

**Bureau of Land Management, Roswell Field Office**  
**Environmental Assessment Checklist, EA# NM-510-2008-118**  
**Volleyball - 2008**

Resources	Not Present on Site	No Impacts	May Be Impacts	Mitigation Included	BLM Reviewer	Date
Air Quality			X	X	Hydrologist /s/ Michael McGee	12/01/08
Soil			X	X		
Watershed Hydrology			X	X		
Floodplains	X					
Water Quality - Surface			X	X		
Water Quality - Ground			X	X	/s/John S. Simitz	12/9/08
Cultural Resources			X	X	Archaeologist /s/Rebecca L. Hill	12Nov2008
Native American Religious Concerns			X	X		
Paleontology			X	X		
Areas of Critical Environmental Concern	X				/s/J H Parman P&EC	11/25/08
Farmlands, Prime or Unique	X				/s/Sanderford	12/17/08
Rights-of-Way			X	X		
Invasive, Non-native Species			X	X	/s/ Joseph M. Navarro	11/26/08
Vegetation			X	X		
Livestock Grazing			X	X		
Threatened or Endangered Species	X				/s/ D Baggao	12/3/08
Special Status Species	X					
Wildlife			X	X		
Wetlands/Riparian Zones	X					
Wild and Scenic Rivers	X				/s/ Bill Murry	12/3/08
Wilderness	X					
Recreation		X				
Visual Resources			X	X		
Cave/Karst			X	X		
Environmental Justice		X			Surface Specialist /s/ Novosak	11/7/2008
Public Health and Safety		X				
Wastes, Hazardous or Solid		X				
Solid Mineral Resources		X			/s/ Jerry Dutchover	12/09/2008
Fluid Mineral Resources		X			/s/ John S. Simitz	12/9/08

**DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT**

Roswell Field Office  
2909 W. Second Street  
Roswell, New Mexico 88201

Project: Volleyball

EA Log Number: NM-510-2008-118

Location:

T. 11 S., R. 26 E., NMPM., Chaves County New Mexico

Section 34, All;

Section 35, All;

Section 36, All.

T. 12 S., R. 26 E., NMPM., Chaves County New Mexico

Section 1, All;

Section 2, All;

Section 3, All;

Section 10, All;

Section 11, All;

Section 12, All.

Roswell Field Office: (575) 627-0272

**Finding of No Significant Impact**

Based on the analysis of potential environmental impacts contained in the attached environmental assessment, I have determined the preferred alternative is not expected to have significant impacts on the environment and that preparation of an Environmental Impact Statement is not warranted.

**Decision Record**

Based upon the analysis, the development of the Volleyball under the Alternative C – Preferred Alternative, in the form of Applications for Permit to Drill is approved. This may include up to 87 fluid mineral development wells aggregating up to 783 acres and up to 10 rights-of-way aggregating up to 120 acres.

Rationale: The Bureau of Land Management staff has reviewed the environmental assessment and identified site-specific mitigation measures to avoid or minimize surface impacts resulting from the construction of this project. The well pad and access road will remain as long term impacts. The cumulative impacts to the environment from existing and new development have been identified.

The Bureau of Land Management's approval of the APD does not relieve the lessee and operator from obtaining required authorizations from the private surface owner.

This preferred alternative is in compliance with the 1997 Roswell Resource Management Plan, as amended. This plan has been reviewed to determine if the preferred alternative conforms to the land-use planning terms and conditions required by 43 CFR 1610.5. This action does not conflict with existing Chaves County land-use planning or zoning.

Administrative Review and Appeal: Under BLM regulations, this Decision Record (DR) is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this DR must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, 1474 Rodeo Road, Santa Fe, NM 87505, no later than 20 business days after this DR is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

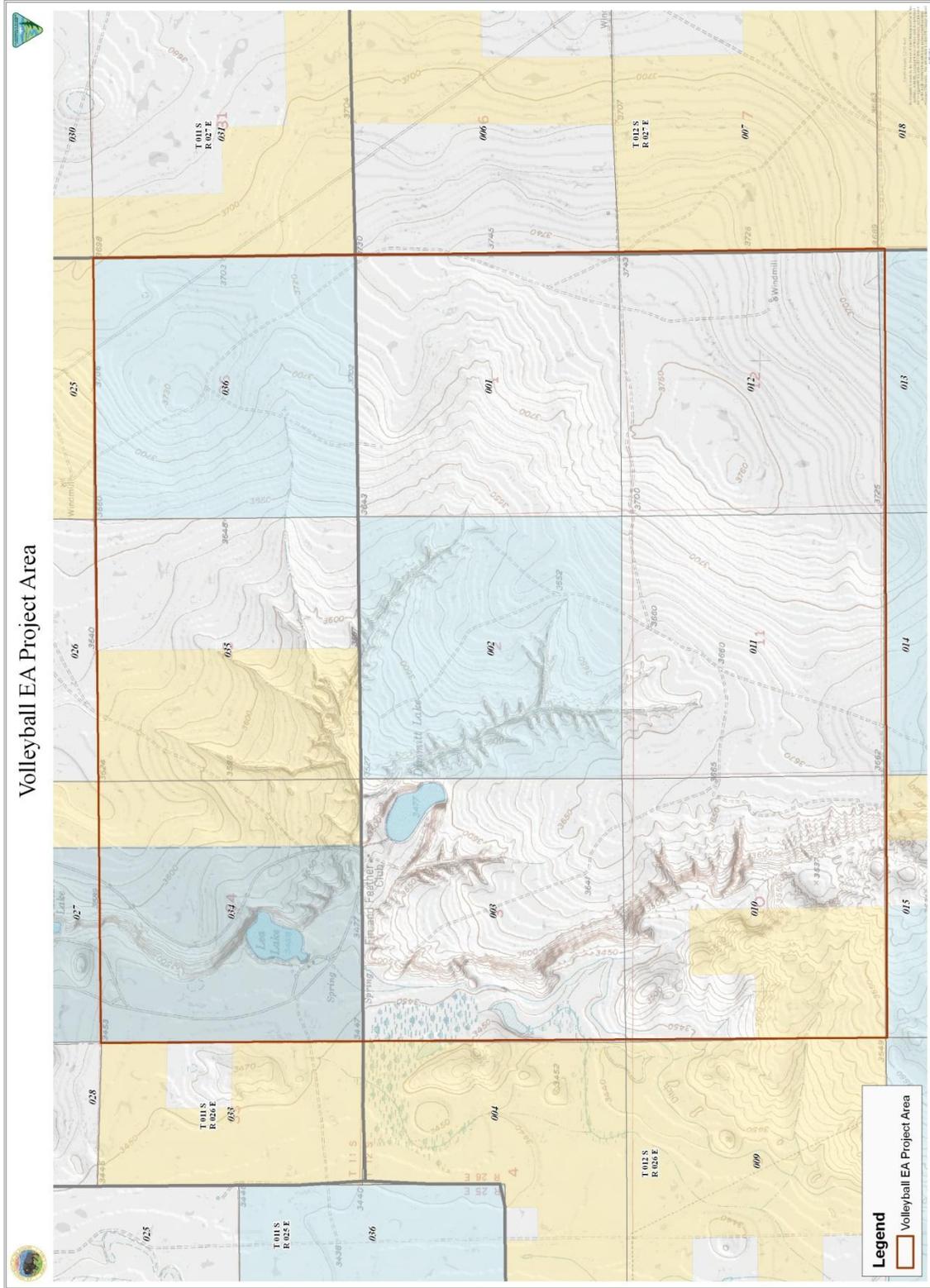
Prepared by:

/s/ Brian A. Novosak Date 22-Jan-2009  
Brian A. Novosak,  
Natural Resource Specialist

Approved by:

/s/ Angel Mayes Date 23-Jan-2009  
Angel Mayes,  
Assistant Field Manager,  
Lands and Minerals

# Map 1 Proposed Action





**BUREAU OF LAND MANAGEMENT  
ROSWELL FIELD OFFICE**

**ENVIRONMENTAL ASSESSMENT # NM-510-2008-118  
VOLLEYBALL**

**1.0 Introduction**

In May 2008, Dawson Geophysical Company was contracted by Armstrong Energy Corporation Inc. to acquire a 3-dimensional seismic survey encompassing the Volleyball Prospect, named for the original well drilled on the prospect. Using the information gathered in the survey, various oil and gas operators have submitted proposals to begin developing fluid minerals in the area by submitting Applications for Permit to Drill (APDs) and Notices of Staking (NOSs). These various proposals include not only the drilling of the wells, but also the permitting of the infrastructure associated with the drilling (access roads, well pads, reserve pits, mineral material pits, salt water disposal wells, overhead power lines, and pipelines).

**1.1 Purpose and Need**

The purpose for the proposed action is to develop oil and natural gas reservoirs on federal fluid mineral leases located in the following locations:

- T. 11 S., R. 26 E., NMPM., Chaves County New Mexico
  - Section 34, All;
  - Section 35, All;
  - Section 36, All.
- T. 12 S., R. 26 E., NMPM., Chaves County New Mexico
  - Section 1, All;
  - Section 2, All;
  - Section 3, All;
  - Section 10, All;
  - Section 11, All;
  - Section 12, All.

The need is to meet the nation's energy demands using domestic production. This environmental assessment (EA) will analyze the impacts of oil and gas development in this area.

**1.2 Conformance with Applicable Land Use Plan and Other Environmental Assessments**

This site-specific EA conforms to the Roswell Resource Management Plan October 1997, as amended.

### **1.3 Federal, State or Local Permits, Licenses or Other Consultation Requirements**

This EA also conforms to the requirements of the Clean Water Act (33 USC 1251 et seq.), National Historic Preservation Act (16 USC 470 et seq.), the Endangered Species Act, as amended (16 USC 1531 et seq.), the Clean Air Act (42 USC 7401 et seq.), and the Energy Policy Act of 2005 (Public Law 109-58, 119 STAT. 594).

Roswell Field Office staff reviewed the proposed action and determined it would be in compliance with threatened and endangered species management guidelines outlined in Biological Assessments Cons. #2-22-96-F-102, Cons. #22420-2006-I-0144, and Cons. #22420-2007-TA-0033. No further consultation with the U.S. Fish and Wildlife Service is required. .

Compliance with Section 106 responsibilities of the National Historic Preservation Act are adhered to by following the BLM – New Mexico State Historic Preservation Officer protocol agreement, which is authorized by the National Programmatic Agreement between the *BLM*, the *Advisory Council on Historic Preservation*, and the *National Conference of State Historic Preservation Officers*, and other applicable BLM handbooks.

Additionally, the Operator is required to:

- Comply with all applicable Federal, State and local laws and regulations.
- Obtain a U.S. Army Corps of Engineers Section 404 permit for any discharge of dredge and fill materials. A New Mexico Surface Water Quality Bureau 401 certification may also be required under a U.S. Army COE Section 404 permit. Operators are required to obtain all necessary permits and approvals prior to any disturbance activities.
- Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
- Certify that a Surface Agreement has been reached with private landowners where required.

## **2.0 Alternatives Including the Proposed Action**

### **2.1 Alternative A – No Action**

The BLM NEPA Handbook (H-1790-1) and the National Environmental Policy Act and associated Code of Federal Regulations state that for EAs on externally initiated proposed actions, the No Action Alternative means that the proposed activity would not take place. The No Action Alternative is presented for baseline analysis of resource impacts, and if selected, would deny the approval of the proposed applications. Current land and resource uses would continue to occur in the proposed project area. No mitigation measures would be required and no fluid minerals would be extracted.

## **2.2 Alternative B – Proposed Action**

Field development with an oil or gas well located on every mineral spacing unit (40-acre spacing for oil wells and 160-acre spacing for gas wells) anywhere on federal minerals within the project area with no consideration to the management prescriptions found in the 1997 Roswell RMP, as amended (see Map 1 – Proposed Action). This would permit up to 126 related fluid mineral development wells (26 natural gas wells and 100 oil wells) within the project area. This analysis includes associated oil and gas field surface disturbing activities such as well pads, roads, and rights-of-way for production facilities (pipelines, power lines, storage tanks, etc.). Estimated surface disturbance on federal minerals would amount up to approximately 1134 acres.

## **2.3 Alternative C – Preferred Alternative**

Under this alternative, all reasonable measures will be taken to ensure that adverse impacts are mitigated in a manner consistent with the measures identified in the 1997 Roswell RMP. These measures, and any decisions that serve as mitigations, may be supplemented during onsite analysis for site-specific actions. This may include relocating or eliminating well locations as well as the locations of access roads and other facilities required for production.

Based on the measures identified in the 1997 Roswell RMP, as amended and the reasonable and foreseeable development (RFD) for the project area (see Appendix 1), up to 87 related federal fluid mineral development wells (18 natural gas wells and 69 oil wells) may be drilled within the project area. The development that accompanies drilling includes well pads, access roads, and rights-of-way for production facilities. Total surface disturbance may amount up to approximately 783 acres.

The following management prescriptions would be applied to all applications for permit to drill (APDs) within the project area (See Map 2 – Preferred Alternative):

- Surface disturbance will not be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects.
- Surface disturbance will not be allowed within up to 200 meters of active heronries or raptor nests.
- Surface disturbance will not be allowed on slopes over 30 percent.
- Surface disturbance will not be allowed within up to 200 meters of playas or alkali lakes
- Surface disturbance will not be allowed within up to 200 meters of the source of a spring or seep or within downstream riparian areas created by flows from the source.
- Surface disturbance will not be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks.
- Surface disturbance will not be allowed within up to 200 meters of known cave entrances, passages or aspects of significant caves, or karst features.
- Well pads will not be located in draws or drainages.
- Cultural inventory surveys will be conducted prior to the approval of any APD. Known sites and sites discovered by the surveys will be avoided by 100 feet.

The reasonable and foreseeable development scenario developed for the project area serves as a predictive tool and is not a threshold for development density. Long-term (10 or more years) development within the project area may or may not approach 87 wells (see Attachment 1).

### **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. These items are included below in Table 3.0, found as the first page of this document. Following the table, only the aspects of the affected environment that are potentially impacted are described. The following elements are not present: Areas of Critical Environmental Concern, Prime or Unique Farmlands, Floodplains, Wild and Scenic Rivers, Wilderness or Wilderness Study Areas, Special Status Species, Wastes, Hazardous or Solids, and Wild Horses and Burros.

The wells would be located in Chaves County, New Mexico and described in the 1997 Roswell RMP, as amended Record of Decision. The prospective development falls within the range of the reasonable and foreseeable development scenario developed for the Roswell RMP. Additional general information on air quality in these areas is contained in Chapter 3 of the Roswell Draft RMP/Environmental Impact Statement.

In addition to the air quality information in the RMPs cited above, new information about GHGs and their effects on national and global climate conditions has emerged since the RMPs were prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO<sub>2</sub>) methane (CH<sub>4</sub>); nitrous oxide (NO); water vapor; and several trace gasses 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 GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

This EA incorporates an analysis of the contributions of the preferred alternative to GHG emissions and a general discussion of potential impacts to climate.

#### **3.1 Air Resources**

Air quality and climate are the components of air resources, which include applications, activities, and management of the air resource. Therefore, the BLM must consider and analyze the potential effects of BLM and BLM-authorized activities on air resources as part of the planning and decision making process.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to some states. Air quality is determined by atmospheric pollutants and

chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Greenhouse gases (GHGs) and the potential effects of GHG emissions on climate are not regulated by the EPA, however climate has the potential to influence renewable and non-renewable resource management.

### **3.1.1 Air Quality**

The area of analysis is considered a Class II air quality area. A Class II area allows moderate amounts air quality degradation. The primary sources of air pollution are dust from blowing wind on disturbed or exposed soil and exhaust emissions from motorized equipment.

Air quality in the area of analysis is generally good and is not located in any of the areas designated by the Environmental Protection Agency as “non-attainment areas” for any listed pollutants regulated by the Clean Air Act.

Greenhouse gases, including carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>), and the potential effects of GHG emissions on climate, are not regulated by the EPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The EPA’s Inventory of US Greenhouse Gas Emissions and Sinks found that in 2006, total US GHG emissions were over 6 billion metric tons and that total US GHG emissions have increased by 14.1% from 1990 to 2006. The report also noted that GHG emissions fell by 1.5% from 2005 to 2006. This decrease was, in part, attributed to the increased use of natural gas and other alternatives to burning coal in electric power generation.

The levels of these GHGs are expected to continue increasing. The rate of increase is expected to slow as greater awareness of the potential environmental and economic costs associated with increased levels of GHG's result in behavioral and industrial adaptations.

### **3.1.2 Climate**

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 systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the 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.

A 2007 US Government Accountability Office (GAO) Report on Climate Change found that, "federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, among others: 1) physical effects such as droughts, floods, glacial melting, and sea level rise; 2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and 3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses." It is not, however, possible to predict with any certainty regional or site specific effects on climate relative to the proposed lease parcels and subsequent actions.

In New Mexico, a recent study indicated that the mean annual temperatures have exceeded the global averages by nearly 50% since the 1970's (Enquist and Gori). Similar to trends in national data, increases in mean winter temperatures in the southwest have contributed to this rise. 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.

### **3.2 Cultural Resource**

The project falls within the Southeastern New Mexico Archaeological Region. This region contains the following cultural/temporal periods: Paleoindian (ca. 12,000-8,000 B.C.), Archaic (ca. 8000 B.C. –A.D. 950), Ceramic (ca. A.D. 600-1540) Protohistoric and Spanish Colonial (ca. A.D. 1400-1821), and Mexican and American Historical (ca. A.D. 1822 to early 20th century). Sites representing any or all of these periods are known to occur within the region. A more complete discussion can be found in *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico An Overview of Cultural Resources in the Roswell District*, Bureau of Land Management published in 1989 by the U.S. Department of the Interior, Bureau of Land Management. A cultural resource inventory shall be conducted of the area of effect for the actions prior to any ground disturbing activities.

### **3.3 Native American Religious Concerns**

A review of existing information indicates this area of analysis is outside any known Traditional Cultural Property.

### **3.4 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.

### **3.5 Invasive & Noxious Weeds**

There are no known populations of invasive or noxious weed species in the area of analysis.

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.

Further, 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.

### **3.6 Wildlife**

The vegetation found at this site provides habitat to a large range of wildlife species. Some of the common mammals are mule deer, pronghorn, badger, coyote, fox, jackrabbit, cottontails, kangaroo rats, and pocket gophers. It also provides habitat for a variety of grassland and desert birds. Important passerine birds include meadowlarks, horned larks, lark buntings, Cassin's sparrows, lark sparrows, Chihuahuan ravens, and loggerhead shrikes. Other birds include scaled quail, mourning doves, roadrunners, common nighthawks, killdeer, and a variety of raptors including red tailed and Swainson's hawks, northern harriers, great horned owls, and burrowing owls. It also provides habitat to a large variety of common lizards and snakes.

### **3.7 Threatened or Endangered Species**

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 action which may affect Federal listed threatened or endangered species or species proposed for listing. RFO reviewed and determined the action is in compliance with listed species management guidelines outlined in Biological Assessments Cons. #2-22-96-F-102, Cons. #22420-2006-I-0144, and Cons. #22420-2007-TA-0033. No further consultation with the Service is required.

### **3.8 Special Status Species**

There are no known special status species in the project area.

In accordance with BLM Manual 6840, 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. Included in this category are State listed endangered species and Federal candidate species which receive no special protections under the Endangered Species Act

### **3.9 Wastes, Hazardous or Solid**

No waste material will be removed from the project area and upon reclamation of the reserve pit the NMOCD rules will be imposed and the reserve pit contents will be encapsulated.

### **3.10 Water Quality**

Surface:

Surface water within the area is affected by geology, precipitation, and water erosion. Factors that currently affect surface water resources include livestock grazing management, oil and gas development, recreational use and brush control treatments. Ephemeral surface water within the area may be located in tributaries, playas, alkali lakes and stock tanks. No perennial surface water is found on public land in the area of operations.

Ground:

Groundwater within the area is affected by geology and precipitation. Factors that currently affect groundwater resources in the area include livestock grazing management, oil and gas development, groundwater pumping and possible impacts from brush control treatments. Water for irrigation and stock use is obtained from the Quaternary Alluviums and Artesia Group. There are several citations of water in the 500' to 680' range. In the adjacent townships, both north and south, usable water is cited deeper than 1050' on the west edge.

The deepest expected usable water should be above 1050'.

### **3.11 General Topography/Surface Geology**

A portion of the area of analysis is on private surface, some state trust lands, and federal surface. The topographic characteristics and/or regional setting are rolling loaming hills with no major land features. No major land features will be disturbed.

### **3.12 Mineral Resources**

There are no known sources of federal owned construction material (caliche/gravel) for surfacing the access road and well pad. It could be obtained by the operator from abandoned well sites or roads with permission from surface owner and well owner.

### **3.13 Soil**

The Soil Survey of Chaves County, New Mexico, Southern Part (USDA Soil Conservation Service, 1980) was used to describe and analyze impacts to soil from the area of analysis. The soil map units represented in the project area are:

Holloman-Gypsum land complex, 3 to 5 percent slopes (HrC) Runoff of the Holloman unit soil is medium and the hazard of water erosion and soil blowing is moderate.

Holloman-Gypsum-land complex, 30 to 50 percent slopes (HSE) Runoff is rapid and the hazard of water erosion is severe and the hazard of soil blowing are moderate.

Reeves Holloman association, 0 to 5 percent slopes (Rl) Runoff is medium and the hazard of water erosion and soil blowing are moderate.

Russler silty clay loam, 0 to 3 percent slopes (Ru) Runoff is medium. The hazard of water erosion is moderate and soil blowing is slight.

### **3.14 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 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 a well pads, permanent and temporary roads, pipelines and power-lines.

### **3.15 Vegetation**

This lease is within the grassland community as identified in the Roswell Resource Management Plan/Environmental Impact Statement (RMP/EIS). Appendix 11 of the Draft RMP/EIS describes the Desired Plant Community (DPC) concept and identifies the components of each community.

**The Ecological Site for this area is SD-3 Gyp Upland (Southern Desertic Basins, Plains & Mountains).**

### **3.16 Livestock Grazing/Range**

This area of analysis is located on BLM grazing allotment #65062, Slash G, permitted to L.A. Ranch Partnership. Current permitted use is 126 AU's year long @ 40% public land for 605 AUM's (Animal Unit Months). Cattle and horses are the class of livestock authorized.

### **3.17 Visual Resources**

Visual Resource Management (VRM) on public land is conducted in accordance with BLM Handbook 8410 and BLM Manual 8411. Management actions contained in this EA has two VRM Class zones. VRM Class II and VRM Class IV.

The objective of Class II is to: In a Class II zone, Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the characteristic landscape. Contrasts may be seen but **must** not attract attention of the observer. "Every attempt, however, should be made to reduce or eliminate activity impacts through careful location, minimal disturbance, and repeating the basic landscape elements."

Management actions falling within the Class IV VRM zone, contrasts may attract the attention of the casual observer and may be a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color, and texture of the characteristic landscape.

### **3.18 Recreation**

The area is primarily used by recreational visitors engaged in hunting, caving, sight-seeing, driving for pleasure, off-highway vehicle use, and other recreational activities. Non-recreation visitors include oil and gas industrial workers and ranchers.

### **3.19 Cave/Karst**

While the area of analysis is located in the *High Potential Karst Area*, no surface cave/karst features were observed in the immediate vicinity of the area of analysis action.

### **3.20 Public Health and Safety**

The project will not be detrimental to public health. The operator will insure that all phases of the project operations are conducted in workman like manner. Precautionary procedures and/or measures will be strictly adhered to in order provide a safe and sound working environment for the general existence of the well.

## **4.0 Environmental Consequences and Proposed Mitigation Measures**

### **Alternative A – No Action**

Under the No Action Alternative, the proposed wells would not be drilled. There would be no new impacts from oil and gas production to the resources. The No Action Alternative would result in the continuation of the current land and resource uses in the project area and is used as the baseline for comparison of alternatives.

### **Alternative B – Proposed Action**

Under Alternative B, the Proposed Action, all wells would be drilled as originally proposed in the APDs, incorporating no changes to reduce the potential impact to the environment. Descriptions of potential impacts on individual resources for action alternatives would be presented and mitigation measures would be incorporated by the BLM where appropriate as Conditions of Approval attached to the permit.

### **Alternative C – Preferred Alternative**

Under Alternative C, the Preferred Alternative, all reasonable measures will be taken to ensure that adverse impacts are mitigated in a manner consistent with the measures identified in the 1997 Roswell RMP, as amended and approval of APDs would incorporate changes to reduce the potential impact to the environment. Descriptions of potential impacts on individual resources for action alternatives would be presented and mitigation measures would be incorporated by the BLM where appropriate as Conditions of Approval attached to the permit.

## **4.1 Air Resources**

### **4.1.1 Direct and Indirect Effects**

#### **Air Quality**

Air quality would temporary be directly impacted with pollution from exhaust emissions, chemical odors, and dust that would be caused by the motorized equipment used to construct the access road, well pad, and by the drilling rig that will be used to drill the well. Dust dissemination would discontinue upon completion of the construction phase of the access road and well pad. Air pollution from the motorized equipment would discontinue at the completion of the drilling phase of the operations. The winds that frequent the southeastern part of New Mexico generally disperse the odors and emissions. The impacts to air quality would be greatly reduced as the construction and drilling phases are completed. Other factors that currently affect air quality in the area include dust from livestock herding activities, dust from recreational use, and dust from use of roads for vehicular traffic.

Over the last 10 years, the leasing of Federal oil and gas mineral estate in Roswell Field Office has resulted in an average total of 60 wells drilled on federal leases annually. These wells would contribute a small percentage of the total emissions (including GHG's) from oil and gas activities in New Mexico.

Potential impacts of development could include increased air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, as well as potential releases of GHG and volatile organic compounds during drilling or production activities. The amount of increased emissions cannot be quantified at this time since it is unknown how many wells might be drilled, the types of equipment needed if a well were to be completed successfully (e.g. compressor, separator, dehydrator), or what technologies may be employed by a given company for drilling any new wells. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs.

The reasonable and foreseeable development scenario developed for the Roswell RMP demonstrated 60 wells would be drilled annually for Federal minerals. Current APD permitting trends within the field office confirm that these assumptions are still accurate. This level of exploration and production would contribute a small incremental increase in overall hydrocarbon emissions, including GHGs, released into the planet's atmosphere. When compared to total national or global emissions, the amount released as a result of potential production from the proposed lease tracts would not have a measurable effect on climate change due to uncertainty and incomplete and unavailable information.

Consumption of oil and gas developed from this area is expected to produce GHGs. 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.

## **Climate**

The assessment of GHG emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net impacts from development of this area on climate. 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. When further information on the impacts to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

### **4.1.2 Mitigation**

The EPA's inventory data breaks down the total US sources of GHG gases by major categories that include "Natural Gas Systems" and "Petroleum Systems." The inventory lists the contributions of natural gas and petroleum systems to total CO<sub>2</sub> and CH<sub>4</sub> emissions (natural gas and petroleum systems do not produce significant amounts of any of the other greenhouse gases). For Natural Gas Systems, the EPA categorizes emissions from distinct stages of the larger category of natural gas systems. These stages include field production, processing, transmission

and storage, and distribution. The BLM has regulatory jurisdiction only over field production. Petroleum Systems sub-activities include production field operations, crude oil transportation, and crude oil refining. Within the petroleum systems emission categories, the BLM has authority to regulate production field operations.

The BLM's regulatory jurisdiction over field production of Natural Gas Systems and production field operations of Petroleum Systems has resulted in the development of "Best Management Practices (BMPs)" designed to reduce impacts to air quality by reducing all emissions from field production and operations. The future development of the lease parcels may be subject to appropriate conditions of approval (COAs) to reduce or mitigate GHG emissions. This may occur at the project level through additional analysis. Specific measures developed at the project stage would be incorporated as COAs in the approved APD, and are binding on the operator. Typical measures may include: flare hydrocarbon and 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; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and revegetate areas of the pad not required for production facilities 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 Best Management Practices proposed by the EPA's Natural Gas Energy Star program. The Roswell 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.

## **4.2 Cultural Resources**

### **4.2.1 Direct and Indirect Impacts**

To ensure there are no direct or indirect impacts to cultural resources an archaeological survey must be completed prior to any ground disturbing activities. If during the archaeological survey cultural resources are encountered then the development of the site-specific area must be moved to avoid the archaeological site or the site may be further mitigated through testing or data recovery.

### **4.3 Native American Religious Concerns**

To date, the areas to be affected by project construction has not been identified by interested tribes as being of tribal concern.

## **4.4 Environmental Justice**

### **4.4.1 Direct and Indirect Impacts**

No minority or low income populations would be directly affected in the vicinity of the action. 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 a small increase in activity where vehicular traffic increases in areas used for grazing or hunting. However, these impacts would apply to all public land users in the project area.

## **4.5 Invasive, Non-native Weed Species**

### **4.5.1 Direct and Indirect Impacts**

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 if they 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.

### **4.5.2 Mitigation**

In the event noxious weeds are discovered after the construction of the access road and well pad, measures will be taken to mitigate those impacts.

## **4.6 Wastes, Hazardous or Solid**

### **4.6.1 Direct and Indirect Impacts**

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

### **4.6.2 Mitigation**

The Conditions of Approval have mitigation measures that would minimize any potential impacts.

## **4.7 Water Quality:**

### **Surface:**

#### **4.7.1A Direct and Indirect Impacts**

Surface disturbance from the construction of the well pad, reserve pits, closed system or steel tanks, 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 these surface disturbing activities 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, closed systems or steel tanks could degrade surface and ground water quality. Authorization of the projects would require full compliance with BLM directives and stipulations that relate to surface and groundwater protection.

#### **4.7.2A Mitigation**

The use of plastic-lined reserve pits, closed system or steel tanks would reduce or eliminate the seepage of drilling fluid into the soil and groundwater. Spills of 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 soil onsite, or offsite, and may potentially impact surface and groundwater resources in the long term.

## **B. Groundwater:**

### **4.7.1B Direct and Indirect Impacts**

Spills of 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 soil onsite, or offsite, and may potentially impact surface and groundwater resources in the long term. Petroleum products and other chemicals, accidentally leaked through casing, could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits, closed systems or steel tanks could degrade ground water quality.

### **4.7.2B Mitigation**

The casing and cementing requirements imposed on the wells would reduce or eliminate the potential for groundwater contamination from drilling muds and other surface sources.

The use of plastic-lined reserve pits, closed system or steel tanks would reduce or eliminate seepage of drilling fluid into the soil and groundwater.

The State Engineers' water listing shows useable water for stock in the Quaternary Alluvium. Surrounding townships and historical well files suggest water at approximate depths of 80 ft to 320 ft. The interval at 280 to 320 seems to be used for domestic, stock and secondary recovery of oil.

## **4.8 General Topography/Surface Geology**

The surface disturbance anticipated from the construction of the well pad and access road would have minimal impacts on the area of the operations. No major land or soil displacement would occur from the cradle to grave operations associated with construction of the access road and well pad.

### **4.8.1 Direct and Indirect Impacts**

Direct impacts would result from the removal of the surface soils (topsoil) during construction of the well pad and access road. The consequential earth moving activities would indirectly impact the vegetation and would cause the fragmentation of the surface habitat where small animals live in the project area.

### **4.8.2 Mitigation**

The inclusion of mitigation measures to conserve the landscape as much as possible in the Conditions of Approval would lessen the impacts from the surface disturbance activities on this project.

## **4.9 Soil**

### **4.9.1 Direct and Indirect Impacts**

The construction of the access road, well pad, reserve pits, and use of a closed system or steel tanks would physically disturb topsoil and would expose the substratum soil. Direct impacts resulting from these surface disturbing activities 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 the access road.

### **4.9.2 Mitigation**

The topsoil will be stripped to approximately 6 inches in depth within the area designated for construction of the well pad. The operator shall stockpile the stripped topsoil adjacent to the constructed well pad. The topsoil will be used for interim and final reclamation of the surface disturbance created by the construction of the well pad. The topsoil will not be used to construct containment structures or earthen dikes that are constructed and maintained on the constructed well pads or used to backfill reserve pits. Reserve pits shall be recontoured and reseeded as described in the attached Conditions of Approval.

Upon abandonment of the well, the direct and indirect impacts to soil resulting from the surface disturbing activities will be mitigated through the surface reclamation/restoration of the disturbed areas as described in the attached Conditions of Approval as necessary.

## **4.10 Watershed - Hydrology**

### **4.10.1 Direct and Indirect Impacts**

Construction and surface disturbance activities from the construction of the well pad, access road, reserve pits, closed system or steel tanks, pipelines and power lines can result in long term and short term alterations to the hydrologic regime. Peak 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 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 baseflow 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 the well and would decrease once the surfacing material has been removed from the well pad and access road. Short term direct and indirect impacts to the watershed and hydrology would occur from access roads that are not surfaced with material and would likely decrease in time due to reclamation efforts.

#### **4.10.2 Mitigation**

The topsoil will be stripped to approximately 6 inches in depth within the area designated for construction of the well pad. The operator shall stockpile the stripped topsoil adjacent to the constructed well pad. The topsoil will be used for interim and final reclamation of the surface disturbance created by the construction of the well pad. The topsoil will not be used to construct containment structures or earthen dikes that are constructed and maintained on the constructed well pads. The direct and indirect impacts to soil resulting from the surface disturbing activities will be mitigated through the instructions and/or orders for surface reclamation/restoration of the disturbed areas.

### **4.11 Vegetation**

#### **4.11.1 Direct and Indirect Impacts**

The construction of the access road and well pad would remove native vegetation.

If it is a producing well, reclamation would not commence until the well is a depleted producer and is plugged and abandoned. Vegetative recovery on the access road and well pad would depend on life of the well. Native vegetation would encroach on the well pad over time and where high volumes of vehicular traffic occur; the areas driven over would remain un-vegetated. If the well is drilled as a dry hole and is plugged, the reclamation of the access road and well pad would immediately follow. The impacts to the vegetation would be short-term if the reclamation efforts of the disturbed areas have re-vegetated successfully within a few years.

#### **4.11.2 Mitigation**

No impact to vegetation is anticipated. However measures will be taken in the event impacts to vegetation are found.

#### **4.12 Livestock Grazing/Range**

##### **4.12.1 Direct and Indirect Impacts**

During the construction and drilling phases of the well, there would be some minor disruption of livestock grazing in the pastures, specifically on the well pad. The increase of vehicle traffic within the project areas could lead to conflicts with livestock.

##### **4.12.2 Mitigation**

If any conflicts with livestock do arise as a result of the access road and well pad construction, mitigation measures will be taken, and consultation with the allottee will mitigate those impacts.

#### **4.13 Wildlife**

##### **4.13.1 Direct and Indirect Impacts**

Some small wildlife species may be killed and their dens or nests destroyed during construction of the access road and well pad. The construction of the access road and well pad could cause fragmentation of wildlife habitat. The short-term negative impact to wildlife would occur during the construction phase of the operations would be due to noise and habitat destruction. In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to disturbances by the high volumes of vehicle traffic during equipment maintenance. Upon abandonment of the well, the area would re-vegetate and wildlife would return to previous levels.

##### **4.13.2 Mitigation**

The conditions of approval would alleviate most losses of wildlife species, such as; netting storage tanks, installation or other modifications of cones on separator stacks, and timing stipulations.

#### **4.14 Recreation**

Oil and gas activities would have little or no affect on recreational opportunities within this area. Large blocks of public land would allow recreationist to use it and avoid the oil and gas facilities within the area.

#### **4.14.1 Direct and Indirect Impacts**

None

#### **4.14.2 Mitigation**

None

### **4.15 Visual Resources**

#### **4. 15.1 Direct and Indirect Impacts**

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. A portion of the area of analysis is designated VRM Class II.

#### **4.15.2 Mitigation**

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

### **4.16 Cave/Karst**

While this is a *High Potential Karst Area*, no surface cave/karst features were observed in the immediate vicinity of the area of analysis.

#### **4. 16.1 Direct and Indirect Impacts**

None

#### **4.16.2 Mitigation**

None

### **4.17 Public Health and Safety**

#### **4.17.1 Direct and Indirect Impacts**

The construction and drilling operations will be conducted in a safe workman like manner and no impacts are anticipated to occur when the operations are conducted in a professional constructive manner.

#### **4.17.2 Mitigation**

None

#### **4.28 Cumulative Impacts**

The leased area of the area of analysis has been industrialized with oil and gas well development. The surface disturbance for each project that has been permitted has created a spreading out of land use fragmentation. The cumulative impacts fluctuate with the gradual reclamation of well abandonments and the creation of new additional surface disturbances in the construction of new access roads and well pads. The on-going process of restoration of abandonments and creating new disturbances for drilling new wells gradually accumulates as the minerals are extracted from the land. Preserving as much land as possible and applying appropriate mitigation measures will alleviate the cumulative impacts.

Due to the absence of regulatory requirements to measure GHG emissions and the variability of oil and gas activities on federal minerals, it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing. Some general assumptions however can be made: leasing the proposed tracts may contribute to drilling new wells.

The New Mexico Greenhouse Gas Inventory and Reference Case Projection 1990-2020 estimates that totals approximately 19.6 million metric tons of both CO<sub>2</sub> and CH<sub>4</sub> emissions are produced each year by oil and natural gas production, processing, transmission and distribution. Of the 19.4 million metric tons, approximately 17.3 million metric tons can be attributed to natural gas activities and 2.3 million metric tons can be attributed to oil production.

Existing oil and gas wells in the Roswell Field Office account for approximately 11 percent of the total wells in New Mexico. Therefore, GHG emissions from all wells within the field office amount to approximately 2.134 metric tons annually (19,4 mmt X 0.11 = 2.134 mmt). Federal oil and gas wells amount to approximately 40 percent of the wells within the field office (see Appendix 7 of the 2006 Draft Special Status Species RMP Amendment.). Annual GHG emissions from federal oil and gas wells are approximately 0.85 metric tons (2.134 mmt X 0.4 = 0.85 mmt).

These totals, when compared to the estimates used for the cumulative analysis previously referenced, show that wells drilled on federal leases wells may be expected to produce approximately 4.4 percent of the GHG emissions produced from wells drilled in New Mexico. This amount of GHG emissions represents a small, incremental contribution to the total emissions and is also insignificant when compared to global GHG emission levels. This small incremental contribution to global GHG gases cannot be translated into incremental effects on climate change globally or in the area of these site-specific actions. As oil and gas and natural gas production technology continues to improve in the future, one assumption is that it may be feasible to further reduce GHG emissions.

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to natural resources and plant and animal species due to climate change 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. 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 more affected by climate change.

Continued oil and gas development and other surface-disturbing activities in these areas may potentially have negative cumulative impacts on vegetation, soil, water, livestock, wildlife and visual resources.

Within the project area there have been 316 wells drilled (95 active and 221 inactive) with approximately 427.5 acres of surface based on the reasonable and foreseeable development in Appendix 1. Up to 141 wells might be drilled on all ownerships within the project area with an associated 1269 acres of surface disturbance. The total number of wells that might be drilled cannot be stated with certainty. The number wells that might be drilled is typically dependent on the success of the previous well successes, the amount and quality of the fluid minerals produced, and production techniques. The BLM does not control the amount or placement of wells on non-federal surface or non-federal mineral estate.

#### **4.28.1 Residual Impacts**

Direct impacts to the local environment detailed above remain throughout the life of the operations; however, these impacts would be substantially reduced by mitigation measures.

#### **4.28.2 Mitigation Measures**

Mitigation measures have been identified and have been incorporated into stipulations and are made part of the permit. These measures include but are not limited to dust control, noxious weed control, road construction, maintenance, and termination.

### **5.0 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.

Table 5.1 Summary of Public Contacts Made During Preparation of Document and Interdisciplinary Team

Public Contact	Title	Organization	Present at Onsite?
Blake Knight	Field Representative	Chesapeake	Yes
Elliot McMaster	Private Surface Landowner	McMaster Ranch	Yes
Richard McMaster	Caretaker, Son	McMaster Ranch	Yes
Don Qimby	Surveyor	John West Surveying Co.	Yes
Michael Simmons	Surveyor	John West Surveying Co.	Yes
ID Team Member	Title	Organization	Present at Onsite?
Michael McGee	Hydrologist	RFO	No
Rebecca L. Hill	Archaeologist	RFO	No
Joseph Navarro	Range Mgmt. Spec.	RFO	No
Dan Baggao	Wildlife Biologist	RFO	Yes
Brian Novosak	Natural Resource Spec.	RFO	Yes
Bill Murry	Outdoor Recreation Plnr.	RFO	No

## 6.0 Appendices

The Roswell Field Office; Project Map (Exhibit A), Pecos District-RFO, Conditions of Approval (Exhibit B). Any special requirements derived from this EA, would be applied to this specific APDs to minimize the surface disturbance and conserve the surrounding landscape.

### 6.1.0 References

EPA Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006. Environmental Protection Agency, Washington, D.C.

EPA, Natural Gas Star Program (2006 data) at: <http://www.epa.gov/gasstar/accomplish.htm>. Environmental Protection Agency, Washington, D.C.

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New York, New York. (Available on the Internet: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>)

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National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. (Available on the Internet: <http://dels.nas.edu/basc/Climate-HIGH.pdf>.)

US Government Accountability Office Report "Climate Change, Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources" GAO-07-863, August 2007 (1st paragraph, 1st page, GAO Highlights) at: <http://www.gao.gov/news.items/d07863.pdf>.

U.S. Department of the Interior, Bureau of Land Management. 1997. Roswell Proposed Resource Management Plan and Final Environmental Impact Statement. Roswell, New Mexico.

U.S. Department of the Interior, Bureau of Land Management. 1997. Roswell Approved Resource Management and Plan Record of Decision. Roswell, New Mexico.

U.S. Department of the Interior, Bureau of Land Management. 2008. Special Status Species Resource Management Plan Amendment and Record of Decision. Roswell, New Mexico.

### **6.1.1 APD**

### **6.1.2 Authorities**

Code of Federal Regulations (CFR)

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.

### **6.1.3 Other Supporting Information**