BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE

ENVIRONMENTAL ASSESSMENT

FOR

Application for Permit to Drill
ConocoPhillips Company

Heaton LS No. 1M

Well Pad and Well-tie Pipeline

Lease # NMSF 078097
F010-2012-145

November 2011
(Revised February 2012)

Prepared by:

Adkins Consulting, Inc.
Environmental Permitting Services
Farmington - Durango

TABLE OF CONTENTS

	Page
1.0 Introduction	**1**
Purpose & Need	1
Conformance with Applicable Land Use Plan and Other Environmental Assessments	1
Federal, State or Local Permits, Licenses or Other Consultation Requirements	1
2.0 Alternatives Including the Proposed Action	**3**
Alternative A – No Action	3
Alternative B – Proposed Action	3
Alternative C – Full Alternative Action	3
3.0 Description of Affected Environment	**6**
Air Resources	7
Areas of Critical Environmental Concern (ACECs)	9
Cultural Resources	9
American Indian Religious Concerns	10
Environmental Justice	11
Farmlands, Prime or Unique	11
Floodplains	11
Invasive, Non-native Species	11
Wastes, Hazardous or Solid	11
Water Quality – Surface/Ground	12
Wetland/Riparian Zones	13
General Topography/Surface Geology	13
Mineral Resources	13
Paleontology	13
Soils	14
Watershed – Hydrology	15
Vegetation, Forestry	15
Livestock Grazing	16
Wild Horse and Burros	16
Wildlife	16
Migratory Birds	16
Special Management Species	18
Visual Resources	20
Recreation	20
Public Health and Safety	21
4.0 Environmental Consequences and Proposed Mitigation Measures	**22**
Air Resources	23
Areas of Critical Environmental Concern (ACECs)	25
Cultural Resources	25
American Indian Religious Concerns	26
Environmental Justice	26
Farmlands, Prime or Unique	26
Floodplains	26
Invasive, Non-native Species	27
Wastes, Hazardous or Solid	27
Water Quality – Surface/Ground	27
Wetland/Riparian Zones	28

General Topography/Surface Geology 28
Mineral Resources 28
Paleontology 28
Soils 28
Watershed – Hydrology 29
Vegetation, Forestry 29
Livestock Grazing 30
Wild Horse and Burros 30
Wildlife 30
Migratory Birds 31
Special Management Species 31
Visual Resources 32
Recreation 32
Public Health and Safety 33

5.0 Cumulative Impacts 34

6.0 Consultation/Coordination 35
References 36

7.0 Appendices 38
Project Area Map 39
Proposed Action Map 40
Alternative Action map 41

1.0 Introduction

A representative of ConocoPhillips Company filed an Application for a Permit to Drill (APD) with the Bureau of Land Management, Farmington Field Office (BLM/FFO) for the Heaton LS No. 1M well pad and well-tie pipeline. The proposed project is located in the SWSE/4 of Section 28, Township 31N, Range 11W, in San Juan 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 mineral resources 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 Heaton LS No. 1M well would allow ConocoPhillips Company to develop their lease and provide additional mineral resources for the national energy market, which would also generate federal and state tax revenue as well as revenue for ConocoPhillips 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

1.3.1 Clean Water Act of 1977

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, a 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.

1.3.2 Endangered Species Act of 1973

The Endangered Species Act (ESA) of 1973 requires all federal departments and agencies to conserve threatened, endangered, and critical and sensitive species and the habitats on which they depend, and to consult with the U.S. Fish and Wildlife Service (USFWS) on all actions authorized, funded, or carried out by the agency to ensure that the action will not likely jeopardize the continued existence of any threatened and endangered species or adversely modify critical habitat. Consultation with the USFWS, as required by Section 7 of the ESA, was conducted as part of the Farmington PRMP/FEIS (Consultation No. 2-22-01-I-389) to address cumulative effects of RMP implementation. The consultation is summarized in Appendix M of the PRMP/FEIS. Farmington Field Office staff reviewed the action alternatives and determined they would be in compliance with threatened and endangered species management guidelines outlined in the September 2002 Biological Assessment (Consultation No. 2-22-01-I-389). No further consultation with the U.S. Fish and Wildlife Service is required.

1.3.3 National Historic Preservation Act of 1966

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.

ConocoPhillips proposes to construct a well pad and well-tie pipeline in order to directionally drill and develop federal minerals in the Basin Dakota, Blanco Mesaverde, and Mancos formations. Access to the Heaton LS No. 1M action alternatives would be gained by traveling north on Highway 574 (Light Plant Road) for 1.9 miles from the intersection with Highway 516 in Aztec, New Mexico. Turn right and travel northeasterly approximately 1.5 miles. Turn right and travel southeasterly approximately 0.5 miles, keeping left at the 'Y', to the plugged and abandoned Heaton A No. 30 location on the right. The action alternatives are located on federal (BLM) surface, with federal minerals administered by the BLM/FFO. Total new surface disturbance for the Proposed Action would be approximately 2.03 acres, and total new disturbance for the Alternative Action would be 3.41 acres.

2.2 Alternative B – Proposed Action

The Proposed Action well pad would be 230 feet by 300 feet with an additional 50-foot construction buffer zone on all four sides of the well pad. The well pad would require between 4.5 and 6.4 feet of cut on the northeast side of the location, and between 0.3 and 8.3 feet of fill on the southwest side of the location. The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Production pits, if used, would be lined. Cut and fill slopes would be returned to the original contour upon reclamation. The Proposed well location would utilize approximately 1.0 acre of existing surface disturbance from the plugged and abandoned BP Heaton A No. 30 well location. Total new surface disturbance from the Proposed Action well pad location would be approximately 2.03 acres.

A diversion ditch would be developed on the northeast side of the location from corner five (5), around corner six (6), and towards corner two (2) back into the natural drainage channel. Potential storm water run-off would be diverted around and away from the well location.

No new access road would be developed and the existing access road for several wells in the vicinity would be utilized.

Once the Proposed well is completed, an associated 43-foot long, 40-foot wide pipeline ROW would be constructed within the proposed well pad area. The proposed pipeline would connect the proposed well to the existing Heaton No. 30 pipeline. No new surface disturbance would result from the construction of the Proposed well-tie pipeline.

2.3 Alternative C – Full Alternative Action

The Alternative Action well pad would be 230 feet by 300 feet with an additional 50-foot construction buffer zone on all four sides of the well pad. The well pad would require between 6.6 and 7.0 feet of cut on the northeast side of the location, and between 4.5 and 8.9 feet of fill on the southwest side of the location. The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Production pits, if used, would be lined. Cut and fill slopes would be returned to the original contour upon reclamation. Total new surface disturbance from the Alternative Action well pad location would be approximately 3.03 acres.

Diversions would be established above the cut slopes on the northeast sides of the well location and access road, draining potential storm water run-off around and away from the location.

A new access road approximately 304 feet in length with an average clearing width of 30 feet would be developed to BLM “Gold Book” standards to provide access to the Alternative well pad. The surfacing and repair of deteriorated sections of the existing access roads may be required. Additional culverts, 24-inch minimum in diameter, may be placed at the proposed access road take-off and in low areas where necessary and according to “Gold Book” standards. New surface disturbance from the construction of the Alternative access road would be approximately 0.21 acres.

Once the Alternative Heaton LS No. 1M well is completed, an associated 353-foot long, 40-foot wide pipeline ROW would be constructed parallel to proposed access roadway. The Alternative pipeline would connect the well to the existing BP Heaton LS No. 1A pipeline. New surface disturbance as a result of the construction of the Alternative well-tie pipeline would be approximately 0.17 acres.

Construction of the well-tie pipeline alternatives 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 inches. The pipe wall strength would be 42,000 pounds per square inch (PSI).

Production equipment used during the life of either 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 mineral resources from low-pressure reservoirs, and prevents waste of the resource.

Farmington Field Office established environmental Best Management Practices (BMP’s) will be followed during construction and reclamation of the well site pad, access road, pipeline tie, facility placement, or any other surface disturbing activity associated with this project’s alternatives. 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. Site specific stipulations and mitigation measures determined at the onsites include:

- All pits would meet State of New Mexico, Oil Conservation Division (NMOCD), pit guidelines and requirements, NMAC 19.15.17.
- A tight sheep fence would be constructed around three sides of the pit during drilling and completion, and around the fourth side after the completion rig leaves the wellhead. The fences would remain until the pits are dried and backfilled.
- Excavated materials from the cuts would be used on the fill portions of the location.
- Reclaimed slopes would be re-contoured to pre-construction topographical contours.
- Cut material from the reserve and burn pits will be stockpiled on the location or used to construct the back-walls of the burn pit.
- All disturbed areas not needed for production would be seeded with the FFO specified seed mixture.
- Above ground structures would be painted to blend with the natural color of the landscape. Paint color would be Juniper Green (Federal Standard 595a-17127). Low profile equipment would be installed.
- Other necessary hydrologic BMPs would be installed as necessary for proper drainage and sediment management throughout the action alternative areas.
- All cultural resource stipulations would be followed.

- The action alternatives are within the BLM/FFO designated Brack's hardwall cactus and Aztec gilia Special Management Species (SMS) potential habitat area. The Proposed Action area provides approximately 2.03 acres of poor to marginal habitat for the two plants. The Alternative Action area provides approximately 3.41 acres of poor to marginal habitat for the two plants. Neither specimen was observed during biological field surveys.

Table 2.2 – Proposed Project Information

Well Name	Well Number	Township	Range	Section	Proposed Footages	Alternative Footages	Lease #	Lease Issue Date
Heaton LS	1M	31N	11W	28	Surface: 720' FSL 1537' FEL	Surface: 625' FSL 1308' FEL	NMSF 078097	2/1/1948
					Bottom Hole: 710' FSL 710' FEL	Bottom Hole: 710' FSL 710' FEL		

County: San Juan

Applicant: ConocoPhillips Company

Surface Owner: Bureau of Land Management

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 of 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	Survey of the action alternatives resulted in the update of one previously recorded site (LA171392) and the location of three IOs.
Native American Religious Concerns		X	X	
Environmental Justice		X	X	
Farmlands, Prime or Unique		X	X	
Floodplains		X	X	
Invasive, Non-native Species		X	X	
Threatened or Endangered Species	X			BLM/FFO review determined compliance with threatened and endangered species management guidelines outlined in the Sept. 2002 Biological Assessment for the BLM/FFO RMP. No further Section 7 ESA consultation with the USFWS is required (See above ESA paragraph, pg. 1).
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 BLM Farmington Field Office district, no

				indirect effects are projected outside the district.
Wilderness		X		Action alternatives are 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	Action alternatives are located within the BLM/FFO designated special management area for the Brack's hardwall cactus and Aztec gilia.
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 action alternatives are located in San Juan 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 (CO_2) methane (CH_4), nitrous oxide (N_2O), 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/m³ from the previous standard of 65 ug/m³. 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 action alternatives 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 action alternatives 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 alternative well locations 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 (CO_2) and methane (CH_4), 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 CO_2 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 uses of land 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 would not be located in any BLM/FFO designated Area of Critical Environmental Concern (ACEC).

3.3 Cultural Resources

The action alternatives 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. Additional information is also included in an associated documented, Cultural Resources Technical Report (CRTR; SAIC 2002).

The BLM FFO has categorized variability in archeological sites by major time period, cultural affiliations/components, average size, and occurrence of features in each of the 20 watersheds within the BLM FFO's jurisdiction (BLM 2003a:3-88). The action alternatives are within the Animas watershed. Based on the CRTR, a total of 965 sites representing 1,376 temporal/cultural components have been documented within the watershed (BLM 2003b). Of the 19 categories of sites defined based on temporal/cultural affiliation, 17 are represented. Lacking in the watershed are sites attributed to Ute and Pueblo occupations. The most frequently occurring cultural affiliations recorded are prehistoric Anasazi Pueblo I (ca. A.D. 700 to 900) and historic Navajo Dinétah/Gobernador Phase (ca. A.D. 1500 to 1753) period components. Features common to these sites include hearths, charcoal stains, middens, pithouses, and roomblocks.

The entire area of potential affect for the action alternatives was surveyed by Western Cultural Resources Management, Inc. (WCRM) at a BLM Class III level (100%) and an inventory report was prepared (Report No. WCRM(F)1090 and WCRM(F)1118) and submitted to the BLM in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (BLM 2005).

One newly recorded site (LA 171392) and one isolated occurrence (IO) were documented during the survey of the Proposed Action area. The IO represents a nonsignificant resource, and no further work is recommended for it. Site LA 171392 is recommended eligible for the National Register of Historic Places (WCRM(F)1090). The update of one previously recorded site (LA171392) and the location of three IOs were documented during the survey of the Alternative Action area (WCRM(F)1118). Site LA 171392 was recommended eligible for the NRHP under criterion (d) based on the potential for subsurface materials, WCRM maintains this recommendation. The three IOs are considered nonsignificant resources, and no further work is recommended for them.

3.4 American Indian Religious Concerns

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

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

Native American cultural associations are the "communities" most likely to identify TCPs, although TCPs are not restricted to this group. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known.
There are several pieces of legislation or Executive Orders that should be considered when evaluating Native American religious concerns. These govern access and use of scared sites, possession of sacred items, protection and treatment of human remains, and the protection of archaeological resources ascribed with religious or historic importance. These include the following:

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

For the action alternatives, identification of TCPs were limited to reviewing existing published and unpublished literature (e.g. Valkenburgh 1941, 1974, Brugge 1993), and the site-specific cultural resources survey report conducted for the action alternatives. In addition, the BLM's cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts. 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
Field inspection of the action alternatives and a review of the GIS data on active and 100-year floodplains (derived from Federal Emergency Management Agency floodplain maps) indicate they 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 action alternatives. BLM GIS data of known invasive or noxious weed populations indicate no known weed populations to be in or nearby the area.

3.9 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 action alternative locations. 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.

3.10 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 the banks a small tributary to Farmer Arroyo. An intermittent watercourse, as mapped by the USGS on the Aztec, New Mexico 7.5-minute quadrangle, flanks the Proposed Action well location on the west side, and a major head cut has formed just off corner two (2). Farmer Tank is located 0.5 miles west of the action alternatives at the head of Farmer Arroyo. The area drains south approximately 0.9 miles into the principle drainage channel of Farmer Arroyo, which continues south another 0.9 miles into the Animas River (perennial) valley. Farmer Arroyo is typical of the many seasonal drainages found throughout the badlands area north of Aztec that drain a fairly large area into the Animas River valley, including Bohanon Canyon, Kiffen Canyon, Estes Arroyo, and Tucker Canyon.

The San Juan Basin is underlain by sandstone aquifers and unconsolidated sand and gravel aquifers. The Colorado Plateau’s Aquifers are sandstone, while the Rio Grande Aquifer system is unconsolidated sand and gravel. The primary Colorado Plateau’s Aquifers that underlie the vast majority of the San Juan Basin are the Unita-Animas Aquifer and the Mesa Verde Aquifer.

The quality of groundwater in the San Juan Basin generally ranges from fair to poor. The Unita-Animas contains fresh to moderately 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.

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

3.12 General Topography/Surface Geology
The action alternatives are located on the banks of a small tributary drainage to Farmer Arroyo in badlands terrain interspersed with piñon-juniper woodland and Great Basin Desert scrub vegetation habitats. The surrounding terrain is composed of gently rolling to moderately steep hillsides with occasional sandstone outcrops and cliff areas. The area is dissected by many sandy washes draining the area into the Animas River valley to the southeast. Elevation in the immediate project area ranges from 5,860 to 5,880 feet.

3.13 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.

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

The BLM's PFYC system is a predictive modeling tool that was developed to provide a baseline guidance for assessing and mitigating paleontological resources. It is intended to be used at an intermediate point in analyses and should be used to assist in determining the need for further mitigation assessment or actions. Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts.

The BLM FFO also recognizes nine Special Designated Areas (SDA) totaling more than 135,000 acres in order to preserve important paleontological resources for scientific study and other public benefits (BLM 2003b:4-117). The action alternatives are not located within a BLM/FFO designated paleontological SDA.

Currently, BLM uses the Potential Fossil Yield Classification system to identify areas with a high potential to produce significant fossil resources (IM 2008-009). All of the Farmington Field Offices SDA's are classified as level 5 and require a level of assessment at the project level (IM 2009-011).

Much information of the early Cenozoic history of mammal evolution is derived from study of faunas collected from the Nacimiento Formation. Correlation among other early Paleocene mammal faunas of North America is accomplished based on the biostratigraphic zonation of this formation. Significant fossil material continues to be collected from the formation.

The proposed actions would be assessed individually based on the BLM's PFYC system, known paleontological locality information, existing reports, and data for the area. If preliminary analysis indicates that the proposed actions fall within a Paleontology SDA or have a high probability of impacting paleontological resources, additional surveys, reporting, and stipulations would be required.

3.15 Soils

The San Juan Basin is bordered by the Defiance Uplift and Chuska Mountains to the west, San Juan Dome to the north, Chaco Slope and Zuni Uplift to the south and the Nacimiento Uplift to the east. In total, the San Juan Basin covers a surface of approximately 4,600 square miles. The soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. The material has been mixed and sorted in transport and has a wide range of 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 Blancot-Notal association, gently sloping, and the Gypsiorthids-Badland-Stumble complex, moderately steep. The Proposed Action has been staked in an area that has been determined to contain sodic soils and within an area exhibiting unstable sub-surface conditions. The Alternative Action has been staked out of the bottom of the intermittent USGS watercourse drainage within the Proposed Action area, and out of the unstable sub-surface area.

The Blancot-Notal association is composed of approximately 55 percent Blancot and similar soils, and 25 percent Notal and similar soils. The Blancot series consists of very deep, well drained soils that formed in alluvium and fan alluvium from shale and sandstone. Blancot soils are on valley sides and ridges. The Notal series consists of very deep, well drained, sodium affected soils that formed in alluvium, stream alluvium, and fan alluvium derived from shale, siltstone, and sandstone. Notal soils are on low stream terraces on valley floors and alluvial fans on valley sides, fan terraces and small depressions of undulating plateaus. The different characteristics of these soil types are listed below in Table 3.15.1.

Table 3.15.1

Characteristic	Blancot	Notal
Surface Layer	Pale brown loam	Pale brown silty clay loam
Slope	0-8%	0-5%
Depth	More than 80”	More than 80”
Surface Runoff	Medium	High
Typical Use	Rangeland	Livestock grazing and limited irrigated agriculture
Moisture Regime	Ustic aridic	Typic aridic
Drainage Class	Well drained	Well drained
Available Water Cap.	High	Low
Permeability	Moderate	Very slow
Parent Material	Fan alluvium derived from sandstone and shale	Stream alluvium derived from sandstone and shale

The Gypsiorthids-Badland-Stumble soil complex is composed of approximately 35 percent Badland, 35 percent Gypsiorthids and similar soils, and 15 percent Stumble and similar soils. The Gypsiorthids series consists of moderately deep, well drained soils that formed in residuum weathered from gypsum. Gypsiorthids soils are on ridges, breaks, and hills. According to the Natural Resources Conservation Service (NRCS), Badlands are defined as a landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly

cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite. The Stumble series consists of very deep, somewhat excessively drained soils that formed in eolian sand and alluvium derived from mixed rocks. Stumble soils are on inset fans, fan skirts, pediments, alluvial flats, alluvial fans, sand sheets, and fan aprons. The different characteristics of these soil types are listed below in Table 3.15.2.

Table 3.15.2

Characteristic	Gypsiorthids	Badland	Stumble
Surface Layer	Sandy loam	Bedrock	Light brownish gray loamy sand
Slope	5-30%	5-30%	0-5%
Depth	10-20”	0-2”	0-60”
Surface Runoff	Medium	Rapid	Medium
Typical Use	Livestock grazing and wildlife habitat	-	Livestock grazing and wildlife habitat
Moisture Regime	-	-	Typic torric
Drainage Class	Well drained	Somewhat excessively drained	Well drained
Available Water Cap.	Very low	-	Very low
Permeability	Rapid	-	Rapid
Parent Material	Residuum weathered from gypsum	Shale	Eolian deposits derived from sandstone

3.16 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 1,370-square mile Animas watershed.

3.17 Vegetation, Forestry

The action alternatives are located within Badland terrain interspersed with areas of Great Basin Desert scrub and piñon-juniper woodland vegetation communities. The Proposed Action would result in the removal of approximately 5 small piñon pine and Utah juniper trees to be mowed, mulched, and incorporated in to the topsoil for erosion control and site stabilization. The Alternative Action would result in the removal of approximately 30 to 40 small to medium piñon pine and Utah juniper trees to be cut, de-limbed and stacked for public firewood access. The area has a fairly strong grass component and appears to have been treated by the BLM with range management prescriptions. Vegetative cover was estimated to be approximately 45 percent, with grasses accounting for approximately 30 percent cover and shrubs and forbs accounting for the remaining 15 percent. Dominant grasses included alkali sacaton, Indian ricegrass, blue grama, and cheatgrass. The minor shrub and forb component included big sagebrush, rabbitbrush, ephedra, greasewood, New Mexican prickly pear cactus, soapweed yucca, cholla, and Russian thistle.

The entire area containing the action alternative locations has been designated by the BLM/FFO as being potential habitat for the BLM Sensitive and State of New Mexico Endangered Brack's hardwall cactus (*Sclerocactus cloveriae* ssp. *brackii*) and Aztec gilia (*Aliciella formosa*). Suitable habitat for the two plant species can be found to varying qualitative degrees throughout the designated potential habitat area, and is typically restricted to the sandy clay strata of the Nacimiento Formation. The two plants are generally found on exposed hillsides within crusted soils (often cryptobiotic), and are not often found in areas with a dense tree canopy. The Proposed Action area provides approximately 2.03 acres of poor to marginal habitat for the two plants. The Alternative Action area provides approximately 3.41 acres of poor to marginal habitat for the two plants. Neither specimen was observed within the actin alternative areas.

3.18 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 actin alternatives are not located within a BLM/FFO managed grazing allotment.

3.19 Wild Horse and Burros

There are no areas managed for wild horse or burros within the actin alternative areas. They lie over 30 miles west 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 area.

3.20 Wildlife

Mule deer and Elk are common in the 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 and wild turkey. Migratory birds that may be present can include the Western bluebird, mountain bluebird, ferruginous hawk, Bendire's thrasher, and Vesper sparrow. Principal raptors that may be seen are the golden eagle, red-tailed hawk, and American kestrel. Nesting neo-tropical migratory birds could include the broad-tailed hummingbird, gray vireo, violet-green swallow, Cassin's kingbird, Virginia's warbler, 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 Southwestern fence lizard, Western whiptail, and short-horned lizard.

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

3.21 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 Avian Conservation Partners website (http://nmpartnersinflight.org), the New Mexico Partners In Flight 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 in the following tables.

Table 3.21.1 Species with potential to occur in Great Basin Desert Shrub community

Common Name (Scientific name)	Habitat Associations
Ferruginous hawk (*Buteo regalis*)	Inhabits dry, open country. Often hovers when foraging or soars in a dihedral. Perches in trees, on poles, on the ground.

Swainson's hawk (*Buteo swainsoni*)	Soars over open plains and prairie with uptilted wings in teetering, vulture-like flight. Gregarious, usually migrates in large flocks.
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.
Gray vireo (*Vireo vicinior*)	In northwest New Mexico, found in broad-bottomed, flat or gently sloped canyons, in areas with rock outcroppings on near ridgetops.
Bendire's thrasher (*Toxostoma bendirei*)	Brushy desert, especially areas of tall vegetation, cholla cactus, creosote bush and yucca.
Mountain bluebird (*Sialia currucoides*)	Inhabits open rangelands, meadows, generally above 5,000 ft; in winter primarily found in open lowlands, desert. Nests in tree cavities and buildings.
Green-tailed towhee (*Pipilo chlorurus*)	Prefer high diversity of shrub species, including sagebrush, greasewood or piñon-juniper. Breeds in Great Basin shrub in the northwest quadrant of the state.
Scaled quail (*Callipepla squamata*)	Barren mesas and plateaus, semidesert scrublands, and grasslands with mixed scrub.
Vesper sparrow (*Pooecetes gramineus*)	Uncommon to fairly common in dry grasslands, farmlands, forest clearings, and sagebrush.

Table 3.21.2 Species with potential to occur in Piñon-Juniper Woodland community

Common Name (Scientific name)	Habitat Associations
Ferruginous hawk *(Buteo regalis)*	Prefers forest edge or mature, isolated, flat-topped junipers, with thick support branches for nests; in NW New Mexico, often nests on rock spires.
Montezuma quail (*Cyrtonyx montezumae*)	Uncommon, secretive and local in grassy understory of open juniper-oak or pine-oak woodlands on semi-arid mountain slopes.
Bridled titmouse (*Baeolophus wollweberi*)	Common resident of woodland stands of oak, juniper, and sycamore in mountains of New Mexico.
Juniper titmouse (*Baeolophus griseus*)	Uncommon to fairly common in juniper or piñon-juniper woodland.
Western bluebird (*Sialia mexicana*)	Nests in holes in trees, posts: common in woodlands, farmlands, orchards; in desert areas during winter, fond in mesquite-mistletoe groves.

Mountain bluebird (*Sialia currucoides*)	Inhabits open rangelands, meadows, generally above 5,000 ft; in winter primarily found in open lowlands, desert. Nests in tree cavities and buildings.
Broad-tailed hummingbird (*Selasphorus platycercus)*	Casual fall and winter to Gulf Coast.
Cassin's kingbird (*Tyrannus vociferans*)	Fairly common in varied habitats; usually prefers denser foliage and hillier country than does Western kingbird.
Gray vireo *(Vireo vicinior)*	In northwest New Mexico, found in broad-bottomed, flat or gently sloped canyons, in areas with rock outcroppings on near ridgetops.
Plumbeous vireo (*Vireo plumbeus*)	Fairly common in varied woodland habitats.
Western scrub-jay (*Aphelocoma californica*)	Interior *woodhouseii* race shy, inhabits lower mountain woodland; all subspecies hold individual territories.
Piñon jay (*Gymnorhinus cyanocephalus*)	Generally seen in large flocks, often numbering in hundreds; nests in loose colonies. Common in piñon-juniper woodlands of interior mountains and high plateaus; also yellow pine (ponderosa) woodlands.
Bendire's Thrasher *(Toxostoma bendirei)*	Brushy desert, especially areas of tall vegetation, cholla cactus, creosote bush and yucca.
Crissal thrasher (*Toxostoma crissale*)	Very secretive, hiding in underbrush. Found mainly in dense mesquite and willows along streams and washes; sometimes on lower mountain slopes.
Virginia's warbler (*Vermivora virginiae*)	Common in mountain brushlands. Rare to coastal California. Casual in the east.
Black-throated gray warbler *(Dendroica nigrescens)*	Prefers large stands of piñon-dominated woodland, often found in dense forests with a canopy.
Loggerhead shrike *(Lanius ludovicianus)*	Relatively xeric habitats dominated by shrubs and grasses.
Vesper sparrow (*Pooecetes gramineus*)	Uncommon to fairly common in dry grasslands, farmlands, forest clearings, and sagebrush.
Black-chinned sparrow (*Spizella atrogularis*)	Inhabits brushy arid slopes in foothills and mountains. Rarely seen in migration.

Sources: New Mexico Avian Conservation Partners, New Mexico Partners In Flight, 2011. National Geographic Society, *Field Guide to the Birds of North America*. 1999.

3.22 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 area are listed in Table 3.22.

Table 3.22– Special Management Species of the BLM/FFO and their potential to occur in the proposed action area.

Common Name *(Scientific name)*	Status*	Habitat Associations	Presence**
BIRDS			
American peregrine falcon *(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	Forages in open grassland, desert scrub, rangeland, and agricultural areas; nests in cavities and trees, and on ledges, cliffs, and power structures.	NS
Mountain plover *(Charadrius montanus)*	SMS	Lowland grasslands, sites with grassland characteristics (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.)	NS
Aztec gilia *(Aliciella formosa)*	SMS NM-E	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	NS
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 are located within the BLM/FFO special management area for the BLM Sensitive and State of New Mexico Endangered Brack's hardwall cactus (*Sclerocactus cloveriae* ssp *brackii*) and Aztec gilia (*Aliciella formosa*). Nacimiento Formation provides the appropriate geologic substrate for the Brack's hardwall cactus and Aztec gilia, and is found throughout the area in varying qualitative degrees. The Proposed Action area provides approximately 2.03 acres of poor to marginal habitat for the two species. The Alternative Action area provides approximately 3.41 acres of poor to marginal habitat for the two plants. Neither specimen was observed within the action alternative areas.

The action alternatives provide 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 3.5 miles north of the action area.

3.23 Visual Resources

The BLM has developed a Visual Resource Management (VRM) classification system designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape. There are four VRM classes (Classes I through IV) which identify suggested degrees of allowed human modification in a landscape. Class I allows the least modification and Class IV allows the most (RMP 2003).

The 2003 RMP based interim VRM classes on a 1978-80 Visual Resource Inventory (VRI) of the BLM-FFO area (BLM-FFO Interim VRM Office Policy 2011). A VRI is a scenic quality evaluation, a visual sensitivity level analysis, and a delineation of distance zones. The 2003 VRM classifications are still implemented pended the completion of a new VRI that would meet current BLM guidance and its review (RMP 2003).

In 2009, a new VRI was completed for the BLM-FFO area. This VRI indicated that the landscape has changed substantially since the 1978-80 VRI, warranting the need for an amendment to the RMP to address visual resources. Therefore, on June 13, 2011, the BLM-FFO filed a Notice of Intent (FR Doc. 2011-14491) to prepare an RMP amendment and EA for visual resources. The BLM-FFO will continue to honor all valid, existing rights and resource allocations discussed in the RMP (BLM-FFO Interim VRM Office Policy 2011). In the interim, until the amendment has been signed, 2003 VRM and 2009 VRI classifications will both be discussed during the EA process.

The action alternatives are within 2003 VRM Management Class III. Class III allows for moderate modifications of the characteristic landscape and the level of change in the basic landscape elements due to management activities may attract attention but should not dominate the view of the casual observer (RMP/FEIS 2003). The action alternatives are in 2009 VRI Class IV.

The action alternatives are located in an area that is moderately industrialized with natural resource extraction. Oil and gas production facilities are common in the immediate area but are not likely noticeable to the casual observer due to mitigation measures such as area appropriate paint color and low profile equipment. Water hauling trucks and well service vehicles are frequently encountered throughout the area. Pipeline and powerline ROWs are common throughout the area as well.

3.24 Recreation

The Farmington Field Office has set aside several areas for special use and manages them as Specially Designated Areas (SDA). Recreation SDA's are managed to accommodate a large variety of recreational uses and outdoor recreational experiences. Areas located outside of recreation SDAs are managed as Extensive Recreation Management Areas (ERMAs). Few recreation facilities or supervisory efforts exist on these lands and they are managed to maintain a freedom of recreation choice with limited regulatory constraints. The action alternatives would not be in a BLM/FFO designated recreation SDA. Dispersed recreational use of the areas may include occasional hunting during the appropriate season and casual exploration of the public lands in the area.

3.25 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 action area include safety hazards associated with increased traffic during the construction of the proposed 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 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.

Proposed Action

A summary of potential surface disturbance is presented in Table 4.0.1. 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 4.0.1 – Summary of Disturbance

Facility		Alternative B		Duration
		Feet	Acres	
Well Pad	New Disturbance	230 x 300	1.58	Short Term
		-	0.75*	Long Term
	Existing Disturbance	-	1.0	Short Term
Construction Zone	New Disturbance	1260 x 50	1.45	Short Term
Pipeline	Existing Disturbance	43 x 40	0.04	Short Term
Total New Disturbance			**2.03**	**Short Term**
			0.75	**Long Term**

Alternative Action

A summary of potential surface disturbance is presented in Table 4.0.2. Descriptions of potential effects on individual resources for the Alternative 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 4.0.2 – Summary of Disturbance

Facility		Alternative C		Duration
		Feet	Acres	
Well Pad	New Disturbance	230 x 300	1.58	Short Term
		-	0.75*	Long Term
Construction Zone	New Disturbance	1260 x 50	1.45	Short Term
Pipeline	Existing Disturbance	353 x 20	0.17	Short Term
Access Road	New Disturbance	304 x 30	0.21	Long Term
Total New Disturbance			**3.41**	**Short Term**
			0.96	**Long Term**

* All well pads will have interim reclamation, average long-term disturbance has been determined to be 0.75 acres.

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 action alternatives 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 mineral resources developed from the action alternatives are 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 Weminuche 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 action alternatives 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 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, tribal, 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 N_2O 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 of 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 CO_2 and CH_4 emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the EPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" sub-activities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

The BLM'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; re-vegetate 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 action alternatives.

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 a cultural resource. 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. A potential indirect effect from the action alternatives is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural resources in the area. 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 action alternatives will have no effect on cultural resources. This determination will be included with the FFO/BLM cultural resources stipulations, if any, attached to the APD/ROW, as the case may be.

One newly recorded site (LA 171392) and one isolated occurrence (IO) were documented during the survey of the Proposed Action area. The IO represents a nonsignificant resource, and no further work is recommended for it. Site LA 171392 is recommended eligible for the National Register of Historic Places (WCRM(F)1090). The update of one previously recorded site (LA171392) and the location of three IOs were documented during the survey of the Alternative Action area (WCRM(F)1118). Site LA 171392 was recommended eligible for the NRHP under criterion (d) based on the potential for subsurface materials, WCRM maintains this recommendation. The three IOs are considered nonsignificant resources, and no further work is recommended for them.

4.3.2 Potential Mitigation

All FFO/BLM cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review, attached to the R-O-W/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. All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment, and that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and or administrative penalties under the provisions of the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm).

In the event of a discovery during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM. The BLM would then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., National Register, NAGPRA, ARPA), it will be protected in place until mitigating measures can be developed and implemented according to guidelines set by the BLM.

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.

4.4.2 Potential Mitigation

No mitigation measures have been recommended for the action alternatives.

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 action alternatives.

4.8.2 Potential Mitigation

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

4.9 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 pits 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.

4.10 Water Quality: Surface and Groundwater

4.10.1 Direct and Indirect Effects

There are no perennial water sources, springs, seeps, or wetlands within either action area. There is a well-defined ephemeral drainage, as mapped by the USGS on the Aztec, New Mexico 7.5-minute quadrangle, in the Proposed Action area. 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).

4.10.2 Potential Mitigation

Culverts, diversions, and silt traps, where indicated in the attached COA's, would be used to stabilize and reduce sediment flow and potential storm water run-off. 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.

4.11 Wetlands/Riparian Zones

No effect.

4.12 General Topography/Surface Geology

Although there will be surface disturbance for all projects, interim reclamation and reseeding is incorporated into the project for site mitigation. No prominent topographical features would be removed or disturbed by the action alternatives.

4.13 Mineral Resources

No effect.

4.14 Paleontology

4.14.1 Direct and Indirect Effects

Although no paleontological resources are known to occur within the action area, impacts to paleontological resources from the action alternatives implementation could possibly occur. Direct impacts of the action alternatives 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 action 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 action alternatives would be low and long-term.

4.14.2 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.

4.15 Soils

4.15.1 Direct and Indirect Effects

Due to the nature of drilling for oil and gas there would be soil disturbance within the action area. All areas to be disturbed would be bladed as needed to create flat surfaces for operating equipment and vehicles. Sodic soils and unstable sub-surface conditions are present within the Proposed Action area. 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 dependent, 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 action alternatives.

4.15.2 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.

4.16 Watershed – Hydrology

4.16.1 Direct and Indirect Effects

The action alternatives would comply with water quality, quantity, and ground water protection standards under the Clean Water Act (CWA) of 1977 and the Safe Drinking Water Act of 1974, as amended. The action alternatives would disturb less than five (5) acres, respectively; 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 Proposed Action area contains a well-defined ephemeral drainage as mapped by the USGS on the Aztec, New Mexico 7.5-minute quadrangle. The drainage skirts the west side of the Proposed well pad area, and drains into a severe head cut off of corner two (2). The Alternative Action would not impact any river, stream, lake, or wetland within jurisdiction of the United States Army Corps of Engineers (USACE), and therefore, a Section 404 Permit from the USACE, Albuquerque District, would not be required.

4.16.2 Potential Mitigation

Drainage diversions would be constructed as needed for the action alternatives. The diversions would be directed such that water would drain around and away from the pad. Additional culverts would be installed where needed to maintain drainages along access roads (see attached COA's).

4.17 Vegetation, Forestry

4.17.1 Direct and Indirect Effects

Direct impacts would be the removal of vegetation to construct the well pad, access road, and well-tie pipeline for the action alternatives. The Proposed Action would remove approximately 2.03 acres of established vegetation and would result in the removal of approximately 5 small piñon and juniper trees to be mowed, mulched, and incorporated into the topsoil. The Proposed project area provides approximately 2.03 acres of poor to marginal habitat for the BLM Sensitive and State of New Mexico Endangered Brack's hardwall cactus (*Sclerocactus cloveriae* ssp *brackii*) and Aztec gilia (*Aliciella formosa*). The Alternative Action would remove approximately 3.41 acres of established vegetation and would result in the removal of approximately 30 to 40 small to medium piñon pine and Utah juniper trees to be cut, de-limbed and stacked for public firewood access. The Alternative project area provides approximately 3.41

acres of poor to marginal habitat for the BLM Sensitive and State of New Mexico Endangered Brack's hardwall cactus (Sclerocactus cloveriae ssp brackii) and Aztec gilia (Aliciella formosa). Neither specimen was observed within the action alternatives. Indirect impacts would be the remaining long-term (20 to 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.

4.17.2 Potential Mitigation

Under the action alternatives, upon 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. Special management stipulations for the Brack's hardwall cactus and Aztec gilia may be prescribed by the BLM/FFO, and would be included in the COA's.

4.18 Livestock Grazing

4.18.1 Direct and Indirect Effects

There would be a temporary loss of 2.03 acres of potential foraging area prior to rehabilitation and reseeding under the Proposed Action, and a temporary loss of 3.41 acres under the Alternative Action. The action alternatives are not located within a BLM/FFO managed grazing allotment. The removal of suitable forage is projected to have low effects on livestock grazing 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

Mitigation measures associated with soils, surface water, riparian/wetland habitat, and wildlife serve to lessen impacts to the rangeland components essential for rangeland health. Under the action alternatives, upon 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 Wild Horse and Burros

No effect.

4.20 Wildlife

4.20.1 Direct and Indirect Effects

Some temporary displacement of wildlife could occur during the construction, drilling, and completion phases of the project. Potentially affected species include the cottontail, black-tailed jackrabbit, mule deer, coyote, and other species that typically utilize such habitat.

The Proposed Action would remove approximately 2.03 acres of potential habitat for such species, while the Alternative Action would remove approximately 3.41 acres. 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). Wildlife 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.

4.20.2 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. All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover re-establishment would minimize impacts to wildlife. All hazards associated with construction and operation of the action alternatives would be fenced or contained in storage tanks.

4.21 Migratory Birds

4.21.1 Direct 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 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 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.

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 Great Basin Desert scrub habitat. Wildlife and bird species may lose nesting/den/burrow habitat and foraging habitat.

4.21.2 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. All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover re-establishment would minimize impacts to migratory birds. All hazards associated with construction and operation of the proposed action would be fenced or contained in storage tanks.

Best Management Practices (BMPs) would be used to avoid or minimize the possibility of the unintentional take of migratory birds, as instructed in the MBTA Washington Office Interim Management Guidance and BLM/FFO Interim Management Policy (MOU No. NM-F00-2010-001).

4.22 Special Management Species

4.22.1 Direct and Indirect Effects

The action alternatives are located within the BLM/FFO special management area for the BLM Sensitive and State of New Mexico Endangered Brack's hardwall cactus and Aztec gilia. Nacimiento Formation provides the appropriate geologic substrate for the two plant species and occurs throughout the proposed action area in varying qualitative degrees. The Proposed Action would result in a loss of approximately 2.03 acres of poor to marginal habitat for the two species; the Alternative Action would result in a loss of approximately 3.41 acres of poor to marginal habitat for the two species. Neither specimen was found within either action alternative area.

The action alternatives provide potential foraging habitat for the American peregrine falcon, prairie falcon, golden eagle, and ferruginous hawk. There would be a temporary loss of potential foraging habitat for the four raptor species prior to rehabilitation and reseeding. The action alternatives would not result in any direct effect on the four raptors 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 within a 1/3 mile buffer zone to any raptor nests.

4.22.2 Potential Mitigation

Standard conditions of approval designed to protect wildlife and migratory birds would serve to protect Special Management Species (see Appendix 7.1). Special management stipulations for the Brack's hardwall cactus and Aztec gilia may be prescribed by the BLM/FFO, and would be included in the COA's. All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover re-establishment would minimize impacts to wildlife. All hazards associated with construction and operation of the action alternatives would be fenced or contained in storage tanks.

4.23 Visual Resources

4.23.1 Direct and Indirect Effects

Visual resource impacts would be low to moderate in the short-term during construction and drilling. Operation of the action alternatives would result in low long-term visual impacts which are minimized by interim reclamation of areas on the pad that are not used. In addition, low-profile equipment painted an area appropriate color would further reduce visibility. Long-term effects would be low as the surrounding area is developed with additional oil and gas facilities, and pipeline and powerline ROWs. The action alternatives would not be visible from any residential areas, major roadways, or recreation areas.

4.23.2 Potential Mitigation

During the construction phase of the action alternatives, activities would be confined to the allowed disturbance area and not migrate outside of the construction zone. Vehicles and equipment would utilize existing access roads and disturbed areas. A rapid construction schedule would minimize impacts to visual resources that result from construction activities and would reduce the period of greatest visual impact. Although minimal vegetation removal is expected as a result of the action alternatives, mitigations that can potentially minimize the visual impact of the project include revegetation requirements and above-ground facility paint color (Juniper Green, Federal Standard 595a-17127) requirements that are established by the BLM.

4.24 Recreation

4.24.1 Direct and Indirect Effects

Construction, drilling, and production of the action alternatives 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 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 low over the long-term 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.

4.24.2 Potential Mitigation

The action alternatives are outside any designated Recreation SDA in an area that is not managed for recreational opportunities. The action alternatives would be painted an area appropriate color 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).

4.25 Public Health and Safety

4.25.1 Direct and Indirect Effects

The action alternatives are located in a somewhat remote area. No residences are located within one mile of the action alternatives. 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.

4.25.2 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 action alternatives 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 dependent 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?**
Mike Flaniken	Environmental Protection Specialist	BLM	YES
Steven Merrell	Manager/Foreman	ConocoPhillips	YES
Matthew Zabka	Third Party Contractor	Adkins Consulting	YES
Harry Begay	Third Party Contractor	Enterprise Field Services	YES
Martin Deleon	Third Party Contractor	Enterprise Field Services	YES
Maria Adkins	Third Party Contractor	Adkins Consulting	NO
Consultation	**Title**	**Organization**	**Present at Onsite?**
Jim Copeland	Archaeologist	BLM	NO
John Hanson	Wildlife Biologist	BLM	NO
John Kendall	Wildlife Management Biologist	BLM	NO
Bill Liess	Supervisory Environmental Protection Specialist	BLM	NO
Sarah Scott	Natural Resource Specialist	BLM	NO
Jeff Tafoya	Rangeland Management Specialist	BLM	NO
Barney Wegener	Natural Resource Specialist	BLM	NO
Dale Wirth	Branch Chief, Range & Multiple Resources	BLM	NO

6.1 References

Brugge, David M. 1993. *An Investigation of AIRFA Concerns Relating to the Fruitland Coal Gas Development Area.* Office of Contract Archaeology, University of New Mexico. Ms. on file, Bureau of Land Management, Farmington, 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.*

Morgan, Sarah M. 2011. *Cultural Resource Inventory of ConocoPhillips Proposed Heaton LS 1M Well Pad and Enterprise Field Services Pipeline, San Juan County, New Mexico* (Report No. WCRM(F)1090). Western Cultural Resources Management, Inc. (WCRM), Farmington, New Mexico.

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).

Parker, Patricia L. and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service, *National Register Bulletin 38*. Washington.

Proper, Michael J. 2011. *Cultural Resource Inventory of ConocoPhillips Proposed Relocated Heaton LS 1M: An Addendum to Cultural Resource Inventory of ConocoPhillips Proposed Heaton LS Unit 1M Well Pad and Access Road and Enterprise Field Services Pipeline, San Juan County, New Mexico* (Report No. WCRM(F)1118). Western Cultural Resources Management, Inc. (WCRM), Farmington, New Mexico.

Science Applications International Corporation. 2002. *Cultural Resources Technical Report: Background Information on Cultural Resources for the Farmington Draft RMP/EIS*. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

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. Department of the Interior, Bureau of Land Management, Farmington Field Office. 2010. *Migratory Bird Treaty Act - BLM/FFO Interim Management Policy*. Instruction Memorandum No. NM-F00-2010-001.

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

Valkenburgh, Richard F. Van. 1941. *Diné Bikeyah*. Department of the Interior, Office of Indian Affairs, Navajo Services, Window Rock. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

Van Valkenburgh, Richard F. 1974. *Navajo Sacred Places*. Edited by Clyde Kluckhohn. Garland Publishing. New York.

.

7.0 Appendices

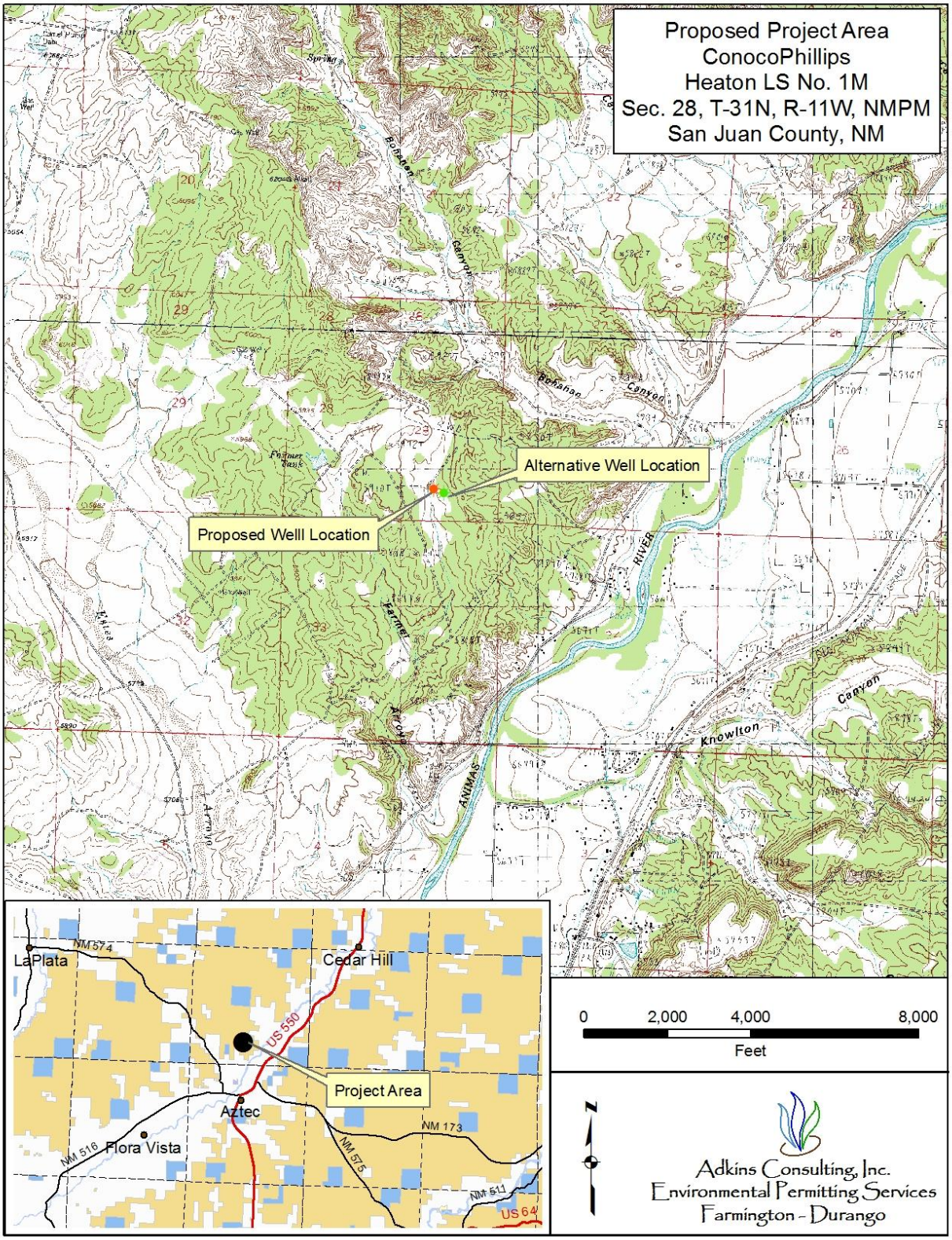
7.1 APD/COA

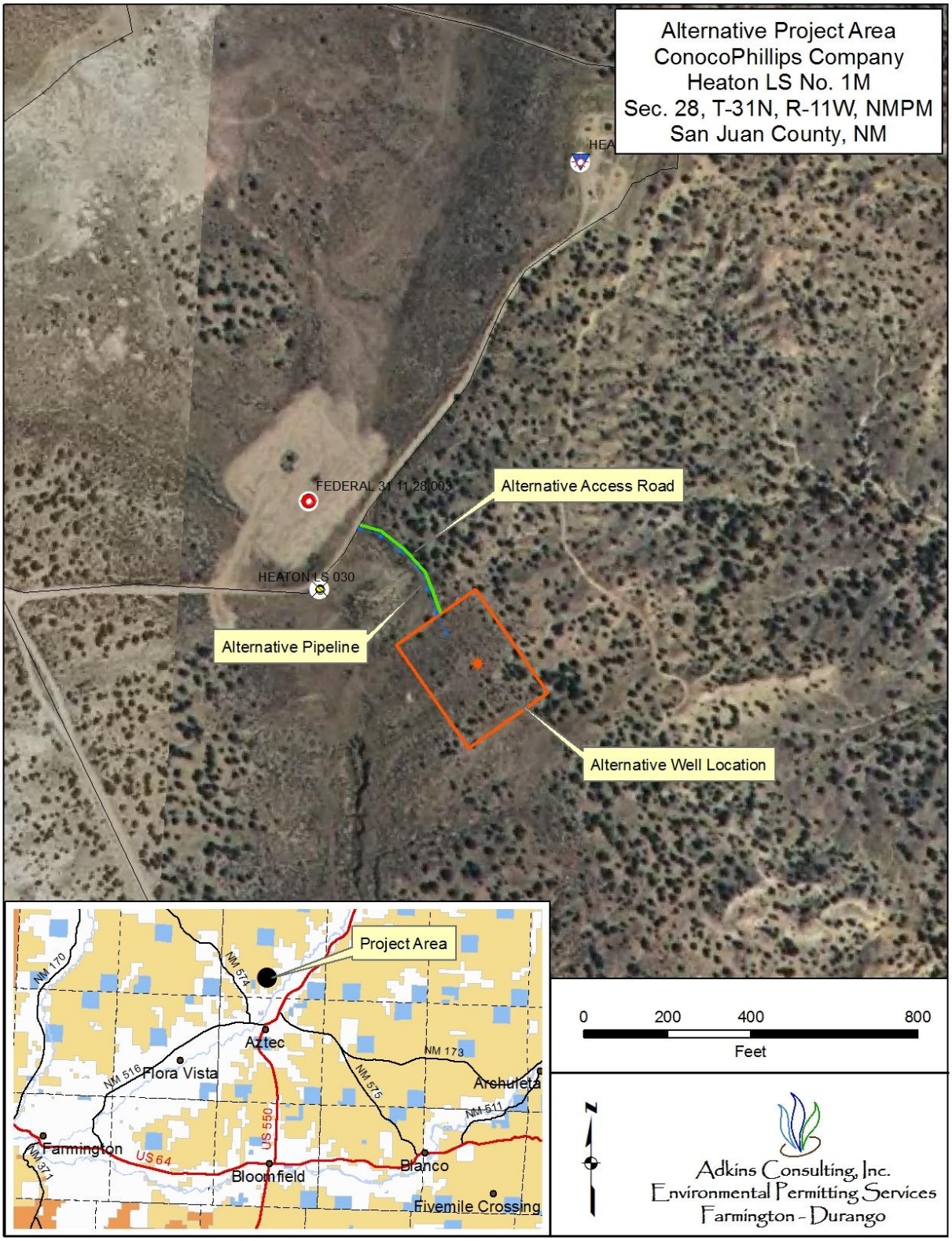
See attachment. The APD and COAs contain additional information about the proposed action including maps of all facilities, roads, pipelines, power lines, etc.

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 Project Area Map



7.4 Proposed Action Area Map

7.5 Alternative Action Area Map