

**DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE**

**Project: January 2011 Competitive Oil and Gas Lease Sale
EA Log Number: DOI-BLM-NM-F010-2010-354-EA
Location: Various Locations in McKinley County, New Mexico.**

Decision Record

The decision is to accept the Proposed Alternative (Alternative B) and offer four (4) parcels of federal minerals totaling 4,222.51 acres for sale in January 2011 with the addition of lease stipulations and notices to certain parcels. The Proposed Alternative is in compliance with the 2003 Farmington Resource Management Plan.

The following 4 parcels would be offered in the lease sale:

| Parcel | Stipulations | Acres |
|---|---|--------------|
| <p style="text-align: center;"><u>NM-201101-033</u></p> <p>T.0200N, R.0050W, NM PM, NM Sec. 005 Lots 1,2; 005 S2NE, SE; 007 Lots 1-4; 007 E2, E2W2; 008 N2; 009 NW</p> | <p>NM-11-LN Special Cultural Resource Lease Notice F-41-LN Biological Survey F-43-NSO No Surface Occupancy-Mountain Plover Sec 07-W2NE, W2E2NE, E2E2NW; Sec05-S2S2NWNE, SWSWNENE, S2S2NENESE, S2SEWNENESE, E2SWNESE, SENESE, N2N2NESESE, N2NENWSESE</p> | 1,420.87 |
| <p style="text-align: center;"><u>NM-201101-034</u></p> <p>T.0200N, R.0050W, NM PM, NM Sec. 022 NW, N2SW</p> | <p>NM-11-LN Special Cultural Resource F-41-LN Biological Survey F-42-NSO No Surface Occupancy-Community & Residences Sec 22-NW from the east line, out 660ft to the west</p> | 240.00 |
| <p style="text-align: center;"><u>NM-201101-035</u></p> <p>T.0200N, R.0050W, NM PM, NM Sec. 028 W2NW, S2 029 ALL 030 Lots 1, 2 030 E2, E2NW 031 E2NE</p> | <p>NM-11-LN Special Cultural Resource F-41-LN Biological Survey F-39-NSO No Surface Occupancy-Special Cultural Values and/or Traditional Cultural Properties Sec 29-S2SE, E2SESW</p> | 1,601.64 |
| <p style="text-align: center;"><u>NM-201101-036</u></p> <p>T.0200N, R.0050W, NM PM, NM Sec. 033 E2; 034 S2; 035 S2</p> | <p>NM-11-LN Special Cultural Resource F-41-LN Biological Survey F-43-NSO No Surface Occupancy-Mountain Plover Sec 34-S2S2</p> | 960.00 |

Alternatives Considered:

The EA considered two alternatives: the No Action Alternative and the Proposed Action. The No Action Alternative was not selected because it does not meet the purpose and need. The Proposed Action offers for lease all nominated parcels that are in conformance with the RMP with applicable stipulations.

Rationale:

The four (4) parcels described in Appendix 1, Exhibit 1 of the EA were reviewed by an interdisciplinary group of specialists at the Farmington Field Office. The purpose of the review was to determine if the parcels were in areas open to oil and gas leasing, if leasing was in conformance with the existing land use plans; if new information had been developed which might affect leasing suitability; to ensure that appropriate lease stipulations were attached to each lease parcels, and to verify that appropriate consultations had been conducted.

The Proposed Alternative was selected because it addressed all four (4) parcels that were released for this sale.

The professional opinion of BLM biologists, using BLM inventory and monitoring data, is that no federally listed threatened, endangered, or proposed species would be adversely affected by sale of the lease parcels. Effects of oil and gas leasing and development on threatened or endangered species were analyzed in Section 7 consultation (Cons. # 2-22-96-F-102, Cons. #22420-2006-I-0144, and Cons. #22420-2007-TA-0033). No new information has been uncovered which would change that analysis. Additional review and analysis would occur when site specific proposals for development are received.

Consultation with the Navajo Nation and Navajo Chapters in which some lease parcels occur has uncovered no new information regarding Traditional Cultural Properties or other cultural resources. Detailed site specific cultural resource inventories will be required as part of any site specific project development on the lease parcels.

New information regarding greenhouse gas emissions and climate change has been developed since the RMP. This information has been incorporated into the analysis of the alternatives. Analysis determined that leasing the subject tracts could lead to eventual development which would result in small incremental increases in GHG emissions. These emissions will be minimized by special conditions of approval developed for specific development proposals. It is unknown at this time the significance of these emissions on climate and it has been determined that additional analysis would not lead to further clarification of these impacts.

Mitigating measures and/or stipulations were considered and analyzed in the environmental assessment. Appropriate lease stipulations and lease notices will be attached to individual parcels as listed in the EA. Additionally, reclamation would be required for any development on the lease following the standards in the Gold Book.

**BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE**

**ENVIRONMENTAL ASSESSMENT FOR
JANUARY 19, 2011 COMPETITIVE OIL AND GAS LEASE SALE
DOI-BLM-NM-F010-2010-354-EA**

INTRODUCTION

It is the policy of the Bureau of Land Management (BLM) as derived from various laws, including the Mineral Leasing Act of 1920, as amended [30 U.S.C. 181 *et seq.*] and the Federal Land Policy and Management Act of 1976, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

The BLM New Mexico State Office conducts a quarterly competitive lease sale to sell available oil and gas lease parcels in New Mexico, Oklahoma, Texas, and Kansas. A Notice of Competitive Lease Sale, which lists lease parcels to be offered at the auction, is published by the BLM State Office at least 45 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary, based on information available at the time, is made during the land use planning process. Surface management of non-BLM administered land overlaying federal minerals is determined by BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale the BLM State Office sends a draft parcel list to each field office where the parcels are located. Field Office staff then review the legal descriptions of the parcels to determine if they are in areas open to leasing; if appropriate stipulations have been included; if new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted, and if there are special resource conditions of which potential bidders should be made aware. Once the draft parcel review is completed and returned to the State Office, a list of available lease parcels and stipulations is made available to the public for a two week comment period. At the end of the two week time period, all comments are reviewed and addressed at the field or state office. Once the public comments are addressed, the lease parcels is made available to the public through a Notice of Competitive Lease Sale (NCLS). On rare occasions, additional information obtained after the publication of the NCLS, may result in withdrawal of certain parcels prior to the day of the lease sale.

The following Environmental Assessment (EA) documents the Farmington Field Office review of the four (4) parcels offered in the January 19, 2011 Competitive Oil and Gas Lease Sale that are under the administration of the Farmington Field Office. It serves to verify conformance with the approved land use plan and provides the rationale for deferring or dropping parcels from a lease sale as well as providing rationale for attaching additional lease stipulations to specific parcels.

1.0 Purpose and Need

The purpose of offering parcels for competitive oil and gas leasing is to allow private individuals or companies to explore for and develop oil and gas resources on public markets.

The sale of oil and gas leases is needed to meet the growing energy needs of the United States public. New Mexico is a major source of natural gas for heating and electrical energy production in the lower 48 states, especially California. Continued leasing is necessary to maintain options for production as oil and gas companies seek new areas for production or attempt to develop previously inaccessible or uneconomical reserves.

1.1 Conformance with Applicable Land Use Plan and Other Environmental Assessments

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (2003). The Final Resource Management was approved by the Record of Decision (ROD) signed September 29, 2003. The RMP designated approximately 2.59 million acres of federal minerals open for continued oil and gas development and leasing under Standard Terms and Conditions. The RMP described specific stipulations that would be attached to new leases offered in certain areas. The Federal Land Policy and Management Act of 1976 (FLPMA) established guidelines to provide for the management, protection, development, and enhancement of public lands (Public Law 94-579).

Site specific analysis as required by the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, 42 USC 4321 *et seq.*) was conducted by Field Office resource specialists who relied on personal knowledge of the areas involved and/or reviewed existing databases and file information to determine if appropriate stipulations had been attached to specific parcels.

It is unknown when, where or if future well sites or roads might be proposed. Also, at the time of this review, it is unknown whether a parcel will be sold and a lease issued. Analysis of projected surface disturbance impacts, should a lease be developed, was estimated based on potential well densities listed in the Reasonable Foreseeable Development Scenario used as the basis for the PRMP/FEIS. Detailed site specific analysis of individual wells or roads would occur when a lease holder submits an Application for Permit to Drill (APD).

The proposed project would not be in conflict with any local, county, or state plans.

1.2 Federal, State or Local Permits, Licenses or Other Consultation Requirements

Purchasers of oil and gas leases are required to obey all applicable federal, state, and local laws and regulations including obtaining all necessary permits required should lease development occur.

Compliance with Section 106 of the National Historic Preservation Act are adhered to by following the BLM – New Mexico SHPO protocol agreement, which is authorized by the

National Programmatic Agreement between BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, and other applicable BLM handbooks.

When draft parcel locations are received by the FFO, cultural resource staff reviews the locations to determine if any are within Navajo Chapter boundaries or known areas of concern to the Navajo Nation or other tribes. Any such parcels are normally withheld from the sale while letters requesting information, comments, or concerns are sent to the Office of the President of the Navajo Nation, the Navajo Historic Preservation Department, and the Navajo Chapters. The Hopi Tribe is also contacted about any concerns they may have regarding leasing and cultural resources.

If the same draft parcels appear in a future sale, a second request for information is sent to the same recipients and the parcels are held back again. If no response to the second letter is received, the parcels are allowed to be offered in the next sale. If responses are received, BLM cultural resources staff will discuss the information or issues of concern with the respondent to determine if all or only portions of a parcel need to be withdrawn from the sale or if special stipulations need to be attached as lease stipulations. In the event that parcels are within 10 miles of Chaco Culture National Historical Park (CCNHP), the pueblos of Acoma, Zuni, Jemez, and Tesuque have also requested consultation. The National Trust for Historic Preservation, the Chaco Alliance, and the San Juan Citizens Alliance are also consulted for parcels within 10 miles of CCNHP.

There are no parcels on the draft sale parcel list for the January 19, 2011 that are being held back from the sale for Tribal Consultation.

PROPOSED ACTIONS AND ALTERNATIVES

2.0 Alternative A – No Action Alternative

The BLM NEPA Handbook (H-1790-1) states that for Environmental Assessments (EAs) on externally initiated proposed actions, the No Action Alternative generally means that the proposed action would not take place. In the case of a lease sale, this would mean that an expression of interest to lease (parcel nomination) would be denied or rejected.

The No Action alternative would withdraw all four (4) lease parcels from the January lease sale. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, and state leases.

If the BLM does not lease these Federal minerals, an assumption is that it is not expected that demand would decrease for oil and gas. Demand would likely be addressed through production elsewhere or imports.

2.1 Alternative B Proposed Action

The Proposed Action would be a recommendation to the State Director to offer for oil and gas leasing all four (4) parcels of federal minerals covering 4,222.51 acres administered by the Farmington Field Office. Standard terms and conditions as well as special stipulations would apply. Lease stipulations (as required by Title 43 Code of Federal Registration 3131.3) would be added to the four (4) parcels to address site specific concerns or new information not identified in the land use planning process.

- NM-201101 – 033 and 036

The four (4) parcels in their entirety would be included in the lease sale. Parcel number, acreage, and location of parcels are listed in Appendix 1, Table 1.

Once sold, the lease purchaser has the right to use so much of the leased lands as is reasonably necessary to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (Title 43 Code of Federal Registration 3101.1-4).

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; ownership of the minerals leased revert back to the federal government and the lease can be resold.

Drilling of wells on a lease is not permitted until the lease owner or operator secures approval of a drilling permit and a surface use plan specified in Title 43 Code of Federal Regulation 3162.

AFFECTED ENVIRONMENT

3.0 Description of Affected Environment

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. Only those aspects of the affected environment that are potentially impacted are described in detail. The following elements are not present: Areas of Critical Environmental Concern, Prime or Unique Farmlands, Wild and Scenic Rivers, Wetlands /Riparian Zones, Wilderness or Wilderness Study Areas, and Wild Horses and Burros.

The proposed lease parcels are located in McKinley County, New Mexico. These parcels are described in the 2003 Farmington RMP Record of Decision. Additional general information on air quality in these areas is contained in Chapter 2 of the Farmington RMP.

3.1 Air Quality

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. These criteria pollutants

include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ & PM_{2.5}), sulfur dioxide (SO₂) and lead (Pb). Regulation of air quality is delegated to the State of New Mexico. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. The area of the proposed action is considered a Class II air quality area. A Class II area allows moderate amounts of air quality degradation. Air quality in the San Juan Basin near the proposed lease tracts is generally good. A review of the EPA's Green Book web page documents that the San Juan Basin is designated as being in attainment for all air pollutants regulated under the Clean Air Act's National Ambient Air Quality Standards (NAAQS). The primary sources of air pollution are dust from blowing wind on disturbed or exposed soil and exhaust emissions from motorized equipment.

The 2003 Farmington Resource Management Plan (RMP) discussed ozone in the Baseline Air Quality and Impact Assessment sections. The December 2003 standard attainment of the ozone was a three-year running average of the annual fourth-highest daily maximum 8-hour ozone concentration of less than 0.084 ppb. During the summers of 2000 through 2002, ozone levels in San Juan County were approaching non-attainment. The New Mexico Air Quality Bureau (NMAQB) held several public meetings to discuss the issue and as a result formed an Early Action Compact (EAC), and coordinated the formation of the Four Corners Ozone Task Force. Additional modeling and monitoring was conducted by Alpine Geophysics, LLC and Environ International Corporations, Inc., in 2003 and 2004. Results of the modeling suggest the episodes recorded in 2000 through 2002 were attributable to regional transport and high natural biogenic source emissions. The model also predicted that the region will not violate the ozone NAAQS through 2007 and that the trends in the 8-hr ozone values in the region will be declining in the future.

The states of Colorado and New Mexico convened the Four Corners Air Quality Task Force (Task Force) in November 2005 to address air quality issues in the Four Corners region and consider options for mitigation of air pollution. The Task Force is comprised of more than 100 members and 150 interested parties representing a wide range of perspectives on air quality in the Four Corners. Members include private citizens, representatives from public interest groups, universities, industry, and federal, state, tribal and local governments, and federal agencies including Farmington Bureau of Land Management (BLM).

The purpose of the Task Force was to bring together a diverse group of interested parties from the area to learn about and discuss the range of air quality issues and options for improving air quality in the Four Corners area. It was decided at the outset that the Task Force would be a process completely open to anyone with an interest in air quality issues in the Four Corners area. This meant that member participation fluctuated from meeting to meeting, although no meeting had fewer than 65 attendees and Task Force participation in total reached some 250 individuals (Task Force members and interested parties combined).

Public involvement was vital to all stages of technical work per the EAC. Periodic meetings with local EAC signatory parties were held by NMED. Several meetings with the Four Corners Ozone Task Force and the public were held during the course of the technical modeling analysis per the requirements of the EAC. Technical decision-making and modeling was performed with involvement of a Technical Peer Review Committee, which was responsible for review and

critique of work plans and products. The Technical Peer Review Committee held several conference calls and one meeting. NMED solicited and received input from stakeholders continually throughout the analysis through telephone and email contacts. Information about the EAC and inventory and modeling reports is available to the public on the Four Corners Ozone Task Force webpage (<http://www.nmenv.state.nm.us/ozonetf/>). Additionally, the project has been well publicized in the local press. Articles and opinion pieces about air quality and ozone, as well as advertisements and press releases for meetings, appeared in local newspapers. Local radio and television broadcasts focused on air quality and ozone.

Initial work of the Task Force has already resulted in the implementation of one “interim” recommendation: the Bureau of Land Management has required new and replacement internal combustion gas field engines of between 40 and 300 horsepower to emit no more than two grams of nitrogen oxides per horsepower-hour. In New Mexico, all new and replacement engines greater than 300 horsepower must not emit more than 1.5 grams of NOx per horsepower-hour. These requirements apply to oil and gas development within the Farmington BLM's jurisdiction.

In March 2008, the EPA revised its Air Quality Index (AQI) for ozone from 0.084 ppm to 0.075 ppm. The New Mexico Environment Department Air Quality Bureau (NMAQB) has determined in a February 22, 2009 report that the 2007 – 2009 ozone design value for San Juan County was 0.069 ppm. Currently, the design value for a county must be greater than the revised 8-hour ozone standard of 0.075 ppm for a nonattainment designation. Therefore, at this time the San Juan County is classified as in attainment with the revised federal ozone standard. Rio Arriba County is unclassified because of there are no ozone monitors sited in Rio Arriba County.

3.2 Climate

The planning area is located in a semiarid climate regime typified by dry windy conditions, limited rainfall (Trewartha and Horn 1980). Table 3.3 summarizes components of climate that could affect air quality in the region.

| Climate Component | Temperature |
|----------------------------------|--------------------------------|
| Mean maximum summer temperatures | 67.1°F |
| Mean minimum winter temperatures | 32.1°F |
| Mean annual temperature | 52.1°F |
| Mean annual precipitation | 8.83 inches |
| Mean annual snowfall | 14.6 inches |
| Mean annual wind speed | 7.3 mile per hour (mph) |
| Prevailing wind direction | NE during a.m., SW during p.m. |

In addition to the air quality information in the RMPs cited above, new information about greenhouse gases (GHGs) and their effects on national and global climate conditions has emerged since the RMP were prepared. Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Without additional meteorological monitoring and modeling systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions; what is known is that increasing concentrations of GHGs may accelerate the rate of

climate change.

Greenhouse gases that are included in the US Greenhouse Gas Inventory are: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). CO₂ and methane (CH₄) are typically emitted from combustion activities or are directly emitted into the atmosphere. On-going scientific research has identified the potential impacts of greenhouse gas emissions (including CO₂; CH₄; nitrous oxide (N₂O), water vapor; and several trace gasses) on global climate. Through complex interactions on regional and global scales, these greenhouse gas emissions cause a net warming effect of the atmosphere (which makes surface temperatures suitable for life on earth), primarily by decreasing the amount of heat energy radiated by the earth back into space. Although greenhouse gas levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO₂ concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO₂ concentrations also lead to preferential fertilization and growth of specific plant species.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. It is not, however, possible at this time to predict with any certainty the causal connection of site specific emissions from sources to impacts on the global/regional climate relative to the Preferred Alternative and subsequent actions of oil and gas development.

Mean annual temperatures have risen across New Mexico and the southwestern U.S. since the early 20th century. When compared to baseline information, periods between 1991 and 2005 show temperature increases in over 95% of the geographical area of New Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state. Recurrent research has indicated that predicting the future effects of climate change and subsequent challenges of managing resources in the Southwest is not feasible at this time (USFS, 2008). However, it has been noted that forests at higher elevations in New Mexico, for example, have been exposed to warmer and drier conditions over a ten year period. Should the trend continue, the habitats and identified drought sensitive species in these forested areas and higher elevations may also be affected by climate change (Enquist and Gori).

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radioactive forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere.

3.3 Cultural Resources

Once the decision is made by the lessee to develop a lease, area specific cultural records review would be done to determine if there is a need for a cultural inventory of the areas that could be affected by the subsequent surface disturbing activities. Generally, a cultural inventory will be required and all historic and archeological sites that are eligible for listing in the National Register of Historic Places or potentially eligible to be listed would be either avoided by the undertaking or have the information in the sites extracted through archeological data recovery prior to surface disturbance.

3.3.1 Cultural

The leases are located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: PaleoIndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 B.C. to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (A.D. 1-1540), and the historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed description of these various periods and select phases within each period is provided in the Bureau of Land Management Farmington Field Office Final Environmental Impact Statement and Resource Management Plan (2003) and will not be reiterated here. Additional information is also included in an associated document (SAIC 2002).

The BLM FFO has categorized variability in archeological sites by major time period, cultural affiliations/components, average size, and occurrence of features in each of the 20 watersheds within the BLM FFO's jurisdiction (BLM 2003:3-88). The parcels lie in the vicinity of Ojo Encino, about 14 miles east of Pueblo Pintado in the Chaco watershed. The watershed and the Ojo Encino area have received extensive amounts of archaeological surveys over the years.

Based on the RMP and SAIC reports, a total of 14408 sites representing 22899 distinct temporal/cultural components have been documented within the Chaco watershed. The most frequently occurring cultural affiliations recorded are Anasazi/Pueblo, Navajo, and Archaic.

To assess the cultural resources of the leases, three avenues of inquiry were considered: literature or file review, Native American consultation, and field reconnaissance. The literature review involved utilizing data sources including computerized data from the Archaeological Records Management Section at the Museum of New Mexico (ARMS; January 2010), BLM site location maps, ethnographic records from previously conducted small and large scale cultural resource surveys, and original General Land Office surveys dating between the early 1880s – 1930s. Native American consultation involved contacting by mail the Navajo Nation President, Navajo Nation Historic Preservation Office, and affected Navajo chapters. By correspondence dated October 19, 2009, the BLM extended to all the New Mexico pueblos and the Hopi Tribe the opportunity to review and comment of future lease sales; only the Hopi Tribe responded.

Previous cultural resource studies and surveys in the leases have been generally limited to inspections ahead of oil and gas related activities, such as well locations and pipelines. In the San Juan Basin, numerous large scale archaeological surveys were also conducted in relation to coal feasibility studies. From a review of available data, there are 35 archaeological sites on

record in the proposed leases and approximately 1291 acres of the proposed leases (30%) have been inventoried for cultural resources. The figures are most likely slightly higher because not all known surveys have been electronically captured in a GIS environment.

The 35 sites represent 38 separate cultural/temporal components. Forty-one percent of the components are of unknown age/temporal affiliation due to an absence of temporally or culturally diagnostic items, such as ceramics or distinctive stool tools. Forty-three percent are Navajo, 8% are Anasazi (*aka* Pueblo), and 8% are Archaic. Most of the Navajo sites appear to be 20th century in age.

Most features identified in the site record are associated with historic 20th century Navajo occupation, and include hogans, corrals, sweat lodges, and other associated remains. Other than hearths associated with artifact scatters, no other pre-Columbian sites seem to have any structural features. Additional sites yet to be identified can be expected to mirror these results.

General Land Office maps dating from 1918–1937 did not yield any significant results. Minor modern improvements such as roads were occasionally noted by the surveyors in the areas of the proposed leases.

No reconnaissance for cultural resources in the proposed leases was deemed warranted. The existing data for the leases seems to be a good example of what can reasonably be expected to occur in those areas that have not been archaeologically surveyed.

Summary of Parcels, Area Archaeologically Surveyed, and Cultural Sites

| Parcel Num | Surface Owner | Parcel Size (ac) | Surveys (ac) | Percent Surveyed | Sites | GLO Map Review |
|---------------|---------------|------------------|--------------|------------------|-----------|-------------------|
| NM-201101-033 | BLM | 1,420 | 231 | 16% | 10 | 1937; roads shown |
| NM-201101-034 | BLM | 240 | 55 | 23% | 2 | 1937; roads shown |
| NM-201101-035 | BLM | 1,602 | 321 | 20% | 14 | 1937; roads shown |
| NM-201101-036 | BLM | 960 | 684 | 71% | 9 | 1937; roads shown |
| TOTALS | | 4,222 | 1,291 | 30% | 35 | |

3.4 Native American Religious Concerns

Traditional Cultural Properties (TCPs) is a term that has emerged in historic preservation management and the consideration of Native American religious concerns. TCPs are places that have cultural values that transcend, for instance, the values of scientific importance that are normally ascribed to cultural resources such as archaeological sites. The National Park Service (Parker and King 1998:1) has defined TCPs as follows:

A traditional cultural property can be defined generally as one (a property) that is eligible for the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community. (National Register Bulletin 38)

Native American “communities” are most likely to identify TCPs, although TCPs are not restricted to those associations. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known.

There are several pieces of legislation or Executive Orders that should be considered when evaluating Native American religious concerns. These govern the protection, access and use of sacred sites, possession of sacred items, protection and treatment of human remains, and the protection of archaeological resources ascribed with religious or historic importance. These include the following:

- The American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996, P.L. 95-431 Stat. 469).
 - Possession of sacred items, performance of ceremonies, access to sites
- Executive Order 13007 (24 May 1996).
 - Access and use of sacred sites, integrity of sacred sites
- The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001, P.L. 101-601).
 - Protection, ownership, and disposition of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony
- The Archaeological Resources Protection Act of 1979 (ARPA; 16 USC 470, Public Law 96-95).
 - Protection of archaeological resources on Federal and Indian lands

For the Proposed Action, identification of TCPs were limited to reviewing existing published and unpublished literature, and ongoing BLM tribal consultation efforts specific to these proposed leases with the Navajo Nation, affected Navajo chapters, and other tribes.

Except for one area reportedly used over 20 years ago for offerings and ceremonial eagle trapping, no other site specific TCPs or other areas of traditional religious and cultural importance have been identified.

3.5 Paleontology Resources

The San Juan Basin has been known to be an important area for mammalian and reptilian fossils since the late 1800s. A variety of paleontological resources exist in the planning area, including animal fossils, fossil leaves, palynomorphs, petrified wood, and trace fossils, occurring in the Triassic, Jurassic, Cretaceous, and Tertiary rocks. Dinosaur and other fossils that have made significant contributions to the scientific record have been found and excavated in the FFO area within the past 5 years.

The BLM uses the Potential Fossil Yield Classification (PFYC) system to identify areas with a high potential to produce significant fossil resource (IM 2008-009). This system has ranked all lands within the FFO management area as a Class 5 designation. Class 5 regions are described as being Very High Potential paleontological resource areas, thus requiring an assessment at the project level (IM 2008-011).

3.6 Socioeconomics and Environmental Justice

Executive Order 12898 requires Federal agencies to assess projects to ensure there is no disproportionately high or adverse environmental, health, or safety impacts on minority and low-income populations. A review of the parcels offered for lease indicates there are no impacts on minority and low-income populations.

3.7 Floodplains

Executive Order 11988 requires federal agencies to consider and evaluate potential effects that a proposed action may have on floodplains. Where applicable, actions should reduce the risk of flood loss, minimize the impact of floods on human safety and restore and preserve the natural and beneficial values served by floodplains. The best available floodplain information for the Farmington Field Office resource area is the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM). These maps define zones according to varying levels of flood risk; the zones reflect the severity or type of flooding in the area. The FEMA maps display 100-year floodplains as “Zone A” areas, describing them as areas with a “1% annual chance of flooding and a 26% chance of flooding over [a thirty year period]” (FEMA 2009). The following table describes the acreage of “Zone A” areas within each parcel.

| Parcel # | 033 | 034 | 035 | 036 |
|-------------|-----|-----|-----|-----|
| Zone A (ac) | 105 | 0 | 0 | 20 |

3.8 Invasive, Non-native Species

Once the decision is made by the lessee to develop a lease, area specific invasive and non native species (weed) inventory review is done to determine if there is a need for a weed inventory of the areas to be affected by surface disturbing activities. Generally, an invasive and non native species (weed) inventory would be required. While there are no known populations of invasive or non-native species on the propose parcels, infestations of noxious weeds can have a disastrous impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Noxious weeds cause estimated losses to producers \$2 to \$3 billion annually. These losses are attributed to: (1) decreased quality of agricultural products due to high levels of competition from noxious weeds; (2) decreased quantity of agricultural products due to noxious weed infestations; and (3) costs to control and/or prevent the noxious weeds.

Furthermore, noxious weeds can negatively affect livestock and dairy producers by making forage either unpalatable or toxic to livestock, thus decreasing livestock productivity and potentially increasing producers’ feed and animal health care costs. Increased costs to operators are eventually borne by consumers. Noxious weeds also affect recreational uses, and reduce realty values of both the directly influenced and adjacent properties.

Recent federal legislation has been enacted requiring state and county agencies to implement noxious weed control programs. Monies would be made available for these activities from the federal government, generated from the federal tax base. Therefore, all citizens and taxpayers of the United States are directly affected when noxious weed control prevention is not exercised.

3.9 Threaten and/or Endangered Species

Federally Listed Threatened: Under Section 7 of the Endangered Species Act of 1973 (as amended), the BLM is required to consult with the U.S. Fish and Wildlife Service on any proposed action which may affect federal listed threatened or endangered species or species proposed for listing. Based on FFO’s field inspection and reviews, it was determined that the proposed action B would be in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. #2-22-01-I-389), as it pertains to mountain plovers with the addition of a no surface occupancy requirement to insure that potential nesting plover habitat is not disturb.

According to the USFWS, there are seven (7) federally listed threatened, endangered or proposed species with the potential to occur within the area of the nominated parcels.

The table below provides an evaluation of the potential for these species to occur in and around the nominated parcels:

Federally Listed Threatened, Endangered, and Candidate Species with Potential to Occur in McKinley County, New Mexico

| Species Name | Conservation Status | Habitat Associations | Potential to Occur in the Proposed Action Area |
|--|---------------------|---|---|
| BIRDS | | | |
| Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>) | Federal-Endangered | Riparian habitats along rivers, streams, or other wetlands with dense growths of willows or other shrubs and medium sized trees. | There are no riparian habitats suitable for willow flycatchers in the proposed action area. |
| Mexican spotted owl (<i>Strix occidentalis lucida</i>) | Federal-Endangered | Mature montane forest and in shaded, woody, and steep canyons. | No montane forests are located within the proposed action area. |
| Yellow-billed cuckoo (<i>Coccyzus americanus</i>) | Federal-Candidate | Low to mid-elevation riparian woodlands, deciduous woodlands, and abandoned farms and orchards. | There are no large cottonwood galleries in, or near the proposed action area. |
| Mountain plover (<i>Charadrius montanus</i>) | Federal-Proposed | Semi desert, grasslands, open arid areas, bare fields, breeds in open plains or prairie. | Proposed action area does contain suitable nesting habitat. |
| FISH | | | |
| Zuni bluehead sucker (<i>Catostomus discobolus yarrow</i>) | Federal-Candidate | Occupies a variety of habitats from headwater streams to large rivers, but mostly found in moderate to fast flowing water above a rubble-rock substrate | Proposed action area does not contain suitable habitat. |
| MAMMAL | | | |
| Black footed ferret (<i>Mustela nigripes</i>) | Federal-Endangered | Grassland plains where it occurs in association with prairie dogs. At a minimum, the black-footed ferret requires prairie dog towns of at least 80 acres for suitable habitat. | No large prairie dog colonies are located within the proposed action area. |
| PLANTS | | | |
| Zuni fleabane (<i>Erigeron rhizomatus</i>) | Federal-Threatened | Occupies nearly barren detrital clay hillsides with soils derived from shales of the Chinle or Baca formations (often seleniferous); most often on north or east-facing slopes in open piñon-juniper woodlands at 2,200-2,400 m (7,300-8,000 ft). | Proposed action area does not contain suitable habitat. |

Mountain Plover – A proposed federally-listed species (Proposed-Threatened) by the USFWS by the authority of the Endangered Species Act (ESA). Fish and Wildlife Service biologists estimate that between 1966 and 1999 the mountain plover suffered a 63 percent decline. A report released in March, 2010 shows that grassland birds, including the mountain plover, are experiencing the most rapid declines among the nation’s birds. The 2002 Biological Assessment

(BA) for the Farmington Field Office RMP determined that O&G development would have a “may affect, not likely to adversely affect” determination on mountain plovers. However, that determination was on the basis of “little oil and gas development activities would take place in potential mountain plover habitat”.

Exceptions within threatened or endangered species habitat would only be allowed if the U. S. Fish and Wildlife concurs that there would be no adverse effect on listed species or their habitat.

Parcels 033 and 036 contain suitable habitat for the Mountain Plover. Due to the habitat present within the parcels, development can be managed effectively with the Mountain Plover stipulation F-43-NSO, No Surface Occupancy – Mountain Plover.

3.10 Wastes, Hazardous or Solid

On leased parcels that could have subsequent proposed surface disturbing projects from proposed and approved APDs, no waste material would be removed from the project areas and upon reclamation of the surface disturbed activities, such as the reserve pit areas for example, the more stringent New Mexico Oil Conservation Division pit reclamation guidelines would be imposed where applicable to contain any oil or gas field hazardous or solid waste.

3.11 Water Quality – Surface/Ground

The San Juan Basin is underlain by sandstone aquifers and unconsolidated sand and gravel aquifers. The Colorado Plateaus Aquifers are sandstone while the Rio Grande Aquifer system is unconsolidated sand and gravel. The primary Colorado Plateaus Aquifers that underlie the vast majority of the San Juan Basin are the Uinta-Animas Aquifer and the Mesa Verde Aquifer. The quality of groundwater in the San Juan Basin generally ranges from fair to poor. The Uinta-Animas contains fresh to moderate saline water while the quality of the Mesa Verde is extremely variable. In general, areas of the aquifer that are recharged by infiltration from precipitation or surface water sources contain relatively fresh water.

3.12 General Topography/Surface Geology

The topographic characteristics and/or regional setting of the project area are: The lands involved in this lease sale have topographic forms that naturally vary, not only to the nature of the land, but in differences in rock and soil texture and composition. The lease parcel areas may vary from hilly uplands to flat lands and with different degrees of sloping from place to place. The horizontal strata of the leasable areas have small mountains, plateau escarpments and other topographical features that are etched out by weathering. The topographic details of the lands in the lease sale are dependent upon differences in rock structure, texture, and attitude that give rise to prominences of semi-arid desert type surface features.

3.13 Mineral Resources

Mineral resources of the FFO are described in detail on pages 3-4 to 3-15 of the PRMP/FEIS (BLM 2003a). The San Juan Basin in New Mexico is a major contributor to the natural gas

supply of the nation. In 1997, almost two-thirds of the natural gas produced in New Mexico came from the RMP planning area.

Oil and gas development began in the FFO administrative area in the 1940s. Today, nearly all of the area with high potential for oil and gas production is under prior existing leases held by production. The FFO fluid minerals program staff has reviewed the proposed parcel lists and has not found any unresolved issues resulting from prior leasing, meaning that there are no: active leases, communitization agreements, unit, or other agreements. The four (4) parcels proposed for leasing have multiple plugged and abandon wells. There are no active leases for these parcels. The lease parcels do not conflict with any active coal or sand and gravel operations.

Spacing requirements for well bores are formation dependant, ranging from 40 acres for Gallup oil wells, to 80 acres for Mesa Verde and Dakota natural gas wells, to 160 acres for Fruitland Coal and Pictured Cliffs natural gas wells. Well density will be dependent on the formation productivity.

3.14 Soils

The soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. The material has been mixed and sorted in transport and has a wide range in mineralogy and particle size. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes and mesas bounded by cliffs. The Natural Resource Conservation Service has mapped 66 different soil map units in the FFO planning area.

3.15 Watershed – Hydrology

The watershed and hydrology in the area is affected by land and water use practices. The degree to which hydrologic processes are affected by land and water use depends on the location, extent, timing and the type of activity. Factors that currently cause short-lived alterations to the hydrologic regime in the area include livestock grazing management, recreational use activities, groundwater pumping and also oil and gas developments such as well pads, permanent roads, temporary roads, pipelines, and powerlines.

3.16 Vegetation

Public lands in San Juan, McKinley, Rio Arriba and Sandoval Counties support a diversity of plant communities. These plant communities developed based on site specific topography, soil type and climatic conditions. The planning area contains five major vegetation units, and a non-native cover type represented by urban/agricultural areas. Pages 3-31-3-34 and Map 3-6 of the PRMP/FEIS provide further details on vegetation resources in the leasing area.

3.17 Livestock Grazing

Livestock grazing is authorized by FLPMA, the Taylor Grazing Act of 1937 and the Public Rangelands Improvement Act of 1978. The principle objective of the rangeland program is to

promote healthy, sustainable rangeland ecosystems; to accelerate restoration and improvement of public rangeland to properly functioning condition; to promote the orderly use, improvement and development of the public lands.

There are 167 grazing allotments managed by the Farmington Field Office with 351 grazing authorizations that permit cattle, sheep and horse grazing within the resource area. Of the 351 grazing authorizations, 317 are permitted under section 3 of the Taylor Grazing Act. Of the 167 grazing allotments, there are 4 authorizations issued under section 15 of the Taylor Grazing Act to the Navajo Tribe that authorized grazing on 35 allotments.

There are additional permits under section 15 authorizations that permit grazing on 30 allotments in the Lindrith, New Mexico Area. The FFO currently consults with grazing permittees on a site by site basis as part of the APD process. Additional information on the FFO grazing program can be found on pages 3-54 and 3-55 of the PRMP/FEIS.

The proposed lease parcels are located in the Star Lake allotment as shown in Appendix 1, Table 1.

3.18 Wildlife

The piñon-juniper and Great Basin Desert Scrub plant communities in the northeastern part of the FFO provide habitat for herds of wintering and resident populations of mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*). Mule deer and elk are found most often on FFO land north of US Highway 550, and are much less common south of the highway due to the lack of suitable habitat. Deer and elk population density on FFO land varies by location and time of year.

Several small populations of pronghorn antelope (*Antilocapra americana*) reside in the area north and east of US Highway 550 near Angel Peak and Ensenada Mesa. There are also remnants of a small antelope herd in the Twin Mounds area. Detailed information on other wildlife species and habitats in the FFO is contained on pages 3-39 to 3-42 of the PRMP/FEIS and the background biological resources analysis (SAIC 2002) prepared for the RMP.

3.19 Special Status Species

In accordance with BLM Manual 6840, the Farmington Field Office of the Bureau of Land Management (FFO) has prepared a list of special management species to focus species management efforts toward maintaining habitats under a multiple use mandate, called FFO Special Management Species (SMS). The BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. The authority for this policy and guidance is established by the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and Department of Interior Manual 235.1.1A. FFO SMS are listed in the Table below.

Special Management Species of the BLM/FFO and their Potential to Occur in the Proposed Action Area

| Species Name | Conservation Status | | Habitat Associations | Potential to Occur in the Proposed Action Area |
|--|---------------------|------------|--|--|
| | BLM/F FO | New Mexico | | |
| <i>Birds</i> | | | | |
| Golden Eagle (<i>Aquila chrysaetos</i>) | SMS | | In the West, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees. | Low: Proposed action area may contain habitat for foraging, but not nesting. |
| Ferruginous hawk (<i>Buteo regalis</i>) | SMS | | Open, arid country or grasslands with piñon-juniper plant associations. Nests on ledges or cliff sites, may use the ground. | Unlikely: Proposed action area may contain habitat for foraging, but not nesting. |
| Prairie falcon (<i>Falco mexicanus</i>) | SMS | | Arid, open country, grasslands or desert scrub, rangeland; nests on cliff ledges, trees, power structures. | Unlikely: Proposed action area does contain habitat for nesting or foraging. No known nests have been documented within lease area. |
| Yellow-billed cuckoo (<i>Coccyzus americanus</i>) | SMS | | Low to mid-elevation riparian woodlands, deciduous woodlands, and abandoned farms and orchards. Rare in the San Juan River valley. | Unlikely: Proposed action area does not contain suitable riparian area habitat. |
| American peregrine falcon (<i>Falco peregrinus anatum</i>) | SMS | NM-T | Open country near lakes or rivers with rocky cliffs and canyons. Tall city bridges and buildings also inhabited. | Low: Proposed action area may contain suitable habitat for foraging, but not nesting. |
| Bald eagle (<i>Haliaeetus leucocephalus</i>) | SMS | NM-T | Near lakes, rivers and cottonwood galleries. Nests near surface water in large trees. May forage terrestrially in winter | Unlikely: Proposed action area do not contain suitable habitat for nesting and unlikely any winter foraging habitat. |
| Burrowing owl (<i>Athene cunicularia</i>) | SMS | | Associated with prairie dog towns. In dry, open, short-grass, treeless plains | Possible: Proposed action area does not contain known prairie dog towns for nesting, however there are prairie dog town within close proximity. |
| <i>Plants</i> | | | | |
| Brack's hardwall cactus (<i>Sclerocactus cloveriae</i> ssp. <i>brackii</i>) | SMS | NM-E | Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft). | Unlikely: Nacimiento formation does not occur in the project and action area. |
| Aztec gilia (<i>Aliciella formosa</i>) | SMS | NM-E | Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft). | Unlikely: Nacimiento formation does not occur in the project and action area. |

The FFO has mapped potential habitats for those species which have readily defined habitat characteristics. A review of the GIS data and field survey indicates there are currently no concerns with special status species relative to the lease sale parcels.

3.20 Visual Resources

Visual Resource Management (VRM) on public lands is conducted in accordance with BLM Handbook 8410 and H-8410-1. The FFO has mapped the VRM resources and a review of this data indicates that there are currently no concerns with VRM resources relative to the lease sale parcels.

3.21 Recreation

The FFO has set aside several areas for special use and manages them as Specially Designated Areas (SDAs). A detailed description of recreation areas within the FFO can be found on pages 3-63 to 3-66 of the PRMP/FEIS. None of the four (4) lease parcels fall in recreation SDAs and would continue to be managed as an Extensive Recreation Management Area and subject to general recreation management policies.

3.22 Public Health and Safety

The area containing the lease parcels has been under oil and gas development for many years. Leasing of the parcels analyzed in this EA would present no new or unusual health or safety issues not covered by existing state and federal laws and regulation.

ENVIRONMENTAL IMPACTS

4.0 Environmental Consequences and Proposed Mitigation Measures

Alternative A - No Action

Under the No Action Alternative, the proposed parcels would not be leased. There would be no subsequent impacts from oil and gas construction, drilling, and production activities. Oil and gas development of federal, state, private, and Indian minerals would continue on the lands surrounding the parcels. No additional natural gas would enter the public markets and no royalties would accrue to the federal or state treasuries. The No Action Alternative would result in the continuation of the current land and resource uses on the parcels. The No Action Alternative is also used as the baseline for comparison of alternatives.

It is an assumption that the No Action Alternative (no lease option) may result in a slight reduction in domestic production of oil and gas. This would likely result in reduced Federal and State royalty income, and the potential for Federal lands to be drained by wells on adjacent private or state lands. Consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate.

If the BLM were to forego its leasing decisions and potential development of those minerals, the assumption is that the public's demand for the resource would not be expected to change. Instead, the resource foregone would be replaced in the short and long-term by other sources that may include a combination of imports, using alternative energy sources (e.g. wind, solar), and other domestic production. This displacement of supply would offset any reductions in emissions achieved by not leasing the subject tracts in the short-term.

Alternative B - Proposed Action

4.1 Air Quality

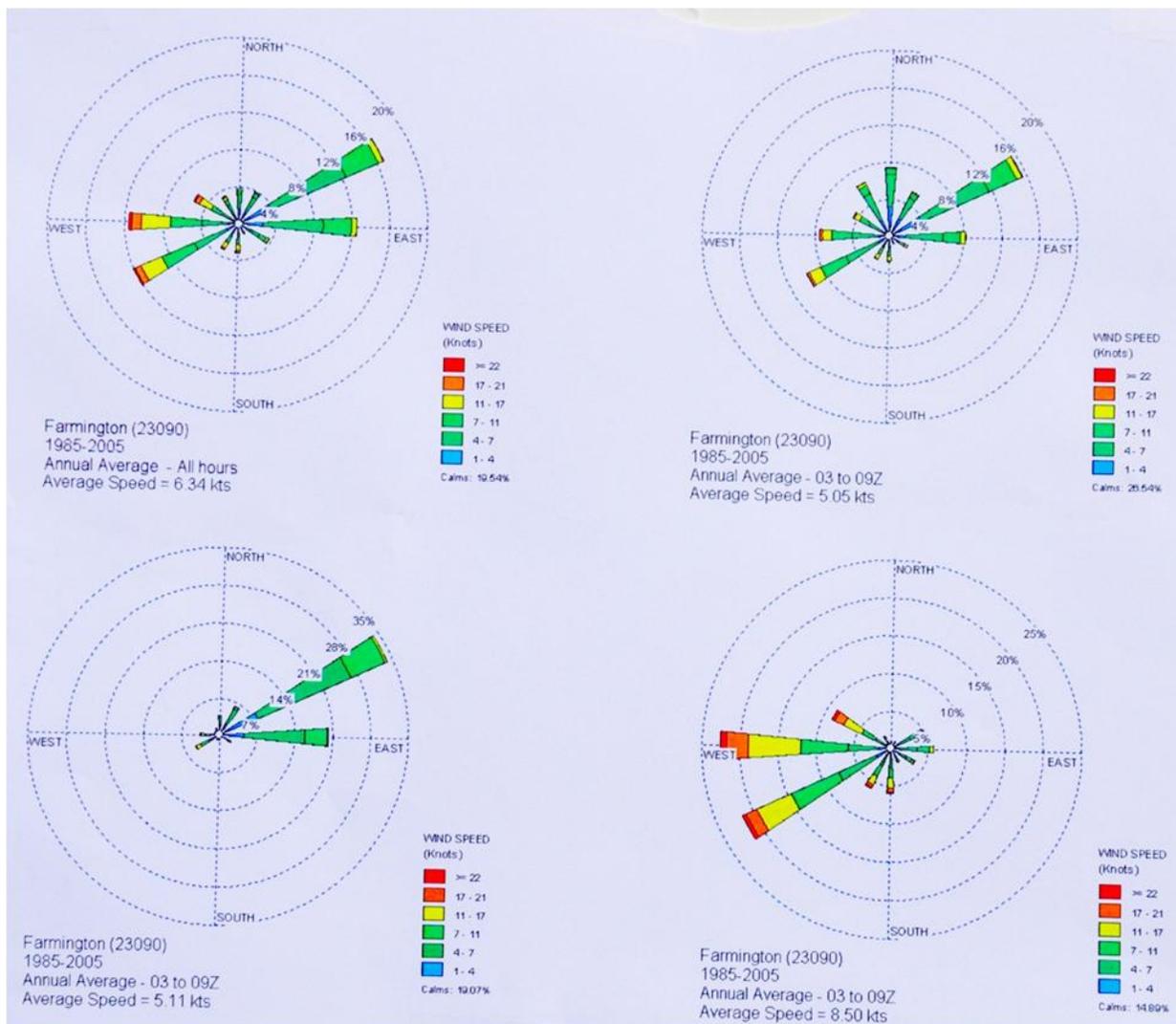
4.1.1 Direct and Indirect Impacts

Leasing the subject tracts would have no direct impacts to air quality. Any potential effects to air quality from sale of lease parcels would occur at such time that the leases were developed. All parcels proposed for leasing are located in various sections of T20N, R5W (Appendix 1). The proposed lease parcels are approximately 57 miles from the Navajo Dam air quality monitoring station established by the New Mexico Environmental Department Air Quality Bureau. Potential impacts of development of the proposed leasing could include increased air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressors

engines, vehicles, flares, and dehydration and separation facilities, and volatile organic compounds during drilling or production activities.

In order to reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as the types of equipment needed if a well were to be completed successfully (e.g. compressor, separator, dehydrator), the technologies which may be employed by a given company for drilling any new wells, area of disturbance for each type of activity (e.g. roads, pads, electric lines, compressor station), number of days to complete each kind of construction, number of days for each phase of drilling process, type(s), size, number of heavy equipment used for each type of construction (backhoe, dozer, etc.), number of wells of all types (shallow, deep, exploratory, etc.), compression per well (sales, field booster), or average horsepower for each type of compressor. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs. Since this type of data is unavailable at this time, including scenarios for oil and gas development, it is unreasonable to quantify emissions. What can be said is that exploration and production would contribute to incremental increases in overall air quality emissions associated with oil and gas exploration and production into the atmosphere.

The potential full development of the proposed lease sale is estimated at 110 wells (4.23 Cumulative Impacts). While all of San Juan County is in attainment of all NAAQS including ozone, the Navajo Dam monitoring station is the most closely watched due to the current design value of 0.069 ppm ozone. While 0.069 ppm is well below the attainment value of 0.075 ppm, it is the highest design value of the three monitoring stations in San Juan County. The Western Regional Climate Center web page lists the prevailing winds at Farmington NM to be easterly in the a.m. hours and westerly in the p.m. hours. A review of a wind rose for Farmington prepared by the National Oceanic and Atmospheric Administration (NOAA) verifies the morning easterly and afternoon westerly prevailing wind direction.



The emission of ozone precursors NO_x and VOCs resulting from the development of the potential lease sale 57 miles south of the Navajo Dam monitoring station will not have a significant impact on ozone levels in the Navajo Dam area.

4.1.2 Potential Mitigation

The BLM encourages industry to incorporate and implement “Best Management Practices” (BMPs), which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include: adherence to BLM’s Notice to Lessees’ (NTL) 4(a) concerning the venting and flaring of gas on Federal leases; for natural gas emissions that cannot be economically recovered, flare hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion; water dirt roads during periods of high use in order to reduce fugitive dust emissions; collocate wells and production facilities to reduce new surface disturbance; implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores; require that

vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and perform interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.

In addition, the majority of the large natural gas producers in the area are members of the Gas STAR program that is administered by EPA. These members of the Gas STAR program operate 78% of the federal wells in the San Juan Basin. Natural Gas STAR is a flexible, voluntary partnership that encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

An application for permit to drill (APD) is required for each proposed well to develop a lease. Onshore Oil and Gas Order No. 1 issued under 43 CFR 3160 authorizes BLM to attach Conditions of Approval (COA) to APDs during the permitting process. As a result of recommendations from the Four Corners Air Quality Task Force, the New Mexico Environment Department, Environmental Protection Division requested FFO attach a COA to APDs requiring new and replacement internal combustion gas field engines of between 40 and 300 horsepower to emit no more than two grams of nitrogen oxides per horsepower-hour. FFO has included a COA limiting nitrogen oxides since August of 2005.

The FFO recently purchased an infrared camera designed to detect natural gas leaks on and around well pad and pipeline facilities. FFO inspection personnel have been trained to operate the camera and FFO is currently developing a strategy to implement the use of the camera in cooperation with oil and gas operators to detect and eliminate natural gas leaks in well pad and pipeline infrastructure.

In 2009, the legislature of New Mexico passed House Bill 195 which enacted a new section of the Air Quality Control Act to provide for regulation of sources of emissions that cause the formation of ozone. If the environmental improvement board determines that emissions from sources within its jurisdiction cause or contribute to ozone concentrations in excess of ninety-five percent of a national ambient air quality standard for ozone, it shall adopt a plan, including regulations, to control emissions of oxides of nitrogen and volatile organic compounds to provide for attainment and maintenance of the standard. At the present time, ozone concentrations in the San Juan Basin are not within 95% of the standard. In the future, if the ozone concentrations are within 95% of the standard, FFO will cooperate with the State of New Mexico to develop appropriate COAs to attach to APDs that may result from the proposed lease sale.

4.2 Climate Change

4.2.1 Direct and Indirect Effects

Leasing the subject tracts would have no direct impacts to climate change. Any potential effects to air quality from sale of lease parcels would occur at such time that the leases were developed. The potential full development of the proposed lease sale is estimated at 110 wells (4.23 Cumulative Impacts). The reasonable and foreseeable development scenario developed for the Farmington RMP forecasted 497 wells would be drilled annually on existing and new leases for Federal minerals. Since 2000, an average of 459 wells has been drilled annually. However, it is

unknown whether the petroleum resources specific to these leases in the Proposed Action are gas or oil or a combination thereof, as well as the actual potential for those resources.

Oil and Gas production in New Mexico is concentrated in the northwest corner, the San Juan Basin, and the southeast corner, the Permian Basin. Production in the San Juan Basin is mostly natural gas while production in the Permian Basin is mostly oil. Production statistics developed from EPA and New Mexico Oil Conservation Division for 2008 are shown in Table 3 for the US, New Mexico and for wells on federal leases in each basin.

Table 2: 2008 Oil and Gas Production

| | Oil (bbl) | % U.S. Total | Gas (MMcf) | % U.S. Total |
|------------------------------|------------------|---------------------|-------------------|---------------------|
| United States | Location | 100 | 25,754,348 | 100 |
| New Mexico | 60,178,252 | 3.32 | 1,473,136 | 5.72 |
| Federal leases in New Mexico | 25,700,000 | 1.42 | 920,000 | 3.57 |
| San Juan Basin | 1,600,000 | 0.09 | 709,000 | 2.75 |
| Permian Basin | 24,100,000 | 1.33 | 211,000 | 0.82 |

In order to estimate the contribution of Federal oil and gas leases to greenhouse gases in New Mexico it is assumed that the percentage of total U.S. production is comparable to the percentage of total emissions. Therefore emissions are estimated based on production starting with total emissions for the United States from EPA 2010, and applying production percentages to estimate emissions for the San Juan Basin. It is understood that this is a rather simplistic technique and assumes similar emissions in basins which may have very different characteristics and operational procedures which could be reflected in total emissions. However, the emissions estimates derived in this way, while not precise will give some insight into the order of magnitude of emissions from federal oil and gas leases administered by the Bureau of Land Management (BLM) and allow for comparison with other sources in a broad sense.

Table 3: 2008 Oil and Gas Field Production Emissions

| Location | Oil | | Gas | | Total O&G Production | %U.S. Total GHG Emissions |
|---------------------------------|------------|------------|------------|------------|---------------------------------|----------------------------------|
| | CO2 | CH4 | CO2 | CH4 | | |
| (Metric Tons CO ₂ e) | | | | | | |
| United States | 500,000 | 28,400,000 | 8,500,000 | 14,100,000 | 51,500,000 | 0.74 |
| New Mexico | 16,607 | 943,287 | 486,196 | 806,513 | 2,252,603 | 0.03 |
| Federal leases in New Mexico | 7,092 | 402,844 | 303,638 | 503,682 | 1,217,257 | 0.02 |
| San Juan Basin | 442 | 25,080 | 233,999 | 388,164 | 647,684 | 0.01 |
| Permian Basin | 6,651 | 377,765 | 69,639 | 115,518 | 569,573 | 0.01 |

Table 3 shows the estimated greenhouse gas emissions for oil and gas field production for the U.S., New Mexico, and Federal leases by basin. Because oil and gas leaves the custody and jurisdiction of the BLM after the production phase and before processing or refining, only emissions from the production phases are considered here. It should also be remembered that following EPA protocols, these numbers do not include fossil fuel combustion which would include such things as truck traffic, pumping jack engines, compressor engines and drill rig engines. Nor does it include emissions from power plants that generate the electricity used at

well sites and facilities. Note that units of Metric tons CO₂e have been used in Table 3 to avoid very small numbers. For comparison one million metric tons is equal to one teragram.

Table 3 provides an estimate of direct emissions that occur during exploration and production of oil and gas. This phase of emissions represents a small fraction of overall emissions of CO₂e from the life cycle of oil and gas. For example, acquisition (drilling and development) for petroleum is responsible for only 8% of the total CO₂e emissions, whereas transportation of the petroleum to refineries represents about 10% of the emissions, and final consumption as a transportation fuel represents fully 80% of emissions (U.S.DOE, NETL, 2008)

To estimate the potential emissions from the proposed lease sale, an estimate of emission per well is useful. To establish the exact number of Federal wells in the San Juan Basin is problematic due to the ongoing development of new wells, the abandonment of unproductive wells, land sales and exchanges, and incomplete or inaccurate data bases. FFO determined that the most transparent and publicly accessible method of estimating the number of active federal wells in the New Mexico portion of the San Juan Basin was to utilize the BLM New Mexico Geographic Information System (GIS) and the New Mexico Conservation Division ONGARD Data Search Page. ONGARD was searched for all Active, New, and Temporarily Abandoned wells in NM (54,137), then refined the search to include only San Juan, Rio Arriba, Sandoval, and McKinley counties (23,595), and finished the search by limiting the results to Federal wells (16,435).

Table 4 estimated that the total emissions from Federal leases in the San Juan Basin in 2008 were 647,684 metric tons CO₂e. Therefore, the estimate of emission per well is 39.41 metric tons CO₂e annually. In the unlikely event that all 110 potential wells were drilled on the proposed leases, the maximum emissions resulting from the lease sale would be 4,335 metric tons CO₂e per year.

Table 4: Potential Greenhouse Gas Emissions Resulting from Proposed Lease Sale Referenced to Latest Available Estimates from 2008

| | | |
|---|---------------------------|----------|
| Total U.S. GHG Emissions From All Sources | 6,956,800,000 metric tons | 100.00 % |
| Total U.S. GHG Emissions From Oil & Gas Field Production | 51,500,000 metric tons | .74% |
| Total New Mexico Emissions From Oil & Gas Field Production | 2,252,603 metric tons | .03% |
| Total San Juan Basin Emissions From Oil & Gas Field Production (16,435 wells) | 647,684 metric tons | .01% |
| Total Potential GHG Emissions From Oil & Gas Field Production at Full Development For Proposed Lease Sale (110 Wells) | 4,335 metric tons | .00006% |

The assessment of GHG emissions, their relationship to global climatic patterns, and the resulting impacts is an ongoing scientific process. It is currently not feasible to know with certainty the net impacts from the proposed action on climate—that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on global climate are speculative given the current state of the science. The BLM does not have the ability to associate a BLM action’s contribution to climate change with impacts in any particular area. The technology to be able to do so is not yet available. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level and determining the significance

of any discrete amount of GHG emissions is beyond the limits of existing science.

Environmental impacts of GHG emissions from oil and gas consumption are not effects of the proposed action as defined by the Council on Environmental Quality, and thus are not required to be analyzed under NEPA. Greenhouse gas emissions from consumption of oil and gas are not direct effects under NEPA because they do not occur at the same time and place as the action. They are also not indirect effects because oil and gas leasing and production would not be a proximate cause of greenhouse gas emissions resulting from consumption.

4.2.2 Potential Mitigation

The EPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total US sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total CO₂ and CH₄ emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the EPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" sub-activities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

The BLM encourages industry to incorporate and implement "Best Management Practices" (BMPs), which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include: adherence to BLM's Notice to Lessees' (NTL) 4(a) concerning the venting and flaring of gas on Federal leases; for natural gas emissions that cannot be economically recovered, flare hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion; water dirt roads during periods of high use in order to reduce fugitive dust emissions; collocate wells and production facilities to reduce new surface disturbance; implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and perform interim reclamation to re-vegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads.

The EPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). One of the factors in this improvement is the adoption by industry of the BMPs proposed by the EPA's Natural Gas Energy Star program. The Farmington Field Office will work with industry to facilitate the use of the relevant BMPs for operations proposed on Federal mineral leases where such mitigation is consistent with agency policy.

4.3 Cultural Resources

While the act of leasing a parcel would produce no impacts, subsequent development of the lease could have impacts on archaeological resources. Required archaeological surveys would be

conducted upon all subsequent actions that are expected to occur from the lease sale to avoid disturbing cultural sites.

4.3.1 Direct and Indirect Impacts

Potential threats to cultural resources from leasing are variable and dependent upon the nature of the cultural resource and the nature of the proposed development. Effects normally include alterations to the physical integrity of a cultural resource. The greatest potential impact to cultural resources stems from the construction of associated lease related facilities such as pipelines, power lines, roads, and well locations. If a cultural resource is significant for other than its scientific information, effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site and diminish the integrity of those criteria that make the site significant. A potential effect from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural resources in the area.

4.3.2 Mitigation

No site-specific mitigating measures are identified at this time for archaeological resources. Provided that Class III cultural resource inventories are conducted as lease development takes place and avoidance measures associated with the preservation of cultural resources are proposed and stipulated during development, there does not appear to be any adverse impacts to cultural resources from leasing. In the event that sites cannot be avoided, mitigating measures will be developed in consultation with Native American tribes that ascribe affiliation or historical relationships to those sites.

4.4 Native American Religious Concerns

4.4.1 Direct and Indirect Effects

The proposed action is not known to physically threaten any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies and rituals pursuant to AIRFA or EO 13007. There are currently no known remains that fall within the purview of NAGPRA or ARPA that are threatened by leasing.

Use of lease notice NM-11-LN will help ensure that new information is incorporated into lease development. Additional consultation may be initiated at the APD stage of development if BLM professional staff determines it is necessary.

4.4.2 Mitigation

All parcels recommended to proceed to sale will have the Special Cultural Resource Lease Notice NMLN-11 attached to the lease. Parcel 201101-035 will also have NSO stipulation on about 100 acres to protect a traditionally significant area.

In the event that lease development practices are found in the future to have an adverse effect on Native American TCPs, the BLM, in consultation with the affected tribe, will take action to

mitigate or negate those effects. Measures include, but are not limited to physical barriers to protect resources, relocation of practices responsible for the adverse effects, or other treatments as appropriate.

To be in conformance with the Native American Graves Protection and Repatriation Act of 1991 (Public Law 101-610), the terms and conditions of the lease should contain the following condition: “In the event that the lease holder discovers or becomes aware of the presence of Native American human remains within the lease, they shall immediately notify the Bureau of Land Management in writing.”

4.5 Paleontological Resources

4.5.1 Direct and Indirect Impacts

No effect.

4.5.2 Mitigation

Mitigation would be deferred to the site specific APD stage of development. BMP would be incorporated in the COAs.

4.6 Socioeconomics and Environmental Justice

4.6.1 Direct and Indirect Impacts

No minority or low income populations would be directly affected in the vicinity of the proposed actions from subsequent proposed oil or gas projects. Indirect impacts could include impacts due to overall employment opportunities related to the oil and gas and service support industry in the region, as well as the economic benefits to State and County governments related to royalty payments and severance taxes. Other impacts could include an increase in activity and noise disturbance in areas used for grazing, wood gathering or hunting. However, these impacts would apply to all public land users in the project area.

4.6.2 Mitigation - None required.

4.7 Floodplains

4.7.1 Direct and Indirect Impacts

The act of leasing Federal minerals produces no impacts to floodplains. However, the subsequent development may produce impacts in the form of surface disturbance. Surface disturbance from the development of well pads, access roads, pipelines, and powerlines can result in impairment of the floodplain values from removal of vegetation, removal of wildlife habitat, impairment of water quality, decreased flood water retention and decreased groundwater recharge.

4.7.2 Mitigation – None required.

4.8 Invasive, Non-native Species

4.8.1 Direct and Indirect Impacts

While the act of leasing Federal minerals produces no impacts, subsequent development produces impacts in the form of surface disturbance. The construction of an access road and well pad may unintentionally contribute to the establishment and spread of noxious weeds. Noxious weed seed could be carried to and from the project areas by construction equipment, the drilling rig and transport vehicles.

The main mechanism for seed dispersion on the road and well pad is by equipment and vehicles that were previously used and or driven across or through noxious weed infested areas. The potential for the dissemination of invasive and noxious weed seed may be elevated by the use of construction equipment typically contracted out to companies that may be from other geographic areas in the region. Washing and decontaminating the equipment prior to transporting onto and exiting the construction areas would minimize this impact.

Impacts by noxious weeds will be minimized due to requirements for the company to eradicate the weeds upon discovery. Multiple applications may be required to effectively control the identified populations.

4.8.2 Mitigation

In the event noxious weeds are discovered during construction of any access roads and well pads, mitigation would be deferred to the site specific development at the APD stage. Best Management Practices (BMPs) would be incorporated into the Conditions of Approval (COAs) of an approved APD.

4.9 Threatened or Endangered Species

4.9.1 Direct and Indirect Impacts

Federally Listed Threatened: The lease area is within mountain plover breeding habitat. Mountain plover potential habitat should stay undisturbed to provide nesting opportunities. Oil and gas activity (and other ground disturbing activities) fragments mountain plover habitat and such activity along with vehicular traffic degrades habitat and impacts nesting mountain plovers.

Allowing Oil & Gas project activities within known mountain plover habitat would be subject to Section 7 Consultation under ESA. Under Section 7 of the Endangered Species Act of 1973 (as amended), the BLM is required to consult with the U.S. Fish and Wildlife Service on any proposed action which may affect federal listed threatened, endangered species or species proposed for listing. At the time of the September 2002 Biological Assessment (Cons. #2-22-01-01-I-389), little oil and gas was expected in plover habitat. Due to the potential increase in oil and gas activity, further mitigation measures will be required for activity within plover habitat to insure that potential nesting habitat is not disturbed. The proposed action B would be in compliance with listed species management guidelines outlined in the 2002 Biological

Assessment, as it pertains to mountain plovers with the addition of a no surface occupancy requirement.

4.9.2 Mitigation

No surface occupancy within known mountain plover habitat. Further mountain plover surveys will be required in potential nesting habitat. Surveys will be conducted by a BLM/FFO approved biologist. No oil and gas or related activity will be allowed to disturb nesting mountain plovers.

4.10 Wastes, Hazardous or Solid

The lease parcels fall under environmental regulations that impact exploration and production waste management and disposal practices and impose responsibility and liability for protection of human health and the environment from harmful waste management practices or discharges.

4.10.1 Direct and Indirect Impacts

The direct impact would follow a lease sale project when solid waste is discarded and contaminates the land surface either by solid, semi-solid, liquid, or contained gaseous material. The indirect impact is the Environmental Protection Agency (EPA) definition of solid wastes that have been designated as exempt and nonexempt and if it is hazardous, civil and criminal penalties may be imposed if the waste is not managed in a safe manner, and according to regulations.

4.10.2 Mitigation

The lease sale parcels are regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C regulations and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The RCRA Subtitle C has extremely stringent regulations. The program exacts stringent bookkeeping and reporting requirements on generators, transporters, and operators of treatment, storage and disposal facilities handling hazardous waste. The CERCLA, which provides for the exclusion of petroleum, including crude oil or any fraction thereof from the definition of hazardous substance, pollutant, or contaminant.

The law authorizes two kinds of response actions: Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response and Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening.

The mitigation would include the stringiest regulation of waste containment within the project areas as stated above.

4.11 Water Quality: Surface and Groundwater

4.11.1 Direct and Indirect Impacts

While the act of leasing a parcel would produce no impacts, subsequent development of the lease would lead to surface disturbance from the construction of well pads, access roads, pipelines, and power lines can result in degradation of surface water quality and groundwater quality from non-point source pollution, increased soil losses, and increased gully erosion.

Potential direct impacts that would occur due to construction of well pads, access roads, pipelines, and power lines include increased surface water runoff and off-site sedimentation brought about by soil disturbance: increased salt loading and water quality impairment of surface waters; channel morphology changes due to road and pipeline crossings; and possible contamination of surface waters by produced water. The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration and time within which construction activity would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts would likely be greatest shortly after the start of construction activities and would likely decrease in time due to natural stabilization, and reclamation efforts. Construction activities would occur over a relatively short period; therefore, the majority of the disturbance would be intense but short lived. Direct impacts to surface water quality would be minor, short-term impacts which may occur during storm flow events. Indirect impacts to water-quality related resources, such as fisheries, would not occur.

Petroleum products and other chemicals, accidentally spilled, could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits could degrade surface and ground water quality. Authorization of the proposed projects would require full compliance with BLM directives and stipulations that relate to surface and groundwater protection.

4.11.2 Mitigation

The use of a plastic-lined reserve pits would reduce or eliminate seepage of drilling fluid into the soil and eventually reaching groundwater. Spills or produced fluids (e.g., saltwater, oil, and/or condensate in the event of a breach, overflow, or spill from storage tanks) could result in contamination of the soils onsite, or offsite, and may potentially impact surface and groundwater resources in the long term. The casing and cementing requirements imposed on proposed wells would reduce or eliminate the potential for groundwater contamination from drilling muds and other surface sources.

4.12 General Topography /Surface Geology

The general topography and surface geology of the lease parcels are generally impacted by the construction projects that are permitted as a result of subsequent APD actions.

4.12.1 Direct and Indirect Impacts

The direct impact from a lease sale is that the lands involved could fall within an environmental sensitive area and subsequent lease actions could impact the issues of environmental concern. Split estate is an issue of concern on a lease sale when and if a private surface landowner is not

in agreement with the proposed project which could create an environmentally sensitive area until the issues are resolved with the surface owner. Indirectly the proposed projects could fall within protected areas that would require changing the spacing requirements of a well by moving the location or road.

4.12.2 Mitigation

The lease sale could have mitigation measures imposed on the proposed subsequent action when and if the concern involves the issuance of such mitigation measures that are deemed necessary to resolve the environmental predicament.

4.13 Mineral Resources

4.13.1 Direct and Indirect Effects

There are no impacts.

4.13.2 Potential Mitigation

Mitigation would be deferred to the site specific APD stage of development.

4.14 Soil

4.14.1 Direct and Indirect Impacts

While the act of leasing a tract would produce no impacts, subsequent development of the lease would physically disturb the topsoil and would expose the substratum soil on subsequent project areas. Direct impacts resulting from the oil and gas construction of well pads, access roads, and reserve pits include removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of top soil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic. These impacts could result in increased indirect impacts such as runoff, erosion and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation of well sites, access roads, gas pipelines and facilities.

Contamination of soil from drilling and production wastes mixed into soil or spilled on the soil surfaces could cause a long-term reduction in site productivity. Some of these direct impacts can be reduced or avoided through proper design, construction and maintenance and implementation of best management practices.

Additional soil impacts associated with lease development would occur when heavy precipitation causes water erosion damage. When water saturated segment(s) on the access road become impassable, vehicles may still be driven over the road. Consequently, deep tire ruts would develop. Where impassable segments are created from deep rutting, unauthorized driving may occur outside the designated route of access roads.

4.14.2 Mitigation

The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed bed is spread over well pads and vegetation re-establishes.

Reserve pits would be re-contoured and reseeded as described in attached Conditions of Approval. Upon abandonment of wells and/or when access roads are no longer in service the Authorized Officer would issue instructions and/or orders for surface reclamation/restoration of the disturbed areas as described in attached Conditions of Approval.

Road constructions requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage. For the purpose of protecting slopes or fragile soils surface disturbance will not be allowed on slopes over 30 percent.

4.15 Watershed - Hydrology

4.15.1 Direct and Indirect Impacts

While the act of leasing a parcel would produce no impacts, subsequent development of the lease would result in long term and short term alterations to the hydrologic regime. Peak flow and low flow of perennial streams, ephemeral, and intermittent rivers and streams would be directly affected by an increase in impervious surfaces resulting from the construction of the well pad and road. The potential hydrologic effects to peak flow is reduced infiltration where surface flows can move more quickly to perennial or ephemeral rivers and streams, causing peak flow to occur earlier and to be larger.

Increased magnitude and volume of peak flow can cause bank erosion, channel widening, downward incision, and disconnection from the floodplain. The potential hydrologic effects to low flow is reduced surface storage and groundwater recharge, resulting in reduced base flow to perennial, ephemeral, and intermittent rivers and streams. The direct impact would be that hydrologic processes may be altered where the perennial, ephemeral, and intermittent river and stream system responds by changing physical parameters, such as channel configuration. These changes may in turn impact chemical parameters and ultimately the aquatic ecosystem.

Long term direct and indirect impacts to the watershed and hydrology would continue for the life of wells and would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and power lines has taken place. Short term direct and indirect impacts to the watershed and hydrology from access roads that are not surfaced with material would occur and would likely decrease in time due to reclamation efforts.

4.15.2 Mitigation

The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. Reserve pits would be re-contoured and reseeded as described in attached Conditions of Approval. Upon abandonment of the wells and/or when access roads are no longer in service the Authorized Officer would issue instructions and/or

orders for surface reclamation/restoration of the disturbed areas as described in the attached Conditions of Approval.

4.16 Vegetation

4.16.1 Direct and Indirect Impacts

At the lease sale stage there are no impacts. Direct and indirect impacts would occur when the lease is developed in the future. The potential impacts would be analyzed on a site specific basis prior to oil and gas development and during the APD stage of development.

4.16.2 Mitigation

Mitigation would be deferred to the site specific APD stage of development. BMP's would be incorporated into COAs.

4.17 Livestock Grazing

4.17.1 Direct and Indirect Impacts - At the lease sale stage there are no impacts to livestock grazing.

4.17.2 Mitigation – None required.

4.18 Wildlife

4.18.1 Direct and Indirect Impacts

Subsequent lease development would impact wildlife due to surface disturbance and habitat fragmentation. The magnitude of impacts would depend on the exact location and time of development in relation to the affected wildlife species and habitat. These impacts would be analyzed on a site specific basis prior to development.

4.18.2 Mitigation

Stipulations and conditions of approval would be applied at the APD level to minimize wildlife impacts.

4.19 Special Status Species

No direct or indirect effects would be expected based on existing information. Further site specific inventories would be conducted, if necessary, at the APD stage to determine if additional analysis would be required.

4.19.1 Direct and Indirect Impacts

There may be nesting burrowing owls within the proposed lease area. There are several known prairie dog towns within one mile of the lease area, as well as rodent burrows that could

accommodate nesting burrowing owls within the proposed lease area. The BLM/FFO has specific management measures to ensure that nesting burrowing owls are protected during the breeding season.

4.19.2 Mitigation - None required.

A preconstruction survey for burrowing owls is required for proposed projects scheduled to be constructed within known habitat during the nesting season of April 1 to July 31. Occupied burrowing owl nests will not be disturbed within a 50 meters radius from April 1 to August 15. After August 15, any project that will cause destruction of the nest burrow can only begin after confirmation that the nest burrow is no longer occupied.

4.20 Visual Resources

Visual resource management is broken into four VRM classes. In the tracts proposed for leasing, VRM classes III and IV are represented.

The VRM Class III objective is to partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. Facilities, such as produced water, condensate or oil storage tanks that rise above eight feet, would provide a geometrically strong vertical and horizontal visual contrast in form and line to the characteristic landscape and vegetation, which have flat, horizontal to slightly rolling form and line. The construction of an access road, well pad and other ancillary facilities, other than facilities greater in height than eight feet, would slightly modify the existing area visual resources. Facilities, such as condensate and produced water or oil storage tanks that rise above eight feet, would provide a geometrically strong vertical and horizontal visual contrast in form and line to the characteristic landscape and vegetation, which have flat, horizontal to slightly rolling form and line. Under visual resource Class III, the method for repeating the basic elements would be to remove strong vertical and horizontal contrast through use of low-profile facilities as reflected in the Farmington RMP (1997, p. AP1-4).

Depending on the production nature of the well site, multiple low-profile condensate and/or oil or produced water tanks would be necessary to accommodate the project. Through color manipulation, by painting well facilities to blend with the rolling to flat vegetative and/or landform setting with a flat gray-green color, the view is expected to favorably blend with the form, line, color and texture of the existing landscape. The flat color Olive Drab from the supplemental environmental colors also closely approximates the gray green color of the setting. All facilities, including the meter building, would be painted this color. Cumulative adverse visual impacts can be avoided by gradually moving into a more appropriate vegetative/landform setting color scheme. Facilities with low-profile horizontal line and form would facilitate favorable blending as older facilities go out of production and are removed.

The VRM Class IV objective is to provide for management activities which require major modification of the existing landscape character. Every attempt, however, should be made to reduce or eliminate activity impacts through careful location, minimal disturbance, and repeating the basic landscape elements. Facilities, such as condensate and produced water or oil storage

tanks that rise above eight feet, would provide a geometrically strong vertical and horizontal visual contrast in form and line to the characteristic landscape and vegetation, which have flat, horizontal to slightly rolling form and line.

The construction of an access road, well pad and other ancillary facilities would slightly modify the existing area visual resources. Through color manipulation, by painting well facilities to blend with the rolling to flat vegetative and/or landform setting with a gray-green color. The view is expected to favorably blend with the form, line, color and texture of the existing landscape. The flat Olive Drab from the supplemental environmental colors also closely approximates the gray green color of the setting. All facilities, including the meter building, would be painted this color. Cumulative adverse visual impacts can be avoided by gradually moving into a more appropriate vegetative/landform setting color scheme.

4.20.1 Direct and Indirect Impacts

Through color manipulation, by painting well facilities to blend with the rolling to flat vegetative and/or landform setting with a gray-green the view is expected to favorably blend with the form, line, color and texture of the existing landscape

4.20.2 Mitigation

The list of flat colors from the Standard Environmental Colors Chart is to be used on all facilities to closely approximate the vegetation within the setting. All facilities, including the meter building, would be painted this color. If the proposed area is in a scenic corridor a low profile tank less than eight feet in high may be recommended for the proposed action.

4.21 Recreation

While the act of leasing Federal minerals produces no impacts, subsequent development of a lease would generate impacts to recreation activities. In public land that are small or land locked by private or state land, recreation opportunities that could occur in this area would be limited or non-existent due to land patterns. In isolated tracks of public land that generally do not have access through state land or county or state roads, oil and gas activities would have little or no affect on the recreational opportunities in this area. In larger blocks of public land recreation activities that could occur within this area are limited to access from BLM lands, county roads or through state land during hunting seasons.

4.21.1 Direct and Indirect Impacts - None

4.21.2 Mitigation - None

4.22 Public Health and Safety

Public Health and Safety would not be impacted by the leasing of the parcels.

4.22.1 Direct and Indirect Impacts

The subsequent construction, drilling, and production operations could have direct impacts on public health and safety during the conduct of oil and gas activities on the lease. Indirectly if the operations on subsequent lease actions are carried out in a safe workman like manner, no impacts are anticipated.

4.22.2 Mitigation

Upon subsequent proposed projects mitigation measures may be attached to the condition of approval if the operations are not conducted in a professional constructive manner.

4.23 Cumulative Impacts

The Farmington Field Office manages Federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley counties. There are approximately 23,595 wells in these counties. About 16,435 of the wells in these counties are Federal wells. Data from 2000 - 2010 indicate on average approximately 459 wells are drilled in these counties annually on Federal mineral lands. Estimates of total surface disturbance for this lease sale action are based on full field development. Full field development assumes development of every spacing unit and has a total complement of roads, pads, power lines, gravel sources and pipelines. Exploration and development of hydrocarbon resources outside of well-developed areas increases the distance required for roads, pipelines, and power lines. The parcels offered are not within or near well-developed fields.

All existing wells have been plugged and abandon. Production is marginal in this area of the San Juan Basin. The surface disturbance assumptions shown in the following estimate impacts associated with oil and gas exploration and development drilling activities for the following parcels:

Parcel #33, 1,420.87 acre tract

Considering spacing requirements and potential formation development, a maximum of thirty-six wells would be required to develop this tract from eighteen well pads. There would be nine well pads with one well each and nine well pads with three wells per well pad. The existing access road, pipeline, and power line would be utilized by the additional wells.

9 well pads, 9 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, & power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding & restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 18.0 acres of Total Long Term Disturbance.

9 well pads, 27 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.

- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 27.0 acres of Total Long Term Disturbance.

Parcel #34, 240 acre tract

Considering spacing requirements and potential formation development, a maximum of eight wells would be required to develop this tract from four well pads if all geologic formations are tested. This would be accomplished by drilling one well each from two well pads and three wells each from the other two well pads.

2 well pads, 2 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 4.0 acres of Total Long Term Disturbance.

2 well pads, 6 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 6.0 acres of Total Long Term Disturbance.

Parcel #35, 1,601.64 acre tract

Considering spacing requirements and potential formation development, a maximum of forty-two wells would be required to develop this tract from twenty well pads if all geologic formations are tested. This would be accomplished by drilling one well each from nine well pads and three wells each from the other eleven well pads.

9 well pads, 9 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 18.0 acres of Total Long Term Disturbance.

11 well pads, 33 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.

- 0.5 acres per twinned well(s).
- 33.0 acres of Total Long Term Disturbance.

Parcel #35, 960 acre tract

Considering spacing requirements and potential formation development, a maximum of twenty-four wells would be required to develop this tract from twelve well pads if all geologic formations are tested. This would be accomplished by drilling one well each from six well pads and three wells each from the other six well pads.

6 well pads, 6 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 12.0 acres of Total Long Term Disturbance.

6 well pads, 18 wells

- 1.5 acres of access roads: 1,300 x 50 foot including road, pipeline ROW, power line.
- 0.5 acres of Interim road reclamation.
- 3.5 acres of Initial well pad.
- 2.5 acres of Interim well reclamation: reseeding and restabilizing after well pad construction.
- 0.5 acres per twinned well(s).
- 18.0 acres of Total Long Term Disturbance.

Full Field Development

| Parcel | Acres | Well Pad(s) | Amount of Wells per Pad | # of Wells | Access Road | | | Total Disturbance | Well Pad | | | Total Disturbance | Twin Wells | | | Total LT Acres Disturbance | |
|--------|----------|-------------|-------------------------|--------------------|--------------------------------|---------------------|-------------------------------|-------------------|----------|---------------------|----------------------|--------------------------|------------|----------------|-------------------|----------------------------|------------|
| | | | | | Road, Pipeline ROW, Power line | Interim Reclamation | Total Access Road Disturbance | | Well Pad | Interim Reclamation | Well Pad Disturbance | | Wells | Acres per Well | Total Disturbance | | |
| a | b | c | d | e=c*d | f | g | h=f-g | i=c*h | j | k | l=j-k | m=c*l | n | o | p=n*o | q=i+m+p | |
| 33 | 1,420.87 | 9 | 1 | 9 | 1.5 | 0.5 | 1.0 | 9.0 | 3.5 | 2.5 | 1.0 | 9.0 | 0 | 0.5 | 0.0 | 18.0 | |
| | | 9 | 3 | 27 | 1.5 | 0.5 | 1.0 | 9.0 | 3.5 | 2.5 | 1.0 | 9.0 | 18 | 0.5 | 9.0 | 27.0 | |
| 34 | 240.00 | 2 | 1 | 2 | 1.5 | 0.5 | 1.0 | 2.0 | 3.5 | 2.5 | 1.0 | 2.0 | 0 | 0.5 | 0.0 | 4.0 | |
| | | 2 | 3 | 6 | 1.5 | 0.5 | 1.0 | 2.0 | 3.5 | 2.5 | 1.0 | 2.0 | 4 | 0.5 | 2.0 | 6.0 | |
| 35 | 1,601.64 | 9 | 1 | 9 | 1.5 | 0.5 | 1.0 | 9.0 | 3.5 | 2.5 | 1.0 | 9.0 | 0 | 0.5 | 0.0 | 18.0 | |
| | | 11 | 3 | 33 | 1.5 | 0.5 | 1.0 | 11.0 | 3.5 | 2.5 | 1.0 | 11.0 | 22 | 0.5 | 11.0 | 33.0 | |
| 36 | 960.00 | 6 | 1 | 6 | 1.5 | 0.5 | 1.0 | 6.0 | 3.5 | 2.5 | 1.0 | 6.0 | 0 | 0.5 | 0.0 | 12.0 | |
| | | 6 | 3 | 18 | 1.5 | 0.5 | 1.0 | 6.0 | 3.5 | 2.5 | 1.0 | 6.0 | 12 | 0.5 | 6.0 | 18.0 | |
| | | | | Total Wells | | | | | | | | | | | | | 110 |
| | | | | | | | | | | | | Total Disturbance | | | 136.0 | | |

A total of 110 wells for all four parcels may be drilled under a full development of all geologic formations that may have hydrocarbon potential. If this unlikely situation would occur, the estimated long term surface disturbance would be 136.0 acres for all parcels.

The 2007 Summary for Policy Makers the Intergovernmental Panel on Climate Change stated that “Global atmospheric concentrations of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years.”

The greenhouse gases of primary interest in reference to the oil and gas industry are carbon dioxide and methane. CO₂ is produced during the burning of fossil fuels to run internal combustion engines which may be used in drilling, transportation, pumping and compression. However, the EPA reports only non combustion CO₂ in its sector reports for Natural Gas and Petroleum Systems with combustion emissions included under Fossil Fuel Combustion with no designation by fossil fuel production sectors. CO₂ may be a significant component of natural gas, especially coalbed methane, and is vented during field operations or processing. CO₂ is also used in enhanced oil production processes and may be released or escape to the atmosphere during those processes. New Mexico has some areas of CO₂ mining which may also be responsible for fugitive emissions.

Methane is the primary component of natural gas and is released to the atmosphere during both oil and gas production either intentionally during production when it cannot be captured or accidentally through leaks and fugitive emissions. While methane is recognized to be a more potent influence in global warming than CO₂, all figures are given in CO₂ equivalents thus accounting for the differences in global warming potential.

U.S. Emissions

The US Environmental Protection Agency (EPA) reported in its latest Inventory of Greenhouse Gas Emissions and Sinks that the 2008 total emissions were 6,956.8 Teragrams of CO₂ equivalent (TgCO₂e). Total emissions of CO₂ in 2008 were 5,921.2 TgCO₂e and total emissions of methane were 567.6 TgCO₂e (USEPA, 2010). EPA further categorizes emissions by sector including Natural Gas Systems and Petroleum Systems. Emissions from Natural Gas Systems for 2008 were estimated at 30.0 TgCO₂e for non-combustion CO₂ and 96.4 TgCO₂e for methane making it the third largest source of methane in the U.S. Petroleum System emissions for 2008 were estimated at 0.5 TgCO₂e for CO₂ and 29.1TgCO₂e for methane. Thus together Natural Gas and Petroleum Systems accounted for 30.5 TgCO₂e of CO₂ and 125.5 TgCO₂e of methane or 0.5% of CO₂ emissions and 22% of methane emissions.

Natural Gas Systems emissions are broken into four subsectors; Field Production, Processing, Transmission and Storage, and Distribution. Petroleum Systems are broken into Production Field Operations, Crude Oil Transportation and Refining. National emissions by subsector for 2008 for CO₂ and Methane are presented in Table 1.

Table 1: 2008 U.S. Subsector Emissions for Natural Gas and Petroleum Systems (TgCO₂e)

| Sector | Subsector | CO ₂ | CH ₄ |
|----------------------------|-------------------------------|-----------------|-----------------|
| Natural Gas Systems | | 30.0 | 96.4 |
| | Field Production | 8.5 | 14.1 |
| | Processing | 21.4 | 13.0 |
| | Transmission and Storage | 0.1 | 39.4 |
| | Distribution | * | 29.9 |
| Petroleum Systems | | 0.5 | 29.1 |
| | Production Field Operations | 0.3 | 28.4 |
| | Pneumatic device venting | * | 8.7 |
| | Tank Venting | 0.2 | 2.8 |
| | Combustion and Process upsets | 0.0 | 1.6 |
| | Misc. venting & fugitives | * | 14.8 |
| | Wellhead fugitives | * | 0.5 |
| | Crude Oil Transportation | 0.0 | 0.1 |
| | Crude Refining | 0.2 | 0.5 |

Source: USEPA, 2010 *Does not exceed 0.05 TgCO₂e

The EPA reports that 2008 emissions from Natural Gas Systems have decreased by 26% for methane and 20% for CO₂ over 1990 levels. This decrease is attributed to improved management practices and technology and replacement of older equipment. Increasing emissions reduction through participation in the Natural Gas Star Program is thought to have contributed to recent decreases in methane emissions as well. For Petroleum Systems methane emissions have declined by 14% and CO₂ emissions by 19% due to industry efforts to reduce emissions and declines in domestic oil production (USEPA, 2010).

This section incorporates an analysis of the contributions of the proposed action to GHG emissions and a general discussion of potential impacts to climate. The EPA's Inventory of US Greenhouse Gas Emissions and Sinks found that in 2007, total U.S. GHG emissions were over 7 billion metric tons and that total U.S. GHG emissions have increased by 17% from 1990 to 2007. Emissions increased from 2006 to 2007 by 1.4 percent (99.0 Tg. CO₂e). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (EPA 2009).

On-going scientific research has identified the potential effects of anthropogenic GHG emissions such as carbon dioxide, methane, nitrous oxide and several trace gasses; changes in biological carbon sequestration; and other changes due to land management activities on global climate. Through complex interactions on a global scale, GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although natural GHG atmospheric concentration 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.

Analysis of cumulative impacts for reasonably foreseeable development (RFD) of oil and gas wells on public lands in the Farmington Field Office was presented in the 2003 RMP. Potential development of all available federal minerals in the field office, including those in the proposed

lease parcels, was included as part of the analysis.

This incremental contribution to global GHG gases cannot be translated into effects on climate change globally or in the area of this site-specific action. As oil and gas production technology continues to improve, and because of the potential development of future regulation or legislation, one assumption is that reductions in the rate or total quantity of GHG emissions associated with oil and gas production are likely. As stated in the direct/indirect effects section under climate change, the assessment of GHG emissions and the resulting impacts on climate is an ongoing scientific process. It is currently not feasible to know with certainty the net impacts from the proposed action on global or regional climate—that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on global climate are speculative given the current state of the science. Therefore, the BLM does not have the ability to associate an action's contribution in a localized area to impacts on global climate change.

Currently, global climate models are inadequate to forecast local or regional effects on resources (USFS, 2008). However, there are general projections regarding potential impacts to natural resources and plant and animal species that may be attributed to climate change from GHG emissions over time; however these effects are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat or competition from other species whose ranges may shift northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependant on historic water conditions (USFS, March 2008).

The New Mexico Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Inventory) estimates that approximately 17.3 million metric tons of GHGs from the natural gas industry and 2.3 million metric tons of GHGs from the oil industry are projected in 2010 as a result of oil and natural gas production, processing, transmission and distribution. As of 2008, there were 23,196 oil wells and 27, 778 gas wells in New Mexico (NM well statistics).¹

When compared to the total GHG emission estimates from the total number of oil and gas wells in the State, the average number of oil and gas wells drilled annually in the Field Office and associated GHG emission levels, represent an incremental contribution to the total regional and global GHG emission levels. The number of oil and gas wells that would eventually result from the proposed action would therefore likely represent an even smaller incremental contribution to GHGs emissions on a global scale.

¹ In 2000, approximately 17 million metric tons and 2.3 million metric tons were respectively attributed to natural gas and oil activities. As of 2002, the Inventory indicates that there approximately 21,771 oil wells and 23,261 gas wells in the State. Uncertainties remain with respect to: the quality of historical field data, processing, and pipeline use of natural gas, does not factor in reclaimed wells and total number of new wells drilled per year; CO2 emissions from enhanced oil recovery, which have not been estimated; and refinery fuel use-EIA indicates less than half the refinery fuel use as indicated by refinery permit data. In addition, it is not feasible to estimate the actual number of wells that would be drilled as a result of the lease.

5.0 Description of Mitigating Measures and Residual Impacts

The lease sale will be mitigated by attaching the Oil and Gas Leasing Stipulation(s) to the lease parcel(s). The Farmington Field Office, Surface Use and Occupancy Requirements, Conditions of Approval, and the Farmington Field Office's Special Leasing Stipulations, which are in place at the New Mexico State Office, will provide adequate mitigation for all lease parcels.

Direct, indirect, cumulative and residual impacts of leasing and lease development are generally described in the Farmington Approved Resource Management Plan and Record of Decision, September 1993. An environmental analysis will be prepared on a case-by-case basis upon receipt of future subsequent actions.

6.0 Summary of Public Comments Received

The table below summarizes the comments received in response to the two week public comment period of the nominated lease parcels.

A comment letter was received via e-mail from the Center for Biological Diversity (CBD) on October 26, 2010 that provided comments on proposed oil and gas leases posted in the 30-day posting period from October 11 through 26, 2010. Responses to the comments made in regards to the nominated lease parcels are provided below.

| No | Comments | BLM Response |
|----|---|--|
| 1 | Deferrals of Parcel | FFO did not defer any parcels. All four (4) nominated parcels were released for sale. See section 2.0 |
| 2 | BLM must adhere to statutory requirements (i.e., NEPA, ESA, FLPMA). | See section 1.1 and 1.2 |
| 3 | Black-Footed Ferret may exist in the nominated parcels. | Field inspection showed no black-footed ferret or prairie dog town in the parcel areas, therefore it was not addressed in the EA. See section 3.9 |
| No | Comments | BLM Response |
| 4 | Species of Concern-Mountain Plover, Burrowing owl. | Mountain Plover is addressed in the EA. See section 3.9 & 4.9 Possibility of the Burrowing Owl is addressed in the EA. See section 3.19 & 4.19. |
| 5 | GHG/Climate Changes | See section 3.1 and 4.1 |
| 6 | Water Quality | See section 3.11 and 4.11 |

7.0 Consultation/Coordination

This section includes individuals or organizations from the public and its' users, the interdisciplinary team, and permittees that were contacted during the development of this document.

Summary of Contacts Made During Preparation of Document and Interdisciplinary Team

| ID Team Member | Title | Organization |
|-----------------------|--|---------------------|
| Jim Copeland | Archaeologist | BLM |
| John Kendall | T & E Biologist | BLM |
| Sarah Scott | Natural Resource Specialist | BLM |
| Jim Lovato | Petroleum Engineer | BLM |
| Jeff Tafoya | Range Management Specialist | BLM |
| Janelle Alleman | Outdoor Planner | BLM |
| John Hansen | Wildlife Biologist | BLM |
| Joe Hewitt | Geologist | BLM |
| Barney Wegener | Natural Resource Specialist | BLM |
| Dale Wirth | Range & Multiple Resource-Branch Chief | BLM |
| Daniel Scott | Mining Engineer | BLM |
| Darlene Horsey | Land Use Planner | BLM |
| Sherrie Landon | Paleontologist | BLM |

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7.2 Authorities

Code of Federal Regulations (CFR) 3100

40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of July 1, 2001.

43 CFR, All Parts and Sections inclusive - Public Lands: Interior. Revised as of October 1, 2000.

U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.

Appendix 1: Table1. Existing level of development on lease parcels

| Lease Parcel Number NM201101 | Acres (per GIS) | ACEC, SDA, Etc. | Allotment | Chapter | VRM Class | # Active Wells | Miles of Road (approx.) | Watershed Sub Basin | Stipulations/Comments |
|---------------------------------|-----------------|-----------------|--------------------------|------------|-----------|----------------|-------------------------|---------------------|--|
| 033 | 1,420.87 | N/A | Star Lake Community-6023 | Ojo Encino | 4 | 0 | 1.80 | Chaco Arizona | 1. NM-11-LN 2. F-41-LN 3. F-43-NSO (sec7 and Sec 05) |
| 034 | 240.00 | N/A | Star Lake Community-6023 | Ojo Encino | 4 | 0 | 0.00 | Arroyo Chico | 1. NM-11-LN 2. F-41-LN 3. F-44-NSO (660ft west of the east line) |
| 035 | 1,601.64 | N/A | Star Lake Community-6023 | Ojo Encino | 3 | 0 | 0.00 | Arroyo Chico | 1. NM-11-LN 2. F-41-LN 3. F-39-NSO (sec29: S2SE, E2SESW) |
| 036 | 960.00 | N/A | Star Lake Community-6023 | Ojo Encino | 3 | 0 | 0.52 | Arroyo Chico | 1. NM-11-LN 2. F-41-LN 3. F-43-NSO (sec34:S2S2) |

Appendix 1

Exhibit 1: Draft Parcel List Received from New Mexico State Office for
January 19, 2011 Oil and Gas Lease Sale.

NEW MEXICO PUBLIC DOMAIN-NW

NM-201101-033 1420.870 Acres

T.0200N, R.0050W, 23 PM, NM

Sec. 005 LOTS 1,2;

005 S2NE,SE;

007 LOTS 1-4;

007 E2,E2W2;

008 N2;

009 NW;

McKinley County

Farmington FO

NMNM 96791, NMNM 99719

3RD REVIEW

Formerly Lease No.

Stipulations:

NM-11-LN Special Cultural Resource

F-41-LN Biological Survey

F-43-NSO No Surface Occupancy-Mountain Plover

Sec07: W2NE, W2E2NE, E2E2NW;

Sec05: S2S2NWNE, SWSWNENE, S2S2NENESE, S2SENWNESE,
E2SWNESE, SENESE, N2N2NESESE, N2NENWSESE

NM-201101-034 240.000 Acres

T.0200N, R.0050W, 23 PM, NM

Sec. 022 NW,N2SW;

McKinley County

Farmington FO

NMNM 100803

3RD REVIEW

Formerly Lease No.

Stipulations:

NM-11-LN Special Cultural Resource

F-41-LN Biological Survey

F-44-NSO No Surface Occupancy-Community & Residences

Sec22: NW from the east line out 660ft to the west

NM-201101-035 1601.640 Acres

T.0200N, R.0050W, 23 PM, NM

Sec. 028 W2NW,S2;

029 ALL;

030 LOTS 1,2;

030 E2,E2NW;

031 E2NE;

McKinley County

Farmington FO

NMNM 96795, NMNM 99721, NMNM 100803

3RD REVIEW

Formerly Lease No.

Stipulations:

NM-11-LN Special Cultural Resource

F-41-LN Biological Survey

F-39-NSO No Surface Occupancy-Special Cultural Values and/or Traditional Cultural
Properties. Sec29: S2SE4, E2SE4SW4

NM-201101-036 960.000 Acres

T.0200N, R.0050W, 23 PM, NM

Sec. 033 E2;

034 S2;

035 S2;

McKinley County

Farmington FO

NMNM 99722

3RD REVIEW

Formerly Lease No.

Stipulations:

NM-11-LN Special Cultural Resource

F-41-LN Biological Survey

F-43-NSO No Surface Occupancy – Mountain Plover
Sec34: S2S2