BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE

ENVIRONMENTAL ASSESSMENT

FOR

Application for Permit to Drill the
Burlington Resources Oil and Gas Company

Klein 24N

Well Pad, Access Road, and Well-tie Pipeline

F010-2010-158

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1.0 Introduction

A representative of Burlington Resources Oil and Gas Company (BROG) filed an Application for a Permit to Drill (APD) with the BLM for the well pad, access road, and well-tie pipeline Klein 24N. The proposed project is located in the SESW /4 of Section 34, Township 26N, Range 6W, in Rio Arriba County, New Mexico.

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan Final Environmental Impact Statement (PRMP/FEIS). This project EA addresses site-specific resources and/or impacts that are not specifically covered within the PRMP/FEIS, as required by the National Environmental Policy Act of 1969 (NEPA), as amended (Public Law 91-90, 42 U.S.C. 4321 et seq.).

1.1 Purpose and Need

The purpose for the proposal is to define and produce natural gas on one or more valid federal oil and gas mineral leases issued to the applicant by the BLM. It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. The Mineral Leasing Act of 1920 (MLA), as amended [30 USC 181 et seq.], authorizes the BLM to issue oil and gas leases for the exploration of oil and gas and permit the development of those leases. The existing lease is a binding legal contract that allows development of the mineral by the holder. An approved Application for Permit to Drill (APD), issued by the BLM, authorizes the applicant to construct and drill the proposed well.

The Klein 24N gas well would allow Burlington Resources Oil and Gas Company to develop their lease and provide additional natural gas for the national energy market, which would also generate federal and state tax revenue as well as revenue for Burlington Resources Oil and Gas Company.

1.2 Conformance with Applicable Land Use Plan and Other Environmental Assessments

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan/Final Environmental Impact Statement [(PRMP/FEIS) BLM 2003a], which was approved as the Final Resource Management Plan for the Farmington Field Office (FFO) of the BLM by the Record of Decision (ROD) signed September 29, 2003 (BLM 2003b). The PRMP/FEIS, Final Plan, and Record of Decision are available for review at the BLM Farmington Field Office, 1235 La Plata Hwy., Farmington, NM or electronically at http://www.nm.blm.gov/ffo/ffo_home.html. This EA addresses the resources and impacts on a site-specific basis as required by the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, 42 USC 4321 et seq.). The proposed project would not be in conflict with any local, county, or state plans.

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

Under Section 402 of the Clean Water Act (as amended), the U.S. Environmental Protection Agency (EPA), was directed to develop a phased approach to regulate storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. Industrial activities disturbing land may require permit coverage through a NPDES storm water discharge. Depending on the acreage disturbed, either a Phase I industrial activity (five or more acres disturbance) or a Phase II small construction activities (between one and five acres disturbance) permit may be required. However, gas and oil activities were recently exempted from NPDES permitting. Additionally, an U.S. Army Corps of Engineers Section 404 permit for the discharge of dredge and fill materials may also be required. Operators are required to obtain all necessary permits and approvals prior to any disturbance activities.

Farmington Field Office staff reviewed the proposed action and determined it would be in compliance with threatened and endangered species management guidelines outlined in the September 2002 Biological

Assessment (Cons. #2-22-01-I-389). 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 SHPO 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 the necessary permits for the drilling, completion and production of this well including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
· Certify that a Surface Use 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) states that for Environmental Assessments (EAs) on externally initiated proposed actions, the No Action Alternative generally means that the proposed activity will not take place. This option is provided in 43 CFR 3162.3-1 (h) (2). This alternative would deny the approval of the proposed application, and the current land and resource uses would continue to occur in the proposed project area. No mitigation measures would be required.

2.2 Alternative B – Proposed Action

BROG proposes to construct a well pad, access road, and well-tie pipeline in order to drill and develop federal minerals in the Basin Dakota, Blanco Mesa Verde and Chacra formati. Access to the proposed Klein 24N well pad would be gained by traveling east on Hwy 64 for 11.4 miles from the intersection of Hwy 550 and Hwy 64 in Bloomfield, NM. Turn right on County Road 4450 and travel south easterly for 3.8 miles. Continue on County Road 4990 and travel in a south easterly direction for 14.8 miles. Turn on County Road 379 and travel in an south easterly direction for 14.2 miles to the proposed Klein 24N staked well location. The proposed project is on federal land with federal minerals.

The proposed well pad would be 230' X 300’ with an additional 50 foot construction buffer zone on all four sides of the well pad. The well pad would require between 3.1 and 13.1 feet of cut on the west side of the location, and between 7.8 and 9.0 feet of fill on the east side of the location. Corner #3 would be rounded to avoid excess cut The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Production pits would be lined and stepped-down 50% into the cut. Cut and fill slopes would be returned to the original contour upon reclamation. New surface disturbance from the proposed well location would be approximately 3.03 acres.

Runoff would be diverted around the well site. A diversion ditch would need to be constructed above the cut slope on the west side of the pad draining north and south such that storm water run-off would be diverted around the well pad. A silt trap would be constructed in the drainage outside of the construction zone on the south side of the pad.

A new access road approximately 502’ in length with an average clearing width of 30’ would be developed to BLM “Gold Book” standards to provide access to the proposed well pad. Approximately 172’ of the road would cross the existing Klein 12 well pad, and the remaining 330’ would run cross-country. Culverts 18” minimum in diameter may be placed at the entrance of the well location, at the proposed access road take-off and in low areas where necessary and according to “Gold Book” standards. New disturbance for the construction of the access road would be approximately 0.23 acres. The surfacing and repair of deteriorated sections of the existing access roads may also be required.

If the well is productive, a well-tie pipeline would be needed to transport produced gas. The pipeline is proposed to be approximately 472’ in length within a 40’ wide construction area. The proposed pipeline would parallel the proposed roadway for 300’ then cross the existing Klein 12 well pad for 172’ and would tie into the existing Klein 12 well location. Potential new disturbance for the pipeline would be approximately 0.14 acres.

Construction of the well-tie pipeline would consist of digging a trench with excavation equipment such as a wheel-ditcher or backhoe, laying pipe, and back filling the trench. The pipeline would be buried at least five feet deep. A 4.5-inch carbon steel pipeline manufactured to American Petroleum Institute 5L specifications would be used. The wall thickness of the pipe would be 0.156". The pipe wall strength would be 42,000 pounds per square inch (PSI).

Production equipment used during the life of the well may include a 3-phase separator - dehydrator, a meter run, 400-barrel tanks and/or smaller fiberglass or galvanized tanks for water disposal. It is also likely that a compressor would be placed on the location during the life of the well. The use of

compressors provides an increase in the economic life of the well increases the ultimate recovery of gas from low-pressure reservoirs and prevents waste of the gas resource. Aboveground equipment would be painted juniper green to blend in with the surrounding tree cover.

Farmington Field Office established environmental Best Management Practices (BMP's) will be followed during construction and reclamation of well site pads, access roads, pipeline ties, facility placement or any other surface disturbing activity associated with this project. Bureau wide standard BMP's are found in the Gold Book, Fourth Edition-Revised 2007. Farmington Field Office BMP's are integrated into the general and site specific stipulations.

For a detailed description of design features and construction practices associated with the proposed action, refer to the APD (attached as Appendix 7.1). Also see the subject APD for additional maps showing the proposed well location and associated facilities described above. Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) are also listed in Appendix 7.1 and incorporated and analyzed in this alternative.

Table 2.2 – Proposed Well Information

Well Name	Well Number	Township	Range	Section	Footages	Lease #	Lease Issue Date
Klein	24N	26N	6W	34	1190' FSL 1930' FWL	NMSF 0079265	4/1/1948

County: Rio Arriba

Applicant: Burlington Resources Oil and Gas Company

Surface Owner: Bureau of Land Management

2.3 Alternative C - Directional Alternative

Alternative C would be a twinned location on the existing plugged and abandoned Klein 12 Basin Dakota, Blanco Mesa Verde and Chacra well pad approximately 415 feet north of the Alternative B well pad. The surface location of the well would be approximately 1582' FSL, 1786' FWL of Section 34, T26N, R6W. The well would be a directional well with the bottom hole located at approximately 1190' FSL, 1930' FWL of Section 34, T26N, R6W. Refer to maps in Section 7.3 for more detail.

Disturbance associated with the well pad would be similar to or less than the proposed well pad (Alternative B) as it would partially utilize an existing well pad. This directional well would need to offset the existing well to the south as it would be drilled south. The alternative pad would be identical in size to the proposed pad (230' X 300' with construction zones). The well pad for Alternative C would result in approximately 2.11 acres of new surface disturbance.

If the well is productive, a well-tie pipeline would be needed to transport produced gas. The pipeline is proposed to be approximately 50' in length within a 40' wide construction area. The proposed pipeline would be constructed over existing disturbance.

The well would be on federal lands overlying the same lease as Alternative B. Other than those specifics mentioned above, Alternative C mitigation measures and construction and production specifics would be similar to those described for Alternative B in section 2.2.

Drilling the well from this location would require a drilling rig to directionally drill approximately 415 feet. Alternative C would be within the limits of offset range and technical capabilities of BROG's directional drilling technologies.

Table 2.3 – Alternate C Proposed Well Information

Well Name	Well Number	Township	Range	Section	Footages	Lease #	Lease Issue Date
Klein	24N	26N	6W	34	Surface: 1582' FSL 1786' FWL	NMSF 0079265	4/1/1948
		26N	6W	34	Bottom Hole: 1190' FSL 1930' FWL		

County: Rio Arriba

Applicant: Burlington Resources Oil and Gas Company

Surface Owner: Bureau of Land Management

2.4 Alternatives Considered But Not Analyzed In Detail
No additional alternative has been considered for this project. The proposed location was selected for the best drainage of subsurface resources while protecting surface resources to the maximum extent possible.

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. Following the table, only the aspects of the affected environment that are potentially impacted are described.

Table 3.0 – Affected Environment and Basis for Determination No Further Analysis

Resource	Located in Project Area	Not in Project Area	Further Analysis Presented in Text	Basis for Determination
CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Air Resources	X		X	
Areas of Critical Environmental Concern		X	X	
Cultural Resources		X	X	
Native American Religious Concerns		X		A review of existing information indicates the project is not associated with any known Traditional Cultural Property.
Environmental Justice		X	X	
Farmlands, Prime or Unique		X	X	
Floodplains		X	X	
Invasive, Non-native Species		X	X	
Threatened or Endangered Species		X	X	
Wastes, Hazardous or Solid		X	X	
Water Quality - Surface/Ground	X		X	
Wetlands/Riparian Zones		X	X	
Wild and Scenic Rivers		X		There are no Wild and Scenic Rivers in Farmington Field Office no indirect effects are projected outside the FFO.
Wilderness		X		Project is greater than 30 miles from the nearest Wilderness Area or Wilderness Study Area. No indirect effects are projected.
NON-CRITICAL ELEMENTS				

General Topography/Surface Geology	X		X	
Mineral Resources	X		X	
Paleontology		X	X	
Soils	X		X	
Watershed/Hydrology	X		X	
Vegetation, Forestry	X		X	
Livestock Grazing	X		X	
Special Management Species		X	X	
Wildlife	X		X	
Wild Horse and Burros		X	X	
Recreation		X	X	
Visual Resources	X		X	
Public Health and Safety		X	X	

3.1 Air Resources

The proposed well is located in Rio Arriba County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington RMP/Environmental Impact Statement. In addition to the air quality information in the RMP cited above, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this RMP was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO2) methane (CH4); nitrous oxide (N2O); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

The 2003 RMP discussed ozone in the Baseline Air Quality and Impact Assessment sections. The National Ambient Air Quality Standard (NAAQS) at the time was 0.084 ppm. In March of 2008, the Environmental Protection Agency (EPA) announced a new primary 8-hour standard of 0.075 ppm.

Increased development in the Four Corners area including a proposed new coal fired power plant, increased oil and gas development, and population growth are all contributing to air quality concerns. Many residents are concerned with potential health impacts from other pollutants. An overall haze and plume of nitrogen oxides can often been seen in the skies, which impact visibility, and there are concerns for the ecosystem due to deposition of mercury and nitrogen.

In addition, the Environmental Protection Agency (EPA), on October 17, 2006, issued a final ruling on the lowering of the National Ambient Air Quality Standard (NAAQS) for particulate matter ranging from 2.5 micron or smaller particle size. This ruling became effective on December 18, 2006, stating that the 24-hour standard for PM2.5, was lowered to 35 ug/m^3 from the previous standard of 65 ug/m^3. This revised PM2.5 daily NAAQS was promulgated to better protect the public from short-term particle exposure.

This EA incorporates an analysis of the contributions of the proposed action to GHG emissions, and a general discussion of potential impacts to climate.

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 of which New Mexico is one. 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 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 the proposed action is considered a Class II air quality area. A Class II area allows moderate amounts of 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 near the proposed well 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. During the summers of 2000 through 2002, ozone levels in San Juan County were approaching non-attainment. 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. At the present time, the San Juan County is classified as in attainment with the revised federal ozone standard of 0.075 ppm. Rio Arriba County is unclassified because of there are no ozone monitors sited in Rio Arriba County.

Greenhouse gases, including carbon dioxide (CO2) and methane (CH4), 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 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 CO2 Eq.). 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).

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 2007, the Intergovernmental Panel on Climate Change (IPCC) predicted a warming of about 0.2°C per decade for the next two decades, and then a further warming of about 0.1°C per decade. 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 are 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 action and subsequent actions.

In New Mexico, a recent study indicated that the mean annual temperatures have exceeded the global averages by nearly 50 percent since the 1970's (Enquist and Gori 2008). 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 percent of the geographical area of New Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state.

3.2 Areas of Critical Environmental Concern (ACECs)

Areas of Critical Environmental Concern (ACEC) were designated in the FFO/BLM 2003 FRMP, under authority of the FLPMA of 1976 allowing for multiple use of lands administered by the BLM. The ACEC designation pertains to "..areas within public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards." (FLPMA 1976 Sec. 103, 43 U.S.C. 1702 et seq.).

The action alternatives (Alternatives B and C) would not be located in any BLM/FFO designated Areas of Critical Environmental Concern (ACECs).

3.3 Cultural Resources

Major emphasis of the BLM cultural resource program is the protection, preservation, and enhancement of cultural resources for present and future generations. Cultural or historic values are normally considered within the realm of the National Historic Preservation Act (NHPA) of 1966 (PL 89-665), as amended. The NHPA requires that federal agencies take into account the effect of federal undertakings upon "historic properties" and ensure that proposed land uses, initiated or authorized by BLM, avoid inadvertent damage to federal and non-federal "historic properties." Compliance with Section 106 responsibilities 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 the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. The protection and potential criminal or administrative penalties for disturbing without authorization important cultural or historic sites, also known as "archaeological resources," is governed by the Archaeological Resources Protection Act (ARPA) of 1979 (PL 96-95), as amended. The identification of "historic properties" and "archaeological resources" is normally completed with field inventories or through reference to existing records.

The action alternatives (Alternatives B and C) 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 (aka Anasazi; 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 (2003) and will not be reiterated here.

A BLM Class III inventory was conducted on the proposed action area (Alternative B) and no cultural or historical sites were located (Report No. 2008-237). No cultural resources inventory has been conducted for Alternative C. If Alternative C was developed, a level III inventory would need to be conducted prior to any construction activities. If as a result of the inventory it was determined that cultural or historic sites would be damaged or disturbed, then Alternative C, in its present form, would cease to be a viable alternative.

3.4 American Indian Religious Concerns

American Indian religious concerns are legislatively considered under several acts and Executive Orders, namely the American Indian Religious Freedom Act of 1978 (PL 95-341), the Native American Graves Protection and Repatriation Act of 1990 (PL 101-601), and Executive Order 13007 (1996; Indian Sacred Sites). In summary, these require, in concert with other provisions such as those found in the NHPA and ARPA, that the federal government carefully and proactively take into consideration traditional and religious Native American culture and life and ensure, to the degree possible, that access to sacred sites, the treatment of human remains, the possession of sacred items, the conduct of traditional religious practices, and the preservation of important cultural properties are considered and not unduly infringed upon. In some cases, these concerns are directly related to “historic properties” and “archaeological resources”. In some cases elements of the landscape without archaeological or other human material remains may be involved. Identification of these concerns is normally completed during the land use planning efforts, reference to existing studies, or via direct consultation.

A review of existing information compiled during previous land use planning efforts, existing studies, or via direct consultation indicates the action alternatives are not within a known Traditional Cultural Property.

3.5 Environmental Justice

Executive Order 12898 requires federal agencies to assess projects to ensure there is no disproportionately high or adverse environmental, health, or safety effects on minority and low-income populations. Minorities comprise a large proportion of the population residing inside the boundaries of the Farmington Field Office (see pages 3-106 to 3-107 of the PRMP/FEIS for more details on ethnicity and poverty rates).

3.6 Farmlands, Prime or Unique

Several of the watersheds within the Farmington Field Office boundaries have some soils meeting the definition of prime farmland, all of which must be irrigated to produce high quality crops (BLM 2003a, pg 3-19).

The action alternatives would not be located within any soil units known to contain prime or unique farmlands (BLM 2003a, pg 3-22).

3.7 Floodplains

A review of the Federal Emergency Management Agency floodplain maps indicates the action alternatives are not located within any designated floodplains.

3.8 Invasive, Non-Native Species

The objective of the Farmington Field Office weed management program is to detect invasive plant species populations, prevent the spread of new invasive populations, manage existing populations using

the tools of integrated weed management and eradicate invasive populations, using the safest environmental methods available. For all actions on public lands that involve surface disturbance or rehabilitation, reasonable steps would be required to prevent the introduction or spread of noxious weeds, including requirements for using weed seed–free hay, mulch and straw.

No invasive or noxious weeds were encountered during the onsite inspection of the proposed action (Alternatives B). Field inspection of the Alternative C location has not been made. Potential exists for non-native weeds to be present on the existing well pad where the Alternative C pad would be located. BLM GIS data of known invasive or noxious weed populations indicate no known weed populations to be in or nearby the area of the action alternatives.

3.9 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 proposed action which may affect federal listed threatened or endangered species or species proposed for listing. FFO reviewed and determined that the proposed action B is in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. #2-22-01-I-389). No further consultation with the Service is required.

Table 3.9 – Species listed by the United States Fish and Wildlife Service (USFWS) under the authority of the Endangered Species Act of 1973, with potential to occur in Rio Arriba County.

Common Name (scientific name)	Status*	Habitat Associations	Presence**
MAMMALS			
Black-footed ferret *(Mustela nigripes)*	E	Open grasslands with year-round prairie dog colonies.	NP
New Mexican meadow jumping mouse *(Zapus hudsonius luteus)*	C	Riparian zones along permanent waterways with dense and diverse vegetation consisting of grasses, sedges, and forbs.	NP
BIRDS			
Southwestern willow flycatcher *(Empidonax traillii extimus)*	E	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	NP
Least tern *(Sterna antillarum)*	E	Breeds on sandbars or sandy shorelines or perennial rivers, lakes, and reservoirs and forages over open waters.	NP
Mexican spotted owl *(Strix occidentalis lucida)*	T	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	NP
Yellow-billed cuckoo *(Coccyzus americanus)*	C	Breeds in riparian woodlands with dense, understory vegetation.	NP
FISH			
Rio Grande silvery minnow *(Hybognathus amarus)*	E	Perennial reaches of the Rio Grande and Pecos Rivers.	NP
Rio Grande cutthroat trout *(Oncorhynchus clarki virginalis)*	C	Perennial headwater tributaries within the subspecies' native range (primarily within the Rio Grande watershed)	NP

Sources: New Mexico Natural Heritage Program 2005, NM Rare Plant 1999, USFWS 2007	
Status* E = Federally listed Endangered T = Federally listed Threatened C = Candidate	**Presence**** K = Known, documented observation within project area. S = Habitat suitable and species suspected to occur within the project area. NS = Habitat suitable but species is not suspected to occur within the project area. NP = Habitat not present and species unlikely to occur within the project area.

3.10 Wastes, Hazardous or Solid

The Resource Conservation and Recovery Act (RCRA) passed in 1976, establishes a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The U.S. Environmental Protection Agency (EPA) regulations define solid wastes as any "discarded materials" subject to a number of exclusions. A "hazardous waste" is a solid waste that is (1) is listed by the EPA as a hazardous waste, (2) exhibits any of the characteristics of hazardous wastes (ignitability, corrosivity, reactivity, or toxicity) or (3) is a mixture of solid and hazardous waste. A 1980, amendment to RCRA conditionally exempted from regulation as hazardous wastes, "drilling fluids, production waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas. On July 6, 1988, EPA determined that oil and gas exploration, development and production (ED&P) wastes would not be regulated as hazardous wastes under RCRA. A simple rule of thumb was developed for determining if an ED&P waste is likely to be considered exempt or non-exempt from RCRA regulations: If (1.) the waste came from down-hole, or (2.) the waste was generated by contact with the oil and gas production stream during removal of produced water or other contaminants, the waste is most likely to be considered exempt by EPA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA), passed in 1980, deals with the release (spillage, leaking, dumping, accumulation, etc.) or threat of a release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as hazardous substances under CERCLA. The New Mexico the Oil Conservation Division (OCD) administers hazardous waste regulations for oil and gas activities in New Mexico.

No hazardous or solid waste materials are present at the Alternative B site. No such waste is expected to exist at the Alternative C location. The notification of releases such as natural gas, natural gas liquids, and petroleum, outside a facility site is required under CERCLA and under BLM NTL-3A.

3.11 Water Quality – Surface/Ground

Availability of water quality data, like stream-flow data, is largely limited to the perennial streams in the northern part of the San Juan Basin. The water quality of the perennial streams varies from upstream to downstream and is strongly influenced by the type of rock and soils with which the water has been in contact. In the upper reaches, the perennial streams have relatively low concentrations of dissolved solids. In the middle and lower reaches, the streams contain progressively more magnesium, calcium, sodium and sulfate concentrations and vary according to flow conditions.

Quality data for the ephemeral runoff south of the San Juan River are limited to only a few observations at sampling stations associated with the USGS coal hydrology program. Ephemeral flows are generally very poor quality water due to the highly erosive and saline nature of the soils. Sparse vegetative cover and rapid runoff conditions are characteristic of the area.

There are no perennial water resources within the immediate vicinity of the action alternatives. The action alternatives are located on Gonzales Mesa, which drains 1.1 miles east into Tapicito Creek. Tapicito Creek flows west approximately 4.0 miles into Largo Canyon, which drains into the San Juan River (perennial) approximately 30.3 miles north west.

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 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 and 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.

The operator proposes to set surface casing to a depth of 250 feet, or as specified by the BLM, to protect any shallow aquifers. An operation plan with the proposed casing program to protect the aquifers would be submitted with the APD.

3.12 Wetlands/Riparian Zones
Field inspection of the proposed action area and a review of BLM GIS data on the action alternatives indicate the action alternatives are not located within any riparian or wetlands habitat.

3.13 General Topography/Surface Geology
The action alternatives would be located on Gonzales Mesa in gradually sloping mesa top terrain. Elevation in the immediate project area ranges from 6,720-6,740 feet.

3.14 Mineral Resources
Federal lands in the San Juan Basin are important sources of mineral materials for construction projects in the region, including sand and gravel, rock and stone and other fill materials. The action alternatives are not located on any permitted surface mineral mining operation or free use area.

3.15 Paleontology
The Farmington Field Office Resource Management Plan identified specific areas within the region as Specially Designated Areas (SDA) for the protection of paleontological resources within the Nacimiento Formation.

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

The San Jose Formation found within the proposed project area is not known to contain any paleontological resources. No fossils are known to occur within or proximate to the proposed project area.

3.16 Soils
The soils in the San Juan Basin were formed primarily in 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.

Soils in the immediate area of the action alternatives are comprised of the Orlie fine sandy loam. The different characteristics of this soil type are listed below.

Table 3.16.1

Characteristic	Orlie
Type	Brown fine to brown clay loam
Slope	1-8%
Depth	3-60 inches
Surface Runoff	Medium
Water Erosion	Moderate
Soil Blowing	Moderate
Drainage Class	Well drained
Available Water Cap.	Very high
Permeability	Moderately slow
Parent Material	Sandstone and Shale

3.17 Watershed – Hydrology
The San Juan Basin consists of broad mesas interspersed with many deep canyons with steep canyon walls, dry washes, entrenched narrow valleys, and alluvial fans and floodplains. Elevations range from approximately 4,800 feet, where the San Juan River flows into Utah, to approximately 8,800 feet near the Jicarilla Apache land, and near 7,300 feet near Lindrith, New Mexico. The planning area is divided into watersheds based on the Hydrologic Units (4th level) delineated by the USGS. Principally, the administrative area under the jurisdiction of the Farmington Field Office consists of five of these 4th level hydrologic watershed units. These watershed units are: (1) Middle San Juan, (2) Animas, (3) Upper San Juan, (4) Blanco Canyon, and (5) Chaco. The action alternatives are within the Blanco Canyon watershed.

3.18 Vegetation, Forestry
The action alternatives would be located within a pinon and juniper woodland and sagebrush vegetation community. The proposed action would result in the removal of 5-15 small piñon and juniper trees to be mowed and incorporated into the topsoil. Alternative C would overlap an existing well pad.

3.19 Livestock Grazing
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 four authorizations issued under section 15 of the Taylor Grazing Act to the Navajo Tribe that authorizes grazing on 35 allotments. There are an additional 30 section 15 authorizations that permit grazing on 30 allotments in the Lindrith, NM area.

The action alternatives are located within the Gonzales Mesa Allotment #5116. The grazing allotment is operated from March 1 through February 28 annually with a maximum of 85 head of cattle. This allotment consists of 0% public land.

3.20 Wild Horse and Burros
There are no areas managed for wild horse or burros within the action alternatives area. The proposed action area lies over 20 miles southwest of the Jicarilla Wild Horse Territory. No wild horses or burros, or sign of wild horses or burros, exist nor are suspected to exist in the action area.

3.21 Wildlife
Mule deer and Elk are common in the action alternatives area as are other common mammalian species such as the coyote, deer mouse, and the black-tailed jackrabbit. Game birds found in the area may include mourning dove. Migratory birds that may be present can include the western bluebird, scrub jay, juniper titmouse, and common raven, principal raptors that may be seen are the Golden eagle, Red-tailed hawk and American kestrel. Nesting neo-tropical migratory birds could include the western bluebird, gray vireo, violet-green swallow, and ash-throated flycatcher. No evidence of nesting birds was observed in the proposed action area at the time of field inspections. The most notable reptiles are the eastern fence lizard and the short-horned lizard.

The action alternatives would not be located in a BLM/FFO designated wildlife SDA.

3.22 Migratory Birds
The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC §§ 701-715s, as amended), established protections for migratory birds and their parts (i.e. eggs, nests, and feathers) from taking, hunting, capture, transport, sale, or purchase. Information from the New Mexico PIF website (http://www.hawksaloft.org/pif.shtml), the New Mexico PIF highest priority list of species of concern by vegetation type, and the 2002 Birds of Conservation Concern Report for the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR) No. 16 have been used to develop a list of migratory bird species with potential to occur in the action area. The species listed below have not been located within the proposed action area.

Common Name (Scientific name)	Habitat Associations
Loggerhead shrike *(Lanius ludovicianus)*	Relatively xeric habitats dominated by shrubs and grasses.
Sage thrasher *(Oreoscoptes montanus)*	Sagebrush plains
Sage Sparrow *(Amphispiza belli)*	Sagebrush-grassland habitat
Black-throated sparrow *(Amphispiza bilineata)*	Xeric habitats dominated by open shrubs with areas of bare ground.
Burrowing Owl *(Athene cunicularia)*	Open grasslands or desert scrub. Presence of suitable nest burrow is critical prerequisite (often prairie dog burrows).
Bendire's Thrasher *(Toxostoma bendirei)*	Brushy desert, especially areas of tall vegetation, cholla cactus, creosote bush and yucca.
Ash-throated Flycatcher *(Myiarchus cinerascens)*	Arid and semiarid scrub, open woodland, and riparian woodlands.
Gray vireo *(Vireo vicinior)*	Found in desert scrub, mixed juniper or piñon pine and oak scrub associations, and chaparral, in hot, arid mountains and high plains scrubland.
Gray flycatcher *(Empidonax wrightii)*	Prefers open piñon-juniper forest, often with interspersed ponderosa, with an understory of shrubs.
Juniper titmouse *(Baeolophus ridgwayi)*	Warm, dry open woodland, especially juniper woodlands.
Piñon jay *(Gymnorhinus*	Found in piñon-juniper woodland, sagebrush, scrub oak, and chaparral communities, and sometimes in pine forests.

cyanocephalus)	
Cassin's kingbird *(Tyrannus vociferans)*	Found in open country with scattered trees or open woodlands including piñon-juniper.
Black-throated gray warbler *(Dendroica nigrescens)*	Found in pine and mixed oak-pine woodlands.

3.23 Special Management Species
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. Special Management Species with potential to occur in the action alternatives area are listed in Table 3.23.

Table 3.23– Special Management Species of the BLM/FFO and their potential to occur in the action alternatives area.

Common Name *(Scientific name)*	Status*	Habitat Associations	Presence**
BIRDS			
American peregrine falcons *(Falco peregrinus anatum)*	SMS NM-T	Nest in ledges or potholes on cliffs in wooded/forested habitats; Forage over riparian woodlands, coniferous & deciduous forests, shrublands, prairies.	NS
Ferruginous hawk *(Buteo regalis)*	SMS	Breed in open country, usually prairies, plains and badlands; semidesert grass-shrub, sagebrush-grass & piñon-juniper plant associations.	NS
Golden eagle *(Aquila chrysaetos)*	SMS	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	NS
Bald eagle *(Haliaeetus leucocephalus)*	SMS NM-T	Nests in forested areas adjacent to large bodies of water.	NP
Burrowing Owl *(Athene cunicularia)*	SMS	Open grasslands or desert scrub. Presence of suitable nest burrow is critical prerequisite (often prairie dog burrows).	NP
Prairie falcon *(Falco mexicanus)*	SMS	Open: grassland, desert scrub, rangeland, agricultural; nest in cavities, ledges, on cliffs, trees, power structures.	NS
Mountain plover *(Charadrius montanus)*	SMS	Lowland grasslands, sites with grassland characterists (alkali flats, agricultural lands).	NP
Yellow-billed cuckoo *(Coccyzus americanus)*	SMS C	Breeds in riparian woodlands with dense, understory vegetation.	NP
PLANTS			
Brack's hardwall cactus *(Sclerocactus cloveriae ssp brackii)*	SMS NM-E	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft.)	NP
Aztec gilia	SMS	Salt desert scrub communities in soils of the	NP

(Aliciella formosa)	NM-E	Nacimiento Formation (5,000-6,000 ft).	
Sources: BLM 2005, New Mexico Natural Heritage Program 2005, NM Rare Plant 1999, USFWS 2007			
Status* SMS = BLM Special Management Species C = Federal Candidate NM-E = State of NM Endangered NM-T = State of NM Threatened		**Presence**** K = Known, documented observation within project area. S = Habitat suitable and species suspected to occur within the project area. NS = Habitat suitable but species is not suspected to occur within the project area. NP = Habitat not present and species unlikely to occur within the project area.	

The action alternatives area provides potential foraging habitat for the American peregrine falcon, Prairie falcon, Golden eagle, and Ferruginous hawk. The action area does not provide nesting habitat for the four raptors. No birds of prey or signs of their presence were observed during onsite inspections. The nearest recorded SMS raptor nest, a Golden Eagle nest, lies 1.5 miles north of the action alternatives.

3.24 Visual Resources

Visual Resource Management (VRM) on public lands is conducted in accordance with BLM Handbook 8410 and BLM Manual 8411. Further details of the Farmington Field Office VRM Program are contained on pages 2-9 to 2-10 and 3-61 to 3-63 of the Farmington PRMP/FEIS.

The action alternatives are located in an area designated by the BLM/FFO as VRM Class IV. Management objectives for Class IV designation include allowing for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements (BLM Manual 8431, Appendix 2).

3.25 Recreation

The Farmington Field Office has set aside several areas for special use and manages them as Specially Designated Areas (SDA). The action alternatives would not be in a SDA for recreation. Dispersed recreational use of the areas may include occasional hunting during the hunting season.

3.26 Public Health and Safety

All worker safety is governed by Occupational Safety and Health Administration (OSHA) safety laws and regulations. Worker safety incidents must also be reported to the BLM under the procedures of Notice to Lessee (NTL)-3A. Pipeline safety regulations are administered by OSHA as well as Department of Transportation (DOT) regulations. Pipeline safety regulations (49 CFR Parts 190 and 192) govern design, construction and operation of gas transmission lines. Any incidents involving DOT-regulated pipelines must be reported under these regulations (District 2003a).

Most substances and wastes generated at oil and gas facilities are exempt from regulation under the Resource Conservation and Recovery Act (1976). The Environmental Protection Agency (EPA) and DOT regulate materials associated with well construction and production activities that are classified as hazardous. When significant amounts of chemicals are stored on-site, governmental agencies will be notified as required under the Emergency Planning and Community Right to Know Act (1986). The notification of releases such as natural gas, natural gas liquids, and petroleum, outside the facility site is required under the Comprehensive Environmental Response Compensation and Liability Act, 1980 (CERCLA) and under BLM NTL-3A. The well location must have an informational sign, as directed under 43 CFR 3160.

Additional hazards to the general public in the proposed action area include safety hazards associated with increased traffic during the construction of the proposed or alternative well. General hazards around producing oil and gas fields such as accidental pipeline failures and moving equipment like pump jacks are potential/present in the action area. Hydrogen sulfide gas is not known to be or expected to be a problem within the action alternatives area.

4.0 Environmental Consequences and Proposed Mitigation Measures

No Action
Under the No Action Alternative, the proposed well 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.

Action Alternatives
A summary of potential surface disturbance is presented in Table 4.0. Descriptions of potential effects on individual resources for the proposed action are presented in the following text. Also described are potential mitigation measures that could be incorporated by the BLM where appropriate as Conditions of Approval attached to the permit.

Table 4.0 – Summary of Disturbance

Facility		Alternative B		Alternative C*		Duration
		Feet	Acres	Feet	Acres	
Well Pad	New Disturbance	230 x 300	1.58	138 x 300	0.95	Long Term
	Existing Disturbance			92 x 300	0.63	Long Term
Construction Zone	New Disturbance	1,260 x 50	1.45	1,008 x 50	1.16	Short Term
	Existing Disturbance			252 x 50	0.29	Short Term
Pipeline	New Disturbance	300 x 20	0.14			Short Term
	Existing Disturbance	172 x 20	0.08	50 x 40	0.04	Long Term
Road	New Disturbance	330 x 30	0.23			Long Term
	Existing Disturbance	172 x 30	0.12			Long Term
Total new disturbance			3.40		2.11	

(*) - Approximate disturbances based on similar BROG well location proposals.
Short-term impacts are those which can be stabilized or mitigated rapidly (within 5 years). Long-term impacts are those that would substantially remain for more than 5 years.

For the purpose of this EA, potential impacts have been divided into three categories:

> **High:** - as defined in CEQ guidelines (40 CFR 1500-1508), impacts which are substantial in severity and therefore should receive the greatest attention in decision-making.
> **Moderate:** - impacts that cause a degree of change that is easy to detect, but do not meet the criteria for significant impacts.

Low: - impacts which cannot be easily detected, and cause little change in the existing environment.

4.1 Air Resources

4.1.1 Direct and Indirect Effects

4.1.1.1 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 northwestern 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 Farmington Field Office has resulted in an average total of approximately 450 to 500 wells drilled on federal leases annually. These wells would contribute an incremental increase to 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, NOx and VOCs 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 Farmington RMP demonstrated 522 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, NOx, and VOCs 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 well would not have a measurable effect on climate change due to uncertainty and incomplete and unavailable information; therefore is not possible to determine the effects on climate change on a regional, national, or global scale.

Consumption of oil and gas developed from the proposed well is expected to produce GHGs, NOx and VOCs. 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. Regional and global transportation, metropolitan traffic, fires (including wildfires, controlled burns and use of domestic fire places), and power plant emissions from the west are all parts of the equation. Regional air quality modeling conducted for the Northern San Juan Basin Coal Bed Methane FEIS Project in August 2006, determined that potential cumulative visibility impacts to Federal PSD Class I Areas (Mesa Verde National Park and the Wenimuche Wilderness Area) could occur at some unspecified time in the future.

The NAAQS are set for the most common and widespread pollutants. The standards are concentrations of air pollution above which the EPA has determined that serious health and welfare consequences could

occur. If the concentrations are below the NAAQS, there are no expected adverse effects to humans and the environment.

4.1.1.2 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 the proposed action 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 Potential Mitigation

The FFO has been a participant of the Four Corners Air Quality Task Force (FCAQTF) since its inception back in 2002 when it was known as the Four Corners Ozone Task Force. Because of the unanswered questions raised by these modeling efforts, the FCAQTF has continued to look at air quality issues in the Four Corners region. The FCAQTF is comprised of a broad base of representatives including federal, state, Indian, and local governments, as well as industry, interest groups, and concerned community members. The FCAQTF has several working groups, which worked on the development of a mitigation options report (completed December 2007), to serve as a resource and guide to the regulatory agencies. The responsible agencies may use the report as the basis for developing air quality management plans for the region. This may include developing new and revising existing regulations, supporting new legislation, developing new outreach and information programs, and developing and/or expanding voluntary programs for emission reductions.

Additional air quality modeling conducted since completion of the 2003 FEIS/RMP and provisions in the ROD for the FEIS/RMP provide for applications of additional emission controls if requested by the NMAQB. Based on this modeling, the NMAQB issued an interim directive that all newly issued APDs limit compressor emissions to no more than 2 grams per horsepower hour of N2O for engines of 300 horsepower or less. The FFO has complied with this directive through a condition of approval (COA) which has been in effect since August 1, 2005. To date, NMAQB has made no other such requests.

Currently, development on Federal minerals in New Mexico's San Juan Basin is at a lower level than forecast in the Reasonable Foreseeable Development (RFD) Scenario prepared in 2001 for the FFO EIS/RMP. The impacts forecast by the RFD are still valid. At the time the 2003 EIS/RMP was written, ozone readings did not represent a violation of the NAAQS for this pollutant. The New Mexico Environment Department Air Quality Bureau has determined that the 2007 – 2009 ozone design value for San Juan County is 0.070 ppm. The design value for the county must be greater than the revised 8-hour ozone standard of 0.075 ppm for a nonattainment designation.

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" subactivities 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's regulatory jurisdiction over field production operations 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. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; placement of compressors engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads; and water dirt roads during periods of high use in order to reduce fugitive dust emission. The significant threshold for particulate matter of 35 ug/m³ daily PM2.5 NAAQS is not expected to be exceeded under the proposed action alternative.

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 and NMAQB to help facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

4.2 Areas of Critical Environmental Concern

No effect.

4.3 Cultural Resources

4.3.1 Direct and Indirect Effects

Direct effects normally include alterations to the physical integrity of the cultural resources. If a cultural resource is significant for other than its scientific information, direct effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. Based on a review of the archaeological reports and the assessment of the undertaking in this area, the BLM cultural resources staff has determined that the proposed action will have no effect on cultural resources.

4.3.2 Potential Mitigation

If selected, Alternative C would be surveyed for cultural resources prior to any construction. Mitigation strategies may be required to protect sites adjacent to the action area. If mitigation strategies are not sufficient to protect cultural resources discovered, then Alternative C would be abandoned as a viable alternative.

If any heritage materials are encountered during the construction phase of the chosen action alternatives, the contractor will immediately stop all construction activities and notify the BLM. Should a site be evaluated as eligible for inclusion in the National Register of Historic Places, it would be treated in the proper manner to mitigate any effects of construction, according to the guidelines set by the BLM and NM SHPO.

4.4 American Indian Religious Concerns

4.4.1 Direct and Indirect Effects

The action alternatives are not known to physically threaten the integrity of 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 threats to remains that fall within the purview of NAGPRA or ARPA. Although none have been identified,

any heretofore unidentified effect of the proposed action to Native American Religious Concerns is expected to be negligible in both the short and long term.

4.5 Environmental Justice

4.5.1 Direct and Indirect Effects

No minority or low income populations would be directly affected in the vicinity of the action alternatives. Indirect effects could include effects 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 effects could include a small increase in activity and noise disturbance in areas used for grazing, wood gathering, or hunting. However, these effects would apply to all public land users in the project area. A more detailed description of potential impacts is contained in the PRMP/FEIS p.4-120 and 4-129.

4.6 Farmlands, Prime or Unique

No effect.

4.7 Floodplains

No effect.

4.8 Invasive, Non-native Species

4.8.1 Direct and Indirect Effects

Weeds (invasive/nonnative vegetation) can be introduced in many ways, including wind, vehicles, heavy equipment, livestock, and wildlife. The potential for weeds to invade or spread within an area is increased when native vegetation is removed and physical disturbance to the soil occurs. Establishment of weeds usually occurs in disturbed sites such as oil/gas pads, pipelines, stock water ponds, and edges of roads.

The Farmington Field Office and the operator would follow BLM policy to control and manage invasive nonnative vegetation species. There were no invasive weeds encountered during the onsite inspection of the proposed action.

4.8.2 Potential Mitigation

It would be the responsibility of the operator to control and eradicate all noxious/invasive weeds within either project area during the life of the project.

4.9 Threatened or Endangered Species

No year round prairie-dog colonies occur within the action alternative areas to support black-footed ferret (Mustela nigripes). The project areas do not occur within the Rio Grande watershed and is therefore beyond the known distribution of the Rio Grande silvery minnow (Hybognathus amarus). No large water bodies are present on the proposed project area, thus habitat to support the Least tern (Sterna antillarum) is not present. No riparian habitat was present to support southwest willow flycatcher (Empidonax traillii extimus). The action alternatives are not located within designated critical habitat for the Mexican spotted owl (Strix occidentalis lucida).

4.10 Wastes, Hazardous or Solid

Typical wastes associated with the action alternatives would include trash, sewage, produced water, and produced hydrocarbons. During drilling and completion, a trash receptacle and a chemically treated portable toilet would be on location for trash and sewer disposal. All produced hydrocarbons would be put in tanks on location during completion work. Produced water would be put in onsite tanks or within lined reserve pit during completion work. All wastes would be disposed of in a proper manner as required by federal and state law and as described in the COAs.

When significant amounts of chemicals are stored on-site, governmental agencies would be notified as required under the Emergency Planning and Community Right to Know Act (1986). The notification of releases such as natural gas, natural gas liquids, and petroleum, outside the facility site is required under the Comprehensive Environmental Response Compensation and Liability Act, 1980 (CERCLA) and under BLM NTL-3A. The well location must have an informational sign, as directed under 43 CFR 3160.

4.11 Water Quality: Surface and Groundwater

4.11.1 Direct and Indirect Effects

There are no perennial water sources, springs, seeps, wetlands or well defined ephemeral drainages within the action alternatives areas. Effects to ground water resources would be low due to mitigation measures such as casing. Below casing depth, losses of produced water or mud may occur to differing degrees in various formations, but the losses are considered to be low and contained to within a few feet of the well bore. These losses are not considered to be substantial because of the very small amount of groundwater that could be affected (BLM 2003a, p. 4-14).

4.11.2 Potential Mitigation

Culverts, diversions, and silt traps, where indicated in the attached COA's, would be used to stabilize and reduce sediment flow. The Operator would be responsible to ensure an adequate casing program is designed to protect ground water from contamination. Onshore Order #2 requires that all useable aquifers be protected by casing or cementing. All pits would be lined to prohibit drilling and production fluids from infiltrating into groundwater resources or flowing into surface water resources.

4.12 Wetlands/Riparian Zones

No effect.

4.13 General Topography/Surface Geology

No prominent topographical features would be removed or disturbed by the action alternatives.

4.14 Mineral Resources

No effect.

4.15 Paleontology

The San Jose Formation found within the proposed project area is not known to contain any paleontological resources. No fossils are known to occur within or proximate to the proposed project area.

4.15.1 Direct and Indirect Effects

Although no paleontological resources are known to occur within the proposed project area, impacts to paleontological resources from the proposed project implementation could possibly occur. Direct impacts of the proposed project to fossil localities could result from the ground disturbing activities or the disturbance of the stratigraphic context in which they are located. This project could also create indirect impacts to areas by changing erosion patterns. Additionally there could be an increase in off-road vehicular access from the project area for recreational activities. An increase in human activity in the area could increase the possibility of unauthorized removal or other alterations to paleontological resources in the area. Potential impacts to paleontological resources as a result of the proposed action would be low and long-term.

4.15.2 Potential Mitigation

All BLM/FFO paleontological resources stipulations will be followed as indicated in the COAs, attached to the APD. These stipulations may include, but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. Upon review, a determination for final project clearance and stipulations shall be issued by the BLM/FFO.

If previously undocumented paleontological sites are encountered during construction, all activities shall stop in the vicinity of the discovery and the BLM will be immediately notified. The site will then be evaluated. Mitigation measures such as data recovery may be required by the BLM to prevent impacts to newly identified paleontological resources.

4.16 Soils

4.16.1 Direct and Indirect Effects

Due to the nature of drilling for oil and gas there would be soil disturbance at either action alternatives location. All areas to be disturbed would be bladed as needed to create flat surfaces for operating equipment and vehicles. Depth of soil disturbance would increase with rougher topography. Available topsoil would be stockpiled for reclamation. The cut and fill slopes on the action alternatives would be especially susceptible to wind and water erosion until vegetation has been reestablished (one to two growing seasons). The potential impacts would be dependant, in part, on seasonal variation in rainfall and snowmelt run-off, terrain, soil type, prevailing winds, and vegetative cover. The heaviest amounts of erosion will be short-term (one to two growing seasons) until the vegetation has established. Effects to soils would likely be low to moderate for the proposed action.

4.16.2 Potential Mitigation

Re-vegetation will reduce or minimize impacts created by water and/or wind erosion. Approximately half of the well location and the entire well-tie pipeline disturbance would be reclaimed. The remaining surface disturbances would remain disturbed for the life of the well for production equipment and vehicle travel surfaces. Following final down-hole plugging and abandonment of the well, the entire well pad and access road would be reclaimed.

Other mitigation could include culverts, diversion ditches, berms, and other such soil erosion control structures (see attached COAs). Existing dirt roadways may be re-ditched and re-crowned or surfaced at the direction of the BLM, to minimize sedimentation.

4.17 Watershed – Hydrology

4.17.1 Direct and Indirect Effects

The action alternatives would comply with water quality, quantity, and ground water protection standards under the Clean Water Act of 1977, and the Safe Drinking Water Act of 1974 as amended. The proposed action would disturb less than five (5) acres; currently, a Storm Water Pollution Prevention Plan for the Environmental Protection Agency (EPA) under the Clean Water Act would not be required.

The Operator would be required to comply with any future changes to the National Pollutant Discharge Elimination System permitting process for storm water discharge from construction activities enacted by the EPA prior to the completion of well construction and site stabilization. The action alternatives would not cross any ephemeral washes; therefore, a Nationwide 404 Permit from the U.S. Army Corps of Engineers, Albuquerque District Office would not be required.

4.17.2 Potential Mitigation

Drainage diversions would be constructed for either action alternative. The diversions would be directed such that water would drain away from the pad. Culverts would be installed where needed to maintain drainages along access roads (see attached COA's).

4.18 Vegetation, Forestry

4.18.1 Direct and Indirect Effects

Direct impacts would be the removal of shrubs, and grasses to construct the well pad, access road, and pipeline for the proposed action. The proposed action would remove approximately 3.60 acres of established vegetation and would result in the removal of 5-15 small piñon and juniper trees to be mowed and incorporated into the topsoil. Alternative C would remove approximately 2.11 acres of established vegetation. Indirect impacts would be the remaining long-term (20-30 years) disturbance of the well location used for production equipment and vehicle driving surfaces. The removal of vegetation is projected to have low effects on the general vegetation as the species of plants to be removed are widespread and abundant in the action area and throughout the San Juan Basin.

4.18.2 Potential Mitigation

Under either action alternative the completion of the construction, drilling and the well being placed into service, the rehabilitation and reseeding of the unused portion of the well pad and pipeline would occur. Those surfaces used for production equipment and vehicle travel would be reclaimed as directed by the conditions of approval (COA's) after final abandonment of the well.

4.19 Livestock Grazing

4.19.1 Direct and Indirect Effects

There would be a temporary loss of 3.60 acres of forage under Alternative B and 2.11 acres under Alternative C prior to rehabilitation and reseeding. There would be no reduction in AUMs.

4.19.2 Potential Mitigation

Mitigation measures associated with soils, water, riparian and wildlife serve to lessen impacts to the rangeland components essential for rangeland health.

4.20 Wild Horse and Burros

No effect.

4.21 Wildlife

4.21.1 Direct and Indirect Effects

Some temporary displacement of wildlife could occur during the construction, drilling and completion phase of the project. Potentially affected species include the cottontail, blacktailed jackrabbit, mule deer, coyote, and other species that typically utilize such habitat. Potentially affected migratory bird species listed by New Mexico Partners in Flight as priority for management include black-throated gray warbler, gray flycatcher, ash-throated flycatcher, juniper titmouse, piñon jay, Western bluebird, mountain bluebird, Cassin's kingbird, and Say's phoebe for piñon-juniper habitat; and Bendire's thrasher, sage thrasher, loggerhead shrike, sage sparrow, and brewer's sparrow for sagebrush habitat. Wildlife and bird species may lose nesting/den/burrow habitat and foraging habitat.

The proposed action would remove 3.60 acres of potential habitat for such species, and Alternative C would remove 2.11 acres of potential habitat. There are approximately 435,500 acres of sagebrush or desert scrub habitat and 633,400 acres of piñon-juniper woodland in the BLM/FFO planning area (BLM 2003a, pg 3-31). Habitat in the action area is not unique to the planning area and is common throughout the northern half of the planning area. Effects to wildlife would be low for oil and gas development that adheres to proper conditions of approval.

4.21.2 Potential Mitigation

Standard mitigation measures to protect or restore wildlife habitat can be found in the RMP (December 2003) pages 2-25 and 2-26.

4.22 Migratory Birds

4.22.1 Direst and Indirect Effects

Adult migratory birds would not be directly harmed by the action alternatives because of their mobility and ability to avoid areas of human activity. Any nests within the area of the proposed action alternatives may be directly impacted, along with eggs and juveniles. The increased human presence during construction, drilling, and reclamation activities may indirectly disturb or displace adults from nests and foraging habitats for a short period of time, three months or less. Long term production operations would result in only a slight increase in human activity in the immediate proposed action area. Effects to the population status of migratory birds are not anticipated due to the mobility of individuals and the abundance of adjacent habitat for these species. In consideration of these factors, there would be low short-term effects to migratory birds, and minimal long-term effects as a result of the action alternatives.

4.22.2 Mitigation Measures

Project mitigation measures are designed to minimize effects on migratory birds and other wildlife. These measures include netting of any permanently open pits and vent caps on all open pipes to prevent bird entry and nesting.

4.23 Special Management Species

4.23.1 Direct and Indirect Effects

None of the action alternatives would result in any direct effect on any Special Management Species or their nests or roosts. Increases in noise and activity would be minimal and consistent with current

activities in the area. The action alternatives are not in close proximity to any raptor nests. There would be a temporary loss of potential foraging habitat for the Golden eagle, Ferruginous Hawk, Peregrine falcon, and Prairie falcon prior to rehabilitation and reseeding.

4.23.2 Potential Mitigation

Standard conditions of approval designed to protect wildlife and migratory birds would serve to protect Special Management Species (see Appendix 7.1).

4.24 Visual Resources

4.24.1 Direct and Indirect Effects

The action alternatives would be located in an area designated a Class IV VRM. The action alternatives would not be visible as a foreground or middle ground feature from any highway, county road, residence, or recreation area.

4.24.2 Potential Mitigation

New and old equipment on the chosen action alternative location would be painted juniper green to mimic the vertical elements of the adjacent vegetation.

4.25 Recreation

4.25.1 Direct and Indirect Effects

Construction, drilling, and production of the chosen action alternative would result in increased human activity, construction activity, and production activity and equipment in the area. Noise levels within the area would increase moderately during construction and drilling of the proposed well. Long-term increases in noise would be low. Equipment and activities would also similarly increase visual disturbance in the immediate area with moderate short-term and low long-term effects. Noise and visual impacts would be less noticeable as there are numerous existing gas and oil developments in the area. A potential indirect effect would be the displacement of some wildlife species from the area surrounding the well location. This could detract from the recreational experience for those recreational visitors hoping to encounter such wildlife.

4.25.2 Potential Mitigation

The action alternatives are outside any designated recreation SDA in an area that is not readily used by recreationists or managed for recreational opportunities. The Either action alternatives would be painted to help blend in with the surrounding scenery. Standard conditions of approval designed to protect wildlife and migratory birds would serve to limit effects to the activities of recreationally important animal species (see Appendix 7.1).

4.26 Public Health and Safety

4.26.1 Direct and Indirect Effects

The action alternatives are located in a somewhat remote area rarely frequented by individuals not involved in the gas and oil industry. No residences are located within one mile of the proposed action. Effects to public safety would be low for the short and long-term and would include increase traffic risks, chemical spills, pipeline failures, and equipment accidents.

4.26.2 Potential Mitigation

The operator is responsible for the proper training and the health of its employees. Occupational Safety and Health Administration (OSHA) safety laws and regulations, BLM Notice to Lessee (NTL)-3A, pipeline safety regulations 49 CFR Parts 190 and 192, the Emergency Planning and Community Right to Know Act (1986), and CERCLA 1980, amongst other legislation, have been enacted to ensure the health and safety of workers and the public at large. A well location must have an informational sign, as directed under 43 CFR 3160.

5.0 Cumulative Impacts

The leased area of the proposed action 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 approving this application for permit to drill. A general assumption, however, can be made: drilling this well may contribute to 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.

6.0 Consultation/Coordination

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

Table 6.0 – Summary of Public Contacts Made During Preparation of Document and Interdisciplinary Team

Public Contact	Title	Organization	Present at Onsite?
ID Team Member	**Title**	**Organization**	**Present at Onsite?**
Roger Herrera	Environmental Protect. Spec.	BLM	YES
Steven Merrell	Manager/Foreman	ConocoPhillips	YES
Maria Adkins	Third Party Contractor	Adkins Consulting	NO
Keri Caraher	Third Party Contractor	Adkins Consulting	YES
Consultation	**Title**	**Organization**	**Present at Onsite?**
Jim Copeland	Cultural specialist	BLM	NO
John Hanson	Wildlife specialist	BLM	NO
John Kendall	T&E specialist	BLM	NO
Sarah Scott	Natural Resource specialist	BLM	NO
Jeff Tafoya	Range specialist	BLM	NO
Barney Wegener	Riparian specialist	BLM	NO
Dale Wirth	Hydrology specialist	BLM	NO

6.1 References

Aztec Archaeological Consultants, LLC. (AAC); 2009. *A Cultural Resource Inventory of the Proposed Burlington Resources Klein Unit 24N Well Pad, Access Road, and Enterprise Field Services Pipeline in Rio Arriba County, NM* (Report No. 2008-237). Aztec, New Mexico.

Enquist, Carolyn and Gori, Dave. 2008. *Implications of Recent Climate Change on Conservation Priorities in New Mexico*. April 2008.

EPA Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007. Environmental Protection Agency, Washington, D.C. April 2009

Goddard Institute for Space Studies. 2007. *Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots*. New York, New York. (Available on the Internet: http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif)

Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Basis (Summary for Policymakers)*. Cambridge University Press. Cambridge, England and New York, New York. (Available on the Internet: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf)

Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2007, Synthesis Report. A Report of the Intergovernmental Panel on Climate Change.*

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)

New Mexico Natural Heritage Program. 2005. (Available at:http://nmnhp.unm.edu Latest update: 3 February 2006)

New Mexico Rare Plant Technical Council. 1999. *New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page.* (Available at:: http://nmrareplants.unm.edu Latest update: 18 January 2006).

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2006. *Web Soil Survey*. Version 1.1. NRCS. (Available at: http://websoilsurvey.nrcs.usda.gov/app Accessed June 22, 2006).

U.S. Department of the Interior, Bureau of Land Management. 2003a. *Farmington Proposed Resource Management Plan and Final Environmental Impact Statement*. Farmington, New Mexico.

U.S. Department of the Interior, Bureau of Land Management. 2003b. *Farmington Resource Management Plan Record of Decision*. Farmington, New Mexico.

U.S. Department of the Interior, Bureau of Land Management and U.S. Department of Agriculture Forest Service, San Juan Public Lands Center (SJPLC). 2006. *Final Environmental Impact Statement, Northern San Juan Basin Coal Bed Methane Project*. Durango, Colorado.

U.S. Department of the Interior, Bureau of Land Management, Farmington Field Office. 2005. *Farmington Field Office Special Status Species Management Policy*. Instruction Memorandum No. IM-NM200-2005-02.

U.S. Fish and Wildlife Service (USFWS).W.S. 2005. (Available at: http://ifw2es.fws.gov/EndangeredSpecies/lists/ListSpecies.cfm)

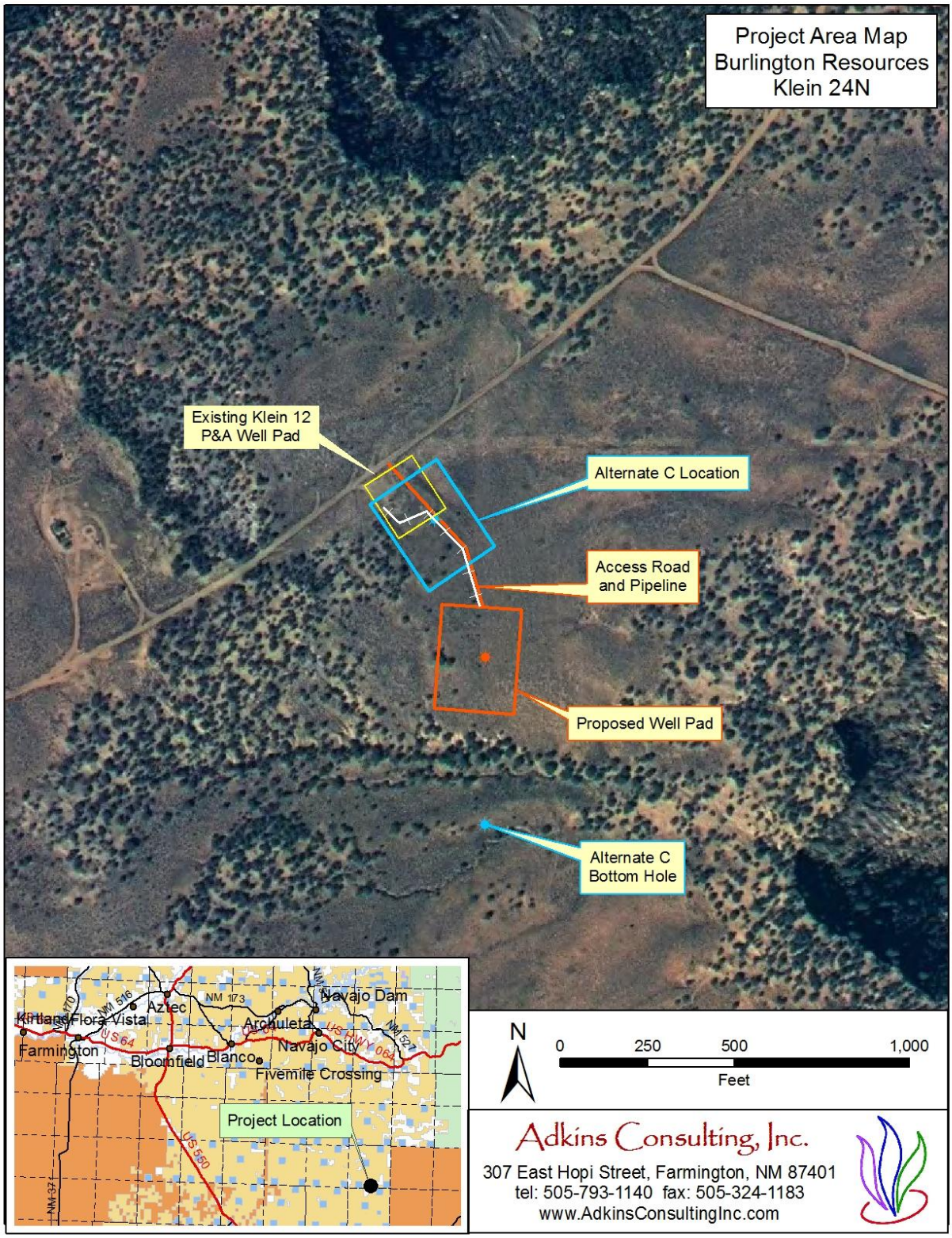
7.0 Appendices

7.1 APD/COA

See attachment. The APD and COAs contain additional information about the proposed action including maps of all facilities, roads, pipelines, power lines, etc.

7.2 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.

7.3 Action Area Map