ENVIRONMENTAL ASSESSMENT

EA No. NM-F010-2011-101

BURLINGTON RESOURCES OIL AND GAS COMPANY, LP
PROPOSED SHAW #100 NATURAL GAS WELL
AND PIPELINE PROJECT
LEASE NUMBER NM SF-077231

Prepared for:

BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE

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Environmental Services

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1.0 INTRODUCTION

Burlington Oil and Gas Company LP (Burlington) has proposed vertically drilling the Shaw #100 natural gas well and constructing an associated pipeline (proposed project) in San Juan County, New Mexico (NM). The proposed Shaw #100 would be twinned on the existing Shaw #1R natural gas well pad. The legal description for the proposed project is:

711 feet FNL (from the north line), 1,086 feet FEL (from the east line)
Section 13, Township 30 North, Range 09 West
New Mexico Principal Meridian (NMPM)

Surface disturbance activities associated with drilling the gas well would entail construction of a well pad and a subsurface well-tie pipeline. The proposed project area is located approximately 19 miles east of Aztec, NM and approximately 2 miles north ofNew Mexico State Highway 173. Burlington has filed an Application for Permit to Drill (APD) for the natural gas well with the Bureau of Land Management Farmington Field Office (BLM/FFO). If the well is productive, Enterprise Products (Enterprise) *would* file for a right-of-way (ROW) grant with the BLMIFFO to construct and operate the proposed well-tie pipeline. The proposed natural gas well project would be located on lands with the surface and federal mineral estate administered by the BLM/FFO.

1.1 Purpose and Need

The purpose of the proposed action is to allow the applicant to produce natural gas from the valid federal mineral lease NM SF-077231 issued by the BLM in 1947 and subsequently acquired by Burlington. 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, as amended (30 USC [United States Code] 181 et seq.), authorizes the BLM to issue oil and gas leases for the exploration of mineral resources 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 APD, issued by the BLM, would authorize Burlington to construct the pad and drill the proposed well.

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 Environmental Assessment (EA) tiers into 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 BLM/FFO by the Record of Decision (ROD) signed September 29, 2003 (BLM *2003b)*. The PRMP/FEIS and ROD are available for review at the FFO, Farmington, New Mexico or electronically at http://www.nm.blm.gov/ffo/ffo_home.htrnl. This project EA addresses site specific resources and/or impacts that are not covered within the PRMP/FEIS, as required by the National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91-90,42 USC 4321 et seq.). The proposed project would not be in conflict with any local, County, or state plans.

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

Under Section 402 of the Clean Water Act (CWA) (as amended), the U.S. Environmental Protection Agency (USEPA) regulates storm water discharges from industrial and construction activities under the National Pollutant Discharge Elimination System program. Additionally, Section 404 of the Act, regulated by the U.S. Army Corps of Engineers, and Section 401 of the Act, regulated by the New Mexico Environment Department (NMED) or USEPA (depending upon surface ownership), protect wetlands and waters of the U.S. Operators are required to obtain all necessary permits and approvals for projects requiring CWA permits prior to any disturbance activities.

The New Mexico Energy, Minerals and Natural Resources Department requires oil and gas operators to follow "pit rule" guidelines contained with NMAC 19.15.17 to reduce the potential for ground water contamination from industry related activities.

The Endangered Species Act of 1973 requires all federal departments and agencies to conserve threatened and endangered 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.

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

Additionally, Burlington will:

- Comply with all applicable federal, state, and local laws and regulations.
- Obtain the necessary permits for the drilling, completion and production of the 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 the private landowner, 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 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 3162.3-2 (h) (2). This alternative would deny the approval of the APD and the current land and resource uses would continue to occur in the proposed project area.

2.2 Alternative B - Proposed Action

Proposed Action Title/Type: Shaw #100 natural gas well project/Application for Permit to Drill and Right-of-Way Grant
County: San Juan County, New Mexico
Applicant(s): Burlington and Enterprise
Surface Owner: BLM
Mineral Estate: Federal

Burlington has filed an APD for the proposed Shaw #100 natural gas well to access the Fruitland Sand/Fruitland Coal mineral estate administered by the BLM/FFO. The legal description for the proposed well head is 711 feet FNL and 1,086 feet FEL in Section 13, Township 30 North, Range 09 West, NMPM, San Juan County, NM. The proposed well-tie pipeline would be located in the NEY4 of the NEY4 of Section 13, Township 30 North, Range 09 West, NMPM. A project vicinity map is provided as Figure 1. The proposed action is shown on the Archuleta, NM U.S. Geological Survey 7.5-minute quadrangle map as Figure 2. Figure 3 shows the proposed action on the Archuleta, NM digital photo orthoquad.

The proposed action would be located in Rattlesnake Canyon Wildlife Area, a BLM Specially Designated Area (SDA) that is managed to support increases in wildlife. The SDA is subject to a winter closure on construction and drilling from December 1 through March 31 annually.

Drilling of the proposed Shaw#100 natural gas well would require construction of a 195-foot by 260-foot well pad with a 50-ft wide construction zone around the perimeter of the pad that would disturb approximately 2.44 acres. The proposed Shaw #100 would be twinned with the existing Shaw #1R. The proposed project would require a maximum cut of 13 feet and a maximum fill of 6 feet to provide a level well pad for drilling. No new access is proposed. If the proposed natural gas well should prove productive, Enterprise would construct and operate the proposed well-tie pipeline which would be approximately 50 feet in length constructed within a 40 foot wide ROW. The entire length of the proposed well-tie pipeline would also be located within the proposed well pad.

Total permitted surface disturbance for the proposed project would be 2.44 acres. Approximately 1.7 acres or 70% of the proposed project area would be located on previously disturbed terrain. Total new disturbance would be approximately 0.75 acres.

Construction activities associated with the proposed action would include drilling the proposed natural gas well and the installation of any surface and subsurface equipment necessary for natural gas production. Construction of the proposed well would commence following the BLMIFFO approval of Burlington's APD. In general, construction ofthe proposed action would follow the sequence listed below.

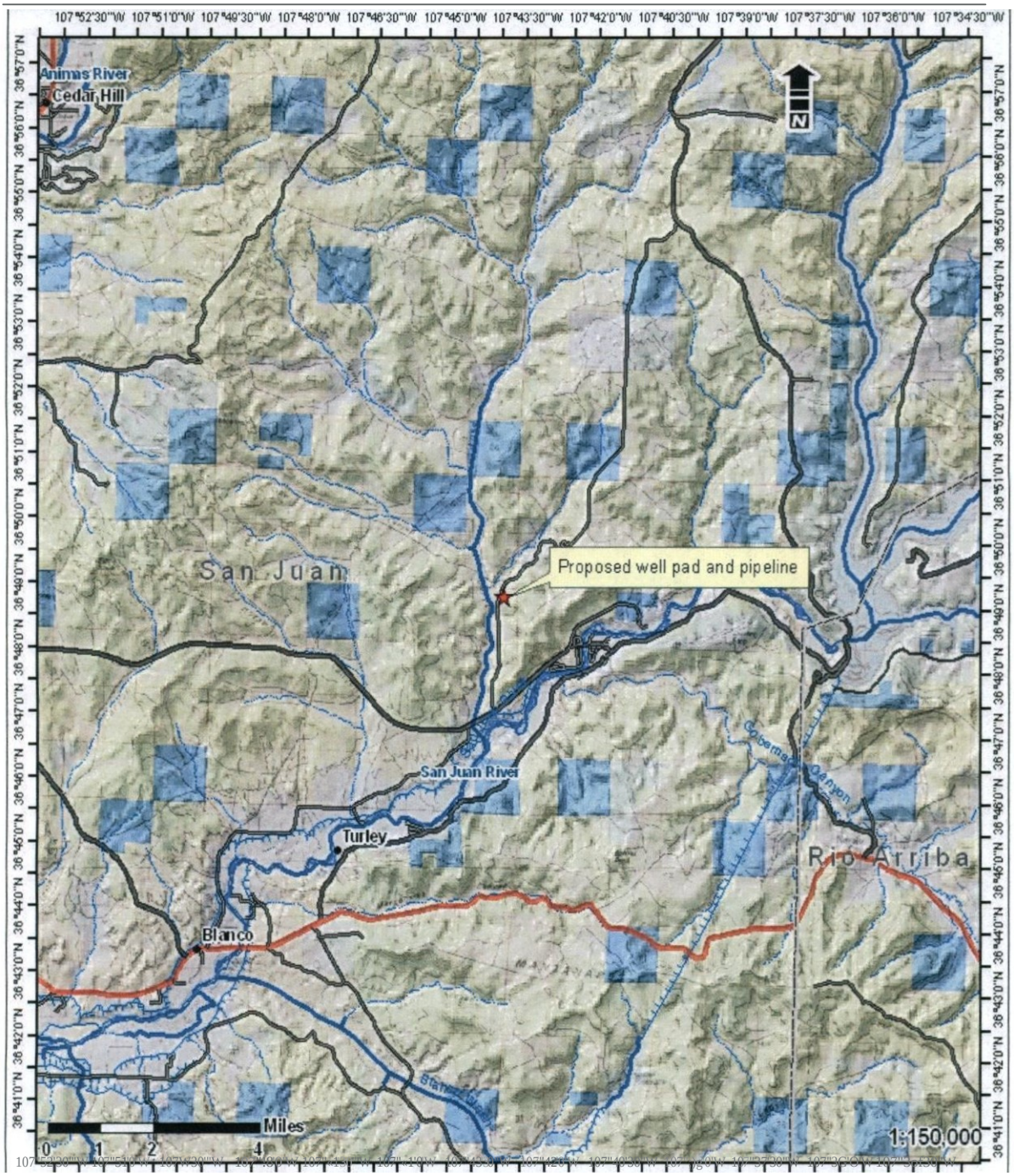
- Construction crews remove vegetation from the proposed natural gas well pad. Excavated materials from the cuts would be used on the fill portion of the location to level the pad.
- Natural gas well drilling facility assembly would occur on the well pad after site clearing and leveling. Associated facilities and equipment utilized in this phase would include a drilling rig, generators, diesel engines, water tanks, mud tanks, safety stations, equipment and material storage units, blowout preventers, an accumulator station, and a gas buster. Water for the drilling would be obtained from a commercial source and trucked to the site.
- The drill cuttings, drill water, and completion fluids would be placed in closed loop system. Any other production equipment or facility for which fluids are present shall be adequately fenced and properly maintained in order to safeguard both livestock and wildlife.
- Pipeline construction activities include: excavation of trenches, laying of pipe, covering of pipe and leveling.
- After the well is completed, a portion of the pad not required for production equipment and vehicular access, would be recontoured and seeded. Approximately 1 acre for production facilities on the well pad would remain in use for production equipment and vehicle access. These areas would not be reclaimed until final abandonment of the well. Production equipment that would remain onsite would include the wellhead, production unit separator, and a meter run. Ancillary equipment such as a Christmas tree, compressor, pump jack, storage tank(s), dehydrator, and separator could also be installed at the well pad site. Equipment such as compressors or pump jacks would be powered by gas compression engines. No electric power line construction is proposed.

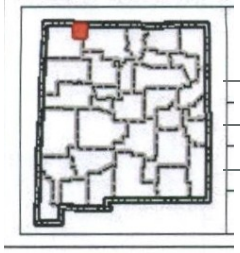
For a detailed description of design features and construction practices associated with the proposed action, refer to the project plats provided in the APD in Appendix A. Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) and ROW grant stipulations are incorporated and analyzed in this alternative. The COAs and pipeline ROW grant stipulations are provided in Appendix B.

Burlington will comply with all applicable federal, state and local laws and regulations and obtain the necessary permits for the installation of the well pad and pipeline. All areas of proposed surface disturbance were inspected in the field to ensure that potential impacts to natural resources would be minimized through the implementation of mitigation measures. Section 4.0 ofthis EA describes these measures for all resources potentially impacted.

2.3 Alternatives Considered But Not Analyzed In Detail

The Shaw #100 well pad is proposed to be twinned with the existing Shaw #l R well. Twinned well pads and directional drilling are generally considered to be an alternative that creates the least amount of resource disturbance, impacts to the environment, and also achieves the purpose and need of the proposed action. No other alternatives were identified during pre and post onsite analysis that would create less disturbance and still achieve the purpose and need of the proposed action.





Burlington Resources Oil and Gas Company LP

Proposed Shaw #100

TONN9-IIP :D NORTH,RANGE 00 WEST,SECTION 13	FIGURE 1
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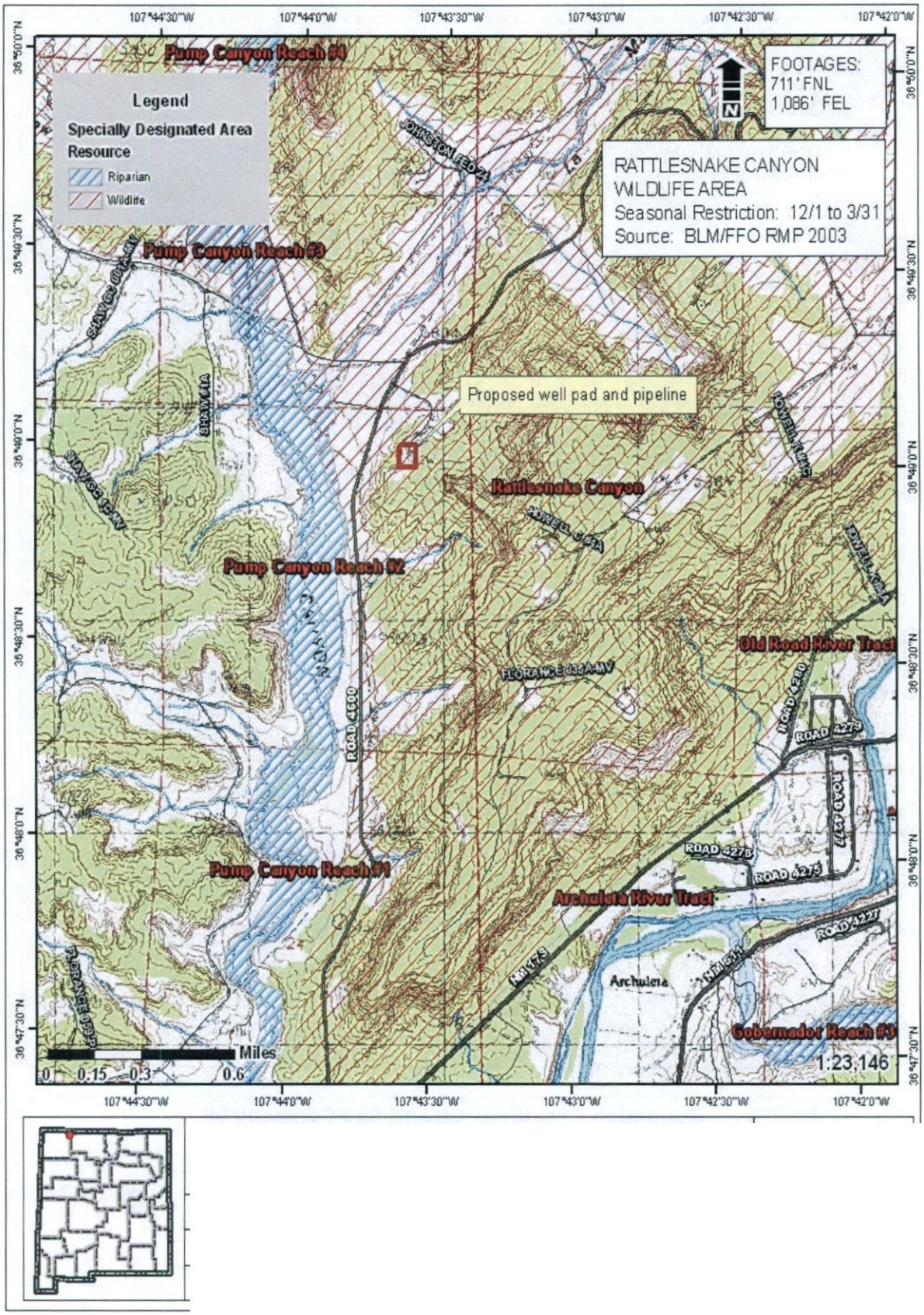
Legend
Specially Designated Area
Resource
Riparian
Wildlife
FOOTAGES:
711' FNL
1,086' FEL
RATTLESNAKE CANYON
WILDLIFE AREA
Seasonal Restriction: 12/1 to 3/31
Source: BLM/FFO RMP 2003
Proposed well pad and pipeline
Pump Canyon Reach #4
Pump Canyon Reach #3
Pump Canyon Reach #2
Pump Canyon Reach #1
Rattlesnake Canyon
Old Road River Tract
Archuleta River Tract
Gobernador Reach #3
Archuleta
ROAD 4600
ROAD 4278
ROAD 4275
ROAD 4227
Miles
0 0.15 0.3 0.6
1:23,146
107°44'30"W
107°44'0"W
107°43'30"W
107°43'0"W
107°42'30"W
107°42'0"W
36°50'0"N
36°49'30"N
36°49'0"N
36°48'30"N
36°48'0"N
36°47'30"N

Burlington Resources Oil and Gas Company LP

Proposed Shaw #100

TONN IP 3) NORTH, RANGE C9 wt:ST, SECTION 13	FIGURE 3
ARCHULETA 7.5-MINUTE USGS QUPO R.ANGLE M.AP 2003 01GIT PHOTO	AERI M.AP
S.AJ1 JUAN COUNTY, NM	11nar.!J10

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3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the environment that would be affected by implementation of the alternatives described in Section 2.0. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Only the aspects of the affected environment that are potentially impacted are described.

An onsite and field resource investigation of the proposed project area were conducted on October 27, 2010 by an Ecosphere Environmental Services (Ecosphere) biologist and attended by representatives from Burlington, Enterprise and the BLMIFFO. Cultural resource surveys were conducted by Western Cultural Resources Management (WCRM) on October 4 and 5, 2010.

3.1 Critical Elements

Certain critical environmental components require analysis under BLM policy (see Appendix 5 of H-1790-1, NEPA Handbook). These requirements, listed in Table 1, are specified by statute, regulations, or Executive Order (EO). Elements that do not exist in the project area or that do not have potential to be impacted are eliminated from further analysis as indicated in the table. Those elements potentially impacted by the proposed action or alternatives are described in the following sections.

Table 1. Affected Environment and Basis for Determination of No Further Analysis of Critical Elements.

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Air Quality	X		X	
Areas of Critical Environmental Concern (ACECs)		X		Project area is not within any BLM designated ACEC.
Cultural Resources		X	X	
Native American Religious Concerns		X	X	No traditional cultural properties known to occur in the proposed project area (Jim Copeland, pers. comm., 1/24/11).
Environmental Justice	X		X	
Farmlands, Prime or Unique		X		No prime or unique farmlands located in project area or vicinity.
Floodplains		X		No floodplains located in project area or vicinitv.
Threatened or Endangered SQecies		X	X	

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Wastes, Hazardous or Solid		X	X	Due to the handling and storage of minor volumes of fuels and lubricants during construction, and due to the presence of existing oil and gas facilities in the project area, further analysis is warranted.
Water Quality, Surface/Ground	X		X	
Wetlands/Riparian Zones		X		No wetlands/riparian areas are located in the project area.
Wild and Scenic Rivers		X		There are no wild and scenic rivers in the project area or vicinity.
Wilderness		X		There are no designated Wilderness areas within a 25 mile radius ofthe proposed project.

3.1.1 Air Quality

The proposed well is located in San Juan County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington PRMP/FEIS. In addition to the air quality information in the PRMP/FEIS cited above, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this PRMP/FEIS was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (C02) methane (CH_4); nitrous oxide (N20); 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 PRMP/FEIS 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 of2008, the USEPA announced a new primary 8-hour standard of0.075 ppm.

Increased development in the Four Comers 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 USEPA, on October 17, 2006, issued a final ruling on the lowering of the 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 $PM_{2.5}$, was lowered to 35 ug/m^3 from the previous standard of 65 ug/m^3. This revised $PM_{2.5}$ daily NAAQS was promulgated to better protect the public from short-term particle exposure.

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

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

The USEPA 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 USEPA, however climate has the potential to influence renewable and non-renewable resource management.

3.1.1.1 Air Quality

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

Air quality in the area near the proposed well is generally good and is not located in any of the areas designated by the USEPA 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.

Greenhouse gases, including $C02$ and CH_4, and the potential effects of GHG emissions on climate, are not regulated by the USEPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The USEPA's Inventory of US Greenhouse Gas Emissions and Sinks found that in 2007, total U.S. GHG

emissions were over 7 billion metric tons and that total U.S. GHG emissions have increased by 17% from 1990 to 2007. Emissions increased from 2006 to 2007 by 1.4 percent (99.0 Tg CO2 Eq.). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (USEPA 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 GHGs result in behavioral and industrial adaptations.

3.1.1.2 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: I) 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 (Enquist and Gori 2008).

3.1.2 Cultural Resources

The project is 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: Paleolndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 BC to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (A.D. 1-1540), and the historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. A detailed description of these various periods and select phases within each period is provided in the Farmington PRMP/FEIS (BLM *2003a).*

The proposed Shaw #I00 natural gas well would be located within the Pump Canyon sub-watershed. Based on the Farmington PRMP/FEIS (BLM 2003a), a total of 900 sites representing the Archaic Period, Basketmaker II, Basketmaker III, Unknown Anasazi, Pueblo I, Pueblo II, Pueblo III, Pueblo IV, Unknown Navajo, Dinetah/Gobernador Phase, Cabezon Phase, Reservation Phase, Pueblo, Hispanic, Euro-Anglo, and General Unknown temporal/cultural components have been documented within the watershed. Of the 19 categories of sites defmed based on temporal/cultural affiliation, 16 are represented. Lacking in the watershed are sites attributed to Paleo, Apache and Ute occupations. The most frequently occurring cultural affiliations recorded are Dinetah/Gobernador (33%), unknown sites (22%), and Anasazi PI period components (14%). Site density is high with any apparent gaps most likely a factor of lacking inventory and not a lack of sites.

WCRM conducted cultural resources surveys of the proposed project under the New Mexico Cultural Resource Permit number 25-2920-10-LL on October 4 and 5, 2010. WRCM surveyed the proposed well pad, construction zone and the proposed pipeline for a total of 6.36 acres. Prior to field surveys of the project area, an investigation of records at the BLM/FFO and an online search of Archeological Records Management Section (ARMS) to determine if any sites had been recorded within 0.25 mile of the survey area. A search of the National Register of Historic Places (NRHP) and State Register of Cultural Properties was conducted, and Van Valkenburgh (1974) was consulted. The cultural resources report (WCRM(F)930] has been submitted to the BLM under a separate cover.

One previously documented site (LA 68307) were documented during the surveys. Eligibility of LA 68307 for the National Register of Historic Places is uncertain. The site is not located within the area of proposed disturbance.

3.1.3 Native American Religious Concerns

There are several pieces of legislation and executive orders that are considered in an evaluation of Native American Religious Concerns [i.e., American Indian Religious Freedom Act (AIRFA) of 1978, Executive Order 13007, The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and the Archaeological Resources Protection Act (ARPA) of 1979].

Traditional Cultural Properties (TCPs) are a separate class of cultural resources that may occur in the EA analysis area, may or may not coincide with archaeological sites and artifact loci, and may fall under the purview of one or more of the cited legislation. The National Park Service 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)

For the proposed action, identification efforts for Native American Religious Concerns were limited to reviewing existing published and unpublished literature and personal communications with Jim Copeland, BLM/FFO archaeologist. The proposed project area would not be located within any TCPs (Jim Copeland, BLM/FFO, pers. comm., January 24, 2011).

3.1.4 Environmental Justice

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

3.1.5 USFWS Threatened and Endangered Species

Under section 7 of the Endangered Species Act (ESA) of 1973 (as amended), the BLM is required to consult with the USFWS on any proposed action which may affect federally listed threatened or endangered species or species proposed for listing. The Biological Survey Report (BSR) completed by Ecosphere addresses the potential for federally listed and other special status species to occur in the project area (Appendix C). Table 2 summarizes the potential for federally listed species to occur in the project area.

Table 2. Habitat Descriptions and Presence of USFWS listed Threatened (T), Endangered (E), (P) Proposed Threatened, or Candidate (C) Species with Potential to occur in San Juan County, New Mexico (USFWS 2010).

SPECIES	STATUS	HABITAT ASSOCIATIONS	PRESENCE*
MAMMALS			
Black-footed ferret *(Mustela nigripes)*	E	Open grasslands with year-round prairie dog colonies of200 acres or greater.	NP
BIRDS			
Mexican spotted owl *(Strix occidentalis lucida)*	T	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	NP
Southwestern willow flycatcher *(Empidonax trai//ii extimus)*	E	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	NP

SPECIES	STATUS	HABITAT ASSOCIATIONS	PRESENCE*
Yellow-billed cuckoo *(Coccyzus americanus ssp. occidentalis)*	C	Breeds in riparian woodlands with dense, understory vegetation.	NP
Mountain plover *(Charadrius montanus)*	p	Breeds in extremely dry, level shrublands, shortgrass prairie, barren agricultural fields, and other sparsely vegetated areas.	NP
FISH			
Colorado pikeminnow *(Ptychocheilus lucius)*	E	Large rivers with strong currents, deep pools, and quiet backwaters.	NP
Razorback sucker *()(yrauchentexanus)*	E	Medium to large rivers with silty to rocky substrates. Prefers strong currents and deep pools.	NP
PLANTS			
Knowlton's cactus *(Pediocactus knowltonii)*	E	Alluvial deposits that form rolling, gravelly hills in pinon-juniper and sagebrush communities {6,200-6,400 ft). A type locality of the Los Pif'ios River area.	NP
Mancos milkvetch *(Astragalus humillimus)*	E	Cracks of Point Lookout Sandstone of the Mesaverde series (5,000-6,000 ft).	NP
Mesa Verde cactus *(Sclerocactus mesae-verdae)*	T	Highly alkaline soils in sparse shale or adobe clay badlands of the Mancos and Fruitland formations {4,000-5,550 ft).	NP

K- Known, documented observation w1thtn proJect area, S – Su1tablc habitat and spec1es suspected to occur w1thtn 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.

No federally listed species with the potential to occur in San Juan County, or potential habitats thereof, were observed within the proposed project area.

3.1.6 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 USEPA 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 USEPA 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 CBM gas. On July 6, 1988, USEPA determined that oil and gas exploration, development and production (EDP) 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 USEPA. 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 Oil Conservation Division (OCD) administers hazardous waste regulations for oil and gas activities in New Mexico.

3.1.7 Water Quality, Surface and Groundwater

The proposed project area would be located in the Upper Colorado River Hydrologic Region and is part of the Pump Canyon sub-watershed. La Manga Canyon, an ephemeral drainage is located 0.30 mile north ofthe project area. The general drainage of the proposed project area flows from east to west into the confluence of Manga Canyon and Pump Canyon. Pump Canyon then flows approximately 2.5 miles south where it ends at the San Juan River. There are no perennial surface water resources in the form of rivers, lakes, ponds or streams, nor any wetlands or springs within the proposed project area.

The BLM designated Pump Canyon Reach #2 Ephemeral Wash Riparian area is located approximately Y.t mile from the proposed well pad. The SDA is managed to provide some additional protection for these riparian systems and facilitate the attainment and maintenance of proper functioning condition..

The primary aquifers in the BLM/FFO area are the sandstone based Uinta-Animas and the Mesaverde. Groundwater is readily available in most of the BLM/FFO area and is of fair to poor quality. A search of the New Mexico State Engineers Office - Water Administration and Technical Engineering Resource System (WATERS) database for the proposed project area and vicinity (1-mile radius) was performed. There is one water well located approximately 3.1 mile northwest of the proposed natural gas well.

3.2 Non-Critical Elements

Non-critical elements include resources that may be affected by the proposed action or alternatives, but are not necessarily required to be analyzed by statute, regulation, or EO. Table 3 lists non-critical elements that are either eliminated from further analysis in the table or are discussed further in this EA as they pertain to management objectives outlined in the BLMIFFO PRMP/FEIS (BLM 2003a).

Table 3. Affected Environment and Basis for Determination of No Further Analysis of Non-Critical Elements.

NON-CRITICAL ELEMENTS				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Topography/Surface Geology	X		X	
Mineral Resources	X		X	
Paleontology	X		X	The project area is located within a PFYC designated Class 5 area.
Soils	X		X	
Vegetation, Forestry	X		X	
Invasive, Non-native Species		X	X	
Livestock Grazing	X		X	
Special Status Species	X		X	
Wildlife	X		X	
Migratory Birds	X		X	
Wild Horses and Burros		X		There are no wild horse or burro populations in or near the project area.
Recreation	X		X	
Visual Resources	X		X	
Public Health and Safety	X		X	

3.2.1 General Topography/Surface Geology

The proposed project would be located on a terrace bench on the west side of Pump Canyon about 0.40 mile south of La Manga Canyon and approximately 3 miles north of New Mexico State Highway 173. Terraced mesas surround the project area and rise approximately 500 feet from the surrounding terrain. The terraces range from about 60-200 feet in height. Elevation of the proposed project area is approximately 5,900 feet. The majority of the proposed project area is relatively flat (>1 degree) with a western aspect. The undisturbed portion of the proposed project area contains tan, sandy soils with scattered boulders to the west and east. Surface geology of the proposed project area is derived from the San Jose Formation.

3.2.2 Mineral Resources

Natural gas production in the San Juan basin occurs at the highest rate in the state of New Mexico, with approximately 650 to 700 million thousand cubic feet (Mcf) produced annually. The proposed natural gas well would produce conventional gas from valid existing federal leases for the minerals associated with the proposed development formation. The proposed well-tie pipeline would transport natural gas from the proposed gas well into the regional natural gas transmission system.

There are no coal mines or salable mineral extraction projects operating in the vicinity of the proposed project.

3.2.3 Paleontology Resources

The proposed project area is located within the paleontological 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 (IM 2008-009). This system has ranked all lands within the FFO management area as a Class 5 designation. Class 5 designations are described as being Very High Potential paleontological resource areas, thus requiring an assessment at the project level (IM 2008-011).

3.2.4 Soils

Soils in the San Juan Basin were formed primarily in two kinds of parent material: alluvial sediment and sedimentary rock. Alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

The undisturbed portion of the proposed project area contains tan, sandy loam soils with sandstone outcrops and boulders while the disturbed portion of the project area is more compact. The proposed project area contains one soil mapping unit; Rock outcrop-Travessilla-Weska complex, extremely steep (Keetch 1980).

The soil in the project area is Rock Outcrop-Travessilla-Weska complex, extremely steep. The unit occurs on hills breaks and mesas with slopes ranging from 30-70%. The unit is comprised of 40% Rock outcrop on 30-40% slopes, 30% Travessilla sandy loam on 30-40% slopes, and 20% Weska silty clay loam on 30-40% slopes. Included in this unit are small areas of Atrac and Twick soils on hills and rubble land at the bottom of steep slopes. Rock outcrop is exposed areas of barren sandstone. Travessilla soil is very shallow to shallow and is well drained. Permeability is moderately rapid with a very low available water capacity. Effective rooting depth varies from 6-20 inches. Runoff is rapid with the potential for water erosion severe. The hazard of soil blowing is severe. Weska soil is very shallow to shallow and is well drained. Permeability is moderately slow with a very low available water capacity. Effective rooting depth is 6-20 inches. Runoff tends to be very rapid with the potential for water erosion very severe. The potential for wind erosion is moderate. The unit has a severe road rating with the main limitations of the unit being depth, slope, low strength and the potential for wind and water erosion. The unit has a low to moderate shrink/swell potential.

3.2.5 Vegetation, Forestry

The maJonty of the proposed project area is located on previously disturbed terrain and is relatively bare with reclaimed grassland. The undisturbed portion, mainly the construction zone of the proposed project is located within pinon-juniper woodland which is dominated by pinon pine *(Pinus edulis)* and Utah Juniper *(Juniperus osteosperma).* Dominant understory vegetation consists of big sagebrush *(Artemisia tridentata)*, rubber rabbitbrush *(Ericameria nauseosa)*, broom snakeweed *(Gutierrezia sarothrae)*, blue grama *(Bouteloua gracilis)*, Indian ricegrass *(Achnatherum hymenoides)* and serviceberry *(Amelanchier utahensis).* The overall vegetative cover was visually estimated at 30. Approximately 3 trees occur within the proposed project

area. A complete list of plants found during the field survey is included in the BSR in Appendix C.

3.2.6 Invasive, Non-native Species

The BLMIFFO maintains a list of invasive and non-native plant species of concern (BLM *2003a).* No BLM/FFO listed invasive or non-native plant species of concern were identified during the field survey.

3.2.7 Special Status Species

In accordance with BLM Manual 6840, the BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. Table 4 lists the special status species and their potential to occur in the proposed project area. The BSR in Appendix C provides the basis for the findings listed in the table.

The project area includes potential foraging habitat for golden eagles *(Aquila chrysaetos),* American peregrine falcons *(Falco peregrinus anatum),* bald eagles *(Haliaeetus leucocephalus)* and prairie falcons *(Falco mexicanus).* The cliff faces surrounding the project area, associated with Pump Canyon, provide potential nesting substrate for these raptors. The proposed project area does not contain potential nesting habitat for these raptors. According to the BLM/FFO, there are 14 historical or active golden eagle nests within approximately ▮ 0 miles of the proposed well pad (BLM 2009, unpublished data). The proposed action is also located within six miles of historical or active prairie falcon and peregrine falcon nests (BLM 2009, unpublished data). No raptors, or sign of consistent raptor use such as whitewash or nests, were observed or recorded in the proposed project area or within an estimated 1/3-rnile radius. Trees located along the edge of the nearby mesa within the general vicinity of the proposed project area offer potential raptor perching sites.

The proposed project area does not contain potential habitat for any other BLM/FFO special status species.

Ta ble 4. Habitat Descnpt10ns andPresence ofBLM/FFO SpecIaIStatus Species.

SPECIES	HABITAT ASSOCIATIONS	PRESENCE
Golden eagle *(Aquila chrysaetos)*	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	S
Burrowing owl *(Athene cunicularia)*	Rarely dig their own burrows and are typically associated with prairie dog colonies.	NP
Ferruginous hawk *(Buteo regalis)*	Flat or rolling terrain in grasslands, shrub-steppes, and deserts; may occur in the periphery ofpii'ion-juniper or other forests. Badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) but also nests on the ground.	p
Mountain plover *(Charadrius montanus)*	Breeds in flat, open grasslands; often associated with prairie dog towns and intensive grazing.	NP

SPECIES	HABITAT ASSOCIATIONS	PRESENCE
Yellow-billed cuckoo *(Coccyzus americanus occidentalis)*	Breeds in riparian woodlands with dense, understory vegetation.	NP
Prairie falcon *(Falco mexicanus)*	Found in arid, open grasslands and shrub-steppe habitats. Prairie falcons require cliffs for nesting.	S
American peregrine falcon *(Falco peregrinus anatum)*	Rugged terrain with rocky cliffs and canyons (30-1 ,000+ ft high), adjacent to rivers, lakes, or streams. Urban areas with towers and buildings are also inhabited.	S
Bald eagle *(Haliaeetus leucocephalus)*	Nests in forested areas adjacent to large bodies of water.	S
Aztec gilia *(Aliciellaformosa)*	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	NP
Brack's hardwall cactus *(Sclerocactus cloveriae ssp. brackii)*	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft).	NP

K - Known, documented observation w1thm proJect area; S - Habitat suitable and species suspected to occur w1thm the project area; NS- Habitat suitable but species is not suspected to occur within the project area; **NP -** Habitat not present and species unlikely to occur within the project area.

3.2.8 Wildlife

Signs of wildlife observed within the proposed project area indicated the presence of mule deer *(Odocoileus hemionus)*. According to the BLM (2008, unpublished data), and confirmed during the field survey, no prairie dog *(Cynomys sp.)* colonies are located in the proposed project area. A list of wildlife species observed within the proposed project area is provided in the project BSR in Appendix C.

The proposed project area is located within Rattlesnake Canyon Wildlife Area SDA, which is managed to support increases in potential wildlife.

3.2.9 Migratory Birds

Under the Migratory Bird Treaty Act (MBTA) (16 USC §703-712) and EO 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds", federal agencies are required to consider management impacts to migratory non-game birds. While all migratory songbirds are protected by law, certain species have been determined to be at greater risk than others. More than 350 avian species occur in San Juan County and the surrounding area administered by the BLMIFFO. A total of 136 species have been confirmed as breeding in San Juan County with likely additional species if one considers the adjacent counties within the FFO area. Data collected through breeding bird surveys coordinated by the USFWS as well as other private sector efforts have provided the basis for the New Mexico Partners in Flight (NMPIF) organization to develop bird "Watch Lists" and the USFWS's "Birds of Conservation Concern List". The NMPIF organization has identified priority species of birds for the state of New Mexico by habitat type. The FFO area lies within the Colorado Plateau physiographic region as identified by the NMPIF. The proposed project area contains two of the habitat types addressed in these documents: Great Basin desert scrub (sage/grass) and pinon-juniper woodland. Some of

the birds listed as "Highest Priority" by the PIF group as well as USFWS "Birds of Conservation Concern" include gray vireo *(Vireo vicinior)*, gray flycatcher *(Empidonax wrightii)*, sage sparrow *(Amphispiza belli)*, and sage thrasher *(Oreoscoptes montanus)*. The USFWS list of "Birds of Conservation Concern" includes the gray vireo and sage sparrow.

The Bird Conservation Plan developed for the State of New Mexico by PIF lists the sage thrasher *(Oreoscoptes montanus)* and sage sparrow within the Great Basin desert scrub habitat type as "highest priority" species for conservation. The ferruginous hawk *(Buteo regalis)*, mountain plover *(Charadrius montanus)*, and long-billed curlew *(Numenius americanus)* are listed as a "highest priority" species under the Plains and Mesa grassland habitat type. Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management "Birds of Conservation Concern 2008" within Bird Conservation Region 16 – Southern Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).

The pinon-juniper woodland habitat within and surrounding the project action area provides foraging and roosting habitat for large raptors, including golden eagles, prairie falcons, and red-tailed hawks *(Buteo jamaicensis)*. A variety of bird species may be found in the surrounding area such as Bendire's thrasher *(Toxostoma bendirei)*, loggerhead shrike *(Lanius ludovicianus)*, and vesper sparrow *(Pooecetes gramineus)*. Certain birds, including the juniper titmouse, western scrub jay *(Apelocoma californica)*, and bushtit *(Psaltriparus minimus)*, nest almost exclusively in pinon-juniper habitats. Mountain chickadees *(Parus gambeli)*, black-throated gray warblers *(Dendroica nigrescens)*, and blue-gray gnatcatchers *(Polioptila caerulea)* also occur in this community (NMPIF 2007).

The open grassland habitat in and surrounding the proposed project area provides foraging habitat for large raptors. Black-throated sparrows *(Amphispiza bilineata)*, Brewer's sparrows *(Spizella breweri)* and mountain bluebirds *(Sialia currucoides)* can also occur in this community (NMPIF 2007).

3.2.10 Grazing

The FFO/BLM manages 167 grazing allotments 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. An additional 30 Section 15 authorizations permit grazing on 30 allotments in the Lindrith, NM area.

The proposed project is located within BLM grazing allotment #5041 (Isaque and Richard Jacquez). Allotment #5041 is permitted for 40 cattle March 1 through April 30 for a total of 75 animal unit months (AUM).

3.2.11 Recreation

The proposed project is also located approximately two miles northwest of Cottonwood Campground in Navajo Lake State Park, four miles west of the "quality waters" on the San Juan River, and five miles west of Navajo Reservoir. Recreationists may use these facilities for a variety of activities including camping, fishing, boating, picnicking, hiking, and biking. However, the proposed project area is not within a designated recreational area. It does provide for dispersed recreation activities such as hunting, hiking, bird and wildlife watching, and products gathering. The proposed project is not within line-of-sight of the recreational areas listed above.

3.2.12 Visual Resources

The proposed project area is within the San Juan Basin, an area visually characterized by steep colorful escarpments, narrow vistas and rugged canyons. The majority of the project area is located on disturbed terrain. The vicinity of the project area consists of primarily desert grassland and piiion-juniper woodland habitat.

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 (BLM 2003a). VRM on public lands is conducted in accordance with BLM Handbook 8410 and BLM Manual 8411. Further details of the BLM/FFO VRM Program are contained on pages 2-9 to 2-10 and 3-61 to 3-63 of the Farmington PRMP/FEIS. Modifications to the visual resource must follow the guidelines for the types of change suitable for each class. The proposed project area is located within a designated Class II VRM area. This classification retains the existing character of the landscape and activities may be visible, but should not attract attention (BLM 2003a).

3.2.13 Public Health and Safety

Public risk associated with natural gas development includes increased traffic on public roads, wildfire, pipeline leakage, rupture, fire and explosion. Additional public health and safety risks include spills of wastes, chemicals, or hazardous materials. Roads in the area are generally unimproved dirt surface and are used to access natural gas facilities. These roads may become hazardous or impassable during periods of inclement weather.

4.0 ENVIRONMENTAL CONSEQUENCES

Environmental resources can be affected in many ways during implementation of the proposed action. The effect, or impact, is defined as any change or alteration in the pre-existing condition of the environment produced by the proposed action, either directly or indirectly. This chapter analyzes the environmental consequences of the proposed action.

Impacts can be either long-term (permanent, residual) or short-term (incidental, temporary). Short-term impacts affect the environment for only a limited time period and the environment usually reverts rapidly to the pre-construction condition. Short-term impacts are often disruptive and obvious. Long-term impacts are substantial and permanent alterations to the pre-project

environment. The BLM defines long-term impacts as those impacts whose results endure more than five years. Impacts may be irreversible or residual and affected resources irretrievable.

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 which 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.

No Action Alternative

Under the no action alternative, the proposed natural gas well pad would not be constructed nor the well drilled. There would be no new impacts from oil and gas production to resources in the project area. The no action alternative would result in the continuation of the current land and resource uses in the project area. This alternative will not be evaluated further in Chapter 4.

Action Alternative - Proposed Action

Under the proposed action, the Shaw #100 well pad would be twinned with the existing Shaw #1R and the well would be drilled as proposed, with mitigation measures to reduce potential impacts to environmental resources. Total surface disturbance associated with the proposed project would be 2.44 acres. The proposed well-tie pipeline ROW would be contained entirely within proposed well pad and construction zone. Approximately 1 acre would be subject to long-term disturbance associated with the natural gas well pad and access. This long-term disturbance would overlap existing disturbance. The potential environmental consequences and proposed mitigation measures for this alternative are described for both critical and non-critical elements in the following sections.

4.1 Air Resources

4.1.1 Direct and Indirect Effects

Air Quality

Air quality would temporarily 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 the FFO administrative area 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 GHGs) 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 GHGs, 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 PRMP/FEIS demonstrated 522 wells would be drilled annually for federal minerals. Current APD permitting trends within the field office confirm that these assumptions are still accurate. This level of exploration and production *would* contribute a small incremental increase in overall hydrocarbon emissions, including GHGs, NOx, and VOCs released into the planet's atmosphere. When compared to total national or global emissions, the amount released as a result of potential production from the proposed well would not have a measurable effect on climate change due to uncertainty and incomplete and unavailable information; therefore is not possible to determine the effects on climate change on a regional, national, or global scale.

Consumption of oil and gas developed from the proposed well is expected to produce GHGs, NOx and VOCs. Consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate. Regional and global transportation, metropolitan traffic, fires (including wildfires, controlled burns and use of domestic fire places), and power plant emissions from the west are all parts of the equation. Regional air quality modeling conducted for the Northern San Juan Basin Coal Bed Methane FEIS Project in August 2006, determined that potential cumulative visibility impacts to Federal PSD Class I Areas (Mesa Verde National Park and the 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 USEPA 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.

Climate

The assessment of GHG emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net impacts from the proposed action on climate. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local

scales, limits the ability to quantify potential future impacts of decisions made at this level. When further information on the impacts to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

4.1.2 Mitigation Measures

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

Additional air quality modeling conducted since completion of the 2003 FEIS/PRMP and provisions in the ROD for the FEIS/PRMP 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 on federal minerals in New Mexico's San Juan Basin is at a lower level than forecast in the Reasonable Foreseeable Development (RFD) Scenario prepared in 2001 for the FFO PRMP/FEIS. The impacts forecast by the RFD are still valid. At the time the 2003 PRMP/FEIS was written, ozone readings did not represent a violation of the NAAQS for this pollutant. The NMED 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 USEPA'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 CH4 emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the USEPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" subactivities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

The BLM's regulatory jurisdiction over field production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures may include:

flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; placement of compressors engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads; and water dirt roads during periods of high use in order to reduce fugitive dust emission. The significant threshold for particulate matter of 35 ug/m^3 daily $PM_{2.5}$ NAAQS is not expected to be exceeded under the proposed action alternative.

The USEPA 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 USEPA's Natural Gas Energy Star program. The FFO 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 Cultural Resources

One previously recorded site (LA68307) was documented during the cultural surveys. This site is not located within the proposed area of disturbance. The cultural resources report has been submitted to the BLM under separate report cover WCRM(F)960.

4.2.1 Direct and Indirect Effects

No direct impacts to cultural resources would be expected to occur. A potential indirect effect from the proposed action is the increase in human activity in the area with the increased possibility of unauthorized removal or other alteration to cultural resources in the area. A cultural resources determination of effect for the proposed action would be issued by BLM/ FFO archaeologists. This determination would be included in the BLM/FFO cultural resources stipulations attached to the APD.

4.2.2 Mitigation Measures

No site specific mitigation measures have been recommended for the proposed project. If previously undocumented cultural sites are encountered during construction, all activities will stop in the vicinity of the discovery and the BLM will be immediately notified. The site would then be evaluated. Mitigation measures such as data recovery may be required by the BLM to prevent impacts to newly identified cultural resources.

4.3 Native American Religious Concerns

The proposed action is not known to physically threaten any TCP's, 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 the American Indian Religious Freedom Act or E013007. Currently, no known remains fall within the purview of the Native American Graves Protection and Repatriation Act or the Archaeological Resources Protection Act.

4.3.1 Direct and Indirect Effects

Although none have been identified, any heretofore-unidentified effects of the proposed action to Native American Religious Concerns, direct and indirect, are expected to be low and long term.

4.3.2 Mitigation

No site-specific mitigation measures for Native American Religious Concerns have been recommended. In the event of any discoveries during project implementation, the BLM will be notified.

4.4 Environmental Justice

4.4.1 Direct and Indirect Effects

Development of the proposed action would not result in negative impacts to minority or low income populations. No minority or low income populations would be directly affected in the vicinity of the proposed action. Indirect effects could include positive 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 goverrunents related to royalty payments and severance taxes. A more detailed description of potential impacts is contained in the PRMP/FEIS p. 4-120 and 4-129.

4.4.2 Mitigation Measures

No mitigation measures for envirorunental justice are recommended.

4.5 USFWS Threatened and Endangered Species

No USFWS listed species, or potential habitats, were found in the project area.

4.5.1 Direct and Indirect Effects

FFO reviewed and determined that the proposed action is in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. No. 2-22-01-1-389). No further consultation with the USFWS is required.

4.5.2 Mitigation Measures

No mitigation measures for USFWS threatened and endangered species are recommended.

4.6 Water Quality: Surface and Groundwater

Key factors that influence the surface water quality in the San Juan drainage basin include some or all of the following: sparse vegetative cover, highly erosive and saline soils, rapid runoff, livestock grazing, and mineral resources development.

4.6.1 Direct and Indirect Effects

The proposed action would temporarily expose an estimated 2.44 acres of soil as a sediment source entering area drainage ways. Vegetation cover is low to moderate throughout the project area. Exposure of soils, particularly near the washes and on slopes, would lead to an increase in an undetermined, but likely small, amount of sediment transport, particularly during and following storm events. The impacts to surface water quality due to short-term increases in sediment would be low as the surface water present in the in the project area is ephemeral. Slight alterations in project area drainage patterns may also lead to an increase in sediment transport. These increases in sediment transport would persist for several years until the disturbed areas are stabilized.

Minimal amounts of hazardous materials (i.e., gas, diesel, etc.) would be used and stored on location. There would be the potential for accidental spills or releases of these materials which could impact local water quality. Potential for surface water quality impacts from accidental spills or releases of hazardous materials would be low and long-term. The impact of the proposed action on area water quality would be low in both the short and long-term.

Contamination of ground water could occur without adequate cementing and casing of the proposed well bore. With implementation of FFO standard drilling and completion requirements, short and long-term impacts to groundwater resources are anticipated to be low.

4.6.2 Mitigation Measures

A closed loop system will be used for drilling and completion. Drainage will be reestablished around well pad at interim reclamation. Approximately 1.5 acres of the project will be re-seeded with the Rattlesnake Canyon seed mix upon completion of well drilling. A 24-inch culvert will be installed approximately 30 feet from the edge of the well pad under the existing road. Burlington maintains a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. All field activities will be suspended in the event of muddy conditions, such that vehicle travel will be creating ruts. Adherence to APD COAs and other mitigation measures, such as adequate casing, cementing and other drilling and completion methods, will minimize effects to water quality.

4.7 General Topography

4.7.1 Direct and Indirect Effects

A total of 2.44 acres of land would be directly impacted from construction of the proposed project. Alterations to current topography would be low due to amount of disturbed area and the amount of cut and fill. To provide a level well pad there would be a maximum of 13 feet of cut and 6 feet of fill. Impacts to topography would likely not be noticeable since the proposed well pad would be twinned with an existing well pad and adjacent to an existing sandstone pit. Impacts to the project area topography would be low and long-term during construction and operation. Following abandonment, impacts to topography would be low and long-term. Impacts to topography would be minimized by development of the proposed action on existing disturbance.

4.7.2 Mitigation Measures

Extra materials needed for well pad construction may be taken from existing sandstone pit southwest of comer 5. Following well completion, areas not needed for operation will be recontoured and reseeded. Once the proposed well is abandoned, Burlington will recontour and reseed the remaining portions of the well pad in accordance with the COAs and stipulations issued by the BLM.

4.8 Paleontology Resources

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

4.8.1 Direct and Indirect Effects

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

4.8.2 Mitigation Measures

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.

4.9 Soils

4.9.1 Direct and Indirect Effects

The proposed action would affect approximately 2.44 acres of soils resulting in temporary displacement, compaction, and mixing of soils. Topsoil in the area is minimal, which is characteristic of the soil mapping unit found on the site. Soils in the area have been described as

having severe to very severe water erosion potential and a moderate to severe wind erosion potential. The well pad and access (approximately 1 acre) would remain as bare, compacted soil for the life of the project, approximately 30 years, and would be subject to an undetermined amount of wind and water erosion until the well is completely reclaimed. Compaction of the soils during construction and operation of the proposed project, coupled with the implementation of mitigation measures described below, would limit soil impacts from erosion. The most susceptible period for soil erosion impacts is during construction when strong winds or precipitation events during soil disturbing activities could mobilize soils. The impact on soils would be localized and low for the short and long-term.

4.9.2 Mitigation Measures

Industry related vehicle and pedestrian traffic will be restricted to proposed disturbance areas and existing roads. Following construction activities, unused areas will be reseeded with the Rattlesnake Canyon Wildlife Area seed mix to stabilize soils and prevent erosion. Following construction, vehicle traffic will be restricted to existing bladed roads to prevent erosion, soil mixing, and compaction in adjacent areas. Implementation of proper soil salvage, storage, and reclamation will retain adequate infiltration and permeability rates that will allow for maintenance of soil moisture, which is necessary for plant growth and vigor, and minimize surface runoff.

4.10 Vegetation, Forestry

4.10.1 Direct and Indirect Effects

Direct impacts would include removal of vegetation during site clearing activities. Construction of the proposed action would result in the removal and modification of approximately 0.75 acre of undisturbed and 1.7 acres of previously disturbed vegetation. Approximately three pinon or juniper trees would be removed. Potential impacts pertain to changes in species composition and density, and an increased potential for invasive species to establish. Woodland areas would be reseeded with a grass and shrub mix and would likely take decades to reestablish trees and return to the current condition. The impact of the proposed action on area vegetation would be low and long-term.

4.10.2 Mitigation Measures

During construction, Burlington and their contractors' vehicles will only operate on areas identified in this EA as work areas and on existing roadways. Revegetation of construction zones will be initiated by Burlington immediately following completion or at the direction of the BLM. The area will be reseeded with a BLM approved seed mixture (Rattlesnake Canyon) shown in Table 5. All rates shown in Table 5 are for pure live seed (PLS). The amount of seed is for drilled rate, for broadcast applications the rate will be doubled.

Table 5: Rattlesnake Canyon Wildlife Area SDA Seed Mixture.

Common Name	Variety	Percent for Mix	Pure Live Seed Lbs/Acre
Western Wheatgrass	Arriba	21%	3.0
Indian Ricegrass	Paloma or Rimrock	21%	3.0
Slender Wheatgrass	San Luis	15%	2.0
Crested Wheatgrass	Hy-Crest	21%	3.0
Pubescent Wheatgrass	Luna	15%	2.0
Small Burnet	Delar	7%	1.0

Source: BLM 2006

4.11 Invasive, Non-native Species

No invasive, non-native species listed by the BLM/FFO were identified in the proposed project area during the biological surveys.

4.11.1 Direct and Indirect Effects

Surface disturbance activities associated with the proposed project may create the potential for introducing noxious weeds and invasive, non-native species. The proposed project would have low and long-term impact from the potential introduction and establishment of invasive, non-native species into the area.

4.11.2 Mitigation Measures

Proper seeding and monitoring of the disturbed areas will reduce the potential for invasive species to occur. Appropriate washing of vehicles entering and exiting the project area will reduce the potential for invasive and non-native plant species infestations. Adherence to BLM reclamation measures will minimize impacts from invasive, non-native species. Continued monitoring for invasive plants and appropriate control/eradication measures will be done in accordance with standard and project-specific BLM stipulations.

4.12 Special Status Species

Golden eagle, bald eagle, peregrine falcon and prairie falcon have the potential to occur in the proposed project area. These BLM special management species were not observed during the field survey in October 2010. Their potential to occur within the project area is based on evaluation of the habitat, the known habitat associations of the species, and the proximity to documented nests and raptor habitat. These species have large home ranges and could potentially use the proposed project area for foraging. There is no potential nesting habitat for any special status raptor species within the proposed project area. However, the sandstone outcrops and cliff bands, along with the San Juan River, in the vicinity could provide potential nesting habitat for these species.

4.12.1 Direct and Indirect Effects

Direct impacts to golden eagles, bald eagles, peregrine falcons and prairie falcons as a result of the proposed project, would include the removal and modification of a maximum of 0.75 acre of

undisturbed and 1.75 acres of disturbed potential foraging for these raptor species. Approximately 1.5 acres would be reclaimed following construction of the proposed project. The proposed project would not result in any disturbance or modification of potential nesting habitat. The loss of approximately three trees would result in reduced perching habitat for raptor species. This reduction is not expected to result in reduced foraging effectiveness given the amount of perching habitat in the surrounding areas. Impacts from loss or modification of foraging habitat and avoidance would be moderate and long-term. Direct short-term impacts to these raptor species would include temporary avoidance during construction and drilling due to increased noise, and human and vehicular presence. Indirect impacts may include a change in vegetation species composition and density due to surface disturbance and reclamation, which could affect the prey base for golden eagles. Indirect impacts would be low and long-term. Impacts to BLM sensitive raptor species would be minimized by development of the proposed action on existing disturbance.

4.12.2 Mitigation Measures

Construction activities will be confined to the permitted area to avoid further disruption to all raptors. Adherence to COAs and stipulations provided by the BLM will minimize effects to all raptors that may utilize the project area and vicinity for foraging. Should any nesting raptors be identified before or during construction activities, the BLM biologist will be immediately contacted in order to evaluate whether additional resource protection measures are warranted.

4.13 Wildlife

The proposed project area is located within the Rattlesnake Canyon Wildlife Area SDA. The SDA is managed to support increases in potential wildlife.

4.13.1 Direct and Indirect Effects

Construction of the proposed action would result in the temporary loss of approximately 2.44 acres of previously disturbed and undisturbed vegetation. The shrub and grass species within the proposed project area and vicinity provides forage for big game and other wildlife species, while trees in the area provide cover and nesting areas. During construction activities and drilling there would be moderate, short-term impacts to area wildlife (such as deer, rabbits, and small mammals) as a result of habitat removal and human and vehicular activity and associated noise. Some small less mobile wildlife or burrowing animals could be killed during construction of the well pad and road. Wildlife in the area would be displaced or may temporarily avoid the project area during construction activities. Once the project is complete wildlife would likely return to the area. Since the vegetation removed would not necessarily be replaced with the same species and in the same percentage, a short-term alteration of habitat and habitat utilization is anticipated in those areas reclaimed. There would be a long-term loss of 1 acre of wildlife habitat, which would overlap existing disturbance, and a modification to approximately 1.5 acres. Impacts to wildlife would be low and long-term following reclamation. Impacts to wildlife are minimized by development of the proposed action on existing disturbance.

4.13.2 Mitigation Measures

There is a seasonal restriction on construction and drilling from December 1 through March 31 within the Rattlesnake Canyon Wildlife Area SDA. Construction activities will be confined to the permitted area to avoid further disruption to wildlife. Revegetation of construction zones will be initiated immediately following construction or at the direction of the BLM. The area will be reseeded with a BLM approved seed mixture as shown in Table 5. Adherence to BLM reclamation and sanitation measures will also minimize potential impacts to wildlife.

4.14 Migratory Birds

Effects to migratory birds would include disturbance from increased human presence, increased noise levels, temporary and permanent removal of nesting or foraging habitat, or destroying individual nests or eggs during habitat removal if the project occurs during the breeding season.

4.14.1 Direct and Indirect Effects

Determining effects on birds is not clear-cut since activities that result in the loss of habitat for one species may improve conditions for another. Habitat provides a source of food, security and escape cover, and nesting habitat for migratory bird species. Direct effects would include the long-term loss of 1 acre and the modification of 0.7 acre of piiion-juniper woodland habitat for birds; similarly, there may be disturbance to individuals from noise and increased human presence during construction. Table 6 lists the migratory bird species of concern potentially occurring in the proposed project area and impacts.

Table 6. Migratory Bird Species of Concern Occurring Within the BLM/FFO and Potential Impacts.

Species	Habitat Type	Effects	Impact Rating None/Low/Moderate/ High
Grasshopper sparrow *(Ammodramus savannarum)*	sage/grass	May be positively affected due to conversion to grassland.	Low
Sage sparrow[1] *(Amphispi:a belli)*	sage/grass	Minor loss of nesting and brood rearing habitat	Low
Burrowing owl *(Athene cunicularia)*	sage/grass	Little effect, nests in abandoned prairie dog burrows.	Low
Ferruginous hawk *(Buteo regalis)*	sage/grass/ pinon-juniper interface	Loss of nesting and foraging habitat; decrease in prey (small mammals) abundance likely.	None
Mountain plover *(Charadrius montanus)*	sage/grass	May be positively affected due to conversion to grassland; may produce more prey (i.e., arthropods).	None
Long-billed curlew *(Numenius americanus)*	sage/grass	May be positively affected due to conversion to grassland.	Low

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Species	Habitat Type	Effects	Impact Rating None/Low/Moderate/ Hi2h
Sage thrasher (*Oreoscoptes montanus)*	sage/grass	May be some loss of sage/nesting habitat	Low
Bendire's thrasher *(Toxostoma bendirei)*	sage/grass	Little effect anticipated some loss of nesting habitat; increase in prey (i.e., arthropods) likely.	Low
Ash-throated flycatcher *(Myiarchus cinerascens)*	Pinon-juniper	Cavity nester; some loss of nesting habitat	Low
Gray vireo *(Vireo vicinior)*	Pinon-juniper	Nests in juniper; reduction of juniper may be detrimental	Low
Gray flycatcher *(Empidonax wri htii)*	Pinon-juniper	Utilizes pinon-juniper and sometimes sage for nesting.	Low
Juniper titmouse *(Baeolophus ridgwayi)*	Pinon-juniper	Secondary cavity nester; some loss of nesting habitat	Low
Pinon jay *(Gymnorhinus cyanocephalus)*	Pinon-juniper	Colony nester in pinon; loss of pit'\on may impact	Low
Cassin's kingbird *T)lrannus vociferans)(*	Pinon-juniper	Nests/forages 10 pifton-juniper	Low
Black-throated gray warbler *(Dendroica virens)*	Pifton-juniper	Nests in pifton-juniper	Low

I = "H1gh Pnonty" b1rd spec1es that are listed on the NMPlF "H1ghest Pnonty" b1rds of conservatiOn concern list but not on the USFWS "Birds of Conservation Concern 2008" list.

Direct effects to migratory birds would be greater should construction occur during the breeding season of April 15 through July 15. Short-term effects would include avoidance of the area during construction and displacement of individuals to adjacent habitats, while long-term effects would include 1 acre of potential nesting and foraging habitat converted to an industrial use. Due to the temporary nature of the construction disturbance, long-term reproductive effects to migratory birds (including raptors) are not expected. Impacts to migratory birds are minimized by development of the proposed action on existing disturbance.

4.14.2 Mitigation Measures

Construction activities will be confined to the proposed project area to mirumize surface disturbance. Adherence to BLM reclamation and sanitation measures will minimize impacts. Following construction activities, disturbed areas will be reseeded with the appropriate BLM seed mix. Noxious weed control measures will minimize the spread of weeds in the project area. Any spills will be promptly cleaned up and Burlington will prepare a hazardous material response contingency plan to cover eventualities that could arise from an accidental release of hazardous materials. Reserve pits will be fenced and any open cavities will be covered. Any bird nests found within the proposed project area should be reported to a BLMIFFO biologist for appropriate mitigation prior to construction activities.

4.15 Grazing

4.15.1 Direct and Indirect Effects

Surface disturbance associated with construction of the proposed action would remove approximately 0.75 acre of undisturbed vegetation and 1.7 acres of previously disturbed vegetation, resulting in a minor reduction in forage and a change in the herbaceous species composition. The direct short-term loss and impact to grazing is estimated to be approximately 0.1 of an AUM (at an estimated 25 acres per AUM). Following interim reclamation, long-term impacts would be the loss of about 0.04 of an AUM. Indirect effects from development and maintenance of the proposed action would be the continued presence of human activity which may disturb livestock occurring within or proximate to the project area. Depending on the time of year, cattle may occur in or near the proposed action during development and operations.

The proposed project would have low and long-term impacts to livestock grazing. Impacts to grazing are minimized by development of the proposed action on existing disturbance.

4.15.2 Mitigation Measures

The Rattlesnake Canyon Wildlife Area BLM/FFO seed mix will be used to revegetate the proposed site disturbance. Approximately 1.5 acres of vegetation will be reclaimed after drilling of the proposed well pad. Interim reclamation will reduce the long-term loss to approximately 0.04 of an AUM.

4.16 Recreation

4.16.1 Direct and Indirect Effects

The general area offers dispersed recreational opportumtles for hunters, hikers and wildlife watchers. During construction and drilling recreationists may experience an increase in traffic, fugitive dust, and sound levels, as well as night time lighting. During operation impacts to recreationists would be low and long-term.

4.16.2 Mitigation Measures

Suspended dust from construction will be reduced through the application of fresh water to disturbed areas and heavy vehicle traffic areas. Construction activities will be confined to the proposed project area. Mitigation measures that minimize the impact of the project include revegetation requirements, sound panels, low profile equipment and above-ground facility paint color Guniper green) that are established by the BLM.

4.17 Visual Resources

4.17.1 Direct and Indirect Effects

During construction and drilling operations, the effects of disturbed ground, machinery emissions, and the presence of the drill rig and construction equipment would result in moderate short-term visual impacts. After construction and during operation of the proposed action, low

long-term visual impacts would occur which are minimized by development of the proposed action partially located on existing disturbance.

4.17.2 Mitigation Measures

A rapid construction schedule will minimize impacts to visual resources that result from construction and drilling activities. Mitigation measures that minimize the visual impact of the project include revegetation requirements, low-profile equipment and above-ground facility paint color.

4.18 Public Health and Safety

The proposed project may impact public health and safety in a number of ways. The primary activities associated with public health and safety is traffic and transportation to/from the site, including the handling, storage, and operation of equipment associated with construction activities. Health and safety issues for construction workers include operation of heavy equipment, welding activities, and working in the vicinity of other utilities (primarily other oil and gas gathering pipelines).

4.18.1 Direct and Indirect Effects

Direct and indirect impacts to public health and safety will be low to moderate and short-term during construction and drilling. Impacts during operation would be low and long-term.

4.18.2 Mitigation Measures

Adherence to company safety policies and BLM COAs will mitigate risk potential for public health and safety. In addition, hauling equipment and materials for the project on public roads will comply with all Department of Transportation regulations. Any spills will be promptly cleaned up and Burlington will prepare a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. All drilling and equipment operation will be performed in compliance with appropriate Occupation Health and Safety Administration (OSHA) regulations.

4.19 Cumulative Effects

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

Due to the absence of regulatory requirements to measure GHG emissions and the variability of oil and gas activities on federal minerals, it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of approving this application for permit to *drill.* A

general assumption, however, can be made: drilling this well may contribute to GHG emissions.

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to natural resources and plant and animal species due to climate change are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated.

Due to loss of habitat or competition from other species whose ranges may shift northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependant on historic water conditions. Forests at higher elevations in NM, 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.

5.0 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 7. Summary of public contacts made during preparation of document and the mterdisciplinary team.

Public Contact	Title	Organization	Present at Onsite?
Steven Merrell	Construction Supervisor	ConocoPhillips	Yes
Brandie Blakley	Construction Technician-Projects Development	ConocoPhillips	No
Harry Begay	Pipeline Construction Supervisor	Enterprise	Yes
Mike Flaniken	Environmental Protection Specialist	BLM	Yes
Jirn Copeland	Cultural Resources Specialist	BLM	No
Thomas J. Lennon	Archaeologists	Western Cultural Resource Management, Inc	No
Theresa Ancell, Toinette Slowman	Biologists	Ecosphere Environmental Services	Yes

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40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of July 1, 2001.
43 CFR, All Parts and Sections inclusive- Public Lands: Interior. Revised as of October 1, 2000.

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

APPENDIX A

APPLICATION FOR PERMIT TO DRILL (APD)

APPENDIXB

CONDITIONS OF APPROVAL (COA)

APPENDIXC

BIOLOGICAL SURVEY REPORT