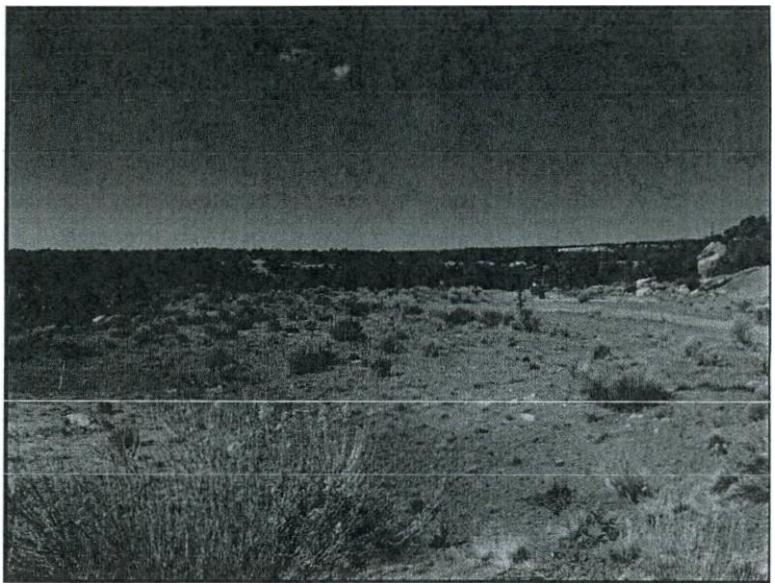
REVISED ENVIRONMENTAL ASSESSMENT

EA # NM-FOl0-2011-80

BURLINGTON RESOURCES OIL AND GAS COMPANY, LP
SAN JUAN 28-6 UNIT #460S
PROPOSED COALBED METHANE GAS WELL
AND PIPELINE PROJECT
LEASE NUMBER NM SF-079193



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Revised January 2011

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1.0 INTRODUCTION

Burlington Resources Oil and Gas Company, L.P. (BROG) has proposed directionally drilling a twinned coalbed methane (CBM) well in Rio Arriba County, New Mexico. The legal coordinates for the proposed surface and bottom hole locations are:

Surface Location
770' FSL (from the south line), 1,715' FWL (from the west line)
Section 16, Township 28 North, Range 6 West, New Mexico Principal Meridian (NMPM)

Bottom Hole Location
710' FNL (from the north line), 1,715' FWL Section 21,
Township 28 North, Range 6 West, NMPM

Surface disturbance activities associated with drilling the CBM gas well would include construction of well pad and installation of a new subsurface well-tie pipeline. The proposed project location would be about 2.8 miles south of U.S. Highway 64, 12.5 miles southeast of the Navajo Darn, and 18 miles east-southeast of Turley, New Mexico. BROG 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). Williams Four Comers, LLC (Williams) would file for a right-of-way (ROW) grant with the BLM/FFO to construct and operate the proposed gas well-tie pipeline if the well is productive. The proposed natwal gas well would be located on public lands with the federal mineral estate administered by the BLMIFFO.

1.1 Purpose and Need

The proposed action would allow BROG to produce gas or oil from the federal mineral lease USA NM SF-079193. This lease was issued on July 1, 1948 by the BLM and became effective on the same date. Lease USA NM SF-079193 incorporates 2,240 total acres in Township 28 North, Range 6 West, Sections 19 and 22. It is the policy ofthe 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 [U.S. 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 the applicant 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 *2003a),* which was approved as the Final Resource Management Plan for the BLM/FFO by the Record of Decision (ROD) signed September 29,2003 (BLM 2003b). The PRMP/FEIS and ROD are available for review at the FFO, Farmington, New Mexico or

electronically at http://www.run.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 Envirorunental 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. Envirorunental 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 Envirorunent 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 Wiidiife Service (USFWS), on all adions authorized, funded, or canied 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, BROG will:

- Comply with all applicable federal, state, and local laws and regulations.
- Obtain the necessary permits for the drilling, completion and production of the wells, 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 28-6 Unit #460S CBM gas well project/Application for Permit to Drill and Right-of-Way Grant
County: Rio Arriba, New Mexico
Applicant: Burlington Resources Oil and Gas Company/Williams Four Comers
Surface Owners: Bureau of Land Management
Mineral Estate: Bureau of Land Management

BROG has filed an APD for the proposed drilling of a CBM gas well to access the Blanco Pictured Cliffs/Basin Fruitland Coal mineral estate administered by the BLM/FFO. The proposed well would be twinned with the existing BROG San Juan 28-6 Unit #126 well. The proposed San Juan 28-6 Unit #460S well pad would be constructed on federal BLM lands at 770' FSL and 1,715' FWL of Section 16 ofTownship 28 North, Range 6 West, NMPM, in Rio Arriba County, New Mexico. The proposed San Juan 28-6 Unit #460S would be directionally drilled with a bottom hole location of 710' FNL and 1,715' FWL of Section 21, Township 28 North, Range 6 West, NMPM. A project vicinity area map is provided as Figure 1. The proposed action is shown on the Four Mile Canyon, New Mexico, U.S. Geological Survey (USGS) 7.5-minute quadrangle map as Figure 2.

The proposed action would be located within the Devil's Springs Mesa Area of Critical Environmental Concern (ACEC), an ACEC managed by BLM to preserve cultural and recreational values. For a detailed description of the design and construction practices associated with the proposed action, refer to the project plats provided in the APD in Appendix A. Implementation of design features contained in the Conditions of Approval (COAs) and pipeline stipulations are incorporated and analyzed in this alternative. The COAs and pipeline stipulations are provided in Appendix B.

Drilling of the proposed CBM gas well project would require construction of a 210-foot by 240-foot well pad including a 50-foot wide construction zone around the perimeter of the well pad for a total permitted surface disturbance of 2.42 acres. Approximately 90% (2.18 acres) of the proposed San Juan 28-6 Unit #460S would overlap the existing BROG San Juan 28-6 Unit #126 well pad. An access road already exists for San Juan 28-6 Unit #126, negating the need for new access for the proposed project. Total new surface disturbance for the well pad would be approximately 0.24 acre. The proposed action would result in approximately 1 acre of long-term disturbance overlapping currently disturbed areas.

A 215-foot subsurface well-tie pipeline constructed within a 40-foot wide ROW and located entirely within existing disturbance would connect San Juan Unit #460S to the existing pipeline for a permitted disturbance of 0.2 acre. Williams would construct and operate the well-tie pipeline. Figure 3 shows the proposed action on the 2005 Fourmile Canyon, New Mexico digital photo orthoquad.

Construction activities associated with the proposed action would include drilling the proposed CBM gas well and the installation of any surface equipment necessary for natural gas production. Construction of the proposed well would commence if the BLMIFFO approves BROG's APD. In general, construction of the well pad project would follow the sequence listed below.

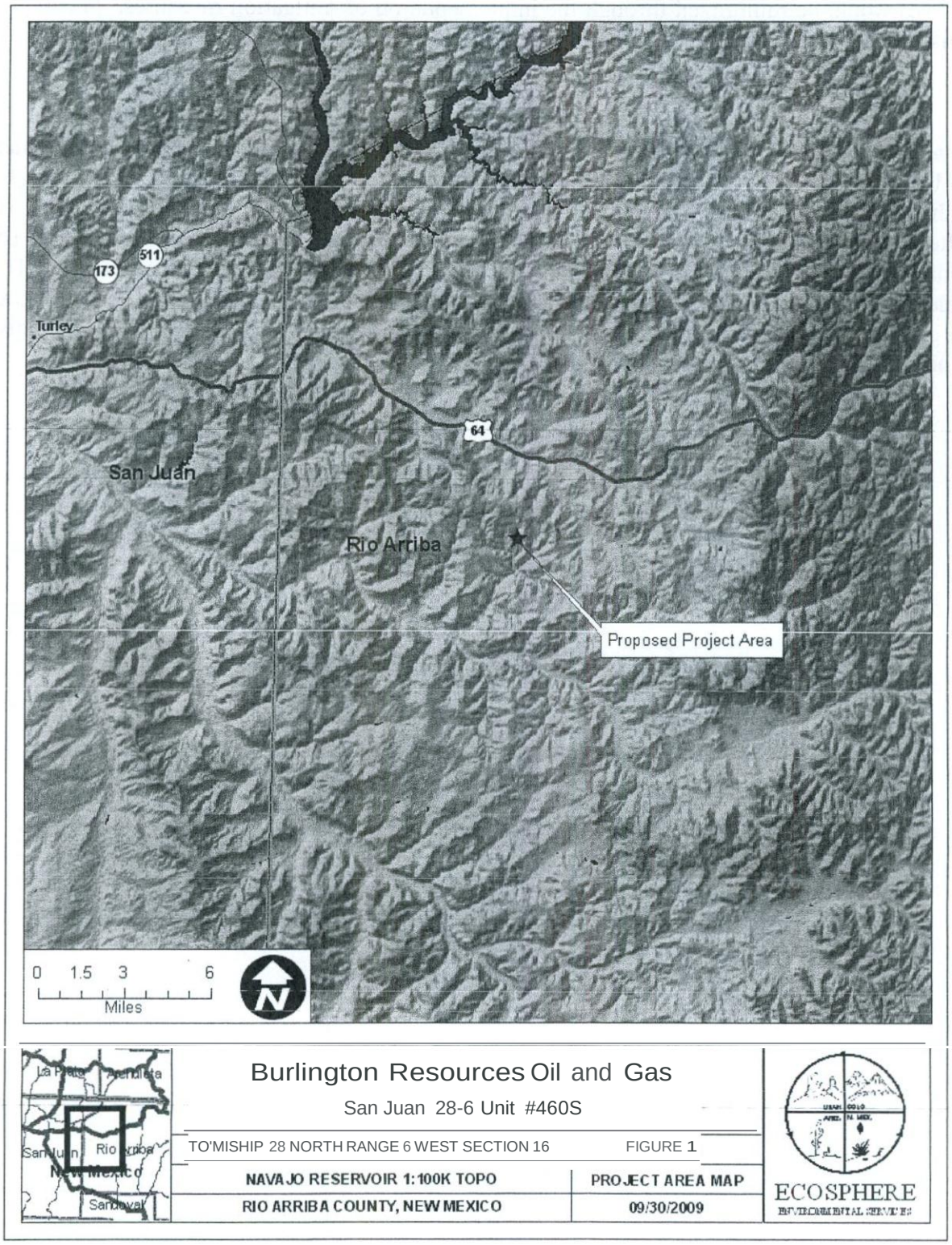
1. Construction crews remove vegetation from the proposed CBM gas well project site. Excavated materials from the cuts would be used on the fill portion of the location to level the pad. Included in the pad construction would be excavation of the reserve and blow pits. Cut material from the reserve and 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.
2. CBM gas well drilling facility assembly would occur on the well pad after site clearing and lev ling. 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.
3. 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.
4. Pipeline construction activities include: excavation of trenches, laying of pipe, covering of pipe and leveling.
5. After the well is completed, a portion of the pad not required for production equipment and vehicular access, would be recontourcd 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.

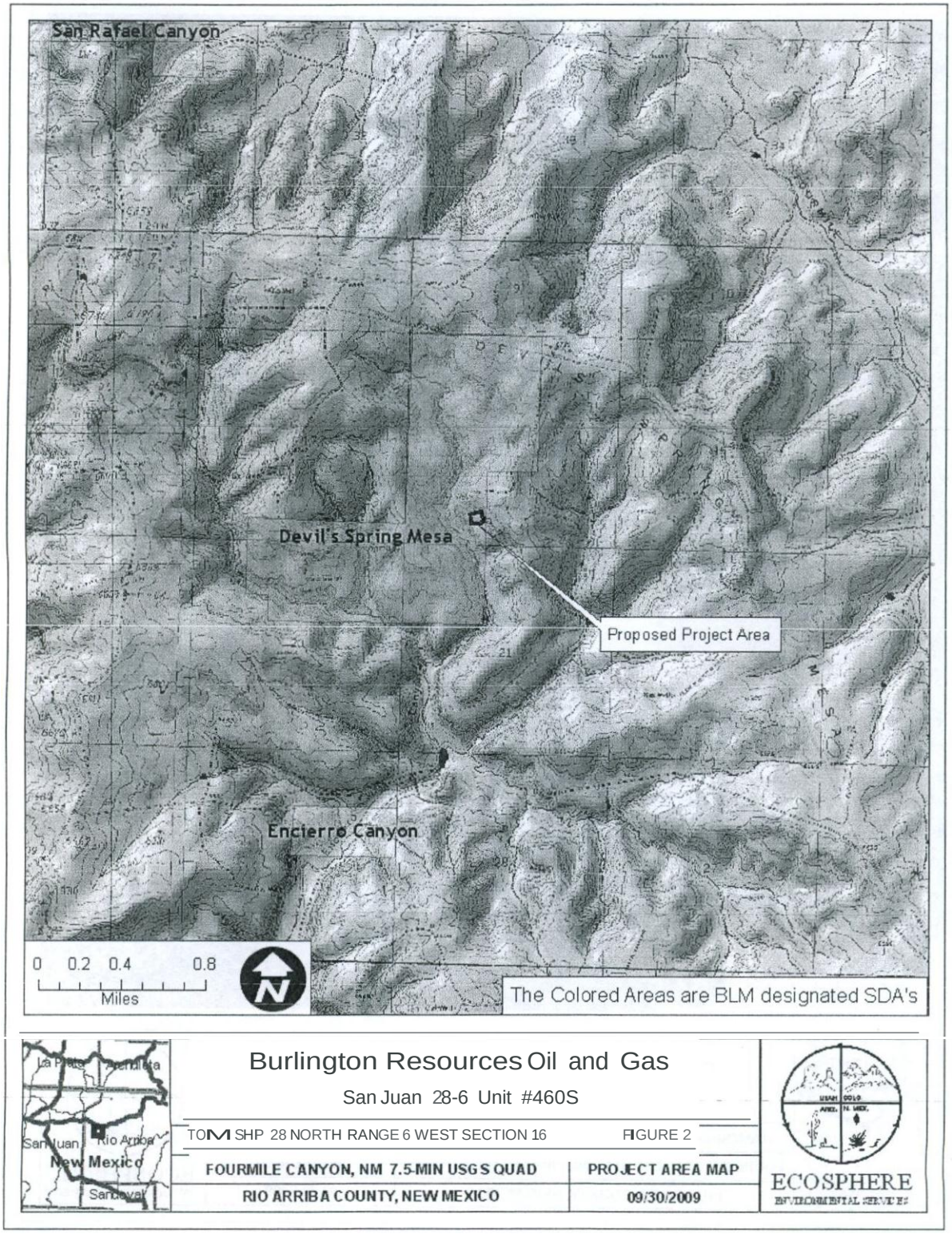
BROG would comply with all applicable Federal, State and local laws and regulations and obtain the necessary permits for the installation of the well pad and pipeline. All areas of proposed

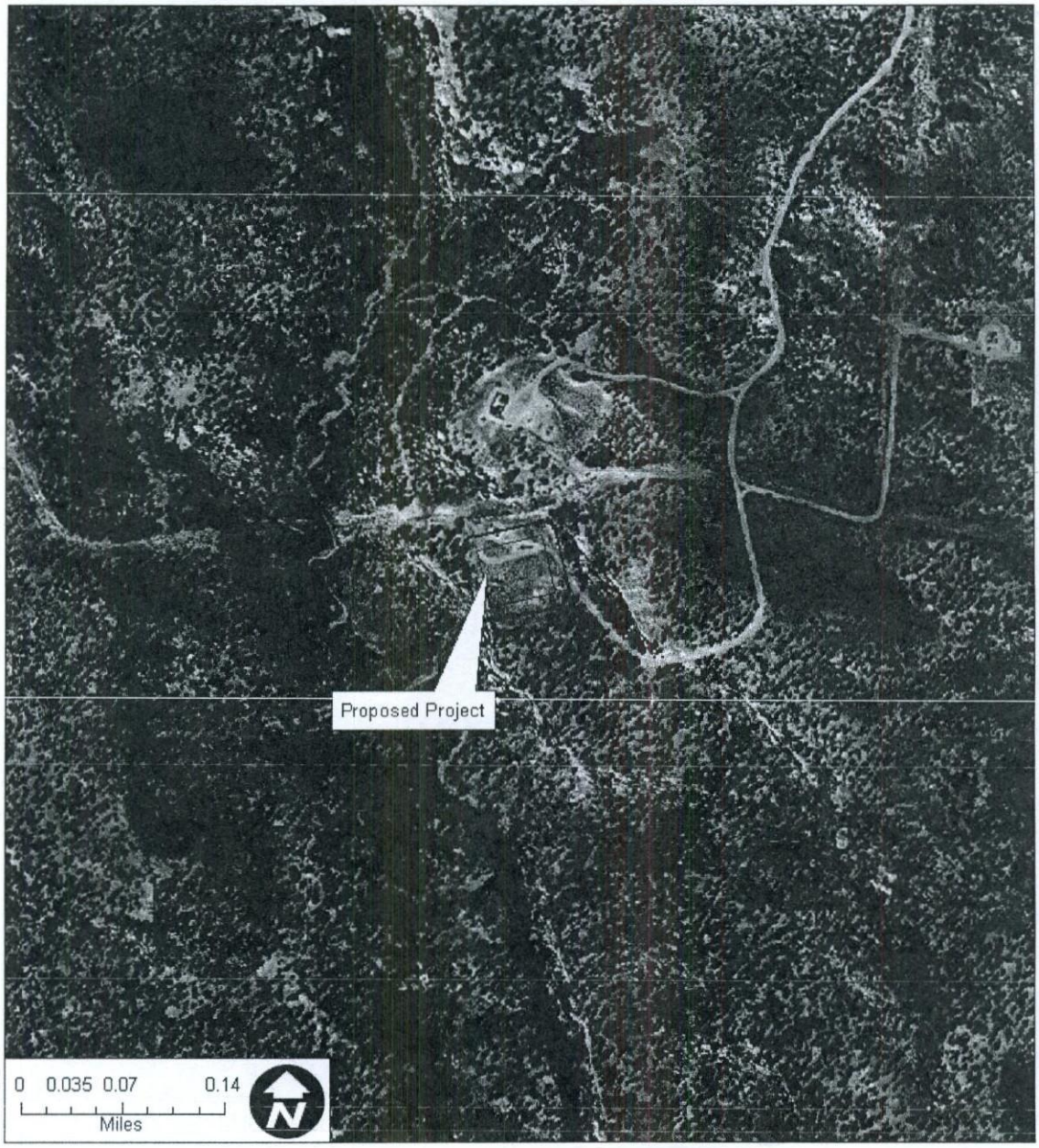
surface disturbance were inspected in the field to ensure that potential impacts to natural resources would be minimized through the implementation of mitigation measures. Section 4.0 of this EA describes these measures for all resources potentially impacted.

2.3 Alternatives Considered But Not Analyzed In Detail

One alternative considered included twinning the proposed action with the proposed San Juan 28-6 Unit #239 well. The proposed San Juan 28-6 Unit #239 would have been twinned with the San Juan 28-6 Unit #126. Under this alternative, the San Juan 28-6 Unit #460S would have resulted in approximately 2.15 acres of new disturbance within the Devil's Spring ACEC. The proposed San Juan Unit 28-6 #239 well has been deferred by the project applicant. This alternative eliminated from detailed consideration as the amount of new disturbance would have been greater and because of the deferment of the San Juan Unit 28-6 #239 well. This alternative will not be analyzed further in this document.


173
511
Turley
64
San Juan
Rio Arriba
Proposed Project Area
0 1.5 3 6
Miles
N
Burlington Resources Oil and Gas
San Juan 28-6 Unit #460S
TO'MISHIP 28 NORTH RANGE 6 WEST SECTION 16
FIGURE 1
NAVAJO RESERVOIR 1:100K TOPO
PROJECT AREA MAP
RIO ARRIBA COUNTY, NEW MEXICO
09/30/2009
ECOSPHERE


San Rafael Canyon
Devil's Spring Mesa
Proposed Project Area
Encierro Canyon
0 0.2 0.4 0.8
Miles
N
The Colored Areas are BLM designated SDA's
Burlington Resources Oil and Gas
San Juan 28-6 Unit #460S
TOWNSHIP 28 NORTH RANGE 6 WEST SECTION 16
FIGURE 2
FOURMILE CANYON, NM 7.5-MIN USGS QUAD
PROJECT AREA MAP
RIO ARRIBA COUNTY, NEW MEXICO
09/30/2009
San Juan
Rio Arriba
New Mexico
Sandoval
ECOSPHERE
ENVIRONMENTAL SERVICES



Burlington Resources Oil and Gas

San Juan 28-6 Unit #460S

TO\r\NSHP 28 NORTH RANGE 6 WEST SECTION 16	FIGURE 3
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3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

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

An onsite and biological survey was conducted with representatives from Ecosphere, BLM, the grazing lessee, and BROG on September 1, 2010. A previous onsite of the proposed project was conducted on February 19, 2009 and a biological survey was conducted on March 5, 2009. Cultural resource surveys were conducted by Western Cultural Resource Management, Inc. (WCRM) between September 18 and November 13, 2008.

3.1 Critical Elements

Certain critical environmental components require analysis under BLM policy. These requirements, listed in Table I, are specified by statute, regulations, or EO. Elements that do not exist in the project area or that do not have potential to be impacted are eliminated from further analysis as indicated in the table. Those elements potentially impacted by the proposed action or alternatives are described in the following sections.

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

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Air Quality	X		X	
Areas of Critical Environmental Concern (ACECs)	X		X	Proposed project located within Devil's Spring Mesa ACEC.
Cultural Resources	X		X	
Native American Religious Concerns		X	X	No traditional cultural properties known to occur in the proposed project area. (Jim Copeland, pers. comm., 04/20/09)
Environmental Justice	X		X	
Farmlands, Prime or Unique		X		No prime or unique farmlands located in project area or vicini_ty.
Floodplains		X		No floodplains located in project area or vicinity.
Threatened or Endangered Species		X	X	

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

3.1.1 Clean Air Act

The Clean Air Act of 1970, as amended, establishes National Ambient Air Quality Standards (NAAQS) to control air pollution. The New Mexico Air Quality Bureau (NMAQB) oversees air quality regulations and standards for stationary sources of air pollution. Impacts to air quality from oil and gas exploration and development are controlled by mitigation measures developed on a case-by-case basis. As part of the planning and decision-making process, the BLM must consider and analyze the potential effects of its activities on air resources. This EA discusses the contributions of the proposed project to regulated air pollutants and greenhouse gas (GHG) emissions and includes general discussion of potential impacts. Additional general information on air quality in the area is contained in Chapter 3 of the PRMP/FEIS (BLM 2003b).

3.1.1.2 Air Resources

The proposed well is located in Rio Arriba County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington RMP/Environrnental Impact Statement. In addition to the air quality information in the RMP cited above, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this RMP was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO_2) methane (CH4); nitrous oxide CN20); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG

concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

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

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

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

This EiI incorporates a..'1 a..'1alysis 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 ELM-authorized activities on air resources as part of the planning and decision making process.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to some states of which New Mexico is one. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Greenhouse gases and the potential effects of GHG emissions on climate are not regulated by the EPA, however climate has the potential to influence renewable and non-renewable resource management.

3.1.1.3 Air Quality

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

Air quality in the area near the proposed well is generally good and is not located in any of the areas designated by the Environmental Protection Agency as "non-attainment areas" for any

listed pollutants regulated by the Clean Air Act. During the summers of 2000 through 2002, ozone levels in San Juan County were approaching non-attainment. Additional modeling and monitoring was conducted by Alpine Geophysics, LLC and Environ International Corporations, Inc., in 2003 and 2004. Results of the modeling suggest the episodes recorded in 2000 through 2002 were attributable to regional transport and high natural biogenic source emissions. The model also predicted that the region will not violate the ozone NAAQS through 2007 and that the trends in the 8-hr ozone values in the region will be declining in the future. At the present time, San Juan County is classified as in attainment with the revised federal ozone standard of 0.075 ppm. Rio Arriba County is unclassified because there are no ozone monitors sited in Rio Arriba County.

Greenhouse gases, including carbon dioxide (C02) and methane (CH_4), and the potential effects of GHG emissions on climate, are not regulated by the EPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks found that in 2007, total U.S. GHG emissions were over 7 billion metric tons and that total U.S. GHG emissions have increased by 17% from 1990 to 2007. Emissions increased from 2006 to 2007 by 1.4 percent (99.0 Tg C02 Eq.). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (EPA 2009).

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

3.1.1.4 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 1970s (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 ofNew Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state.

3.1.2 Areas of Critical Environmental Concern

The proposed project would be located within the Devil's Spring Mesa ACEC that encompasses early Navajo defensive sites and communities. This ACEC spans 660 acres of public land and is a combination of Casa Mesa Diablo (CMD) Special Management Area (SMA) and Yeis-in-Row (YIR) ACEC. A pueblito and petroglyphs occur in YIR ACEC. A pueblito, two hogans, oxidized sandstone, and various artifact scatters occur in the CMD SMA. The major objective of the [illegible] is to [illegible] [illegible] rPf'rPatinna! [illegible] fBT 1\tf ?Q01n). M<>n.aement prescriptions for Devil's Spring Mesa ACEC allow oil and gas development and ROWs with the following management constraints:

- Attach No Surface Occupancy COA to the original 40 acres and apply a Controlled Surface Use constraint to the remaining acreage;
- Apply a No Surface Occupancy constraint for new oil and gas leasing;
- No new ROWs for CMD, new ROWS on remaining acreage must be placed in existing ROW disturbance;
- Visual Resource Management (VRM) Class II designations;
- Minimize disturbance and impacts by restrict other surface disturbing activities except for ROWs previously listed;

As of December 2009, BLM records indicate a totai of 10 wells permitted in or abutting this ACEC (BLM, unpublished data). This figure includes dual completed, co-mingled, and co-located well sites. Six well pads within the ACEC are visible on 2009 aerial imagery. This aerial imagery shows approximately 2.43 miles of existing roads within the ACEC.

3.1.3 Cultural Resources

The project is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: Paleolndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 BC to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (A.D. 1-1540), and the historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. A detailed

description of these various periods and select phases within each period is provided in the Farmington PRMP/FEIS (BLM *2003a).*

The proposed San Juan 28-6 Unit #460S CBM 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, Dinetah/Gobemador Phase, Cabezon Phase, Reservation Phase, Apache, Pueblo, Hispanic, and Euro-Anglo temporal/cultural components have been documented within the watershed. Of the 18 categories of sites defined based on temporal/cultural affiliation, 17 are represented. Lacking in the watershed are sites attributed to Ute occupations. The most frequently occurring cultural affiliations recorded are Dinetah/Gobemador (38%) and Pueblo I (21%). Gaps in data are most likely due to a lack of inventory, not a lack of sites given the high density of sites in the area.

WCRM completed a cultural resources survey of the proposed project under the NM Cultural Resource Permit number 25-2920-08-GG between September 18 and November 13, 2008. In conjunction with field surveys of the project area, the investigation included a literature review of known resources with the propose project area. WCRM searched literature available from the National Register of Historic Places (NRHP), State Register of Cultural Properties, and consulted VanValkenburg (1974). GIS data from the Laboratory of Anthropology Archaeological Record Management Section (ARMS) and the BLMIFFO was reviewed for sites located within '4 mile of the proposed project area. WCRM surveyed the proposed well pad, construction zone and the proposed pipeline for a total of7.08 acres. The cultural resources report WCRM(F)782 has been submitted to the BLM under a separate cover.

One newly recorded site and two isolated occurrences (lOs) were documented within a '4 mile radius of the proposed project area. The lOs represent non-significant resources. The newly recorded site dates from the Navajo period between A.D. 1500 to A.D. 1800. WCRM recommends the newly recorded site as not eligible for the NRHP. No cultural resources were identified in the proposed project area.

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 ofthe BLM/FFO (see pages 3-106 to 3-107 of the PRMP/FEIS for more details on ethnicity and poverty rates).

3.1.5 Native American Religious Concerns

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

Traditional Cultural Properties (TCPs) are a separate class of cultural resources 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:

> 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 commw1ity that (a) are rooted in that colTh-nunity's history, and (b) are important in maintaining the continuing cultural identity of the community. (National Register Bulletin 38)

For the proposed action, identification efforts for Native American Religious Concerns were limited to reviewing existing published and unpublished literature and personal communications with Jim Copeland, BLM/FFO archaeologist. The proposed project area is not located within any TCPs (Jim Copeland, BLM/FFO, pers. comm. April 20, 2009).

3.1.6 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 (Section 3.2.8) to occur in the project area (see .tA,.ppendix C). Table 2 sun1Inarizes** 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), Proposed Threatened (P), or Candidate (C) species with potential to occur in Rio Arriba County, New Mexico.

SPECIES	STATUS	HABITAT ASSOCIATIONS	PRESENCE*
Black-footed ferret *(Mustela nigripes)*	E	Open grasslands with year-round prairie dog colonies.	NP
New Mexico meadow jumping mouse *(Zapus hudsonius luteus)*	C	Nests in dry soils but uses moist, streamside, dense riparian/wetland vegetation.	NP
Least tern *(Sterna antiliarum)*	E	Colonies found on bare or sparsely vegetated sand or dried mudflats along coasts or rivers; also sandy islands and gravel and sarfd pits.	NP
Mexican spotted owl *(Strix occidentalis Iucida)*	T	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	NP
Southwestern willow flycatcher *(Empidonax traillii extimus)*	E	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	NP

Yellow-billed cuckoo *(Coccyzus americanus occidentalis)*	C	Nests in cottonwood/willow riparian habitat with dense understory along rivers; rare in the San Juan River valley.	NP
Mountain plover *(Charadrius montanus)*	p	Breeds in flat, open grasslands. Often associated with prairie dog towns and intensive grazing.	NP
Jemez Mountain salamander *(Plethodon neomexicanus)*	C	Inhabits high elevation mixed conifer forest consisting primarily of Douglas fir, blue spruce, ponderosa pine (and aspen.	NP
Rio Grande cutthroat trout *(Oncorhynchus clarki virginalis)*	C	Prefers clear mountain streams or lakes with large substrate in the Rio Grande watershed.	NP
Rio Grande silvery minnow *(Hybognathus amarus)*	E	Prefers large streams with slow to moderate currents over a mud, sand, or gravel bottom.	NP

[1]K- Known, documented observatiOn withm proJect area; S – Suitable habitat and species suspected to occur withm the proJect area; NS - Habitat suitable but species is not suspected to occur within the project area; NP - llabitat not present and species unlikely to occur within the project area (USFWS 2011).

No federally listed threatened and endangered species with the potential to occur in Rio Arriba County, or potential habitats, were observed within the proposed project area during the biological survey.

3.1.7 Wastes, Hazardous or Solid

No chemicals subject to the Superfund Amendments and Reauthorization Act (SARA) Title III in amounts greater than 10,000 lbs. would be used. No extremely hazardous substances as defined in 40 CFR 355 in threshold planning quantities would be used.

3.1.8 Water Quality, Surface and Groundwater

The proposed project area is located in the Upper Colorado River Hydrologic Region and is part of the San Juan River sub-region. The proposed project area is located within the Carrizo sub-watershed on a narrow (400-600 foot wide) bench that has mild to moderate slopes ranging from 2-4 degrees and drains into an unnamed tributary that eventually flows into Encierro Canyon. No perennial water sources occur within the proposed project area. Bob Spring, which flows seasonally, is located in the canyon west of the proposed well pad. Navajo Reservoir is located approximately 11.5 miles north of the proposed project area.
The project area contains no wetlands or riparian areas.

The primary aquifers in the BLM/FFO area are the sandstone based Uinta-Animas and the Mesaverde. Fair to poor quality groundwater is readily available in most of the BLM/FFO area. 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 recorded no water wells within a 1-mile radius.

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 *2003a).*

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

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

3.2.1 General Topography/Surface Geology

The proposed project would be located on Devil's Spring Mesa above Encierro Canyon. The proposed well location is located at 6,556 feet elevation on a narrow (400-600 foot wide) bench with steep slopes rising 20 feet in elevation to the top of the mesa on the east and north side of the project area. The proposed project area mildly slopes from 2-4 degrees on the existing well pad. A 20 foot high cutslope marks the northern and northeastern boundary of the existing well pad with an existing pipeline located on the ridge above it. The slope is littered with large boulders and fragments. The ridge immediately north is capped with massive sandstone with clay eroding below. The southern existing well pad boundary is characterized by an approximate 4 foot drop off to the previous pit location, which is now leveled. The western boundary of the proposed well pad is situated on the edge of the canyon rim which drops down into a narrow unnamed tributary ofEncierrro Canyon.

The San Jose Formation, a sedimentary rock formation composed of medium-grained mixed clastic rock such as weathered sandstone, shale, and conglomerate deposited by south-flowing Eocene rivers, comprises the surface geological material in the project area (USGS 2008).

3.2.2 Mineral Resources

Natural gas production in the San Juan basin is the highest in the state of New Mexico, with approximately 650 to 700 million thousand cubic feet (Met) annually. The proposed gas well would produce CBM gas from a valid existing federal lease 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 gathering 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 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 assessment at the project level (IM 2008-011). The proposed project area is located within the paleontological rich area of the San Juan Basin of northern New Mexico.

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. The material has been mixed and sorted in transport and is widely ranging in mineralogy and particle size. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

The surface soil texture at the project area and existing well pad consists primarily of silty clay loam. Biological soil crusts were observed in the undisturbed portion of the project area with approximately 1-2% coverage. The previous disturbance at the proposed project area has resulted in removal, compaction and extensive mixing of the soils in the disturbed area. The Rock Outcrop – Vessilla – Menefee Complex, 15 to 45% slopes soil mapping unit occurs at the proposed project area.

This soil mapping unit is composed of approximately 40% Rock outcrop, 30% Vessilla soils and 30% Menefee soils. This unit is found on hills with slopes ranging from 15-45 percent. Rock outcrop consists of sandstone outcrops. Vessilla soil is shallow and derived in alluvium and colluvium from sandstone. It is well drained with a moderately rapid permeability. The available water capacity is very low with surface runoff rapid. The hazard of water and wind erosion is severe. Menefee soils are shallow and derived from shale. The unit is typically well drained with a slow permeability. Available water capacity is very low with a rapid surface

runoff. The hazard of water and wind erosion is severe with this soil type. The major limitations of this soil unit are soil depth, the hazards of water and wind erosion and slope. Therefore, this soil type has a severe road rating (USDA/NRCS 2007).

3.2.5 Vegetation, Forestry

Vegetation communities in the proposed project area include recently reseeded grassland and Colorado Plateau pinon-juniper woodland interspersed with Great Basin desert scrub. Vegetation cover in the disturbed area was visually estimated at 15-20%, up to 30% in the reseeded pit area. Understory vegetation and canopy cover in the pinon-juniper woodland was visually estimated at 5% and 30%, respectively. Dominant plant species observed in the disturbed and reseeded portion of the proposed project area include rubber rabbit brush *(Ericameria nauseosa)*, four wing saltbush *(Atriplex canescens)*, western wheatgrass *(Pascopyrum smithii)*, broom snakeweed *(Gutierrezia sarothrae)*, and Indian ricegrass *(Achnatherum hymenoides)*. Dominant understory plant species observed in the pinon-juniper woodland include big sagebrush, galleta grass *(Pleuraphis jamesii)* and antelope bitterbrush *(Purshia tridentata)*. Less than five Utah juniper *(Juniperus osteosperma)* and pifion pine *(Pinus edulis)* trees occur in the undisturbed section of the proposed action. A complete list of plants and wildlife, including wildlife signs, observed within the project area during the field survey on September 1, 2010 is included 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 *2003a)*. None of the species listed by the BLM were observed in the project area during the field surveys.

3.2.7 Livestock 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 Section 15 authorizations permit grazing on 30 allotments in the Lindrith, NM area.

The proposed project occurs within the BLM grazing allotment #5098 (Devil's Spring). This grazing allotment includes 3,152.8 acres of which 88% are public land. The authorized livestock use for this allotment allows for 22 head of cattle to graze from June 1 to September 30. In total, 78 federal animal unit months (AUMs) are permitted to this grazing allotment.

3.2.8 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.

Table 4. Habitat Descriptions and Potential for Presence ofBLMIFFO Special Status Species in the Proposed Project Area.

SPECIES	HABITAT ASSOCIATIONS	PRESENCE
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
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 pinon-juniper or other forests. Badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) but also nests on the ground.	NP
Golden eagle *(Aquila chrysaetos)*	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	S
Mountain plover *(Charadrius montanus)*	Breeds in flat, open grasslands; often associated with prairie dog towns and intensive grazing.	NP
Prairie falcon *(Falco me.xicanus)*	Found in arid, open grasslands and shrub-steppe habitats. Prairie falcons require clif.fs for nesting.	S
Yellow-billed cuckoo *(Coccyzus americanus occidentalis)*	Breeds in riparian woodlands with dense, understory vegetation.	NP
Aztec gilia *(Aiiciel/a 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 observat10n wtthm proJect area; **S** - Habttat suttable and spectes suspected to occur wtthin 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.

Foraging habitat exists for golden eagles *(Aquila chrysaetos)* and prame falcons *(Falco mexicanus)* within the vicinity of the proposed project area. The closest documented golden eagle nest occurs 11 miles west. Due to the proximity to known raptor habitat in the cliffs of Delgadito Mesa 2.5 miles southwest of the proposed project, it is likely that these species would transit through the proposed project area for foraging opportunities. Both golden eagles and prairie falcons have large home ranges that extend beyond the distance to the known nests and the proposed project (Kochert et al. 2002). Also, the overall landscape of pinon-juniper woodland could support prey species and foraging opportunities for these raptors.

Neither open grassland nor riparian areas occur within the proposed project area. Special status species found in these habitats would most likely not be found within the proposed project area. No signs of any special status species were observed during the field investigations conducted on March 5, 2009 or September 1, 2010.

3.2.9 Wildlife

A variety of wildlife species are found within the surrounding habitat and could occasionally travel through the project area. Elk *(Cervus elaphus)* and mule deer *(Odocoileus hemionus)* sign was observed in the project area during the field investigation in March 2009 and September 2010. Wildlife use of the project area is likely limited, however, due to direct and indirect human disturbance, reduced vegetation cover, and habitat fragmentation from previous disturbance at the project area. Small and medium-sized mammals commonly found in Great Basin desert scrub communities may include prairie dog *(Cynomys* spp.), black-tailed jackrabbit *(Lepus californicus),* desert cottontail *(Sylvilagus audubonii),* ground squirrels *(Spermophilus variegates),* coyote *(Canis latrans),* and badger *(Taxidea laxus).* Merriam's turkeys *(Meleagris gallopavo merriami)* and mountain lions *(Felis concolor)* may also occur in the surrounding area. The silty clay loam soils observed during the field surveys are ideal habitat for several species of small mammals such as sagebrush vole *(Lemmiscus curtatus)* and Ord's kangaroo rat *(Dipodomys ordii).* A list of wildlife species observed within the proposed project area is provided in the project BSR in Appendix C.

3.2.10 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 thrudthers. There are slightly over 350 avian species 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". Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management "Birds of Conservation Concern 2008" within Bird Conservation Region 16 – Southern Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).

The NMPIF Group has identified priority species of birds for the State of New Mexico by habitat type. The FFO area lies within the Colorado Plateau physiographic region as identified by the NMPIF. The proposed project area contains two of the habitat types addressed in these documents: Great Basin desert shrub (sage/grass) and pinon-juniper woodland. The sage thrasher *(Oreoscoptes montanus)* and sage sparrow *(Amphispiza belli)* are listed as "highest priority" species within the Great Basin desert shrub habitat type (NMPIF 2007). Priority species in pinon–juniper woodland include gray vireo *(Vireo vicinior),* pinon jay *(Gymnorhinus cyanocephalus),* and juniper titmouse *(Baeolophus ridgwayi).*

The interspersed sagebrush habitat in the proposed project area may provide habitat for a variety of bird species such as Bendire's thrasher *(Toxostoma bendirei),* loggerhead shrike *(Lanius*

ludovicianus), and vesper sparrow *(Pooecetes gramineus).* Certain birds, including the vesper sparrow, sage sparrow, and sage thrasher nest almost exclusively in Great Basin desert shrub habitats. Black-throated sparrows *(Amphispiza bilineata),* Brewer's sparrows *(Spizella breweri)* and mountain bluebirds *(Sialia currucoides)* also occur in this community (NMPIF 2007).

The pinon-juniper woodland habitat surrounding the proposed project area provides foraging and roosting habitat for large raptors, including golden eagles, prairie falcons, and red-tailed hawks *(Buteo jamaicensis).* Certain birds: including the juniper titmouse, western scrub jay *(Apelocoma californica),* and bushtit *(Psaltriparus minimus)* nest almost exclusively in pinon-juniper habitats. Mountain chickadees *(Parus gambeli),* black-throated gray warblers *(Dendroica nigrescens),* and blue-gray gnatcatchers *(Polioptila caerulea)* also occur in this community.

An Important Bird Area (IBA) is recognized as globally important habitat for the conservation of bird populations. Currently, there arc about 10,000 IBAs worldwide. Identified by the National Audubon Society and pursuant to the Memorandum of Understanding (MOU) between the U.S Forest Service and USFWS (08-MU-1113-2400-64), one IBA, the Bisti-de-na-Zin wilderness area, occurs within the FFO management boundaries.

3.2.11 Recreation

The Farmington Field Office has set aside several areas for special use and manages them as Specially Designated Areas (SDA). Recrealiun SDA's are managed to accommodate a large variety of recreational uses and outdoor recreational experiences. Areas located outside of recreation SDAs are managed as Extensive Recreation Management Areas (ERMAs). Few recreation facilities or supervisory efforts exist on these lands and they are managed to maintain a freedom of recreation choice with limited regulatory constraints. The proposed action area would not be in a SDA for recreation. The proposed project area vicinity provides dispersed recreation opportunities such as hiking, mountain biking, horseback riding, and hunting. People may visit Devil's Spring Mesa ACEC to observe the petroglyphs and cultural artifacts in the area. This ACEC is managed to protect its recreational values.

3.2.12 Visual Resources

The project area is located on Devil Springs mesa, an area visually characterized by steep colorful escarpments, mesas, plains, dunes, and sheer-walled canyons. The majority of the project area is located in previously disturbed teiTain. The area surrounding the proposed project area is characterized by pinon-juniper woodland interspersed with Great Basin desert scrub shrubland. Well pads, access roads, powerlines, and pipeline ROWs are currently present within and surround the proposed project area. The project twins a current location and would not change the character of the landscape in the immediate area. It is not visible from the bottom of the canyon or from either pueblito locations (Yei's-In-Row or Casa Mesa Diablo).

The BLM has developed a Visual Resource Management (VRM) classification system designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape (BLM 2003a). The proposed project area is within Devils Springs ACEC and was assigned a VRM Class II in the 2003 RMP. Class n is managed to retain the existing character of

the landscape. The level of change should be low and management activities may be seen, but should not attract attention. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape (BLM Manual 8431, Appendix2).

3.2.13 Public Health and Safety

The majority of the proposed well pad would be located on an ex1stmg well pad with an operational gas well and the associated pipeline ROW and access road, as well as near other oil and gas facilities, and a network of dirt surface access roads. 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 ofthe 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 CBM gas well pad would not be constructed and the well would not be drilled. There would be no new impacts from oil and gas production to resources in the project area. The no action alternative would result in the continuation of the

current land and resource uses in the project area. This alternative will not be evaluated further in Chapter 4.

Action Alternative - Proposed Action

Under the proposed action, the San Juan 28-6 Unit #460S well pad would be twinned with the existing San Juan 28-6 Unit #126 well pad and the CBM gas well drilled as proposed, with mitigation measures to reduce potential impacts to the environment. The majority (90%) of the San Juan 28-6 Unit #460S well pad would overlap the existing San Juan 28-6 Unit #126 well pad. Total proposed surface disturbance for the well pad would be about 2.42 acres, of which approximately 0.24 acres would be new disturbance. Long-term impacts would include approximately 1.0 acre of disturbance which would overlap existing disturbance. The potential environmental consequences and proposed mitigation measures for this alternative are described for both critical and non-critical elements in the following sections.

4.1 Air Resources

Alternative A

Under the No Action alternative, there would be no additional impacts to GHG levels within the PPA because there would be no additional surface disturbance, traffic, or release of hydrocarbons from the PPA into the atmosphere. If the proposed project is not approved, there wouhl be no use of a drill rig, compressors, separators, or dehydrators and therefore no impact to climate change.

Alternative B

Air Quality

4.1.1 Direct and Indirect Effects

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

Over the last 10 years, the leasing of Federal oil and gas mineral estate in Farmington Field Office has resulted in an average total of approximately 450 to 500 wells drilled on federal leases annually. These wells would contribute an incremental increase to the total emissions (including GHG's) from oil and gas activities in New Mexico.

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

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

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

The NAAQS are set for the most common and widespread pollutants. The standards are concentrations of air pollution above which the EPA has determined that serious health and welfare consequences could occur. If the concentrations are below the NAAQS, there are no expected adverse effects to humans and the environment.

4.1.2 Mitigation Measures

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 project 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.

Potential Mitigation

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

Additional air quality modeling conducted since completion of the 2003 FEISIRMP and provisions in the ROD for the FEIS/RMP provide for applications of additional emission controls if requested by the NMAQB. Based on this modeling, the NMAQB issued an interim directive that all newly issued APDs limit compressor emissions to no more than 2 g per horsepower-hour of N_2O for engines of 300 hp or less. The FFO has complied with this directive through a condition of approval (COA) which has been in effect since August 1, 2005. To date, NMAQB has made no other such requests.

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

The EPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total U.S. sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total C02 and CH4 emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the EPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" subactivities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

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

combustion; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; placement of compressors engines 300 hp or less must have NOx emissions limited to 2 g per horsepower-hour; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads; and water dirt roads during periods of high use in order to reduce fugitive dust emission. The significant threshold for particulate matter of 35 ug/m^3 daily PM2.5 NAAQS is not expected to be exceeded under the proposed action alternative.

The EPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development *(Inventory of US Greenhouse Gas Emissions and Sinks: 1990–2006)*. One of the factors in this improvement is the adoption by industry of the BMPs proposed by the EPA's Natural Gas Energy Star program. The Farmington Field Office will work with industry and NMAQB to help facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

4.2 Areas of Critical Environmental Concern

The proposed project would be located within Devil's Spring Mesa ACEC. The major objective of the ACEC is to preserve cultural and recreational values. The Controlled Surface Use Management constraints within this ACEC include no surface occupancy in the original 40 acres and a No Surface Occupancy constraint for new oil and gas leasing. No new ROWs are pennitted in the CMD portion of the ACEC ru.1d new ROWs in the rest of the ACEC must be placed in existing ROWs. A complete list of management prescriptions for this ACEC is found on pages N-34 and N-35 of the PRMP/FEIS (BLM *2003a)*.

4.2.1 Direct and Indirect Impacts

The proposed action would have no direct impacts to cultural resources located within the ACEC. The proposed well pad would be twinned with an existing well, minimizing potential surface disturbance and impacts to the ACEC. The proposed project would result in approximately 0.24 acre of new disturbance. Impacts to the ACEC include short-term dust resulting from construction and vehicle traffic during construction and drilling. Long-term noise, vehicular and human activity would occur during well operation though these impacts would not be any greater than those currently occurring. Impacts to the Devil's Spring Mesa ACEC would be minimized by development of the proposed action on existing disturbance. Impacts would be low in both the short and long-term.

4.2.2 Mitigation Measures

The proposed project will require VRM Class II restrictions and will have low profile equipment. Industry related traffic will be restricted to the proposed action disturbance areas and existing roads. Following construction activities, unused areas will be reseeded with a BLM approved seed mix. Reseeding will be repeated by BROG at the request of the BLM until it is successful. Following construction, vehicle traffic will be restricted to existing bladed roads.

4.3 Cultural Resources

WCRM documented one newly recorded site and two lOs within a V4 mile radius of the proposed project area. No cultural resources were recorded within the proposed project area.

4.3.1 Direct and Indirect Effects

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

4.3.2 Mitigation Measures

Mitigation measures would include temporary restnctlve fencing and monitoring during construction activities. Final project clearance and stipulations will be issued by the BLM/FFO.

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

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 Native American Religious Concerns

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 American Indian Religious Freedom Act or Executive Order 13007. There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act or the Archaeological Resources Protection Act.

4.5.1 Direct and Indirect Effects

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

4.5.2 Mitigation Measures

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

4.6 USFWS Threatened and Endangered Species

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

4.6.1 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. #2-22-01-I-389). No further consultation with the USFWS is required.

4.6.2 Mitigation Measures

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

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. The proposed action would temporarily expose a maximum of 2.48 acres of soil as a sediment source entering area drainage ways. The proposed action could alter the flow patterns of the project area.

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 that could impact local water quality. No water wells occur near the proposed project area.

4.7.1 Direct and Indirect Effects

The impacts to surface water quality due to the short-term increases in sediment would be low as the drainages present in the general vicinity of the project area are ephemeral and far from perennial water sources. The 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 surface water quality would be low in both the short and long-term from ground disturbances and potential localized erosion. The proposed project would not impact groundwater resources.

4.7.2 Mitigation Measures

The majority of the proposed San Juan 28-6 Unit #460S is twinned with the existing San Juan 28-6 Unit #126 well pad. A closed loop system will be used for drilling. Water will be diverted upslope of the well pad from center right to comer 3 continuing to corner 5 to avoid surface runoff onto the well pad. The flare wall will be wrapped toward the laydown to avoid fill spilling into the canyon to the west. Boulders will be placed along the toe of the slopes on the north and east well pad boundaries to armor the base of the slope. Additionally, a 24 inch culvert will be installed in the road at the entrance to the pad. A silt pond will be constructed to slow water velocities and trap sediment. The existing road will be upgraded to Gold Book standards from the pad to the next intersection, which will ensure adequate cross-drainage and minimize erosion. BROG maintains a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. Adherence to APD COAs and other mitigation measures will minimize effects to water quality.

4.8 General Topography

A total of 2.48 acres of previously disturbed (2.24 acres) and undisturbed (0.24 acre) land would be impacted from construction of the proposed project. Alterations to current topography would be minimal due to the location of 90% of the proposed project on an existing well pad and access road. To create a level well pad, cuts and fills for San Juan 28-6 Unit #460S include a maximum cut of 4 feet at comer 3 with a maximum fill of 14 feet at comer 6. Changes in topographic relief would likely not be noticed as the well pad construction zone 'vvou!d be re-contoured to match the existing topography and the pad would be constructed on existing disturbance. Re-contouring has the potential for altering drainage patterns.

4.8.1 Direct and Indirect Effects

Impacts to the general topography would be low and long-term. Impacts to topography are minimized by construction of the proposed action on existing disturbance.

Cross contamination between geological zones could occur without adequate cementing and casing of the proposed well bores. With implementation of FFO standard drilling and completion requirements, short and long-term effect to mineral resources and geology are anticipated to be low.

4.8.2 Mitigation Measures

Water will be diverted upslope of the well pad to reduce erosion potential on the well pad (see Section 4.7.2). Following well completion, areas not needed for operation will be recontoured and reseeded. Boulders will be placed along the toe of the slopes on the north and east well pad boundaries to armor the base of the slope. Once the proposed well is abandoned, BROG will recontour and reseed the remaining portions of the well pad in accordance with the COAs and stipulations issued by the BLM.

Adequate casing, cementing, mud weight, blow out preventor and reserve pit volume will be issued by the BLM with the COAs to mitigate any potential down-hole impacts.

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. Additionally there could be an increase in off-road vehicular access from the project area for recreational activities. An increase in human activity in the area could increase the possibility of unauthorized removal or other alterations to paleontological resources in the area. Potential **impacts to paleontological resources as a result of the proposed action \VOuld be lo\;\t a.TJ.d long-**term.

4.9.2 Mitigation Measures

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

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

4.10 Soils

A total of approximately 2.48 acres of soil would be exposed as a result of construction activities associated with the proposed project, resulting in temporary displacement, compaction, and mixing of soils. Accelerated precipitation runoff and soil erosion due to wind and water is possible in this area, especially given that the soil type found in the proposed project area has rapid runoff and severe water and wind erosion capabilities. The removal of vegetation during construction activities would accelerate the potential of erosion, given that vegetation plays an

important role in storing water and preventing runoff and soil erosion. The implementation of mitigation measures described below would limit soil impacts from erosion. The most susceptible period for soil erosion impacts is during construction or traveling on dirt roads when strong winds or precipitation events can mobilize soils.

4.10.1 Direct and Indirect Effects

The impact on soils in would be localized and low for the short and long-term. Impacts to soils are reduced by development ofthe proposed project on existing disturbance.

4.10.2 Mitigation Measures

Industry related traffic will be restricted to the proposed action disturbance areas and existing roads. Drainage will be managed to reduce erosion potential on the well pad (see Section 4.7.2). The flare wall will be wrapped toward the Jaydown to avoid fill spilling into the canyon to the west. Boulders will be placed along the toe of the slopes on the north and east well pad boundaries to armor the base of the slope. Additionally, a 24 inch culvert will be installed in the road at the entrance to the pad. A silt pond will be constructed to slow water velocities and trap sediment. The existing road will be upgraded to Gold Book standards from the pad to the next intersection, which will ensure adequate cross-drainage and minimize erosion. Following construction activities, unused areas will be re-seeded with the BLM approved seed mix to stabilize soils and prevent erosion. Reseeding will be repeated by BROG at the request of the BLM u..11til it is successful. Following construction, vehicle traffic will be restricted to existing bladed roads to prevent erosion, soil mixing, and compaction in adjacent areas.

4.11 Vegetation, Forestry

Construction of the proposed action would result in the modification of 0.24 acre of undisturbed pinon-juniper woodland and sagebrush shrubland. Approximately five mixed-age Utah juniper and pifion pine trees would be removed during the construction of the proposed action. Species composition and density would most likely be different than current conditions following reclamation and/or abandonment. Reseeding mixes typically consist of grass and shrub species beneficial for livestock and big game wildlife instead of pinon-juniper woodland that occurs currently in the project area. Invasive species have the potential to establish at higher rates and out-compete native plants in disturbed areas that experience human disturbance. Dust from vehicles traveling on roads and well pads can damage plants along roadsides

4.11.1 Direct and Indirect Effects

The impact of the proposed action on area vegetation would be low and short to long-term. Direct impacts would include removal and modification of vegetation during site clearing activities. Indirect impacts would include the increased potential for invasive species to establish in the area at a faster rate than native species. Impacts to vegetation are reduced by the development of the proposed action on existing disturbance.

4.11.2 Mitigation Measures

During construction, BROG and their contractors' vehicles will only operate on areas identified in this EA as work areas and on existing roadways. Revegetation of construction zones will be initiated by BROG immediately following construction or at the direction of the BLM. Trees and brush will be mulched and incorporated into the soil. 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 (PLS). The amount of seed is for drilled rate, for broadcast applications the rate will be doubled. Monitoring for invasive plants and appropriate control/eradication measures will be done in conjunction with the BLM and other required permits/agencies.

Table 5. Farmington Field Office Seed Mixture.

Common Name	Variety	%for Mix	PLS 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

No BLM listed invasive, non-native species of concern were identified in the project area. Surface disturbance activities associated with the proposed project may create the potential for the establishment and spread of noxious weeds and invasive, non-native species.

4.12.1 Direct and Indirect Effects

The proposed project would have low and long-term impact from the potential introduction of invasive, non-native species into the area.

4.12.2 Mitigation Measures

Appropriate washing of vehicles entering the project area will reduce the potential for invaSive and non-native plant species infestations. Proper seeding and monitoring of the disturbed areas will reduce the potential for invasive species to establish. Adherence to BLM reclamation measures will minimize impacts from invasive, non-native species. Monitoring for invasive

plants and appropriate control/eradication measures will be done in accordance with standard and project specific BLM stipulations_

4.13 Livestock Grazing

Approximately 0.24 acre of undisturbed vegetation within the BLM grazing allotment would be removed and modified by the proposed action resulting in a minor reduction in forage (less than 1 AUM) and a change in the composition of herbaceous species in the project area.

4.13.1 Direct and Indirect Effects

The proposed project would have low and long-term impacts to livestock grazing. The new surface disturbance associated with the proposed project would result in an approximate direct short term loss of 0.01 Federal AUMs (at an estimated 30 acres per AUM) during construction activities. Following interim reclamation and successful revegetation of areas not needed for operations, the long term disturbance associated with the well pad and access road would be approximately 1 acre which would result in the long term loss of approximately 0.03 AUMs for the duration of the gas well. Other potential impacts to range animals include noise, human activity, and traffic hazards.

4.13.2 Mitigation l\1easures

Reseeding will reduce impacts to livestock grazing. Control of invasive weeds during construction and operation of the proposed project will be important for controlling further habitat degradation of the affected allotment.

4.14 Special Status Species

Two species with BLM special management status have the potential to occur in the proposed project area: golden eagle and prairie falcon. Impacts to these species would include the loss of approximately 2.24 acres of disturbed and 0.24 acre of undisturbed foraging habitat and temporary avoidance of the project area during construction and drilling. Approximately 25-30 mixed-age Utah juniper and pifion pine trees would be removed by the proposed action. The trees in the project area are not large enough to provide suitable nesting habitat for these raptors, however, the trees and understory cover provide cover for many prey species. During operation and maintenance of the proposed gas well, human and vehicular activity would increase in the action area. This increase in activity may result in raptors temporarily avoiding the area. Indirectly, the proposed action would result in a change in vegetation species composition and density that may affect the prey base for these raptors.

4.14.1 Direct and Indirect Effects

Direct and indirect impacts to golden eagles and prairie falcons would be low in both the short and long-term. No impacts to any other special status species are expected to occur.

4.14.2 Mitigation Measures

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

4.15 Wildlife

Construction of the proposed action would result in the removal of approximately 0.24 acres of undisturbed pinon-juniper woodland. Wildlife use of the project area may be limited, however, due to human disturbance and little vegetation cover on the majority of the proposed project location. Mule deer and elk sign was observed during the field surveys in March 2009 and September 2010. However, natural gas and oil development activities can cause displacement of wildlife or altered habitat use patterns (Sawyer et al. 2006). Additionally, some burrowing animals may be killed or displaced and their burrows destroyed during construction activities. Most wildlife would likely return to the area after the well is completed, however some species such as elk may not return for several years.

The pinon-juniper woodland in the undisturbed area of the proposed well pad provides cover for big game and other wildlife species. This cover provides protection from predators and shelter from the elements. Approximately five mixed-age Utah juniper and pinon pine trees would be removed during the construction of the proposed action resuiting in a minor ioss of cover. Since the vegetation removed would not necessarily be replaced with the same species and in the same percentage, an alteration in additional habitat above that already altered is anticipated.

4.15.1 Direct and Indirect Effects

Impacts to wildlife would be low to moderate in the short-term during construction and drilling. Impacts during operation would be low and long-term. Impacts to wildlife are minimized by construction of the proposed action on existing disturbance.

4.15.2 Mitigation Measures

Construction activities will be confmed to the permitted area to avoid further disruption to wildlife. Adherence to BLM reclamation and sanitation measures will also minimize potential impacts to wildlife. The area will be reseeded with a BLM approved seed mixture shown in Table 5. Control of invasive weeds during construction and operation of the proposed project will be important for controlling further habitat degradation.

4.16 Migratory Birds

EO 13186 dated January 17, 2001 calls for increased efforts to more fully implement the MBTA. In keeping with this mandate, the BLM/FFO has consulted the PIF Bird Conservation Plan for the State of New Mexico and the USFWS list of Birds of Conservation Concern. A review of these documents, specifically as they pertain to the Colorado Plateau physiographic area, indicates there are three "priority" avian species (with a known range of distribution in the FFO area) that utilize the pinon-juniper woodland habitat type and eight "priority" species that utilize

the sagebrush/grass within the Great Basin desert shrub habitat type that occur on the NMPIF "Highest Priority" and USFWS "Birds of Conservation Concern 2008" lists. Nine of these species occur on both lists. Various types of perturbations and or anthropogenic activity may affect these species. These species and a brief assessment of the effects of the proposed action on their habitat are provided in Table 6.

Table 6. Migratory Bird Species of Concern Occurring within the BLMIFFO and Potentia11mpacts.

Species	Habitat Type	Effects	Impact Rating None/Low/Moderate/High
Bendire's thrasher *(Toxostoma bendirei)*	sage/grass	Little effect anticipated some loss of nesting habitat; increase in prey (i.e., arthropods) likely.	Low
Burrowing owl *(Athene cunicularia)*	sage/grass	Little effect, nests in abandoned prairie dog burrows.	Low
Grasshopper sparrow *(Ammodramus savannarum)*	sage/grass	May be positively affected due to conversion to grassland.	Low
Long-billed curlew *(Numenius americanus)*	sage/grass	May be positively affected due to conversion to grassland.	Low
Mountain plover *(Charadrius montanus)*	sage/grass	May be positively affected due to conversion to grassland; may produce more prey (i.e., arthropods).	None
Sage sparrow *(Amphispiza belli)*	sage/grass	Minor loss of nesting and brood rearing habitat	Low
Sage thrasher[1] *(Oreoscoptes montanus)*	sage/grass	May be some loss of sage/nesting habitat	Low
Ferruginous hawk *(Buteo regalis)*	sage/grass/ pinon-juniper interface	Loss of nesting and foraging habitat; decrease in prey (small mammals) abundance likely.	None
Gray vireo *(Vireo vicinior)*	pinon-juniper	**csts in juniper; reduction of** juniper may be detrimental.	Low
Juniper titmouse *(Baeolophus ridgwayr)*	pinon-juniper	Secondary cavity nester; some loss of nesting habitat.	Low
Pinon jay *(Gymnorhinus cyanocephalus)*	pinon-juniper	Colony nester in pinon; loss of pifton may impact.	Low

I = "H1gh Pnonty" bird species that are hsted on the NMPIF "Highest Pnonty" birds of conservation concern list but not on the USFWS "Birds of Conservation Concern 2008" list.

No identified IBAs or species associated with IBAs would be impacted by the proposed action. Impacts to migratory birds would be low given the level of existing disturbance in the project area but also the vegetation cover that would need to be removed in the undisturbed portion of the proposed project. Impacts to migratory birds would include the removal of approximately 0.24 acres of pinon-juniper woodland habitat. Approximately five mixed-age Utah juniper and pinon pine trees would be removed during the construction of the proposed action. The dense pinon pine and Utah juniper trees in the vicinity of the proposed project area provide potential habitat for gray vireos, a species listed as "Highest Priority" by PIE as well as USFWS -·Birds of Conservation Concern". Noise levels associated with construction and operation of the gas well can impact breeding birds by masking communications used to attract mates and defend territories. Increased noise levels could also result in nest abandonment and decreased reproductive success (BLM 2000). Impacts to migratory birds would be greater should construction occur during the breeding season of April 15 through July 15.

4.16.1 Direct and Indirect Effects

Direct and indirect impacts to migratory birds of concern would be low and short to long-term. These impacts are minimized by construction of the proposed project on existing disturbance.

4.16.2 Mitigation Measures

Construction activities will be confined to the proposed project area to avoid further disruption to migratory birds. Adherence to BLM reclamation and sanitation measures will minimize potential impacts. Following construction activities, disturbed areas will be reseeded with the appropriate BLM seed mix. Any spills will be promptly cleaned up and BROG will prepare a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. Any open pits will be fenced and any open cavities will be covered. Any bird nests found within the proposed project area must be reported to a BLM/FFO biologist for appropriate mitigation prior to construction activities.

4.17 Recreation

The proposed project is located in an area that offers several dispersed recreational opportunities. During construction and drilling, recreationalists may experience an increase in traffic, fugitive dust, and sound levels, as well as night time lighting.

4.17.1 Direct and Indirect Effects

The proposed action would have low to moderate impacts to recreation opportunit es for the short-term. Impacts would be low for the long-term. These impacts are minimized by construction of the proposed project on existing disturbance and a rapid construction schedule.

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. Adherence to BLM reclamation and sanitation measures will minimize potential impacts. Following construction activities, disturbed areas will be reseeded with the appropriate BLM seed mix. Any spills will be promptly cleaned up and BROG will prepare a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. Low profile equipment will be installed, and existing equipment will be upgraded.

4.18 Visual Resources

The proposed project twins an existing location within Devils Spring ACEC. No new access road would be needed to build or maintain the proposed. During construction and drilling operations, machinery emissions, and the presence of the drill rig and construction equipment would result in low to moderate short-term visual impacts. After construction, production equipment would be low profile and painted to blend with the surrounding vegetation. The Farmington Team completed a contrast rating sheet from the nearest cultural structure. The team determined that the proposed project was not visible from the pueblito.

Because the proposed project would twin an existing location, production equipment would be low profile, painted to blend with the surrounding vegetation, visual resources would not be further degraded.

4.18.1 Direct and Indirect Effects

Visual resource impacts would be low to moderate in the short-term during construction and drilling. Operation of the proposed action would result in low long-term visual impacts which are minimized by development of the proposed action on existing disturbance, low-profile equipment painted an area appropriate color to reduce visibility.

4.18.2 Mitigation Measures

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

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 are 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 provide mitigation for-public health and safety. In addition, hauling equipment and materials for the project on public roads will comply with all Department of Transportation regulations. Any spills will be promptly cleaned up and BROG 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 widespread land use fragmentation. The cumulative impacts fluctuate with the gradual reclamation of well abandonments and the creation of new additional surface disturbances in the construction of new access roads and well pads. The on-going process of restoration of abandonments and creating new disturbances for drilling new wells gradually accumulates as the minerals are extracted from the land. Preserving as much land as possible and applying appropriate mitigation measures will alleviate the cumulative impacts.

Due to the absence of regulatory requirements to measure GHG emissions and the variability of oil and gas activities on federal minerals, it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of approving this application for permit to drill. A general assumption, however, can be made: drilling this well may contribute to GHG emissions.

The New Mexico Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Inventory) estimates that approximately 17.3 million metric tons (mmt) of natural gas and 2.3 million metric tons of natural gas emissions are projected by 2010 as a result of oil and natural gas production, processing, transmission and distribution. As of 2008, there were 23,196 oil wells and 27, 778 gas wells in New Mexico.

There are approximately 19,000 existing oii and gas wells m the FFO, which accounl for approximately 37 percent of the total wells in New Mexico. Therefore, GHG emissions from all wells within the field office amount to approximately 7.252 million metric tons annually (19.6 mmt X 0.37 = 7.252 mmt). Federal oil and gas wells amount to approximately 70 percent of the wells within the field office. Annual GHG emissions from federal oil a!1d gas wells are approximately 5.08 million metric tons (7.252 mmt X 0.7 = 5.08 mmt).

These totals, when compared to the estimates used for the cumulative analysis previously referenced, show that wells drilled on federal leases wells may be expected to produce approximately 25.9 percent (5.08 mmt + 19.6 mmt) of the GHG emissions produced from wells drilled in New Mexico. This amount of GHG emissions represents a moderate incremental contribution to the total emissions and is also minimal when compared to global GHG emission levels. This small incremental contribution to global GHG gases cannot be translated into incremental effects on climate change globall y or in the area of these site-specific actions. As oil and natural gas production technology continues to improve in the future, one assumption is that it may be feasible to further reduce GHG emissions.

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

Due to loss of habitat or competition from other species whose ranges may shift northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependant on historic water conditions. Forests at higher elevations in New Mexico, for example, have been exposed to warmer and drier conditions over a ten year period. Should the trend continue, the habitats and identified drought sensitive species in these forested areas and higher elevations may also be more affected by climate change.

S.OCONSULTATION/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 Tearn.

Public Contact	Title	Organization	Present at Onsite?
Sam Jaquez and Steve Merrell	Construction Supervisor	Burlington Resources Oil and Gas Company, LP	Yes
Bill Liess and Mike Flaniken	Environmental Protection Specialist	BLM	Yes
Don Schreiber	Grazing lessee		Yes
Vicky Estlack		Williams Four Comers	Yes
Mike Vivalda and Joey Herring	Biologist	Ecosphere Environmental Services	Yes
Jim Copeland	Cultural Resources Specialist	BLM	No

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APPENDIX A

APPLICATION FOR PERMIT TO DRILL (APD)

APPENDIXB

CONDITIONS OF APPROVAL (COA)

APPENDIXC

BIOLOGICAL SURVEY REPORT