there are provisions for an additional 60 day extension. Offsite habitat protection or enhancement for wildlife or vegetation (compensation) may be required by the U.S. Fish and Wildlife Service when designated or proposed critical habitat is disturbed. The consultation may also result in some restrictions to the lessee's plan of development, including movement or modification of activities, and seasonal restrictions. Surface disturbing activities will be prohibited on the lease only if the consultation or conference concludes that either of the conditions identified in 1. or 2. above exist.

## Additional Information

Application. The Controlled Surface Use - Designated and Proposed Critical Habitat (CSU - Critical Habitat) stipulation would be attached to leases within areas that are designated as critical habitat, or proposed for designation as critical habitat for certain species. A list of species and parcels would be included with the stipulation for each lease. Critical habitat is designated or proposed by the U.S. Fish and Wildlife Service according to the regulations found in 50 CFR 424. Critical habitat means (1) the specific areas within geographical area currently occupied by a species, at the time it is listed in accordance with the Endangered Species Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary that such areas are essential for conservation of the species (50 CFR 424.02).

There is currently no designated or proposed critical habitat, or else the constituent elements do not exist, within the parcels covered by this EA. Consequently, no critical habitat would be affected by leasing and developing these parcels and none of the parcels would have this stipulation. If additional areas are designated within these parcels, future permit approvals would be evaluated using those criteria as appropriate.

Review Process. Generally, the following process will be used to approve surface disturbing activities on leases with the CSU - Critical Habitat stipulation. The proposed activity would be reviewed to determine if designated or proposed critical habitat would be affected. This review may involve site specific surveys for plant and animal species, conducted according to established methodologies which may specify certain seasons or other conditions. In some cases this may mean that a survey cannot be completed until the next growing season for some plant species or after seasonal appearance for some animal species.

If the review determines that listed or proposed critical habitat will not be affected, approval of the application will normally be granted within 30 days of the review.

If the review determines that listed or proposed critical habitat may be affected, but in a beneficial, insignificant or benign manner, and written concurrence is received from the U.S. Fish and Wildlife Service, approval of the application will normally be granted within 30 days of receiving U.S. Fish and Wildlife Service concurrence.

If it is determined that a listed or proposed critical habitat may be adversely affected, the BLM will work with the applicant to modify the proposal to minimize impacts. Modifications may include movement of activities, seasonal restrictions, mitigation and compensation. Modified proposals will be developed cooperatively with the applicant to ensure that the modified project still meets the applicant's objective. If the modified project may still adversely affect designated or proposed critical habitat, BLM will initiate formal consultation or conference with the U.S. Fish and Wildlife Service.

Coordination with the U.S. Fish and Wildlife Service on Designated Critical Habitat. The BLM is required to initiate formal consultation with the U.S. Fish and Wildlife Service for any action that may adversely affect designated critical habitat. As a result of the consultation, the U.S. Fish and Wildlife Service issues a document, called the Biological Opinion. The U.S. Fish and Wildlife Service has up to 135 days to complete a Biological Opinion and they may request an additional 60 day extension. Extensions beyond 195 days require the consent of any applicant.

As part of the Biological Opinion, the U.S. Fish and Wildlife Service will determine if the proposed action is likely to destroy or adversely modify critical habitat. Destruction or adverse modification of

critical habitat means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical (50 CFR 402.02).

If consultation concludes that critical habitat will be destroyed or adversely modified, then surface disturbance will be prohibited on the affected portion of the lease. Surface disturbance will also be prohibited if the consultation concludes that the proposed action is inconsistent with the recovery needs of the listed species as identified in an approved U.S. Fish and Wildlife Service Recovery Plan. Coordination with the U.S. Fish and Wildlife Service on Proposed Critical Habitat. Bureau policy requires conferencing with the U.S. Fish and Wildlife Service on any action that may adversely affect proposed critical habitat. Depending on the complexity of the situation, a conference may be completed in a single telephone conversation or may require the time frames of a consultation. Generally, upon completion of the conference, approval of the application will be granted within 30 days. If the conference concludes that proposed critical habitat will be destroyed or adversely modified, then surface disturbance will be prohibited on the affected portion of the lease.

Final Approval. Final approval of applications that will have no effect on designated or proposed critical habitat will normally be granted within 30 days of the review.

Final approval for projects that may affect designated or proposed critical habitat in a beneficial, insignificant or benign manner will normally be granted within 30 days of receiving U.S. Fish and Wildlife Service written concurrence. The U.S. Fish and Wildlife Service generally responds to requests for concurrence in 30 days.

For projects that require consultation or conference with the U.S. Fish and Wildlife Service, final approval will normally be granted within 30 days of consultation or conference completion. Conditions of approval will include any conditions specified by the BLM or U.S. Fish and Wildlife Service for minimizing impacts.

## *Controlled Surface Use - Raptor* (CSU - Raptor) – N/A

## *Department of Defense lands* (CSU – Defense) – N/A

## *Coast Management Area* (CSU – Coast, for management of Coast Area ACEC's/SMA's) – N/A

### Standard Engineering Practices

Recognized engineering practices for the routine operation of oil and gas exploration and development are known as Conditions of Approval or COAs. These standard procedures are described in the Federal Onshore Orders and further clarified in the Code of Federal Regulations (CFR 43, October, 2005).

Standard regulations may be supplemented with additional COAs. The additional COAs address sensitive issues within the Area managed by the Bakersfield Field Office. Critical issues underlying the federal regulations and supplemental COAs are the protection of usable aquifers, mineral zones including hydrocarbons, surface environmental issues, site safety and well control, and site reclamation.

Bureau inspection and monitoring of oil field activity on public lands is discussed within the phases of oil and gas development:

Drilling a New Well
Temporary Abandonment of a Producing Well (Idle Well)

Plugging and Abandonment of a Well

Surface Reclamation

No special COAs are normally added for routine producing operations.

## Drilling a New Well

After an Application for Permit to Drill (APD) has been received by the Bakersfield Office of the Bureau of Land Management (BLM), a review of engineering design as well as potential effects to sensitive resources is undertaken. Special conditions would be noted on the application at this review stage of an oil and gas project by either the operator or the BLM. Modified proposals would be developed cooperatively with the applicant to ensure that the modified project still meets the applicant's objective. Any special conditions would be attached to the APD by the BLM and the applicant would be informed within seven days of receipt of the APD. In addition to Bureau-wide regulations, the Bakersfield Field Office has developed procedures - these may include but are not limited to:
Steam Injectors. All steam injection wells within a 300' radius of a new location must be shut-in a minimum of 3 days prior to the spudding of a new well.

**Conductor Pipe.** A minimum of 50' of conductor pipe is to be set and cemented to surface. The conductor pipe must be equivalent to or exceed the properties of A-25 grade line pipe.

**Diverter.** Prior to spud, a diverter system will be installed on the conductor pipe and function tested. The test will be recorded in the drilling log. The diverter system, at a minimum, will consist of an annular type preventer (minimum working pressure 1000 psi); 2" (minimum ID) kill line, and 6" (minimum ID) diverter line with no internal restrictions or turns. A full opening hydraulically-controlled valve will be installed in the diverter line which will automatically open when the annular preventer is closed. The accumulator system will have sufficient capacity to close the annular preventer and open the hydraulically-controlled valve.

Remote controls for the diverter system will be located on the rig floor and readily accessible to the driller. Remote controls will be capable of closing the annular preventer and opening the hydraulically-controlled valve. Master controls will be located at the accumulator and will be capable of closing and opening the annular preventer and opening the hydraulically-controlled valve. The diverter system will be function-tested daily and the test recorded in the drilling log.

**General Casing and Cementing.** A Subsequent Report (Form 3160-5) detailing the size, weight, and grade of the casing; the amount and type of cement, including additives; and a copy of the service company's materials ticket and job log will be submitted to the BLM within five (5) business days following the cementing of the casing string. Each casing string (except conductor pipe) will be pressure tested, prior to drilling out the casing shoe, to 0.22 psi/ft of casing string length or 1000 psi, whichever is greater, but not to exceed 70% of the internal yield pressure of the casing. The casing pressure test will be recorded in the drilling log. The wait-on-cement (WOC) time for each casing string will be adequate to achieve a minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

**Drilling Fluids.** Sufficient quantities of drilling fluid (mud and water) will be maintained at the well site, at all times, for the purpose of controlling steam kicks.

## Temporary Abandonment of a Producing Well (Idle Well)

Economic conditions often depress the California market for the typical heavy oil produced in the area managed by the Bakersfield Field Office. When the producing market is depressed, an operator may decide to shut-in his uneconomic, producing wells and wait for conditions to improve. The highly viscous nature of most Kern County crude oil, typical low well head pressures, and the relatively low corrosive properties of the fluids (low sulfur crude) make the known dangers of shutting in a well for long periods and then bringing it back on-line less of a mechanical problem here in this Field Office Area than in other producing regions of the country. As a result, by 1990, a large number of wells were remaining idle for longer and longer periods. Monitoring and correction of the problem have been successfully undertaken by the California Division of Oil, Gas, and Geothermal Resources and the local BLM Field Office. The following additional conditions *may* be required as applicable prior to the temporary abandonment (TA) of a producing oil/gas well, service well, or an injection well.

Zone Isolation. The requirement to isolate the producing interval (General Requirement #4) is waived. This waiver is based on the information submitted with the application and the geologic data in Volume # 1 California Oil and Gas Fields, Central California, (Buena Vista Oil Field) which indicates the absence of usable water aquifers above the producing horizon in (section in which well is located).

Mechanical Integrity of Casing. The mechanical integrity of the casing may be determined using the ADA pressure test method.

Fluid Surveys. A fluid level survey will be performed at 2-5 year intervals during the period the well is temporarily abandoned. A copy of the survey will be submitted to the BLM with the TA well request (Sundry Notice Form 3160-5).

Monitoring of Wellhead Pressures and Temperatures. Wellhead pressure and temperature will be continuously monitored throughout the period the well is temporarily abandoned. Any pressure/temperature change will be promptly reported to the BLM.

Isolation of the Producing Interval. The producing interval will be isolated by setting a plug in the casing within 100' above the producing interval if a rising fluid level, an increasing wellhead pressure, or an increasing wellhead temperature is detected. The plug can be either a retrievable or drillable-type bridge plug or a cement plug of at least 100' in length.

## Plugging and Abandonment of a Well

No additional conditions are typically attached to the abandonment of a well in California. Onshore Orders describe the plugging procedure. While final abandonment will normally be witnessed by the BLM, no final site marker is currently required by the Bakersfield field office.

## Surface Reclamation

Conditions for the recovery of an oil well site are unique to each area's ecosystem and habitat. The following examples of Conditions of Approval have been developed for use within the Area managed by the Bakersfield Field Office. The applicability of any or all of these COAs will be determined based on site-specific conditions.

**General.** The operator (or Lessee) will prepare a seedbed by: a) scarifying the disturbed area, (b) distributing topsoil uniformly, or c) disking the topsoil, as directed by the BLM Authorized Officer (use one as appropriate).

The operator will recontour the disturbed area and obliterate all earthwork by removing embankments, backfilling excavations, and grading to re-establish the approximate original contours of the land in the area of operation.

The operator will uniformly spread topsoil over all unoccupied disturbed area (outside the ditch line, fence line, and work area). Spreading will not be done when the ground or topsoil is frozen or wet. The operator will seed all disturbed area, using an agreed upon method suitable for the location. Seeding will be repeated if a satisfactory stand is not obtained as determined by the BLM Authorized Officer upon evaluation after the first growing season.

The operator will arrange to have a biologist available to assist the construction workers in the identification and avoidance of endangered species.

**Producing Wells.** Site reclamation for producing wells will be accomplished for portions of the site not required for continued operation of the well. The following measures are typical reclamation requirements, and any or all of these may be required on a site by site basis:

Reclamation of drilling fluid pit (mud pit). Polluting substances, contaminated materials moved offsite or buried.

Site fencing.
Berm removal and site grading.
Cut and fill slope vegetation.

**Non-producing Wells.** Rehabilitation on the entire site will be required and will commence as soon as practical, dependent upon prevailing weather conditions. Cut and fill slopes will be reduced and graded to blend to the adjacent terrain.

Drilling fluids held within pits may be allowed to dry. Fluids that will not dry must be removed. All polluting substances or contaminated materials such as oil, oil-saturated soils, and gravels will be buried with a minimum of 2 feet of clean soil as cover, or be removed to an approved site.

Drainages will be re-established and temporary measures will be required to prevent erosion to the site until vegetation is established.

After final grading and before replacement of topsoil, the entire surface of the site will be scarified to eliminate slippage surfaces and to promote root penetration. Topsoil will then be spread over the site to achieve an approximate uniform, stable thickness consistent with the established contours.

**Permanent Well Abandonment.** The surface management agency is responsible for establishing and approving methods for surface rehabilitation and determining when this rehabilitation has been satisfactorily accomplished. At this point, a Subsequent (Final) Report of Abandonment will be approved.

# APPENDIX D – Oil & Gas Activity on Leases from Recent Lease Sales Conducted within the Past 10 Years (3-1-2002 through 3-1-2012)

| CASE NUMBER | Lease Issue Date | OPERATOR | WELL No. | WELL NAME | TWP | RGE | SEC | QTR SME | SPUDDED | *STATUS AS OF 3-9-2012 | **Notice of First Prod Rec'd | Wildcat? | Total New Disturbance (acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CACA44904 | 2/01/2003 | VINTAGE | 613-9Y | | 30S | 21E | 9 | | 1-23-12 | DRLG | | | 3.76 |
| **CACA44904 Count** | | | 1 | | | | | | | | | | |
| CACA44917 | 2/01/2003 | HATHAWAY | 1-20 | | 27S | 27E | 20 | | 3/20/2011 | POW | yes | No | 0 |
| CACA44917 | 2/01/2003 | HATHAWAY | 2-20 | | 27S | 27E | 20 | | 09/03/2011 | POW | yes | No | 0 |
| CACA44917 | 2/01/2003 | HATHAWAY | 3-20 | | 27S | 27E | 20 | | 12/01/2011 | POW | yes | No | 0 |
| **CACA44917 Count** | | | 3 | | | | | | | | | | |
| CACA44937 | 10/18/02 | E & B EXPLORATION | 16x-34 | USL | 1N | 20W | 34 | | 2/11/10 | P+A | | Yes | 1.86 |
| **CACA44937 Count** | | | 1 | | | | | | | | no | | |
| CACA45939 (Unit CACA51616X) | 02/25/04 | VENOCO | 1-29 | BLM | 31S | 22E | 29 | | 2/14/10 | P+A | | yes | 2.51 |
| CACA45939 (Unit CACA51616X) | | VENOCO | 1-29RD | BLM | 31S | 22E | 29 | | | DRLG | | yes | 0 |
| **CACA45939 Count** | | | 2 | | | | | | | | yes | | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-3 | USL | 29S | 29E | 26 | NWNW FEE | 3/4/2007 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-4 | USL | 29S | 29E | 26 | SWNW FEE | 3/7/2007 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-4B | USL | 29S | 29E | 26 | SWNW FEE | 7/3/2008 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-3B | USL | 29S | 29E | 26 | SWNW FEE | 7/7/2008 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-6 | USL | 29S | 29E | 26 | | 6/5/2010 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 2-4 | USL | 29S | 29E | 26 | SWNW FEE | 7/10/2008 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING | 2-6 | USL | 29S | 29E | 26 | SWNW FEE | 7/14/2008 | POW | | No | 12.61 |

| CASE NUMBER | Lease Issue Date | OPERATOR | WELL No. | WELL NAME | TWP | RGE | SEC | QTR SME | SPUDDED | *STATUS AS OF 3-9-2012 | **Notice of First Prod Rec'd | Wildcat? | Total New Disturbance (acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CO | | | | | | | | | | | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 3-5 | USL | 29S | 29E | 26 | SWNW FEE | 7/16/2008 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 4-5 | USL | 29S | 29E | 26 | SENW FEE | 7/19/2008 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 2-5 | USL | 29S | 29E | 26 | SWNW FEE | 3/31/2009 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 2-4B | USL | 29S | 29E | 26 | SWNW FEE | 4/3/2009 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 2-3 | USL | 29S | 29E | 26 | NWNW FEE | 4/5/2009 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 2-3B | USL | 29S | 29E | 26 | SWNW FEE | 6/24/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 3-3B | USL | 29S | 29E | 26 | SWNW FEE | 6/28/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 4-5B | USL | 29S | 29E | 26 | SENW FEE | 7/1/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-5 | USL | 29S | 29E | 26 | SWNW FEE | 11/10/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 3-5B | USL | 29S | 29E | 26 | SWNW FEE | 11/14/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-5B | USL | 29S | 29E | 26 | SWNW FEE | 11/14/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 2-5B | USL | 29S | 29E | 26 | SWNW FEE | 11/16/09 | POW | | No | |
| CACA46601 | 21/30/2004 | NAFTEX OPERATING CO | 3-4 | USL | 29S | 29E | 26 | | 11/23/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 3-6 | USL | 29S | 29E | 26 | SWNW FEE | 11/19/09 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 3-4B | USL | 29S | 29E | 26 | SENW | 5/30/10 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 4-3 | USL | 29S | 29E | 26 | NENW | 5/27/10 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING | 5-6 | USL | 29S | 29E | 26 | SENW | 5/24/10 | POW | | No | |

| CASE NUMBER | Lease Issue Date | OPERATOR | WELL No. | WELL NAME | TWP | RGE | SEC | QTR SME | SPUDDED | *STATUS AS OF 3-9-2012 | **Notice of First Prod Rec'd | Wildcat? | Total New Disturbance (acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CO | | | | | | | | | | | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 4-6 | USL | 29S | 29E | 26 | SENW | 5/15/10 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-2B | USL | 29S | 29E | 26 | NWNW | 6/2/10 | POW | | No | |
| CACA46601 | 12/30/2004 | NAFTEX OPERATING CO | 1-2 | USL | 29S | 29E | 26 | NWNW | 6/8/10 | POW | | No | |
| **CACA46601 Count** | | | 27 | | | | | | | | yes | | |
| CACA47598 | 7/18/2006 | NATIONS PETROLEUM USA LTD | E-G15 | USL | 25S | 20E | 33 | SWNE BLM | 12/15/2007 | DRG | | No | |
| CACA47598 | 7/18/2006 | NATIONS PETROLEUM USA LTD | E-M20 | USL | 25S | 20E | 33 | SWNE BLM | 12/17/2007 | DRG | | No | 1.7 |
| **CACA47598 Count** | | | 2 | | | | | | | | no | | |
| CACA47611 | 7/20/2006 | SOLIMAR ENERGY LLC | 6 | WELLINGTON-MARI | 11N | 23W | 8 | SESE FEE | 3/16/2008 | POW | | No | |
| CACA47611 | 7/20/2006 | SOLIMAR ENERGY LLC | 7 | WELLINGTON-MARI | 11N | 23W | 8 | SESE FEE | 8/28/2008 | POW | | No | 1.72 |
| **CACA47611 Count** | | | 2 | | | | | | | | yes | | |
| CACA48007 | 7/18/2006 | PLAINS EXPL & PROD CO LP | 340M | USL 34Z WEST | 30S | 22E | 34 | SWSW BLM | 8/7/2007 | POW | | No | |
| CACA48007 | 7/18/2006 | PLAINS EXPL & PROD CO LP | 338M | USL 34Z WEST | 30S | 22E | 34 | SESE BLM | 8/8/2007 | POW | | No | 1.86 |
| **CACA48007 Count** | | | 2 | | | | | | | | yes | | |
| CACA49192 | 9/27/2007 | OCCIDENTAL ELK HILLS INC | 581X-22Z | | 30S | 22E | 22 | NENE BLM | 12/7/2007 | POW | | No | |
| CACA49192 | 9/27/2007 | OCCIDENTAL ELK HILLS INC | 371X-22Z | | 30S | 22E | 22 | NENE BLM | 7/13/2008 | POW | | No | 5.34 |
| **CACA49192 Count** | | | 2 | | | | | | | | yes | | |
| CACA49625 (Unit CACA51616X) | 4/30/0**8** | VENOCO | 1-19 | BLM | 31S | 22E | 19 | | 8/30/2011 | DRLG | | yes | 1.38 |
| CACA49625 (Unit CA51616X) | 4/30/08 | VENOCO | 2-19 | BLM | 31S | 22E | 19 | | 12/15/2011 | DRLG | | yes | 0 |

| CASE NUMBER | Lease Issue Date | OPERATOR | WELL No. | WELL NAME | TWP | RGE | SEC | QTR SME | SPUDDED | *STATUS AS OF 3-9-2012 | **Notice of First Prod Rec'd | Wildcat? | Total New Disturbance (acres) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CACA49625 Count** | | | 2 | | | | | | | | | | |
| CACA50418 | 1/8/03 | CARNEROS/ VINTAGE | 27-15 | USL | | | | | 4/23/04 | | | yes | 1 |
| **CACA50418 Count** | | | 1 | | | | | | | | no | | |
| CACA52221 | 11/29/2010 | AERA | 23 | Bronson | 11N | 23W | 17 | | 4/30/2010 | POW | | | |
| **CACA52221 Count** | | | 1 | | | | | | | | Yes | | |
| **Grand Count** | | | 46 | | | | | | | | | | 35 |

# APPENDIX E –Lands Deferred

| Township | Range | Section | Aliquot/Lots | Acres | Meridian | County | Land Status | Reason |
|---|---|---|---|---|---|---|---|---|
| 0240S | 0170E | 20 | E½NE¼,W½W½,SE¼SW¼, SE¼ | 440.00 | Mt. Diablo | Kings | Split Estate | w/in CA condor range |
| 0260S | 0170E | 26 | SW¼, W½SE¼; | 240.00 | Mt. Diablo | Kings | Public | w/in CA condor range |
| 0270S | 0180E | 7 | NE¼NW¼,S½SE¼; | 120.00 | Mt. Diablo | Kern | Split Estate | w/in CA condor range |
| 0270S | 0180E | 9 | SW¼NE¼,S½SW¼,W½SE¼; | 200.00 | Mt. Diablo | Kern | Split Estate | w/in CA condor range |
| 0300S | 0210E | 19 | Lots 1-8, 12-16, 19,20, S2 of Lot 99, S½SE¼; | 477.80 | Mt. Diablo | Kern | Split Estate | w/in CA condor range |
| 0120N | 0240W | 29 | Lots 1 thru 4; | 64.06 | Mt. Diablo | Kern | Public | w/in CA condor range |
| 0120N | 0240W | 30 | Lots 1 thru 4; | 17.94 | Mt. Diablo | Kern | Public | w/in CA condor range |
| 0120N | 0240W | 31 | Lots 1-4, E½W½, E½; | 650.86 | Mt. Diablo | Kern | Public | w/in CA condor range |
| 0120N | 0240W | 32 | All | 640.00 | Mt. Diablo | Kern | Public | w/in CA condor range |

# APPENDIX F - Air Emissions Calculations

For the purpose of this exercise, there are a number of assumptions. First, as a maximum, it is assumed that the emission numbers in the above table are for wells alone and not for all of the other equipment and sources previously described. In making this assumption, BLM is conceding that these estimates are above actual individual well emission factors, and the numbers calculated are higher than actual emission factors that would be found if the appropriate data were available. The analysis also uses a 45,000 oil and gas well estimate gathered from the California Division of Oil and Gas (www.consrv.ca.gov/DOG) as the number of total oil and gas wells in the San Joaquin Valley. Furthermore, we are using the values for Kern County, CDOGGR District 4, and the San Joaquin Valley APCD in analyzing the environmental effects related to air quality under this EA. This is necessary because the data are not available on an individual well basis.
An emission formula and emission factor was provided by Air Quality Engineer Leonard Scandura of the SJVAPCD. The formula is E = A x EF where E= emissions, A= activity or source, and EF is the constant emission factor. Using a derivative of the E= A x EF formula and the Estimated Statewide and SJVAPCD Annual Emissions from Oil and Gas Production, 2010, the emission calculations for ROG, NOx, SOx, $PM_{10}$ and PM 2.5 for one well are included below. Based on the RFD scenario of four wells, the estimates presented below can be multiplied by a factor of four to determine the estimated emissions from four wells. The range is described in Chapter 4.

The emission calculation for ROG is as follows:

33.62 tons ROG/day = 67,240 lbs ROG/day
EF = E/A
EF = 67,240 lbs ROG/day / 45,000 total wells = 1.49 lbs VOCs /day/well. 1.49 lbs VOCs/day/well x 365 days/year = 543.85 lbs VOCs/year/well

This is 0.002% (1.49 lbs/day/well / 67,420 lbs VOCs/day) of the total oil and gas production emissions for VOCs, and below the de minimis level for VOCs.

The emission calculation for NOx is as follows:

11.56tons NOx/day = 23,120 lbs NOx/day
EF = E/A
EF = 23,120 lbs NOx/day / 45,000 total wells = 1.03 lbs NOx/day/well
0.51 lbs NOx/day/well x 365 days/year = 187.53 lbs NOx/year/well

This is 0.002% (0.51 lbs/day / 23,120 lbs NOx/day) of the total oil and gas production emissions for NOx, and below the *de minimis* level for NOx of 10 tons/year/stationary source.

The emission calculations for SOx are as follows:

1.94 tons SOx/day = 3,880 lbs SOx/day
EF = E/A
EF = 3,880 lbs SOx/day / 45,000 total wells = 0.08 lbs SOx/day/well
0.08 lbs SOx/day/well x 365 days/year = 31.5 lbs SOx/year/well

This is 0.002% (0.08 lbs/day / 3,880lbs SOx/day) of the total oil and gas production emissions for SOx, which is below the *de minimis* level for SOx of 10 tons/year/stationary source.

The emission calculations for $PM_{10}$ are as follows:

1.77 tons $PM_{10}$/day = 3,540 lbs $PM_{10}$/day
EF = E/A
EF = 3,540 lbs $PM_{10}$/day / 45,000 total wells = 0.079 lbs $PM_{10}$/day/well
0.079 lbs $PM_{10}$/day/well x 365 days/year = 28.84 lbs $PM_{10}$/year/well

This is 0.002% (0.081 lbs/day / 3,640 lbs $PM_{10}$/day) of the total oil and gas production emissions for $PM_{10}$, which is below the *de minimis* level for $PM_{10}$ of 15 tons/year/stationary source.

The emission calculations for $PM_{2.5}$ are as follows:

1.77 tons $PM_{2.5}$/day = 3,540 lbs $PM_{2.5}$/day
EF = E/A
EF = 3,540 lbs $PM_{2.5}$/day / 45,000 total wells = 0.079 lbs $PM_{2.5}$/day/well
0.079 lbs $PM_{2.5}$/day x 365 days/year = 28.84 lbs $PM_{2.5}$/year/well

This is 0.002% (0.079 lbs/day / 3,540 lbs $PM_{2.5}$/day) of the total oil and gas production emissions for $PM_{2.5}$, which is below the *de minimis* level for $PM_{2.5}$ of 15 tons/year/stationary source.