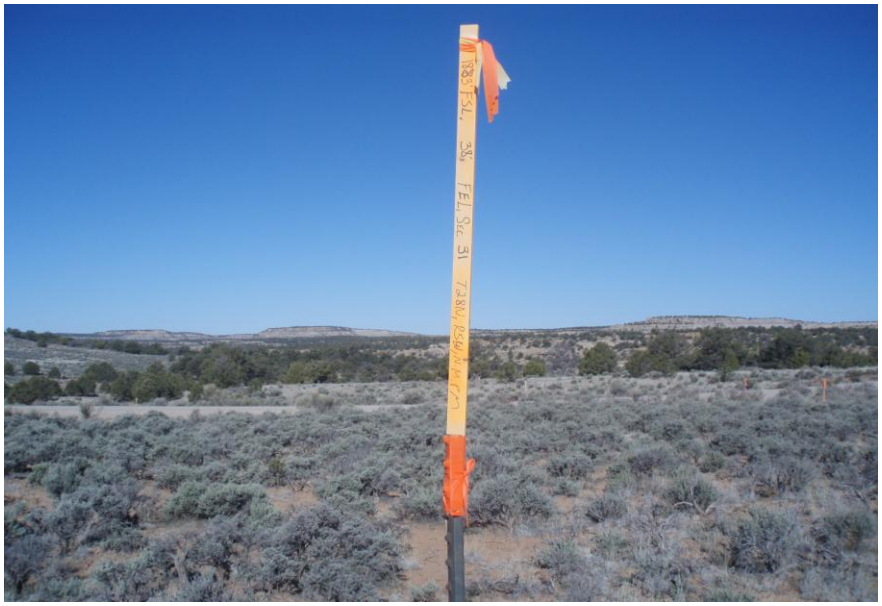
ENVIRONMENTAL ASSESSMENT

EA No. NM-F010-2011-386
Serial No.

BURLINGTON RESOURCES OIL AND GAS COMPANY, LP
SAN JUAN 28-5 UNIT #56N
PROPOSED NATURAL GAS WELL, ACCESS ROAD AND PIPELINE PROJECT
LEASE NUMBER USA SF-079521



Prepared for:

BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE

Prepared by:

Ecosphere
Environmental Services

August 2011

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1.0 INTRODUCTION

Burlington Oil and Gas Company LP (Burlington) has proposed directionally drilling the San Juan 28-5 Unit #56N natural gas well and constructing an associated access road and pipeline in Rio Arriba County, New Mexico. The legal coordinates for the proposed project are:

Surface Location:
1,883 feet FSL (from the south line), 38 feet FEL (from the east line)
Section 31, Township 28 North, Range 5 West
New Mexico Principal Meridian (NMPM)

Bottom Hole Location:
2,200 feet FSL, 215 feet FWL (from the west line)
Section 32, Township 28 North, Range 5 West, NMPM

Surface disturbance activities associated with drilling the gas well would involve construction of a well pad, access road, and subsurface well-tie pipeline. The proposed project area would be located approximately 5.9 miles south of Highway 64, and approximately 1.2 miles north of Santos Peak, and 0.4 mile south of Munoz Creek. 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, Williams Four Corners (Williams) would file for a right-of-way (ROW) grant with the BLM/FFO to construct and operate the proposed well-tie pipeline. The proposed natural gas well project would be located on federal lands with the federal mineral estate administered by the BLM/FFO.

4.6 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 USA SF-079521 issued by the BLM in 1948 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 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 2003*a*), which was approved as the Final Resource Management Plan for the BLM/FFO by the Record of Decision (ROD) signed September 29, 2003 (BLM 2003*b*). 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.html. 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, Sections 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. No mitigation measures would be required.

2.2 Alternative B - Proposed Action

Proposed Action Title/Type: San Juan 28-5 Unit #56N natural gas well project/Application for Permit to Drill and Right-of-Way Grant
County: Rio Arriba County, New Mexico
Applicant(s): Burlington and Williams
Surface Owner: BLM
Mineral Estate: Federal

Burlington has filed an APD for the proposed San Juan 28-5 Unit #56N natural gas well to access the federal mineral estate administered by the BLM/FFO. The legal coordinates of the proposed surface location are 1,883 FSL and 38 feet FEL of Section 31, Township 28 North, Range 5 West, New Mexico Principal Meridian (NMPM) in Rio Arriba County, New Mexico. The proposed well would be directionally drilled to a bottomhole location of 2,200 feet FSL and 215 feet FWL in Section 32, Township 28 North, Range 5 West, NMPM. The proposed well-tie pipeline would be located in the NE/SE ¼ of Section 31, Township 29 North, Range 5 West, NMPM. A project vicinity map is provided as Figure 1. The proposed action is shown on the Santos Peak, NM U.S. Geological Survey (USGS) 7.5-minute quadrangle map as Figure 2. Figure 3 shows the proposed action on the Santos Peak 2009 New Mexico digital photo orthoquad.

Drilling of the proposed San Juan 28-5 Unit #56N natural gas well project would require construction of a 230-foot by 300-foot well pad with a 50-foot wide construction zone around the perimeter of the pad that would disturb approximately 3.03 acres. If the proposed natural gas well should prove productive, Williams Four Corners (Williams) would construct and operate the proposed well-tie pipeline, which would be approximately 648 feet in length constructed within a 40-foot wide right-of-way (ROW). Approximately 175 feet of the proposed pipeline would be located within the proposed well pad dimensions. An approximately 66-foot access road would be constructed to access the site. The proposed road would be located within the proposed pipeline ROW and would not result in additional surface disturbance. Total surface disturbance for the proposed project would be 3.46 acres. Approximately 95 percent of the proposed project would be located on undisturbed land.

Burlington will comply with all applicable federal, state and local laws and regulations and obtain the necessary permits for the construction of the well pad, access road, 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 of this EA describes these measures for all resources potentially impacted.

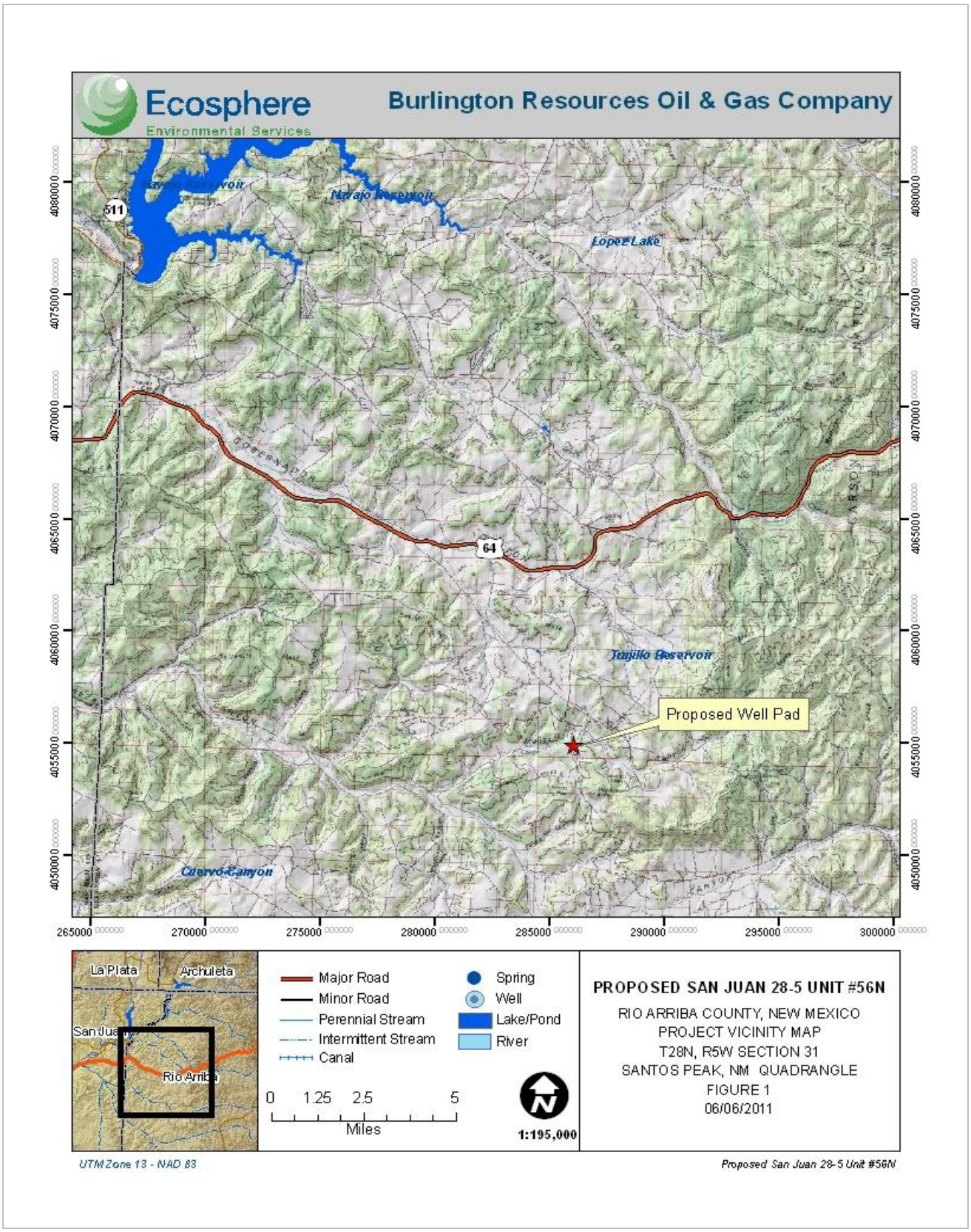
Construction activities associated with the proposed action would include drilling the proposed natural gas well and the installation of any surface and subsurface equipment necessary for natural gas production. Construction of the proposed well pad would commence following the BLM/FFO approval of Burlington's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

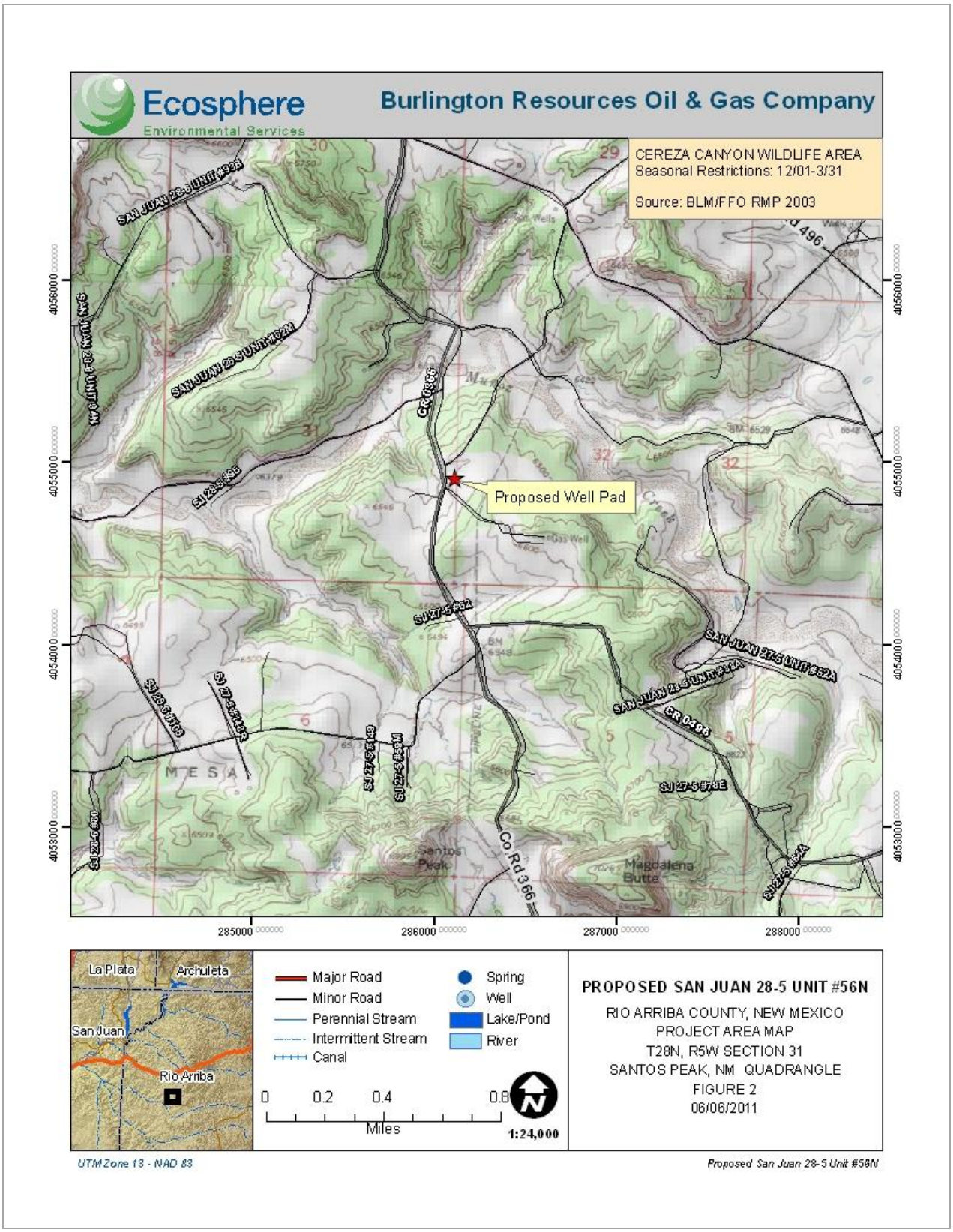
- Construction crews remove vegetation from the proposed natural gas well project site. Excavated materials from the cuts would be used on the fill portion of the location to level the pad. Included in the pad construction would be excavation of the reserve and blow pits. Cut material from the reserve and burn pits would be stockpiled on the location or used to construct the back walls of the burn pit, which is where a gas flare is burned during drilling to relieve wellbore pressure.
- 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 a lined reserve pit. The reserve pit would be fenced on three sides away from the pad during drilling and the fourth side fenced as soon as the rig moves out. The reserve pit would be allowed to dry or the free fluids removed or trucked to an approved disposal facility or reused in drilling operations at another well site. In addition, 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.

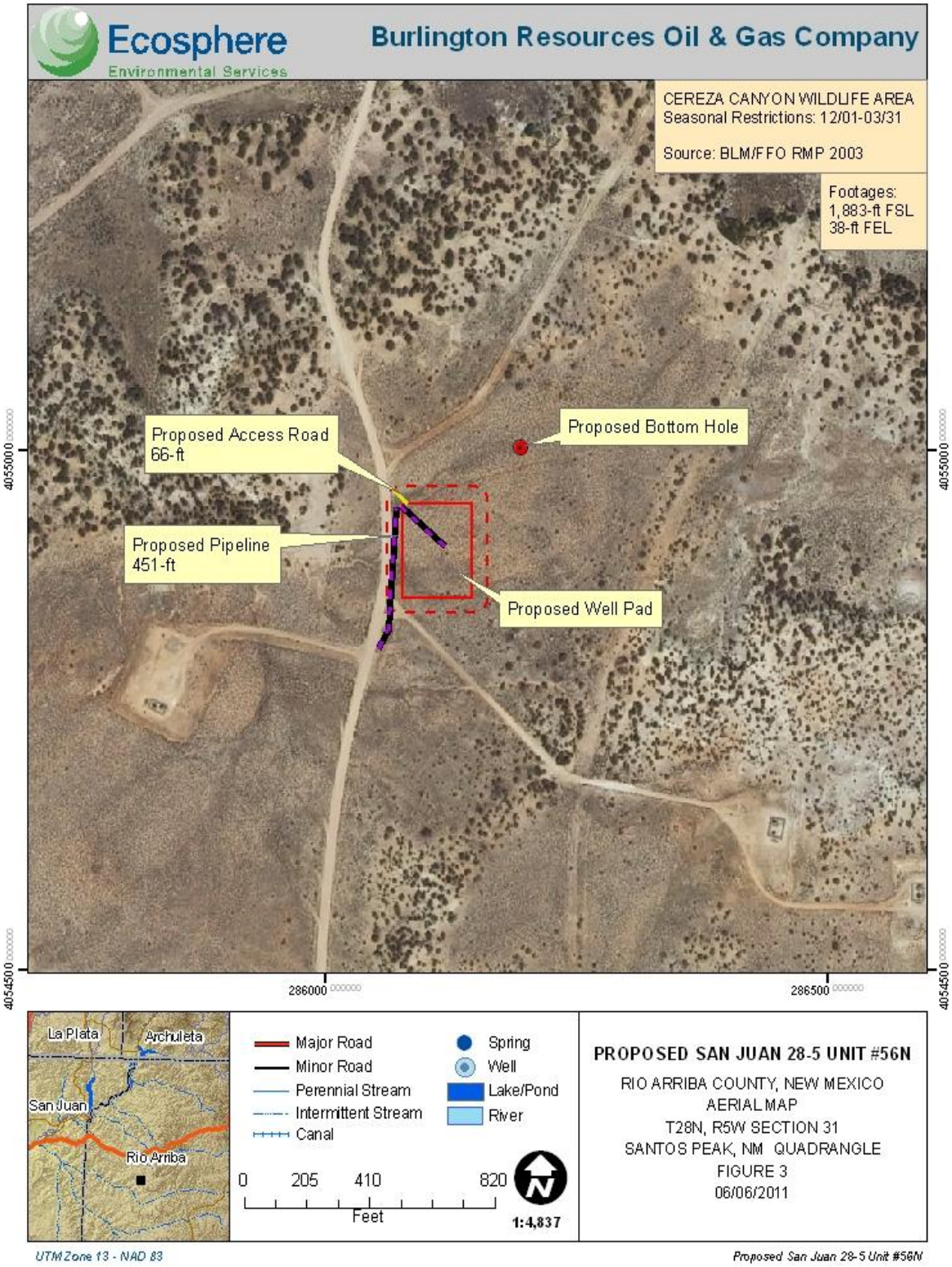
For a detailed description of design features and construction practices associated with the proposed action, refer to the project plats provided in the APD in Appendix A. Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) and ROW grant stipulations are incorporated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

2.3 Alternatives Considered But Not Analyzed In Detail

Originally the location was staked at 1,575 feet FSL and 239 feet FWL in Section 32, Township 28 North, Range 5 West NMPM in Rio Arriba County, New Mexico. This location was evaluated on March 8, 2011 by the BLM and the applicant. Placement of the proposed well pad at this location would have required 10.8 feet of cut at corner 2 and 7.2 feet at corner 3. Corners 5 and 6 would have had 9.4 and 5.2 feet of fill, respectively. A 5-foot deep drainage was located in the southern corner and would have required additional effort to divert. Therefore; the proposed action was moved down the slope to the northwest to a relatively flat area which would require less cut and fill, place it closer to road, and outside the drainage. No other alternatives were identified during pre and post analysis that would create less impact and still achieve the purpose and need of the proposed action.


Ecosphere
Environmental Services
Burlington Resources Oil & Gas Company
Navajo Reservoir
Lopez Lake
Trujillo Reservoir
Cuervo Canyon
Proposed Well Pad
511
64
4080000
4075000
4070000
4065000
4060000
4055000
4050000
265000
270000
275000
280000
285000
290000
295000
300000
La Plata
Archuleta
San Juan
Rio Arriba
Major Road
Minor Road
Perennial Stream
Intermittent Stream
Canal
Spring
Well
Lake/Pond
River
0 1.25 2.5 5
Miles
1:195,000
PROPOSED SAN JUAN 28-5 UNIT #56N
RIO ARRIBA COUNTY, NEW MEXICO
PROJECT VICINITY MAP
T28N, R5W SECTION 31
SANTOS PEAK, NM QUADRANGLE
FIGURE 1
06/06/2011
UTM Zone 13 - NAD 83
Proposed San Juan 28-5 Unit #56N


Ecosphere
Environmental Services
Burlington Resources Oil & Gas Company
CEREZA CANYON WILDLIFE AREA
Seasonal Restrictions: 12/01-3/31
Source: BLM/FFO RMP 2003
Proposed Well Pad
SAN JUAN 28-5 UNIT #92M
SAN JUAN 28-5 UNIT #92A
SAN JUAN 27-5 UNIT #52A
CR 0496
CR 0486
Co Rd 386
Santos Peak
Magdalena Butte
MESA
4056000
4055000
4054000
4053000
285000
286000
287000
288000
La Plata
Archuleta
San Juan
Rio Arriba
Major Road
Minor Road
Perennial Stream
Intermittent Stream
Canal
Spring
Well
Lake/Pond
River
0 0.2 0.4 0.8
Miles
1:24,000
PROPOSED SAN JUAN 28-5 UNIT #56N
RIO ARRIBA COUNTY, NEW MEXICO
PROJECT AREA MAP
T28N, R5W SECTION 31
SANTOS PEAK, NM QUADRANGLE
FIGURE 2
06/06/2011
UTM Zone 13 - NAD 83
Proposed San Juan 28-5 Unit #56N


Ecosphere
Environmental Services
Burlington Resources Oil & Gas Company
CEREZA CANYON WILDLIFE AREA
Seasonal Restrictions: 12/01-03/31
Source: BLM/FFO RMP 2003
Footages:
1,883-ft FSL
38-ft FEL
Proposed Access Road
66-ft
Proposed Bottom Hole
Proposed Pipeline
451-ft
Proposed Well Pad
4055000
4054500
286000
286500
La Plata
Archuleta
San Juan
Rio Arriba
Major Road
Minor Road
Perennial Stream
Intermittent Stream
Canal
Spring
Well
Lake/Pond
River
0 205 410 820
Feet
1:4,837
PROPOSED SAN JUAN 28-5 UNIT #56N
RIO ARRIBA COUNTY, NEW MEXICO
AERIAL MAP
T28N, R5W SECTION 31
SANTOS PEAK, NM QUADRANGLE
FIGURE 3
06/06/2011
UTM Zone 13 - NAD 83
Proposed San Juan 28-5 Unit #56N

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 May 12, 2011 by an Ecosphere Environmental Services (Ecosphere) biologist and attended by representatives from Burlington and the BLM/FFO. Cultural resource surveys were conducted by Western Cultural Resources Management (WCRM) between December 28, 2010 and April 29, 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	**Effected by the Proposed Action**	**Not Effected by the Proposed Action**	**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
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 vicinity.
Threatened or Endangered Species		X	X	No threatened or endangered species or habitats located within the project area.

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Resources	**Effected by the Proposed Action**	**Not Effected by the Proposed Action**	**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 of the proposed project.

3.1.1 Air Quality

The proposed well is located in Rio Arriba County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington 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 (CO_2) methane (CH_4); nitrous oxide (N_2O); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

The 2003 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 of 2008, the USEPA announced a new primary 8-hour standard of 0.075 ppm.

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

impact visibility, and there are concerns for the ecosystem due to deposition of mercury and nitrogen.
In addition, the 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/m³ from the previous standard of 65 ug/m³. 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 CO_2 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 percent 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: 1) physical effects such as droughts, floods, glacial melting, and sea level rise; 2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and 3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses." It is not, however, possible to predict with any certainty regional or site specific effects on climate relative to the proposed action and subsequent actions.

In New Mexico, a recent study indicated that the mean annual temperatures have exceeded the global averages by nearly 50 percent since the 1970's (Enquist and Gori 2008). Similar to trends in national data, increases in mean winter temperatures in the southwest have contributed to this rise. When compared to baseline information, periods between 1991 and 2005 show temperature increases in over 95 percent of the geographical area of New Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state (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: PaleoIndian (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 2003*a*).

The proposed San Juan 28-5 Unit #56N natural gas well would be within the Carrizo sub-watershed. Based on the Farmington PRMP/FEIS (BLM 2003a), a total of 1,588 sites representing Paleo, Archaic Period, Basketmaker II, Basketmaker III, Unknown Anasazi, Pueblo I, Pueblo II, Pueblo III, Pueblo IV, Unknown Navajo, Dinétah/Gobernador Phase, Cabezon Phase, Reservation Phase, Apache, Pueblo, Hispanic, Euro-Anglo, and General Unknown temporal/cultural components have been documented within the watershed. Of the 19 categories of sites defined based on temporal/cultural affiliation, 18 are represented. Lacking in the watershed are sites attributed to Ute occupations. The most frequently occurring cultural affiliations recorded are Dinétah/Gobernador (38%) and Prehistoric Anasazi (21%). Features common to these sites include hearths, rock art, middens, hogans, pithouses, sweat lodges, and small pueblos. Site density is high with any apparent gaps most likely a factor of lacking inventory and not a lack of sites.

The entire area of potential affect for the Proposed Action was surveyed by Western Cultural Resources Management (WCRM) at a BLM Class III level (100%) and an inventory report was prepared and submitted to the BLM (WCRM(F)1026; BLM No. 2011(IV)009F) in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (BLM 2005).

One previously recorded site was updated (LA 1870), two newly discovered sites (LA 170354 and LA 170355) were recorded and four isolated occurrences (IOs) were documented. The IOs represent non-significant resources, and no further work is recommended for them. All three sites are recommended eligible for the National Register of Historic Places.

3.1.3 Native American Religious Concerns

Traditional Cultural Properties (TCPs) are a separate class of cultural resources which 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 (Parker and King 1998):

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

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

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

For the Proposed Action, identification of TCPs were limited to reviewing existing published and unpublished literature (e.g. Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), and the site-specific cultural resources survey report conducted for the Proposed Action. In addition, the BLM's cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts. The proposed project area is not located within any known TCPs.

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 (see 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), or Candidate (C) Species with Potential to Occur in San Juan County, New Mexico (USFWS 2011).

SPECIES	STATUS	HABITAT ASSOCIATIONS	PRESENCE*
MAMMALS			
Black-footed ferret (*Mustela nigripes*)	E	Open grasslands with year-round prairie dog colonies of 200 acres or greater.	NP
New Mexico meadow jumping mouse (*Zapus hudsonius luteus*)	C	Nests in dry soils but uses moist, streamside, dense riparian/wetland vegetation in mountainous areas.	NP
Canada lynx (*Lynx canadensis*)	C	Generally occurs in boreal and montane forests dominated by coniferous or mixed forest with thick undergrowth.	NP
Gunnison's prairie dog (*Cynomys gunnisoni*)	C	Primarily inhabits grass/forb/shrub habitats on abandoned land, valley floors, stream valleys, mountain meadows, high-elevation plateaus and benches, and intermountain valleys.	NS
BIRDS			
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	NP
Least tern (*Sterna antillarum*)	E	Colonies found on bare or sparsely vegetated sand or dried mudflats along coasts or rivers; also sandy islands and gravel and sand pits.	NP
Mexican spotted owl (*Strix occidentalis lucida*)	T	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	NP
Yellow-billed cuckoo (*Coccyzus americanus ssp. occidentalis*)	C	Breeds in riparian woodlands with dense, understory vegetation.	NP
FISH			
Rio Grande silvery minnow (*Hybognathus amarus*)	E	Prefers large streams with slow to moderate currents over a mud, sand, or gravel bottom.	NP

SPECIES	STATUS	HABITAT ASSOCIATIONS	PRESENCE*
Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*)	C	Prefers clear mountain streams or lakes with large substrate in the Rio Grande watershed.	NP
Roundtail chub (*Gila robusta*)	C	Occurs in large rivers and streams in the Upper Colorado River Basin.	NP
AMPHIBIAN			
Jemez Mountains salamander (*Plethodon neomexicanus*)	C	Restricted to coniferous forests dominated by Douglas fir, spruce, ponderosa pine and white fir above 7,200 feet in elevation	NP

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

No federally listed species with the potential to occur in Rio Arriba County, or potential habitats of federally listed species, 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 EDP 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 project area is located in the Upper Colorado River Hydrologic Region and is part of the Carrizo sub-watershed. No drainages bisect the proposed project area. Surface runoff would flow east to west from the proposed well pad and enters an ephemeral wash located 475 feet to the west. Munoz Creek is located about 0.4 mile from the project area. There are no perennial surface water resources in the form of rivers, lakes, ponds or streams, nor any wetlands, springs, or riparian habitats, within the proposed project area.

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. No recorded water wells are located within a 1-mile radius of the proposed project area. The nearest water well is located approximately 1.5 miles northeast of the proposed project.

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 BLM/FFO PRMP/FEIS (BLM 2003*a*).

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

NON-CRITICAL ELEMENTS				
Resources	**Affected by the Proposed Action**	**Not Affected by the Proposed Action**	**Further Analysis Presented in Text**	**Basis for Determination**
Topography/Surface Geology	X		X	
Mineral Resources	X		X	
Paleontology		X		.
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	

NON-CRITICAL ELEMENTS				
Resources	**Affected by the Proposed Action**	**Not Affected by the Proposed Action**	**Further Analysis Presented in Text**	**Basis for Determination**
Visual Resources	X		X	
Public Health and Safety	X		X	

3.2.1 General Topography/Surface Geology

The proposed project area would be located approximately 5.9 miles south of U.S. Highway 64, and approximately 1.2 miles north of Santos Peak. The proposed action would be located on broad terrace bench that rises 120 feet above Munoz Creek. Slopes range from 1-3 degrees with a westerly aspect. Elevation of the proposed project is 6,525 feet. The principle geological formation underlying the proposed project area is 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 natural 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 proposed project would be located on the Orlie fine sandy loam, soil mapping unit. Soil texture is sandy clay and reddish brown in color. No biological soil crusts were observed in the

project area. Orlie fine sandy loam is found on uplands, fan remnants and mesas with slopes from 1 to 8 percent. The unit is 80 percent Orlie soils and minor components of 10 percent Lindrith soils, 5 percent Rosced soils and 5 percent Royosa soils. Orlie soils are very deep in depth and well drained. Derived predominantly from sandstone and shale, permeability is moderately slow. The available water capacity is very high. Runoff is medium with the potential for water erosion moderate. The shrink/swell potential is moderate (USDA/NRCS 2011).

3.2.5 Vegetation, Forestry

The proposed project would be located primarily (90%) in undisturbed Great Basin desert scrub dominated by shrub species such as big sage (*Artemisia tridentata*) and blue grama (*Bouteloua gracilis)*. Herbaceous species include cheatgrass (*Bromus tectorum*), Indian ricegrass (*Achnatherum hymenoides*) and needle and thread (*Hesperostipa comata*). Ground cover was visually estimated at 50 percent vegetation component. The area surrounding the proposed project is composed primarily of piñon-juniper woodland and Great Basin desert scrub interface. Approximately 20 piñon (*Pinus edulis*) and juniper (*Juniperus osteosperma*) trees are located in the southeast corner of the proposed well pad. Species at the beginning of the proposed pipeline consisted of reclaimed vegetation such as rubber rabbitbrush (*Ericameria nauseosa*), cheatgrass, tumble mustard (*Sisymbrium altissimum*), Indian ricegrass and big sage. 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 BLM/FFO maintains a list of invasive and non-native plant species of concern (BLM 2003*a*). No species listed by the BLM were observed in the project area. A complete list of plants found during the field survey is included in the BSR in Appendix C.

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*) and prairie falcons (*Falco mexicanus*). The proposed project area does not contain potential nesting habitat for golden eagles or prairie falcons. According to the BLM/FFO, there are six historical or active golden eagle nests within seven miles of the project area. According to the BLM/FFO, the nearest prairie falcon nest is within 12 miles of the project area. 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-mile radius.

Table 4. Habitat Descriptions and Presence of BLM/FFO Special Status Species.

SPECIES	HABITAT ASSOCIATIONS	PRESENCE *

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 of piñon-juniper or other forests. Badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) but also nests on the ground.	NP
Mountain plover (*Charadrius montanus*)	Breeds in flat, open grasslands; often associated with prairie dog towns and intensive grazing.	NP
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.	NP
Bald eagle (*Haliaeetus leucocephalus*)	Nests in forested areas adjacent to large bodies of water.	NP
Aztec gilia (*Aliciella formosa*)	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 within project area; **S** - Habitat suitable and species suspected to occur within the project area; **NS** - Habitat suitable but species is not suspected to occur within the project area; **NP** - Habitat not present and species unlikely to occur within the project area.

3.2.8 Wildlife

The proposed project site is located within the Cereza Canyon Wildlife Area, a BLM Specially Designated Area (SDA). Signs of wildlife observed within the proposed project area indicated the presence of elk (*Cervus canadensis*) and mule deer (*Odocoileus hemionus*). Birds observed during the May field visit included the common raven (*Corvus corvax*). No prairie dog *(Cynomys sp.)* colonies are located in the project area. A list of wildlife species observed within the proposed project area is provided in the project BSR in Appendix C.

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 nongame 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 BLM/FFO. 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 one of the habitat types addressed in these documents: Great Basin desert scrub (sage-grass). 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 (*Amphispiza belli*) within the Great Basin desert shrub 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).

3.2.10 Grazing

The BLM/FFO 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 #5107 (Delgadito AMP). Allotment #5107 is permitted for 3 horses November 1 through February 28 for a total of 11 animal unit months (AUMs) and from March 1 to June 1 for a total of 9 AUMs. Allotment #5107 is also permitted for 342 cattle November 1 through February 28 (1,309 AUMs) and March 1 to June 1 (1,014 AUMs).

3.2.11 Recreation

The objective of the BLM-FFO outdoor recreation program is to ensure the continued availability of public lands for an array of resource-dependent recreation opportunities. Recreation use is managed to protect visitors, protect resources, resolve use conflicts, and stimulate the enjoyment of public lands. Recreation SDAs are managed to accommodate a large variety of recreational uses and outdoor recreational experiences. The proposed action area is not within a recreation SDA. BLM-FFO areas located outside of recreation SDAs are managed as Extensive Recreation Management Areas (ERMAs). ERMAs are managed to maintain a freedom of recreation choice with limited regulatory constraints. In

ERMAS, few recreation facilities or supervisory efforts exist. Dispersed recreational use in ERMAs may include occasional hunting during the hunting season.

3.2.12 Visual Resources

The project area is within the San Juan Basin, an area visually characterized by steep colorful escarpments, mesas, plains, dunes, and sheer-walled canyons. The project area is located on Cereza Mesa.

The BLM has stewardship responsibility to indentify and protect visual values on public lands. Visual Resource Management (VRM) objectives are developed by determining the extent and quality of visual resources by utilizing the Visual Resource Inventory (VRI) process. After the VRI is completed, visual resources are weighed along with all other resource allocations identified during the RMP development process. A VRI was conducted between 1978 and 1980 within the planning area and VRM management classes were assigned in the 1988 RMP. The 2003 RMP carried forward the VRM class designations from the 1988 RMP pending completion of a new VRI and RMP amendment, if necessary.

In 2009, an updated VRI was completed for the FFO planning area. The VRI identified the proposed project area as displaying Class IV VRM values based on landscape changes over the last 30 years.

In June 2011, the BLM/FFO filed a Notice of Intent (NOI) to amend the RMP (BLM/USDI 2003a) and prepare an associated EA to address the VRM in the planning area. The 2009 VRI will form the basis of the analysis in the RMP amendment. The FFO will analyze issues during the amendment process and will continue to honor all valid existing rights and other planning criteria listed in the NOI.

The VRM classification system is designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape (BLM 2003a). Modifications to the visual resource must follow the guidelines for the types of change suitable for each class. The proposed action would be located in a Class IV VRM area (BLM/USDI 2003a). Management objectives for the Class IV VRM provide for activities that require major modification of the landscape.

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. The pipeline and access road would not be constructed. 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 well would be drilled as proposed, and the pipeline and road constructed, with mitigation measures to reduce potential impacts to environmental resources. Total surface disturbance associated with the well pad would be 3.46 acres. Approximately new disturbance associated with the proposed action would be 3.31 acres. Approximately 1 acre would be subject to long-term disturbance associated with the natural gas well pad operation and access. 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

Local 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

well pad and pipeline and by the drilling rig that will be used to drill the well. Dust dissemination would discontinue upon completion of the construction phase. 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, recreational use, and 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 Corners Air Quality Task Force (FCAQTF) since its inception in 2002 when it was known as the Four Corners Ozone Task Force. Because of the unanswered questions raised by these modeling efforts, the FCAQTF has continued to look at air quality issues in the Four Corners region. The FCAQTF is comprised of a broad base of representatives including federal, state, 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 PRMP/FEIS and provisions in the ROD for the PRMP/FEIS provide for applications of additional emission controls if requested by the New Mexico Air Quality Bureau (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 CH_4 emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the 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/m³ 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 was updated (LA 1870), two newly discovered sites (LA 170354 and LA 170355) were recorded and four isolated occurrences (IOs) were. Sites LA 1870 and LA 170354 were avoided by relocating the proposed well pad. Site LA 170355 is not located within the proposed area of effect.

4.2.1 Direct and Indirect Effects

Direct effects normally include alterations to the physical integrity of a cultural resource. If a cultural resource is significant for other than its scientific information, direct effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. A potential indirect effect from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural resources in the area. Based on a review of the archaeological reports, the assessment of the undertaking in this area, and field checks by the BLM archaeological staff, the cultural resources staff has determined that the proposed action will have no effect on cultural resources. This determination will be included with the BLM cultural resources stipulations attached to the APD.

4.2.2 Mitigation Measures

All FFO/BLM cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review, attached to the R-O-W/APD. These stipulations may include, but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth

disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education.

All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment, and that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and or administrative penalties under the provisions of the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm).

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

4.3 Native American Religious Concerns

4.3.1 Direct and Indirect Effects

The proposed action is not known to physically threaten any TCPs, prevent access to sacred sites, prevent the possession of sacred objects or interfere or otherwise hinder the performance of traditional ceremonies and rituals pursuant to the AIRFA or EO13007. Currently, no known remains fall within the purview of the NAGPRA or the ARPA.

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/FFO 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 governments 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 Environmental 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-I-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 Wastes, Hazardous or Solid

Typical wastes associated with the proposed action include trash, sewage, produced water, and produced hydrocarbons. No chemicals subject to the Superfund Amendments and Reauthorization Act (SARA) Title III in amounts greater than 10,000 lbs. will be used during project activities. No extremely hazardous substances as defined in 40 CFR 355 in threshold planning quantities will be used.

4.6.1 Direct and Indirect Effects

The potential for littering and hazardous leaks exists during construction and operation of the proposed project. The impacts from hazardous or solid waste would be minimal to non-existent in both the short and long-term with adherence to the following mitigation measures.

4.6.2 Mitigation Measures

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

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

4.7 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.

4.7.1 Direct and Indirect Effects

The proposed action would temporarily expose an estimated 3.46 acres of soil as a sediment source entering area drainage ways. Exposure of soils, particularly 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 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.

4.7.2 Mitigation Measures

Approximately 2.4 acres of the project will be reseeded with the BLM/FFO seed mix upon completion of well drilling. Burlington maintains a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. Storm water will be diverted from the east side of the proposed well pad around corner 6 to corner 5 and from corner 6 to corner 2. A 24 inch culvert will be placed at the take off of the new access road. 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.

4.8 General Topography

The proposed San Juan 28-5 Unit #56N natural gas well would be located adjacent to and would partially overlap an existing roadway. There are no prominent topographical features such as cliffs or slickrock within the proposed project area. Slopes within the area are mild and less than 3 degrees. To construct a level well pad approximately 6.9 feet of cut and 7.1 feet of fill would be required.

4.8.1 Direct and Indirect Effects

A total of 3.46 acres of land would be directly impacted from construction of the proposed project. Alterations to the topography from the removal of soils and rocks within the proposed project area would be low to moderate during the construction phase and low and long-term after recontouring and reseeding the periphery of the well pad. Recontouring has the potential for

slightly altering drainage patterns. Impacts to the project area topography would be low to moderate in the short-term and low for the long-term.

4.8.2 Mitigation Measures

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.

4.9 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.

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

4.9.1 Direct and Indirect Effects

Although no paleontological resources are known to occur within the proposed project area, impacts to paleontological resources from the proposed project implementation could possibly occur. Direct impacts of the proposed project to fossil localities could result from the ground disturbing activities or the disturbance of the stratigraphic context in which they are located. This project could also create indirect impacts to areas by changing erosion patterns. 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.

4.9.2 Mitigation Measures

If paleontological resources are encountered at the site, 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.

4.10 Soils

4.10.1 Direct and Indirect Effects

The proposed action would affect approximately 3.46 acres of soils which have been classified as having moderately high water, and moderate to severe wind erosion potential. Construction would result in temporary displacement, compaction, and mixing of soils. 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.

4.10.2 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 a BLM approved 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.

4.11 Vegetation, Forestry

4.11.1 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 up to 3.46 acres of previously disturbed and undisturbed vegetation. Up to 20 piñon and juniper trees would be removed from the proposed location. Potential impacts pertain to changes in species composition and density, and an increased potential for invasive species to establish. Approximately 1 acre of vegetation would be converted for industrial use for the life of the project. The impact of the proposed action on area vegetation would be low and long-term.

4.11.2 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 and the pipeline ROW will be initiated by Burlington immediately following construction or at the direction of the BLM. All vegetation removed during site clearing activities will be mowed and incorporated into stockpiled topsoil. The area will be reseeded with a BLM approved seed mixture shown in Table 5. All rates shown in Table 5 are for pure live seed. The amount of seed is for drilled rate, for broadcast applications the rate will be doubled.

Table 5: Farmington Field Office Seed Mixture**.**

Common Name	Variety	Percent for Mix	Pure Live Seed Lbs/Acre
Western Wheatgrass	Arriba	23%	3.0
Indian Ricegrass	Paloma or Rimrock	23%	3.0
Slender Wheatgrass	San Luis	15%	2.0
Crested Wheatgrass	Hy-Crest	22%	3.0
Bottlebrush Squirreltail		15%	2.0
Four-wing Saltbush		2%	0.25

Source: BLM 2006

Alternative Species for Consideration:

Grass: Alkali sacaton (for clayey and salty bottoms)
Needle and thread
Pubescent wheatgrass
Intermediate wheatgrass
Smooth brome (for higher elevations)

4.12 Invasive, Non-native Species

4.12.1 Direct and Indirect Effects

No BLM listed invasive, non-native species of concern were identified in the project area. Surface disturbance activities associated with the proposed project create potential for the establishment and spread of noxious weeds and invasive, non-native species. Invasive, non-native species can outcompete and displace native vegetation resulting in altered wildlife habitat use.

4.12.2 Mitigation Measures

Proper seeding and monitoring of the disturbed areas will reduce the potential for invasive species to spread further. 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.

4.13 Special Status Species

Golden eagle 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 May 12, 2011. 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. The proposed project area does not provide potential habitat for any other BLM listed special status species.

4.13.1 Direct and Indirect Effects

Direct impacts to golden eagles and prairie falcons as a result of the proposed project, would include the removal and modification of a maximum of 3.46 acres of potential foraging habitat. Approximately 2.4 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. Impacts would be reduced through the utilization of existing disturbance. Impacts from habitat loss and modification would be low and long-term. Raptor species may also be directly impacted during construction and drilling due to an increase in human and vehicular presence, and noise. These increases may cause raptors to temporarily avoid the area. Impacts from avoidance would be low and short-term. Indirect impacts may include a change in vegetation species composition and density due to surface disturbance and reclamation, which could affect the prey base. Indirect impacts would be low and long-term.

4.13.2 Mitigation Measures

Construction activities will be confined to the permitted area to avoid further disruption to 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. 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. 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.

4.14 Wildlife

4.14.1 Direct and Indirect Effects

The proposed action would result in the short-term loss of 2.4 acres of vegetation and the long-term loss of approximately 1 acre of vegetation. The shrub and grass species within the proposed project area and vicinity provides forage for big game and other wildlife species. During construction 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, human and vehicular activity and associated noise. Wildlife in the area would be displaced to adjacent habitat or may temporarily avoid the project area during construction and drilling activities. Some small, less mobile species or burrowing species could be killed during well pad construction. 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, an alteration of habitat and habitat utilization is anticipated. There would be a long-term loss of about 1 acre of wildlife habitat. Impacts to wildlife would be low and long-term following interim reclamation.

4.14.2 Mitigation Measures

Cereza Canyon wildlife area SDA is subject to a seasonal restriction on construction and drilling from December 1 through March 31 annually. Construction activities will be confined to the permitted area to avoid further disruption to wildlife. Revegetation of construction zones will be

initiated by Burlington 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. 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. Adherence to BLM reclamation and sanitation measures will also minimize potential impacts to wildlife.

4.15 Migratory Birds

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

4.15.1 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. Migratory species of concern that may occur in the project area are listed in Table 6. Habitat provides a source of food, security and escape cover and nesting substrate for migratory bird species. Direct effects would include the long-term loss of 1 acre and the modification of 2.4 acres of potential nesting and foraging habitat for birds; similarly, there may be disturbance to individuals from noise and increased human presence during construction.

Table 6. Migratory Bird Species of Concern Potentially Occurring within the Project Area 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] (*Amphispiza 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/piñon-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

Species	Habitat Type	Effects	Impact Rating None/Low/Moderate/High
Sage thrasher[1] (*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

1 = "High Priority" bird species that are listed on the NMPIF "Highest Priority" birds 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. Other effects could include nest abandonment during construction in adjacent areas; degradation of habitat from invasive species introduction; and decreased mammal prey base for raptors due to loss of habitat. 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.

4.15.2 Mitigation Measures

Construction activities will be confined to the proposed project area to minimize 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 will be reported to a BLM/FFO biologist for appropriate mitigation prior to construction activities.

4.16 Grazing

4.16.1 Direct and Indirect Effects

Surface disturbance associated with construction of the proposed action would remove 3.46 acres of undisturbed and disturbed vegetation, resulting in a minor reduction in forage and a change in the species composition. The direct short-term loss and impact to grazing is estimated to be less than 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.

4.16.2 Mitigation Measures

The BLM/FFO seed mix will be used to revegetate the proposed disturbance. Approximately 2.4 acres of vegetation will be reclaimed after drilling of the proposed well. Interim reclamation will reduce the long-term loss of AUMs.

4.17 Recreation

4.17.1 Direct and Indirect Effects

There are no designated recreational areas within the proposed project area or immediate vicinity. The proposed project area does offer opportunities for dispersed recreational activities, such as hunting. 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 resulting from periodic increases in localized fugitive dust and noise.

4.17.2 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 requirement and compatible above-ground facility paint color (juniper green) requirements that are established by the BLM.

4.18 Visual Resources

4.18.1 Direct and Indirect Effects

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

4.18.2 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, above-ground facility paint color, and low profile equipment.

4.19 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).

4.19.1 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.

4.19.2 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 (DOT) 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.

4.20 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 abandoned wells and the creation of new 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 Interdisciplinary Team.

Public Contact	Title	Organization	Present at Onsite?
Steven Merrell	Construction Supervisor	Burlington	Yes
Dollie Busse	Construction Technician-Projects Development	Burlington	No
Mike Flaniken	Environmental Protection Specialist	BLM	Yes
Jim Copeland	Cultural Resources Specialist	BLM	No
Theresa Ancell/Toinette Slowman	Biologists	Ecosphere	Yes
Charles W. Wheeler	Archaeologists	Western Cultural Resource Management, Inc	No

6.0 REFERENCES

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APPENDIX A

APPLICATION FOR PERMIT TO DRILL (APD)

APPENDIX B

CONDITIONS OF APPROVAL (COA)

APPENDIX C

BIOLOGICAL SURVEY REPORT