ENVIRONMENTAL ASSESSMENT

for the

San Juan 32-5 Unit No. 118H
Well Pad, Access Road, and Pipeline Tie

ConocoPhillips Company
Williams Four Corners, LLC

BLM EA No. NMFOl0-2011-227

Well Location:
2140' FNL & 2305' FEL
Section 21, Township 32 North, Range 6 West,
New Mexico Principal Meridian,
San Juan County, New Mexico

U.S. Department of the Interior
Bureau of Reclamation-Western Colorado Area Office
Bureau of Land Management - Farmington Field Office

June 2011

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BUREAU OF RECLAMATION-WESTERN COLORADO AREA OFFICE
BUREAU OF LAND MANAGEMENT-FARMINGTON FIELD OFFICE

ENVIRONMENTAL ASSESSMENT
FOR
CONOCOPHILLIPS COMPANY's
SAN JUAN 32-5 UNIT No. 118H WELL PAD & ACCESS ROAD
&
WILLIAMS FOUR CORNERS, LLC's
PIPELINE TIE

1.0 Introduction

1.1 The Proposal

ConocoPhillips Company (ConocoPhillips) has filed a sundry with the Bureau of Land Management, Farmington Field Office (BLM-FFO) for the San Juan 32-5 Unit No. 118H, a Fruitland Coal gas well. The proposed action would include the construction of a well pad and access road; the drilling and production of a well; the usage of the well pad and access road throughout the life of the well; and the fmal abandonment of the well, well pad, and access road. Williams I:our Comers, LLC (Williams) would construct, operate, and finally abandon an associated pipeline tie, which would be necessary to transport gas from the proposed well.

The proposed well pad, access road, and pipeline tie would be on Bureau of Reclamation (BOR) land. The proposed action would be managed by the BLM-FFO. ConocoPhillips would drill through federal minerals to access State of New Mexico minerals. Minerals extracted as a result of the proposed action would be associated with a valid, existing gas lease, State of New Mexico E-504-15.

Per 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific Environmental Analysis (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) and the Farmington Resource Management Plan (RMP), approved per the September 29, 2003 Record of Decision (ROD). The RMP with ROD is available for review at the BLM-FFO (Farmington, New Mexico) or at www.nm.blm.gov/ffo/ffo_home.html. This EA addresses site-specific resources and effects of the proposed action that were not specifically covered within the PRMP/FEIS, as required by the National Environmental Policy Act of 1969 (NEPA), as amended (Public Law 91-90, 42 United States Code [USC] 4321 et seq.).

1.2 Purpose and Need

The need for the BLM to approve the proposed action is to comply with ConocoPhillips' gas lease, which constitutes a binding legal contract.

The purpose of approving the proposed action is to authorize the lessee, via an approved sundry, to construct, drill, operate, and finally abandon the proposed well and any associated facilities. These activities would allow production of Fruitland Coal gas from the lease.

1.3 Conformance with Applicable Land Use Plan and Other Environmental Assessments

The regulations under 43 CFR 1610.5 require the proposed action to be in conformance with the terms and the conditions of the Farmington RMP. The Federal Land Policy and Management Act

of 1976 (FLPMA) established guidelines to provide for the management, protection, development, and enhancement of public lands (Public Law 94-579, 43 USC 1701 et seq.). Under this authority, Specially Designated Areas (SDAs) and Areas of Critical Environmental Concern (ACECs) are identified in the RMP. The proposed action area is within Middle Mesa Wildlife SDA. This SDA is discussed in the Wildlife sections ofthis EA (3.13, 4.13).

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

ConocoPhillips and Williams would comply with all applicable Federal and State of New Mexico laws and reguiations (Appendix A). Non-point source pollution is an identified probiem in the planning area that is directly associated with soil stability and water quality. The New Mexico Energy, Minerals and Natural Resources Department requires operators to follow "pit rule" guidelines contained within NMAC 19.15.17 in an effort to reduce groundwater contamination from industry related activities. Mandated by the Clean Water Act (CWA), efforts to reduce non-point source pollution through implementation of erosion control and management practices are an important part of the BLM's management activities. Industrial activities disturbing land may require permit coverage through a National Pollution Discharge Elimination System (NPDES) stormwater discharge permit. Oil and gas development, however, is exempt from NPDES regulation per 40 CFR Part 122. A U.S. Army Corps of Engineers Section CWA 404 Permit for the discharge of dredge and fill materials may also be required. Operators are required to obtain all necessary permits and approvals prior to any disturbance activities.

Consultation with the U.S. Fish and Wildlife Service (USFWS), as required by Section 7 of the Endangered Species Act, was conducted as part of the Farmington PRMP/FEIS (Consultation No. 2-22-01-1-389) to address cumulative effects of RMP implementation. The consultation is summarized in Appendix M of the PRMP/FEIS. Review of current USFWS Federally Listed Species and an onsite evaluation of habitat for the proposed action indicate no need for additional Section 7 consultation.

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

The State of New Mexico Oil Conservation Commission (NMOCC) has assigned spacing rules for producing oil and gas formations. Current spacing for the Fruitland Coal formation is 320 acres per two wells.

Additionally, ConocoPhillips would:

- Comply with all applicable Federal, State of New Mexico, and local laws and regulations. A listing of selecte<i Eederallaws an<iregulations applicable to the proposed action can_ be found in Appendix A.
- Obtain applicable permits for the construction, drilling, completion, production, and final abandonment of this well including water rights appropriations, water discharge permits, relevant air quality permits, and permits associated with the installation of water management facilities.

2.0 Alternatives Including the Proposed Action

2.1 Alternative A – No Action

The No Action Alternative provides a reference, enabling decisionmakers to compare the magnitude of environmental effects of the alternatives. 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 would not take place. This option is provided in 43 CFR 3162.3-l(h)(l). The No Action Alternative would deny the approval of the proposed sundry. The well would not be drilled, and current land and resource uses would continue to occur in the proposed action area. No mitigation measures would be required.

2.2 Alternative B - Proposed Action

ConocoPhillips has proposed the drilling, production, and final abandonment of a natural gas well and the construction, operation, and final abandonment of an associated well pad and access road. Williams has proposed the construction, operation, and final abandonment of an associated pipeline tie. The action is proposed for summer/fall 2011.

General Location and Description

Maps of the proposed action area are located on the following pages. The proposed action area is plotted on a 250,000:1 composite map (Figure 1); the Bancos Mesa Northwest, New Mexico, 7.5-minute United States Geological Service (USGS) quadrangle inap (Figure 2); and a 2009 San Juan County aerial photo (Figure 3).

The proposed action area is located in the San Juan Basin of northwestern New Mexico, approximately 26.0 miles northeast of the town of Blanco, 2.2 miles south of the New Mexico-Colorado border, and 0.4 mile west of Navajo Reservoir. The proposed action area is on a gently rolling upland finger overlooking Navajo Reservoir to the north, east, anc south. There are small, ephemeral washes within the proposed action area. Elevation is approximately 6385 feet at the proposed well pad location. Habitat within the proposed action area is open pinon-juniper woodland.

Directional drilling would be utilized. The proposed bottom hole would be 710 feet from the north line (FNL) and 710 feet from the east line (FEL) of Section 16, Township 32 North, Range 6 West, New Mexico Principal Meridian (NMPM), San Juan County, New Mexico. The wellhead (surface) location would be 2140 feet FNL and 2305 feet FEL of Section 21, Township 32 North, Range 6 West. The proposed action area would be within the southwest quarter of the northeast quarter of Section 21. From the western edge of the proposed well pad, the proposed access road and pipeline tie would travel approximately 157 feet to the west-northwest, to an existing access road and pipeline.

Figure 1: Vicinity Map
ConocoPhillips Company Proposed
San Juan 32-5 Unit No. 118H T32N,
R06W, Section 21, NMPM
San Juan County, New Mexico

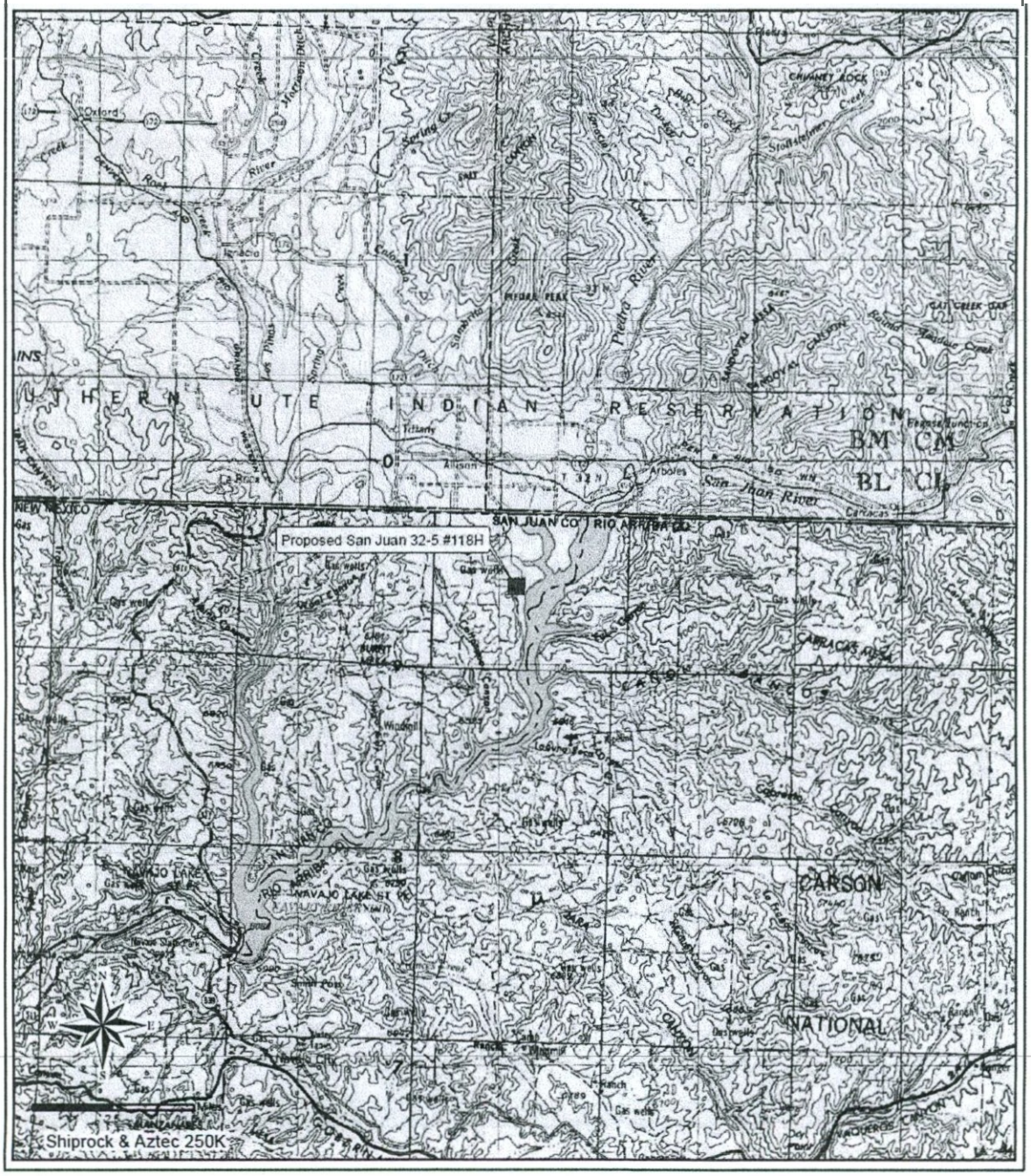


Figure 2: Project Area Map
ConocoPhillips Company Proposed San Juan 32-5 Unit No. 118H T32N, R06W, Section 21, NMPM
San Juan County, New Mexico

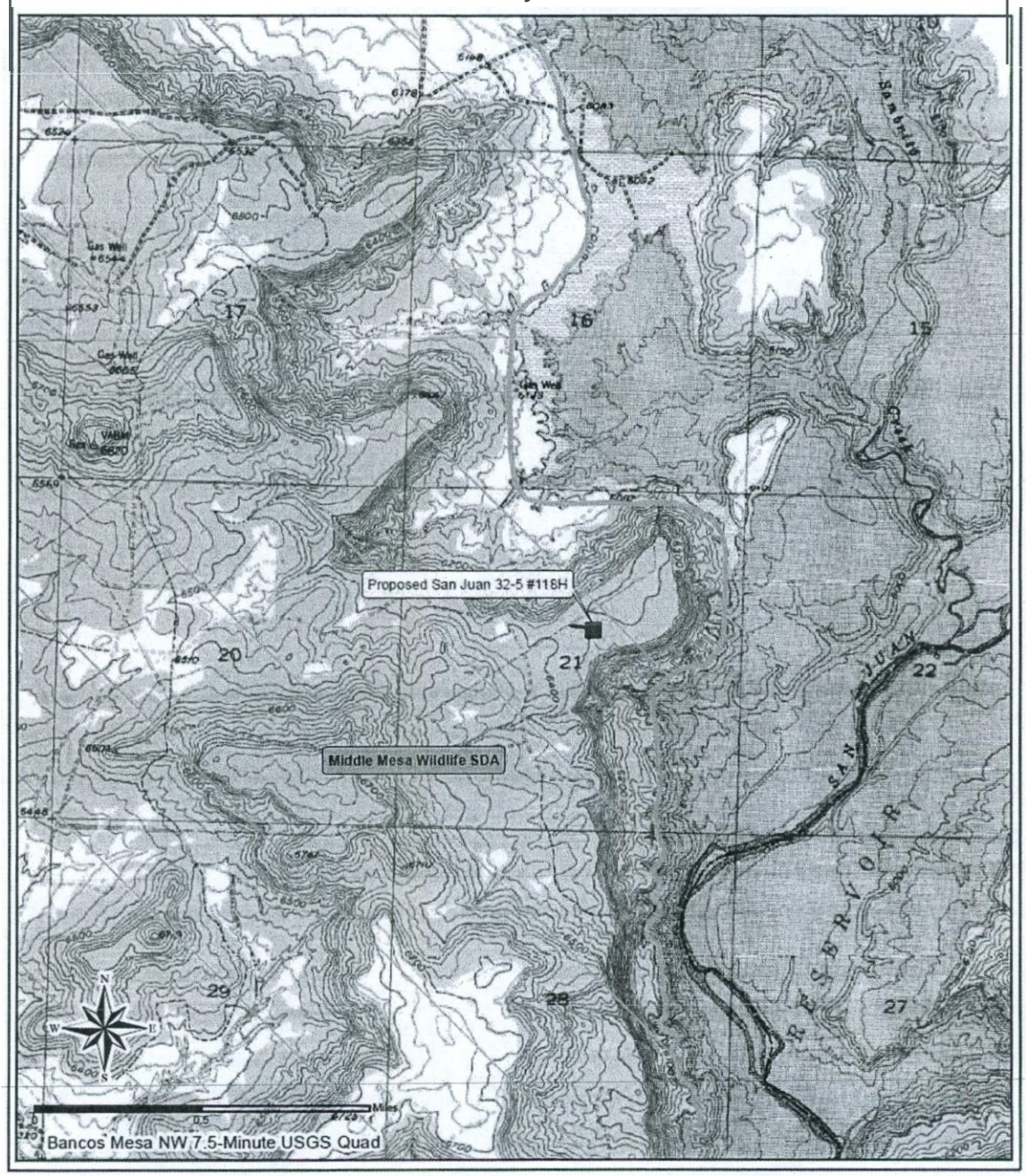
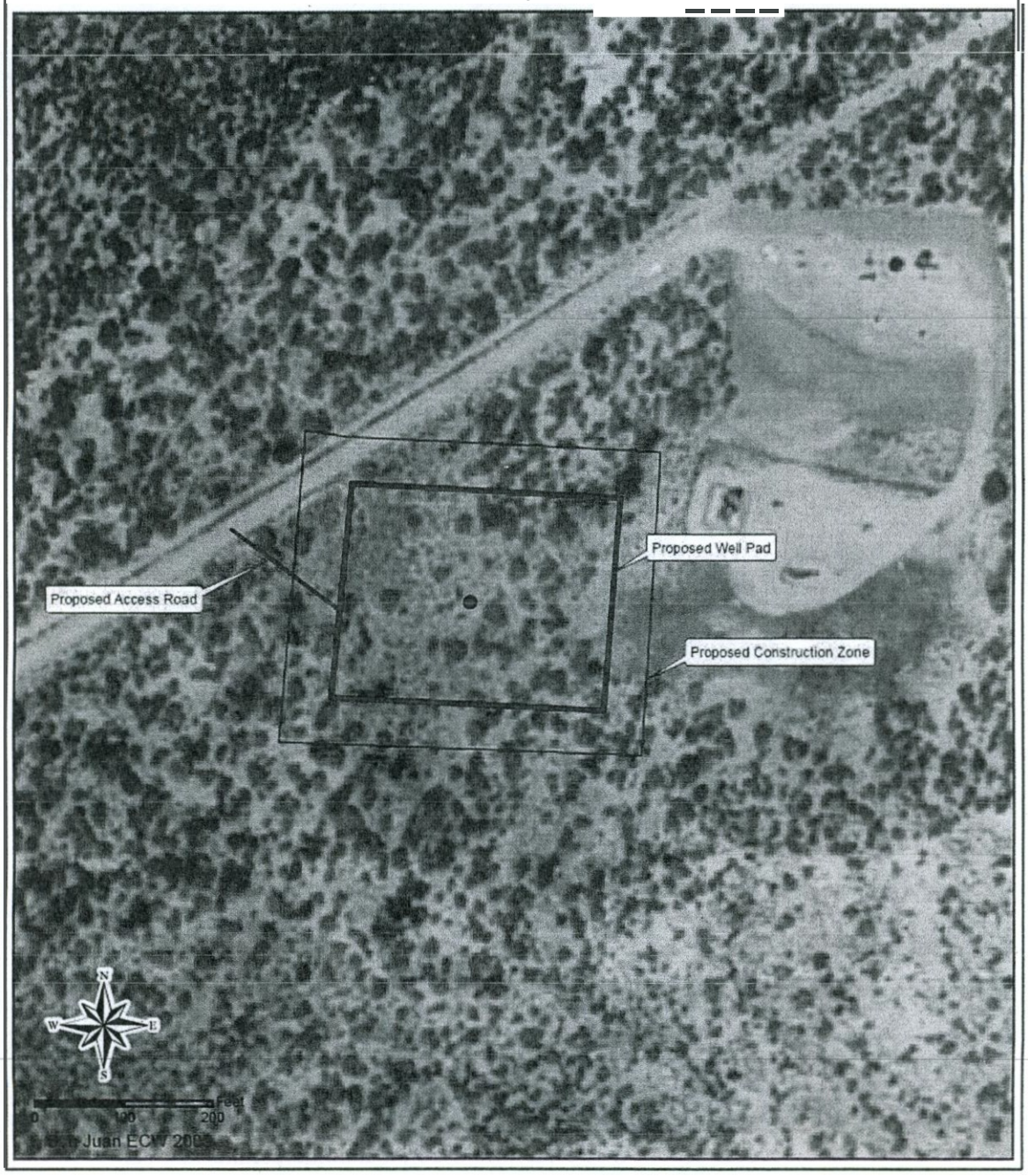


Figure 3: Aerial Photo
ConocoPhillips Company Proposed
San Juan 32-5 Unit No. 118H T32N,
R06W, Section 21, NMPM
San Juan County, New Mexico



Construction Phase

The maximum permitted surface disturbance associated with the proposed action would be approximately 3.44 acres. Actual new disturbance would be approximately 3.14 acres. Survey plats are provided in Appendix B. For a detailed description of design features and construction practices associated with the proposed action, refer to the sundry on file at the BLM-FFO.

Table 1: Proposed Surface Disturbance

Project Component	Previous/ Existing or Restricted Disturbance Acreage	New Disturbance Acreage	Total
Access Road	0	0.11	0.11
Well Pad	0.09	2.94	3.03
Pipeline Tie	0.21	0.09	0.30
Totals	**0.30**	**3.14**	**3.44**

Access Road

The proposed access road would measure 156.66 feet long by 30 feet wide, or 0.11 acre.

Well Pad

A well pad would be created using a D-8 bulldozer. Leveling is needed to provide space and a level surface for a drilling rig, completion rig, and other heavy equipment to access and drill the proposed well. The proposed well pad would measure 230 feet by 300 feet. A 50-foot-wide construction zone would surround the proposed well pad. Thus, maximum disturbance associated with the well pad would be 3.03 acres. However, approximately 0.03 acre of the proposed well pad construction zone would overlap an area already calculated into proposed access road disturbance. Approximately 0.06 acre of the construction zone, northwest of the well pad, would overlap an existing access road. Therefore, new disturbance associated with the well pad would be 2.94 acres.

The maximum cut would be eight feet on the northeastern comer (No. 6) of the proposed pad. The maximum fill would be six feet on the southern side (B).

Pipeline Tie

Once the proposed well is completed, a 326.1-foot-long, 40.0-foot-wide pipeline tie corridor would connect the proposed well to the existing EPNG A No. IA pipeline. The maximum disturbance resulting from the pipeline tie would be approximately 0.30 acre. However, approximately 140.5 feet would overlap the proposed well pad, and the remaining 185.6 feet would parallel the proposed access road. Where the proposed pipeline tie parallels an access road, only 20 feet of new disturbance width would be required within the pipeline tie corridor. Therefore, new disturbance associated with the proposed pipeline tie would be limited to approximately 0.09 acre.

Recommended mitigation measures would be implemented as Conditions of Approval (COAs). Below are site-specific construction mitigation measures determined for the proposed action, per the April 20, 2011 onsite meeting:

- GENERAL CONSTRUCTION:
  - Trees six inches in diameter or greater (diameter at breast height) would be cut, delimbed, and stacked.
  - The top six (6) inches of topsoil would be stockpiled to be utilized during reclamation.
  - Excavated materials from cuts would be used on fill portions of the location.
  - Diversions would be established above the cut, from Comer No. 6 to No. 5, and from Corner No. 6 to No. 2.
  - A 24-inch-diameter culvert would be installed at the access road takeoff.
  - Low-profile equipment would be used.
  - Above-ground structures would be painted to blend with the natural color of the landscape (Juniper Green).
  - Per Middle Mesa Wildlife SDA stipulations, no construction or drilling would occur between December I and March 31.

- PITS:
  - The reserve pit would be lined with an impervious material, at least 12 millimeters thick.
  - All pits would meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and rules, NMAC 19.15.17.
  - Upon final reclamation of the reserve and blow pits, pits would be filled utilizing existing disturbance only.
  - Cut material from the reserve and burn pits would be stockpiled on the location or used to construct back-walls of the bum pit.
  - A tight sheep fence would be constructed around three sides of the pit during drilling and completion, and around the fourth side after the completion rig leaves the wellhead. The fences would remain until the pits are dried and backfilled.

Drilling Phase

After the well pad is constructed, a drilling rig would be moved onto the location and assembled. Drilling to the formation would require approximately 14 days. After the well has been drilled, completion would take approximately 14 additional days. Construction, drilling, and completion are expected to require four to eight weeks total. During this phase, both heavy equipment and light vehicles would use existing roads to access the well site. Traffic would include drilling rigs, large tractor-trailers, construction equipment, water trucks, drilling and production equipment, tanks, and numerous light pick-ups.

Production Phase

Interim Reclamation

After the well is completed, interim reclamation would occur. During interim reclamation, portions of the proposed action area not required for production equipment and vehicular access would be reclaimed. This reclaimed area, which would include the pipeline tie, the well pad construction zone, and other portions of the well pad, would total approximately 1.83 acres. The following would occur during interim reclamation:

- Slopes would be recontoured to pre-construction topographical contours.
- Disturbed areas would be seeded with a BLM-FFO-approved seed mixture.

Equipment Onsite

Production equipment may be required to conform to BLM-FFO Noise Notice to Lessees (NTL) standards. The well production equipment that would remain onsite would include the following:

- Dual wellhead
- Production unit separator
- Cathodic station with solar panel
- Meter run with electronic telemetry
- One to two 500-barrel storage tanks
- Possibly a compressor, to assist in bringing fluids and gas to the surface. The compressor size would be dependent upon production.

Activities

After production of the well begins, normal upkeep would be required. Typically, one pick-up truck would come to the well site approximately every two days during the normal work week to check on production and resolve any problems that may occur at the well. Trucks would be used to J:-emove wastewater stored in tanks on the site. The frequency of water hauling would depend on the amount of water the well produces and may vary from once a day to once a month. Occasionally, a work-over rig would be required for downhole maintenance. Surface impacts of a work-over rig would be similar to the effects described for drilling, although usually to a lesser degree. The estimated production phase of a well is 20 to 30 years.

Abandonment Phase

When...the wellis_no_longer_commercially viable, *it* would be plugged and abandoned as follows:

- Downhole well abandonment would be carried out under current BLM-FFO regulations for well plugging and surface restoration.
- Surface equipment would be removed, except for an aboveground marker that would contain individual well identification information, including the location of the plugged hole.

- The proposed well pad and access road, if not needed for other purposes, would be reclaimed as specified in the COAs. Typically, slopes would be recontoured to pre-construction topographical contours. Disturbed areas would be seeded with a BLM-FFO-approved seed mixture.
- The underground pipeline tie would typically be plugged and left in place.

2.3 Alternatives Considered but not Analyzed in Detail

Vertically drilling the proposed well would require a new, 3.03-acre well pad and an access road/pipeline tie corridor more than 700 feet in length. Therefore, this was not considered a feasible alternative.

Directional drilling is the practice of drilling non-vertical wells. This practice allows for flexibility in the placement of the well pads and associated surface facilities. Directional drilling often allows for "twinning," or drilling two or more wells from one shared well pad. Directional drilling applications throughout the San Juan Basin have become relatively routine: Generally, the use of this technology is applied when it is necessary to avoid or minimize impacts to surface resources or to access minerals from different bottom hole locations.

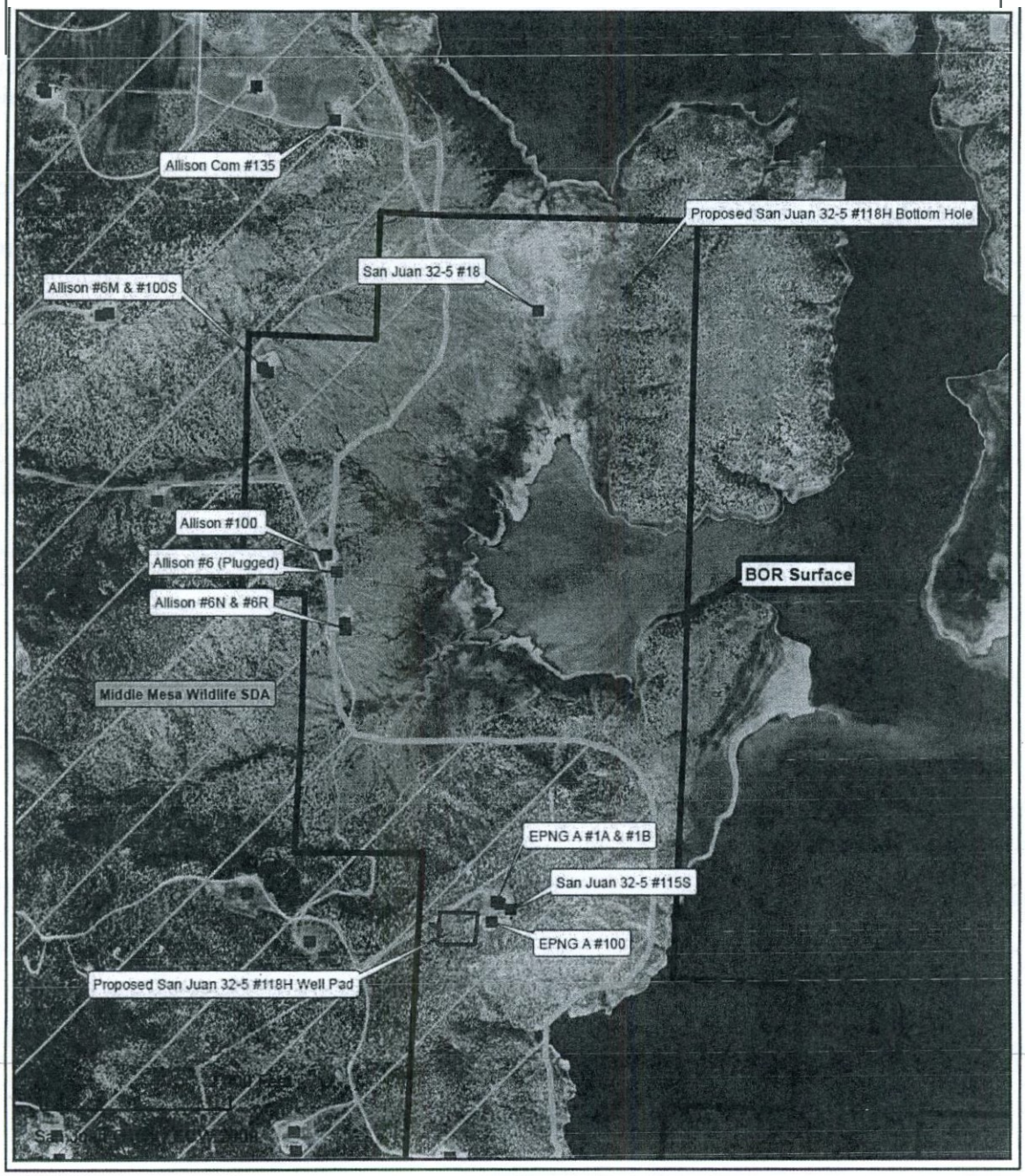
Several technical factors must be considered before deciding on the use of directional applications. Factors such as reservoir depth, angle of deviation, lateral displacement, completion technique and risk must all be considered. In addition, operating factors such as production efficiency, rod, pump, and tubing wear, and workover frequency must also be a consideration.

Generally, directional well completion and operating costs are 20 to 25 percent higher than vertical well drilling. The primary economic factors that determine the feasibility of directional applications include, but are not limited to the following:

- Incremental drilling, completion, and operating costs
- Oil and gas reserves
- Rates of production
- Oil and gas pricing
- Royalties and taxes
- Return on investment

The proposed well could not be twinned with the existing EPNG A No. IA/No. IB, EPNG A No. I00, or San Juan 32-5 Unit No. 115S wells because of the presence of cultural resources near these well pads. The proposed well pad would be placed adjacent to an existing access road and existing well pad (see Figure 4 on following page).

Figure 4: Alternative Locations Map
ConocoPhillips Company Proposed San Juan 32-5 Unit No. 118H T32N, R06W, Section 21, NMPM
San Juan County, New Mexico



3.0 Description of Affected Environment

Chapter 3 describes the environment that may be affected by implementation of the proposed action and any alternatives described in Section 2. If they are present, critical resource elements require analysis under BLM policy. These elements are listed below in the below table. Following the table, only those resources that have the potential to be affected by the proposed action are discussed.

Table 2 Potential Resources and Elements that may be affected by the Proposed Action

CRITICAL RESOURCE ELEMENTS			
Air Resources	Construction activities and well production facilities are potential emission sources.	YES	3.1, 4.1
Surface and Groundwater Quality and Quantity	Construction activities may result in sedimentation, which could affect water quality downgradient of the proposed action area.	YES	3.2, 4.2
Hazardous and Solid Wastes	Some oil and gas constituent wastes could be subject to regulations as hazardous substances under CERCLA.	YES	3.3, 4.3
Environmental Justice/Socio-Economics	The regional population includes minority and low-income groups.	YES	3.4, 4.4
Cultural Resources	A project-specific cultural resources inventory is required for all ground-disturbing activity.	YES	3.5, 4.5
Native American Religious Concerns	Native American Religious Concerns have been evaluated on a regional and local scale within the BLM-FFO management area. These concerns may be analyzed in detail on a site-specific basis.	YES	3.6, 4.6
Federally Listed Species	Federally Listed Species habitat is present within BLM-FFO boundaries and evaluated on a project-specific basis.	YES	3.7, 4.7
Invasive, Non-native Species	The potential for introduction of invasive, non-native species exists through ground disturbance, as well as through transportation of equipment and facilities.	YES	3.8, 4.8
Areas of Critical Environmental Concern (ACEC)	The proposed action area is not within any ACECs.	NO	
Wilderness	The proposed action area is not located in or near a designated Wilderness Area; the proposed action would not affect any Wilderness Areas.	NO	
Wild and Scenic Rivers	No Congressionally-designated or potentially eligible Wild and Scenic Rivers exist within BLM-FFO boundaries; such areas would not be affected by the proposed action.	NO	
Floodplains	According to FEMA maps, no floodplains (as defined by Executive Order No. 11988) are present in the proposed action area; such areas would not be affected by the proposed action.	NO	
Farmlands, Prime and Unique	Based on a field visit to the site, no farmlands (as defined by 30 U.S.C. 1201 et seq. and 7 U.S.C. 4202 et. seq.) are present in the proposed action area; such areas would not be affected by the proposed action.	NO	
Wetlands/ Riparian Zones	Based on topo maps and a field visit to the site, no surface water resources, seeps, or springs are present within the proposed action area; no such resources would be affected by the proposed action.	O	

RESOURCE	POTENTIAL TO OCCUR IN THE PROPOSED ACTION AREA OR TO BE AFFECTED BY THE PROPOSED ACTION	FURTHER ANALYSIS?	SECTIONS
	NON-CRITICAL RESOURCE ELEMENTS		
Mineral Resources/ Geology	The proposed action is intended to extract local mineral resources.	YES	3.9, 4.9
Soils	The proposed action includes the disturbance, mixing, and compaction of local soils.	YES	3.10, 4.10
Watershed/ Hydrology	Alterations to soils and vegetation may result in sedimentation downgradient of the proposed action area, consequently affecting local hydrology.	YES	3.11, 4.11
Vegetation/ Forestry	Construction would include the removal of some local vegetation, ultimately changing the species composition	YES	3.12, 4.12
Wildlife	The proposed action would result in net habitat loss and fragmentation for wildlife species. The proposed action area is within Middle Mesa Wildlife SDA.	YES	3.13, 4.13
Migratory Birds	The proposed action would result net habitat loss for migratory bird	YES	3.14, 4.14
Range	The proposed action area is within a BLM-FFO grazing allotment.	YES	3.15, 4.15
Special Management Species (SMS)	SMS habitat is present within BLM-FFO boundaries and is evaluated on a project-specific basis.	YES	3.16, 4.16
Wild Horses and Burros	Wild horses and burros are not known to use the proposed action area; therefore, the proposed action · these animals would not be affected by the proposed action.	NO	
Recreation	The proposed action area is not within a designated recreation area.	NO	
Visual Resources	The proposed action would result in visual scarnng and a change in local topography. Production facilities may result in a long-term change in the view.	YES	3.17, 4.17
Noise	Construction, drilling, and production activities and facilities may result in a change in area noise.	YES	3.18, 4,18
Paleontology	BLM-FFO lands are designated as Very High Potential paleontological resource areas, thus requiring an assessment at the ect level.	YES	3.19, 4.19

3.1 Air Resources

The proposed action area is in San Juan County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the BLM-FFO RMP/EIS. In addition, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this RMP was prepared. Ongoing scientific research has identified the potential impacts of GHG emissions (such as carbon dioxide [CO_2,] methane [C], nitrous oxide [N_2O1 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. These changes are 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 eight-hour standard of0.075 parts per million (ppm). In addition, on October 17,2006, the EPA issued a final ruling on the lowering of the NAAQS for particulate matter measuring 2.5 microns (PM2.5) or smaller. This ruling became effective on December 18, 2006. It stated that the 24-hour standard for PM2.5 was lowered to 35 micrograms per cubic meter (ug/m^3) from the previous standard of 65 ug/m^3. This revised NAAQS was promulgated to better protect the public from short-term particle exposure.

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 be seen in the skies, impacting visibility, and there are concerns for the ecosystem due to the deposition of mercury and nitrogen.

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

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

The EPA has the primary responsibility for regulating air quality, including the regulation of seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to some states, including New Mexico. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology, and terrain. Air quality 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.

Air Quality

The proposed action area is within a Class U 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 action area is generally good. The proposed action area is not within an EPA-designated "non-attainment area" 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-hour 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 of there are no ozone monitors sited in *Rio* Arriba County.

Greenhouse gases, including CO_2 and CH4, and the potential effects of GHG emissions on climate, are not regulated by the EPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks found that in 2007, total U.S. GHG emissions were over 7 billion metric tons and total U.S. GHG emissions increased by 17 percent between 1990 and 2007. Emissions increased from 2006 to 2007 by 1.4 percent (99.0 Tg CO2 Eq.). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (EPA 2009).

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

Climate

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. Global mean surface temperatures have increased nearly 1.0° C (1.8° F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). 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 0.1o 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. Observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere.

A 2007 US Government Accountability Office (GAO) Report on Climate Change found that "federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, among others: I) physical effects such as droughts, floods, glacial melting, and sea level rise; 2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and 3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses." It is not, however, possible to predict with any certainty regional or site specific effects on climate relative to the proposed action and subsequent actions.

In New Mexico, a recent study indicated that 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 of New Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state.

3.2 Surface and Groundwater Quality and Quantity

The proposed action area is in the Colorado River Drainage Basin, in which the Animas and San Juan Rivers are the largest perennially flowing streams. There are some small, ephemeral drainages within the proposed action area. No surface waters are located within the vicinity of the proposed action area. Most stream and wash channels in the region are ephemeral. In the region, natural soil erosion compounded by man-made barren surfaces and historic livestock grazing has led to high sedimentation of drainages. The quantity of surface water can reach flash-flood levels during thunderstorms or rapid snowmelts. Runoff and sedimentation in washes during precipitation events can be considerable. Generally, surface water quality in drainages is extremely poor following storm/flood/rapid snowmelt events. Key features that adversely influence the surface water quality include ephemeral water sources, sparse vegetative cover, highly erosive and saline soils, and rapid runoff. Erosion conditions promote the formatio!l of canyons, arroyos, and gullies, further contributing to poor water quality.

The BLM-FFO has estimated that surface runoff frequently contains more than 10,000 milligrams per liter (mg/L) of suspended sediment and more than 1,000 mg/L of total dissolved solids {TDS). Public Law 93-320 mandated control of salinity runoff into the Colorado River Basin. A 1984 amendment to the Colorado River Salinity Control Act of 1974 "...specifically requires the Director of the BLM to develop a comprehensive program for minimizing salt contributions to the Colorado River and their tributaries from BLM administered lands" (BLM 1988). No specific, quantifiable water quality or quantity data for the proposed action area is available.

Colorado Plateau aquifers underlie an area of approximately 110,000 square miles in western Colorado, northwestern New Mexico, northeastern Arizona, and eastern Utah. The distribution of these aquifers is controlled largely by structural deformation, and the principle aquifers interconnect across the plateau and are present within basins located on the plateau, such as the San Juan, Uinta, and Piceance Basins.

The Uinta-Animas aquifer is widespread across the Colorado Plateau and present in the Uinta, Piceance, and San Juan Basins. Sedimentary rocks in this aquifer are Lower Tertiary in age. The Uinta-Animas aquifer in the San Juan Basin of northwestern New Mexico consists of the San Jose Formation; the underlying Animas Formation in the Durango area and its equivalent in northern New Mexico, the Nacimiento Formation; and the Ojo Alamo Sandstone. The Animas Formation in Durango consists of a main body of green volcaniclastic conglomerate, sandstone and shale, and the basal McDermott Member, also a volcaniclastic conglomerate. The Nacimiento Formation and Ojo Alamo Sandstone are primarily permeable conglomerates and sandstones interbedded with less permeable shale and mudstone. The thickness of the aquifer in the northeastern San Juan Basin is approximately 3500 feet. Aquifers beneath the Uinta-Animas aquifer are the Mesa Verde aquifer, the Dakota-Glen Canyon aquifer, and the Coconino-DeChelly aquifer.

Recharge of the Uinta-Animas aquifer in the San Juan Basin occurs at the higher altitude areas that encircle the Basin. Most water supplies in the Basin are obtained from valley fill deposits o Quaternary age along rivers, and some of the shallower Cretaceous sandstones bodies. Terrace deposits of boulders and cobbles cut into Tertiary bedrock. Thickness of terrace deposits generally does not exceed 30 feet. Alluvial valley fill deposits of sand, gravel, silt, and clay rarely exceed 100 feet in thickness. Limited surficial and groundwater resources are available due to the arid climate. Irrigation water for agriculture comes from the diversion of the perennial streams and rivers. Outside of the river corridors, dry farming is nearly nonexistent.

3.3 Hazardous or Solid Waste Materials

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

The Comprehensive Environmental Response Compensation and Liability Act (CERCLA), passed in 1980, deals with the release (spillage, leaking, dumping, accumulation, etc.) or threat of a release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA-exempt contaminants could be subject to regulations as hazardous substances under CERCLA. The New Mexico Oil Conservation Division (OCD) administers hazardous waste regulations for oil and gas activities in New Mexico.

There are currently no known hazardous or solid waste materials within the proposed action area.

3.4 Environmental Justice/Socio-Economics

On February 11, 1994, the President issued Executive Order No. 12898 concerning Environmental Justice and impacts on minority and low-income populations. The purpose of this order is to identify and address disproportionately high or adverse human health and environmental effects from programs, policies, or activities on minority or low-income populations.

In the region around the proposed action area, statistically significant populations include Native Americans, Hispanics, and white Euro-Americans. Some members of these populations are within financially low-income groups. San Juan County has produced oil and gas resources for over 40 years. The extraction of this resource is an income source to the local communities as well as to the County, the State of New Mexico, and the Federal government. Many County and local contractors and their employees are employed in some aspect of the oil and gas industry.

3.5 **Cultural** Resources

The proposed project area is located within the archaeologically rich San Juan Basin. The pre-history of the San Juan Basin can be divided into five major periods:

- Paleolndian (cs. I0,000 B.C. to 5,500 B.C.)
- Archaic (ca. 5,500 B.C. to A.D. 400)
- Basketrnaker Il-IJI and Pueblo I-IV periods (A.D. 1 to 1540)
- The historic (A.D. I540 to present) - includes Native American as well as later Hispanic and Euro-American settlers.

Detailed description of these various periods and select phases within each period is provided in the Bureau of Land Management Farmington Field Office Final Environmental Impact Statement and Resource Management Plan (2003) and will not be reiterated here. Additional information is also included in an associated documented, Cultural Resources Technical Report (CRTR; SAIC 2002).

The BLM-FFO has categorized variability in archeological sites by major time period, cultural affiliations/components, average size, and occurrence of features in each of the 20 watersheds within the BLM-FFO's jurisdiction (BLM 2003:3-88). The proposed action area is within the Navajo Reservoir Watershed. Based on the CRTR, a total of 3106 sites, representing 4329 temporaVcultural components, have been documented within the watershed (BLM 2003b). Ofthe 19 categories of sites defined - based on temporaVcultural affiliation, 17 are represented in the watershed. Lacking in the watershed are sites attributed to Paleo and Ute occupations. The most frequently occurring cultural affiliations are Basketrnaker II through Pueblo IIi (65 percent) period components and Dinetah/Gobemador (16 percent) period components (BLM 2003b:3-9). Features common to these sites include hearths, middens, and pithouses.

A BLM Class I literature review was conducted by La Plata Archaeological Consultants (LAC) prior to the cultural resources inventory. There are six previously recorded sites within one-quarter mile of the proposed action area. Five of these sites are over 100 feet from the proposed action area; one site (LA67598) is within the cultural survey area and is discussed below.

The entire area of potential affect was surveyed at a BLM Class III level (100 percent) by LAC. An inventory report (LAC Report 2010-lle) was prepared and submitted to the BLM-FFO in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico ELM Responsibilities* (BLM 2005). The BLM concurred with the report's findings (BLM No. 2011[Ill]003F). No new sites or isolates were discovered during the survey. Previously recorded site LA67598 was encountered. This site, a possible Anasazi Pueblo I seasonal habitation, is recommended as eligible for nomination to the National Register of Historic Places. This site is located southwest of the proposed well pad construction zone.

3.6 Native American Religious Concerns

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

> A traditional cultural property can be defined generally as one (a property) that is eligible for the National Register because of its association with cultural practices

> or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. (National Register Bulletin 38)

Native American cultural associations are the "communities" most likely to identifY TCPs, although TCPs are not restricted to this group. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known.

There are several pieces of legislation or Executive Orders that should be considered when evaluating Native American religious concerns. These govern access and use of scared sites, possession of sacred items, protection and treatment of human remains, and the protection of archaeological resources ascribed with religious or historic importance. These include the following:

- The American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996, P.L. 95-431 Stat. 469):
    1. Possession of sacred items
    2. Performance of ceremonies
    3. Access to sites
- Executive Order 13007 (24.May 1996):
    1. Access and use of sacred sites
    2. Integrity of sacred sites
- The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001, P.L. 101-601):

    Protection, ownership, and disposition of:
    - Human remains
    - Associated funerary objects
    - Unassociated funerary objects
    - Sacred objects
    - Objects of cultural patrimony
- The Archaeological Resources Protection Act of 1979 (ARPA; 16 USC 470, Public Law 96-95):

    Protection of archaeological resources on Federal and Indian lands

For the proposed action, reviews of existing published and unpublished literature and the site-specific cultural resources inventory served to identifY any TCPs in the area. In addition, the BLM-FFO cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts. There are no known TCPs in the vicinity of the proposed action area.

3.7 Federally Listed Threatened or Endangered Species

Eleven federally listed Threatened, Endangered, Candidate, or Proposed species could possibly occur within San Juan County, New Mexico. The table below lists these species along with their status, habitat, and potential to occur within the proposed action area.

Table 3: Federally Listed (Endangered, Threatened, Candidate, & Proposed) Species With Potential to Occur in San Juan County, New Mexico

Species	Federal Status	Habitat	Potential to Occur in Proposed Action Area (PAA)
		PLANTS	
Knowlton cactus *(Pediocactus knowltonii)*	Endangered	Rolling, gravelly hills in pinon-juniper-sagebrush communities. Elevation -5900-6560 ft.	UNLIKELY: No rolling, gravelly hiils within PAA.
Mancos milkvetch *(Astragalus humillimus)*	Endangered	Large, nearly flat sheets of Point Lookout sandstone. Clusters around margins of bowl-like depressions in bedrock, or cracks / fissures in the sandstone or at the base of gentle, slickrock inclines. Elevation –5000-6000 ft.	UNLIKELY: Point Lookout sandstone not identified within the PAA.
Mesa Verde cactus *(Sclerocactus mesae-verdae)*	Threatened	Dry, low, exposed hills and mesas in full sun. Mancos or Fruitland clays. Soils typically high in selenite. Elevation -3900-6600 ft.	UNLIKELY: Mancos and Fruitland soils not identified within PAA.
		FISH	
Colorado pikeminnow *(Ptychocheilus lucius)*	Endangered with Critical Habitat	Medium to large rivers. Shoreline habitat with sand substrate. Young prefer small, quiet backwaters; adults use various habitats (deep, turbid, strongly flowing water; eddies; runs; flooded bottoms; backwaters; lowlands inundated during spring flow).	WOULD NOT OCCUR: No perennial water sources within immediate vicinity of PAA.
Razorback sucker *(Xyrauchen lexanus)*	Endangered with Critical Habitat	Slow areas, backwaters, and eddies of medium to large rivers and their impoundments (preferably reservoirs).	WOULD NOT OCCUR: No perennial water sources within immediate vicinity of PAA.
Roundtail chub *(Gila robusta)*	Candidate	Historically occurred in the San Juan, Zuni, San Francisco, and Gila River drainages.	WOULD NOT OCCUR: No perennial water resources within immediate vicinity of PAA.
		BIRDS	
Mexican spotted owl *(Strix occidentalis lucida)*	Threatened with Critical Habitat	Old growth or mature forests with complex structural components (uneven aged stands, high canopy closure, multi-storied levels, high tree density). Prefer canyons with riparian or conifer habitats.	UNLIKELY: No complex forests or canyons within immediate vicinity of PAA.
Mountain plover *(Charadrius montanus)*	Proposed Threatened	Nesting trees, cliff ledges, or caves. Short-grass plains, sandy desert, and agricultural lands. Nesting: areas with short vegetation, significant areas of bare ground, and flat or gentle slopes. Often associated with prairie dog colonies. Winter: Out of region.	UNLIKELY: No short-grass prairie, agricultural fields, sandy desert, or prairie dog colonies within PAA.

Species	Federal Status	Habitat	Potential to Occur in Proposed Action Area (PAA)
Southwestern willow flycatcher *(Empidonax lraillii extimus)*	Endangered with Critical Habitat	Breeding: Dense, riparian habitats. Winter: Out of region.	UNLIKELY: No riparian areas within immediate vicinity ofPAA.
Yellow-billed cuckoo *(Coccyzus americanus)*	Candidate	Breeding: Tall cottonwood, mature willow riparian, or deciduous woodlands; moist thickets; orchards; or overgrown pastures. Winter: Out of region.	UNLJKELY: No cottonwood, riparian, or deciduous woodlands; moist thickets; orchards; or overgrown pastures within immediate vicinity ofPAA.
MAMMALS			
Black-footed ferret *(Mustela nigripes)*	Endangered	Grasslands, steppe, and shrub steppe. Closely associated with prairie dog colonies (preferably colonies larger than 80 hectares).	UNLIKELY: No prairie dog colonies recorded or observed within immediate vicinity of PAA.

Based on habitat and range, the potential does not exist for any Federally listed species to occur within the proposed action area.

3.8 Invasive, Non-Native Species

Management of invasive and non-native species is mandated under the Lacey Act, as amended; the Federal Noxious Weed Act of 1974, as amended; and Executive Order 13112, Invasive Species (February 3, 1999). Invasive plants are found in the San Juan Basin, particularly in areas disturbed by surface activities. These plants displace native plant communities and degrade wildlife habitat. A total of212 invasive and poisonous weeds have been identified on public land administered by the BLM-FFO (Heil and White 2000). No invasive, non-native species were recorded within the proposed action area.

3.9 Mineral Resources/Geology

The San Juan Basin holds the second largest accumulation of natural gas in the country in Upper Cretaceous sandstone reservoirs of the Pictured Cliff, Mesa Verde Group, Gallup, and Dakota sandstone. These Cretaceous formations deposited in marine environments in the Western Interior Seaway are conventional sources of natural gas, and range in depth from 2500 to 8000 feet throughout the basin. Most wells permitted in the New Mexico portion of the basin are conventional. New Mexico alone provides approximately 95 percent of the San Juan Basin production.

Coal bed methane is a more recent development of an unconventional source of natural gas, in that the natural gas is methane associated with coal beds found in the Upper Cretaceous Fruitland Formation. The Fruitland and overlying Kirtland Formations both contain coal beds that are mined for coal-fired power plants. Coalbed methane wells tend to be shallower, especially along the northeastern edge of the basin, and thus extract large amounts of produced water during production. Coal seam sources contribute more than 60 percent of the basin total output, with New Mexico accounting for approximately 53 percent of the volume.

Surface geology within the proposed action area is the San Jose Formation. The San Jose is the uppermost formation in the Basin proper, consists of a sequence of interbedded sandstones and mudstones, and generally forms cliffs with some slopes. It consists of several distinctive members. The Cuba Mesa Member is a 100- to 300-foot-thick single and multiple sheet sandstone, which grades laterally into the Regina Member. The Regina Member consists of green, gray, purple, and yellow mudstone interbedded with lenticular sandstone. The Llaves and Tapicots Members cap the high mesas in the area. The Llaves Member consists of cliff-forming conglomerate and thickly bedded sandstones. The Tapicitos Member is characterized by brick red mudstone and light red sandstone. Separation of these two members is difficult, as they are interbedded. The San Jose Formation thickness ranges from 200 feet in the west and south to 2700 feet near Cuba and Gobemador, New Mexico. This formation outcrops generally east of Aztec, New Mexico and the western part of Rio Arriba County, to near Dulce, and covers the Carson National Forest, much of the Jicarilla Apache Reservation, the Navajo Reservoir area, and the Animas River drainage from Bondad Hill, Colorado south to Aztec.

The San Jose Formation was deposited in a sandy, braided river system with overbank floodplain deposits of mudstones and shales. Some of the variegated red and green mudstones with burrowing and root traces are indicative of paleosol development. Fossil plants and non-marine invertebrates and vertebrates suggest a humid forested environment.

3.10 Soils

The San Juan Basin is bordered by the Defiance Uplift and Chuska Mountains to the west, San Juan Dome to the north, Chaco Slope and Zuni Uplift to the south and the Nacimiento Uplift to the east. In total, the San Juan Basin covers a surface of approximately 4,600 square miles. The soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. The material has been mixed and sorted in transport and has a wide range of mineralogy and particle size. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

The Soil Conservation Service (now the Natural Resource Conservation Service [NRCS]) has surveyed the soils in the proposed action area. Complete soil information is available in the Soil Survey of San Juan County, New Mexico, Eastern Part, developed by the United States Department of Agriculture, NRCS. Two soil units are found within the proposed action area:

Penistaja-Buckle association, gently sloping

This unit is found on mesas, plateaus, and fans and in valleys; the slope is 0 to 5 percent. The unit is 50 percent Penistaja loam, 0 to 5 percent slopes and 35 percent Buckle silt loam, 0 to 5 percent slopes. The remaining 15 percent of this unit includes small areas of Travessilla and Weska soils on mesas, hills, and breaks, and Twick soils on hills.

The Penistaja soil is deep and well drained, and was formed in alluvial and eolian material derived dominantly from sandstone and shale. The surface layer is typically brown loam about 3 inches thick. This soil has moderate permeability, high available water capacity, medium runoff, and a moderate potential for water erosion. The Buckle soil is deep and well drained, and was formed in alluvium derived dominantly from sandstone and shale. The surface layer is typically brown, silt loam about 8 inches thick.

This soil has moderately slow permeability, very high available water capacity, medium runoff potential, and a moderate potential for water erosion. The potential plant community for this soil unit is western wheatgrass, blue grama, galleta, and high sagebrush.

Rock outcrop-Travessilla-Weska complex, extremely steep
This unit is found on hills, breaks, and mesas; slopes are 30 to 70 percent. The unit is 40 percent Rock outcrop, 40 to 70 percent slope; 30 percent Travessilla sandy loam, 30 to 40 percent slopes; and 20 percent Weska silty clay loam, 30 to 40 percent slopes. The remaining 10 percent of the unit includes small areas of Atrac and Twick soils on hills and rubble land at the bottom of steep slopes.

The Rock outcrop is exposed areas of barren sandstone. The Travessilla soil is very shallow and well drained, and is formed in residuum derived dominantly from sandstone. The surface layer is typically pale brown, sandy loam about 1 inch thick. This soil has moderately rapid permeability, very low available water capacity, rapid runoff, and a severe hazard of water erosion. The Weska soil is very shallow and well drained, and is formed in residuum derived dominantly from shale. This soil has moderately slow permeability, very low available water capacity, rapid runoff, and a severe hazard of water erosion. The potential plant community for this soil unit includes juniper, pifion, sideoats grama, and blue grama.

3.11 Watershed/Hydrology

The proposed action area is in the Navajo Reservoir watershed. The proposed action area is located on a southeast-sloping bench overlooking Navajo Reservoir, approximately 0.4 mile to the east.

In the Navajo Reservoir Watershed, the San Juan River arm is the major surface waterway. The San Juan River is a major tributary to the Colorado River. Its headwaters are in the San Juan Mountains of southwestern Colorado, north of Pagosa Springs. From its headwaters, the San Juan River flows south and enters northwestern New Mexico through Navajo Reservoir, or Navajo Lake. Navajo Dam has controlled flow in the San Juan River since 1963, when it was constructed by the Bureau of Reclamation for irrigation, sediment and flood control, and recreation. The San Juan-Chama Project has diverted water upstream of Navajo Dam east to the Rio Grande drainage since 1971. Since 1976, water from Navajo Reservoir has been diverted to irrigate land on the Navajo Indian Irrigation Project, which is south of the San Juan River on Mesa Portales. There are several major tributaries of the San Juan River that flow into Navajo Reservoir. From the north, the Pine River (in Colorado), Negro Andy (in New Mexico), and Cottonwood Canyon (in New Mexico) flow into the Reservoir. Bancos Canyon, Cabrestro Canyon, and Laguna Seca, all ephemeral streams, flow into the Reservoir from the east and southeast in New Mexico. Frances Canyon and La Jara Creek flow into the lake from the south. Landowners/managers surroundi ng the Reservoir include private-individuals, the BLM-FFO, the Bureau of Reclamation, Carson National Forest, and the Jicarilla Apache Indian Tribe.

3.12 Vegetation/Forestry

Habitat within the proposed action area is open pinon-juniper woodland. There are 75 to 100 pinon pine *(Pinus edulis)* and juniper *(Juniperus* sp.) trees within the proposed action area. The understory consists of dense big sagebrush *(Artemisia tridentate)* and a few small shrubs and grasses. Recorded species include broom snakeweed *(Gutierezia sarothrae)*, blue grama

(Bouteloua gracilis), galleta *(Hilaria jamesii),* Indian ricegrass *(Achnatherum hymenoides),* pricklypear *(Opuntia* sp.), and banana yucca *(Yucca baccata).* Cover (including litter) ranges from 30 to 70 percent.

3.13 Wildlife

The proposed action area is within New Mexico Department of Game and Fish (NMDGF) Management Unit 2B. The NMDGF monitors big game population trends in the area. Depending on winter weather conditions and snow depths, mule deer *(Odocoileus hemionus)* and elk *(Cervus elaphus)* migrate to their winter ranges from high elevations during late November and December, and migrate back to summer ranges in March or April. Twenty-five years ofNMDGF aerial survey information for Unit 2 indicates that mule deer and elk winter populations have fluctuated over the years, but no evident trend seems apparent in the proposed action area. Deer numbers counted appear to be most strongly linked with the severity of winter conditions. The data does not appear to support any cause or effect relationship between wintering deer populations and the level of oil and gas development. Elk numbers also fluctuate with severity of winter, burgenerartrends observed over the years, comoined with the professional observations ofBLM-FFO staff, indicate that elk use and resident elk populations have expanded in the BLM-FFO jurisdictional area during the past 25 years (BLM unpublished file records).

The proposed action area is within Middle Mesa Wildlife SDA. This SDA encompasses 46,052 acres. Of this, 31,390 acres are on public land and 40,317 acres have federal minerals. This area once supported many mule deer and elk. Currently, there is a small influx of deer during the winter. A portion of this SDA is designated as critical deer winter range. The management goal of Middle Mesa Wildlife SDA is "to presetve and protect wildlife and their habitat" (BLM 2003b). Management prescriptions related to the proposed action are as follows:

- Seasonal timing limitations exist on drilling and construction within new and current oil and gas leases from December I through March 31.
- New oil and gas leases are managed under Controlled Surface Use constraints.
- ROWs are allowed on a case-by-case basis with special management constraints and mitigation.
- VRM Class II and **fii** designations are implemented.

Mule deer tracks were observed within the proposed action area. No sign of prairie dogs was seen; no prairie dog colonies are recorded within the vicinity of the proposed action area.

3.14 Migratory Birds

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Executive Order 13186 (EO) was signed on January 10, 2001 directing executive departments and agencies of the Federal government to take certain actions to further implement the MBTA. Section 3 of the EO directed each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement, within two years, a Memorandum of Understanding (MOU) with the USFWS that shall promote the conservation of migratory bird populations. Section 3(c) of the EO states that the MOU shall recognize that the agency may not be able to implement some elements of the MOU until such time as the agency has successfully included the elements in that agency's formal planning process (such as revision

of agency land management plans), including public participation and NEPA analysis as appropriate.

A National MOU between the BLM and the Service was signed on April 12, 20 I 0. lncluded in the MOU is the stipulation that the BLM evaluate effects of projects on migratory birds. The BLM should identify where take may have a measurable negative effect on populations, focusing first on species of concern, priority habitats, and key risk factors. The BLM would then implement approaches to lessen such take.

The BLM-FFO has consulted the Partners in Flight Bird Conservation Plan for the State of New Mexico and the USFWS's list of Birds of Conservation Concern. A review of these documents, specifically as they pertain to the Colorado Plateau physiographic area, indicates there are seven (7) "priority" avian species that utilize the pinon-juniper habitat type and seven (7) species that utilize the Great Basin desert shrub habitat type. The selected species have a known distribution in the BLM-FFO area and may be affected by various types of perturbations. These species and a brief assessment ofthe effects ofthe proposed action on th ir habitat are as follows:

Table 4: Priority Miratory Birds with a Known Distribution in the BLM-FFO Area

Species	Habitat	Potential to Occur in Proposed Action Area (PAA)
Ash-throated flycatcher *(Myiarchus cinerascens)*	-juniper and riparian woodlands.	POSSIBLE: Habitat within PAA is open woodland.
Bendire's thrasher *(Toxostoma bendirei)*	Brushy desert, especially areas of tall vegetation, cholla cactus, creosote bush, and yucca.	UNLIKELY: No brushy desert areas with appropriate vegetation found within PAA.
Black-throated gray warbler *(Dendroica nigrescens)*	Found in pine and mixed oak-pine woodlands.	POSSIBLE: Habitat within PAA is open pinon-juniper woodland.
Black-throated sparrow *(Amphispiza bilineata)*	Xeric desert habitats dominated by shrubs with bare, open ground.	UNLIKELY: No xeric desert habitat within PAA.
Burrowing owl *(Athene cunicularia)*	Open grasslands or desert scrub; presence of suitable nest burrow is critical prerequisite (often prairie dog burrows).	UNLIKELY: No open grasslands or desert scrub within PAA; no prairie dog colonies or other suitable nesting burrows present within PAA.
Cassin's kingbird *(Tyrannusvociferans)*	Found in open country with scattered trees or open woodlands, including pifion-juniper.	POSSIBLE: Habitat within PAA is open pinon-juniper woodland.
Gray flycatcher *(Empidonax wrightii)*	Prefers open piflon-juniper forest, often with interspersed ponderosa, with an understory of shrubs.	POSSIBLE: Habitat within PAA is open pifion-juniper woodland.
Gray vireo *(Vireo vicinior)*	Found in desert scrub, mixed juniper or piflon pine and oak scrub associations, and chaparral, in hot, arid mountains and high plains scrubland.	POSSIBLE: Habitat within PAA is open piflon-juniper woodland.
Juniper titmouse *(Baeolophus ridgwayi;*	Warm, dry open woodland, especially juniper woodlands.	POSSIBLE: Habitat within PAA is open pii'lon-juniper woodland.
Loggerhead shrike *(Lanius ludovicianus)*	Relatively xeric habitats dominated by shrubs and grasses.	UNUKELY: No appropriate xeric habitat found within PAA.

Species	Habitat	Potential to Occur in Proposed Action Area (PAA)
Piiion jay *(Gymnorhinus _cyanocephalus)*	Found in pinon-juniper woodland, sagebrush, scrub oak, and chaparral communities, and sometimes in pine forests.	POSSIBLE: Habitat within PAA is open pinon-juniper woodland.
Sage sparrow *(Amphispiza belli)*	Sagebrush-grassland.	UNLIKELY: No sagebrush-grassland habitat within PAA.
Sage thrasher *(Oreoscoptes montanus)*	Sagebrush plains.	UNLIKELY: No sagebrush plains found within PAA.

No nesting migratory birds were recorded during the survey.

3.15 Range

There are 167 grazing allotments managed by the BLM-FFO, 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 (4) authorizations issued under section 15 of the Taylor Grazing Act to the Navajo Tribe that authorizes grazing on 35 allotments. There are an additional 30 section 15 authorizations that permit grazing on 30 allotments in the Lindrith, New Mexico area.

The proposed action area is located within BLM-FFO Grazing Allotment No. 5056, Middle Mesa AMP, a 36,126-acre allotment currently leased to Sean C. and Dawnette L. Washburn. This allotment, which is 87-percent public, is leased for 268 head of cattle year-round, annually. A total of 2798 Federal Animal Unit Months (AUMs) are provided by this allotment. Thus, there are approximately 12.9 acres per AUM within the allotment. Cattle manure was recorded within the proposed action area. No livestock improvements are located in the immediate area.

3.16 BLM-FFO Special Management Species

The BLM-FFO has prepared a list of SMS to focus species management efforts toward maintaining habitats under a multiple use mandate. The authority for this policy and guidance is established by the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and Department of Interior Manual 235.1.1A. BLM-FFO SMS are listed in the following table. Those species warranting further evaluation are discussed following the table.

Table 5: BLM-FFO SMS

Species	Habitat	Potential to Occur in Proposed Action Area (PAA)
Aztec gilia *(Aiiciella formosa)*	Sandy-clay hills of the Nacimiento formation, desert scrub habitat, elevation 5000-6400 ft.	UNLIKELY: The PAA is not within the BLM-FFO-designated potential habitat "zone" for this species. Geology is not Nacimiento. Habitat is not desert scrub.
Brack's fishhook cactus (Sci*erocactus cloveriae* var. *brackii)*	Sandy-clay hills of the Nacimiento formation, desert scrub habitat, elevation 5000-6400 ft.	UNLIKELY: The PAA is not within the BLM-FFO-designated potential habitat "zone" for this species. Geology is not Nacimiento. Habitat is not desert scrub.

Species	Habitat	Potential to Occur in Proposed Action Area j!>AA)
American peregrine falcon *(Falco peregrinus anatum)*	Rugged, semi-open to wooded areas, including open forests, farmlands, and cities. Nesting: Locally, typically ledges on vertical cliffs.	POSSIBLE: PAA is within open woodlands, which could be used for foraging. No nesting ledges within PAA.
Bald eagle *(Haliaeetus leucocephalus)*	Typically within 2.5 mi of river or lake that supports fish or waterfowl, but may be in areas where other resources (such as carrion) available.	POSSIBLE: PAA is 0.4 mi from Navajo Reservoir, which supports fish and waterfowl.
Burrowing owl *(Athene cunicularia)*	Open grasslands. Nesting: abandoned animal burrows.	UNLIKELY: No open grasslands within PAA No prairie dog colonies or other appropriate burrows within PAA.
Ferruginous hawk *(Buteo regalis)*	Open country, including prairies, badlands, sagebrush shrubland, desert scrub, and the periphery of pifion-juniper woodlands. Nesting: lone trees, cliff ledges, rock spires, or powerline towers.	UNLIKELY: PAA is within woodland habitat. No lone trees, cliff ledges, rock spires, or powerline towers for nesting within PAA.
Golden eagle *(Aquila chrysaetos)*	Open country, including open forests. Nesting: Cliff ledges or scattered large trees.	POSSIBLE: PAA is within open woodland habitat, which could be used for foraging. No nesting ledges or large trees within PAA.
Mountain plover *(Charadrius montanus)*	Areas with very short vegetation, >30% bare ground, and flat to gentle slopes.	UNLIKELY: Habitat within PAA does not include very short vegetation or >30% bare ground.
Prairie falcon *(Falco mexicanus)*	Arid, very open areas, particularly areas with short vegetation, scrub habitat, or large areas of bare ground.	UNLIKELY: No short-grass habitat, scrub habitat, or areas of bare ground within PAA.
Yellow-billed cuckoo *(Coccyzus americanus)*	Cottonwood woodlands, willow riparian woodlands, deciduous woodlands, moist thickets, orchards, or overgrown pastures.	WOULD NOT OCCUR: No cottonwood, riparian, or deciduous woodlands; moist thickets; orchards; or overgrown pastures within PAA.

Sources: NatureServe 2010, New Mextco Rare Plants Techntcal Council 2005, Wheeler 2003

According to the most recent BLM-FFO raptor nest GIS data, no active raptor nests are located within one-third.mile of the proposed action area.

American peregrine falcon *(Falco peregrinus anatum)*

Peregrine falcons may be found in the region year-round (Wheeler 2003). Peregrine falcons prefer open habitats, such as tundra, moorlands, steppe, seacoasts, mountains, open forests, and human population centers (NatureServe 2010). In the interior U.S., during the summer, this species can be found in rugged, semi-open and wooded, often montane regions. They prefer areas with rocky cliffs, outcrops, and canyons (greater than 30-feet high) adjacent to lakes, rivers, or streams. They often nest on ledges or holes on the faces of rocky cliffs (at least 30 feet high) or crags, on river banks, on tundra mounds, in open bogs, in tree hollows, in other species' large stick nests, and on man-made structures. Locally, nests are typically found on ledges of vertical rocky cliffs. During the winter, lower-elevation pairs may remain in summer breeding habitat, while higher-elevation or northern latitude pairs may move south or to lowland habitat that often lacks cliffs (Wheeler 2003).

The open pinon-juniper woodland habitat within the proposed action area could potentially provide foraging habitat for this species. However, no nesting habitat is provided. The nearest recorded peregrine falcon nest is approximately 13 miles west-southwest of the proposed action area. No evidence of this species was observed during the survey of the proposed action area.

Bald eagle *(Haliaeetus leucocephalus)*

Bald eagles are typically found in northwestern New Mexico only during the winter (Wheeler 2003). They typically prefer habitat within 2.5 miles of coastal areas, bays, rivers, lakes, or other bodies of water that provide fish or waterfowl (NatureServe 2010). However, during the winter, if sufficient prey is available, eagles may be found in areas that lack water (Wheeler 2003). This species prefers to roost in conifers or other sheltered sites in the winter. Communal roost sites, used by two or more eagles, are common. Bald eagles typically avoid areas with nearby human activity and development (NatureServe 2010).

The proposed action area is approximately 0.4 mile west of Navajo Reservoir, which provides fish and waterfowl. No bald eagles were observed during the survey of the proposed action area.

Golden eagle *(Aquila chrysaetos)*

Golden eagles may be found in northwestern New Mexico year-round (Wheeler 2003). Golden eagles are generally found in open country, including prairies, tundra, open wooded areas, and barren areas. They prefer hilly or mountainous regions (NatureServe 2010). They may be found in areas with light agricultural use, but are rarely found in rural areas. They prefer areas with elevated perches. Nesting birds will utilize embankments or cliffs, or flat to moderate areas with scattered large trees. During the summer, they may be found above timberline; in the winter, they are typically only round below timberline, and may be found in moderate agricultural areas (Wheeler 2003).

Golden eagles could potentially utilize the open woodland within the proposed action area for foraging. The proposed action area does not provide nesting habitat. The nearest recorded golden eagle nest is approximately 15 miles to the west-southwest.

3.17 Visual Resources

The BLM has developed a Visual Resource Management (VRM) classification designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape. Due to its location near Navajo Reservoir, the proposed action area is within VRM Class II. Class II is managed to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (RMP/FEIS 2003).

The proposed action area is blocked from view from users on Navajo Reservoir by woodland vegetation and topography. The proposed action area is not visible from any residences, commercial areas, major roadways, or recreation areas. There are currently access roads, powerlines, pipeline ROWs, and well pads immediately adjacent to the proposed action area.

3.18 Noise

Increases in the level of sound generated from the production and pipeline transportation of oil and gas has occurred in the San Juan Basin over the last several years. These increases are generated primarily from the escalating need to use equipment such as compressors and pumping units, which operate on a continual basis. The increase in noise affects natural resource values and management of a number of agency SDAs, ACECs, research natural areas (RNAs), etc.

The proposed action area is within Middle Mesa Wildlife SDA; no noise stipulations exist for this SDA. From the proposed well pad site, a well compressor can be heard on an adjacent well pad.

3.19 Paleontology

The proposed action area is located within the paleontologically rich area of the San Juan Basin of northern New Mexico. The BLM uses the Potential Fossil Yield Classification (PFYC) system to identify areas with a high potential to produce significant fossil resources (BLM 2008b). The BLM's PFYC system is a predictive modeling tool that was developed to provide baseline guidance for assessing and mitigating paleontological resources. It is intended to be used at an intermediate point in analyses and should be used to assist in determining the need for further mitigation assessment or actions. Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts. This system has rariked all lands within the BLM-FFO management area as PFYC Class 5. Class 5 designations are described as being Very High Potential paleontological resources areas, thus potentially requiring an assessment at the project level (IM 2008-009).

Geology within the proposed action is the San Jose Formation, ranked as PFYC Class 5 for very high paleontological sensitivity (BLM 2008b), which could entail project-SQcific assessments. The San Jose Formation of the San Juan Basin is the most extensively preserved and exposed Eocene Rock-stratigraphic unit in New Mexico. The formation has yielded one of the largest and most diverse vertebrate faunas of early Eocene age collected in North America. Fossil plants from lacustrine strata within the San Juan Basin are the only flora described from the San Jose Formation.

The BLM-FFO also recognizes nine paleontology SDAs, totaling more than 135,000 acres, to preserve important paleontological resources for scientific study and other public benefits (BLM 2003b:4-117). The proposed project is not within or in the vicinity of a paleontology SDA.

Based on local knowledge of the area from numerous projects, the analyses conducted for the 2003 RMP, and the fact that the proposed action area is not located within a paleontology SDA, there are few paleontological resources assumed to be in the proposed action area. The BLM does not require a site-specific paleontological survey of the proposed action area (Landon 2011).

4.0 Environmental Consequences

Effects can be long term (permanent or residual) or short term (incidental or temporary). Short-term impacts affect the environment .for only a limited period of time; the environment reverts to pre-action conditions (usuaJly within one to three years). Long-term effects are substantial and permanent alterations to the pre-existing environmental condition; the effects last longer than three years.

Alternative A - No Action Alternative

Under the No Action Alternative, neither Alternative B nor an alternative location for the proposed well would be realized. The No Action Alternative would result in the continuation of the current land and resource uses in the action area. The No Action Alternative would result in no effect to each resource discussed within this section. No mitigation would be required.

Alternative B - Proposed Action

Under the proposed action, all proposed actions listed, including site-specific mtttgation measures, would occur. For a complete description of the proposed action, see Section 2.2, Alternative B – Proposed Action. The proposed action would result in 3.14 acres of direct surface disturbance. Following interim reclamation, 1.31 acres of long-term surface disturbance would remain. The table below summarizes the long- and short-term disturbance resulting from the proposed action.

Table 6: Summa of New Disturbance

Facility	Acreage of New Disturbance- Short term	Acreage of New Disturbance – Long term	Total New Disturbance Acreage
Access Road	0	0.11	**0.11**
Well Pad	1.74	1.20	**2.94**
Pi eline Tie	0.09	0	**0.09**
Totals	**1.83**	**1.31**	**3.14**

Potential disturbance resulting from the proposed action has been divided into three categories:

	As defined in CEQ guidelines (40 CFR 1500-1508), effects that are substantial in severity and therefore should receive the greatest attention in decision-making.
Moderate	Effects that cause a degree of change that is easy to detect, but that do not meet the criteria for significant impacts.
	Effects that cannot be easily detected and cause little change in the existing environment.

4.1 Air Quality

4.1..1 Direct and Indirect Effects

Air Quality

Air quality would temporary be directly impacted with pollution from exhaust emissions, chemical odors, and dust that would be caused by motorized equipment used to construct the access road, well pad, and pipeline tie, and by the drilling rig that would be used to drill the well. Dust dissemination would discontinue upon completion of the construction phase. Air pollution from the motorized equipment would discontinue at the completion of the drilling phase. The winds that frequent the northwestern part of New Mexico generally disperse the odors and emissions. Other factors that currently affect air quality in the area include dust from livestock-herding activities, recreational use, and vehicles on roads.

Over the last 10 years, the leasing of the federal oil and gas mineral estate within the BLM-FFO has resulted in an average of approximately 450 to 500 wells drilled on federal leases annually. These wells would contribute an incremental increase to the total emissions (including GHGs) from oil and gas activities in New Mexico.

Potential impacts of development could include increased airborne soil particles blown from new well pads or roads; exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities; and 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 BLM-FFO RMP demonstrated that 522 wells would be drilled annually for federal minerals. Current APD-permitting trends within the BLM-FFO 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, it is not possible to determine the effects on climate change on a regional, national, or global scale.

Consumption of oil and gas developed from the proposed well is expected to produce GHGs, NOx and VOCs. Consumption is driven by a variety of complex interacting factors, including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate. Regional and global transportation, metropolitan traffic, fires (including wildfires, controlled bums, and use of domestic ftreplaces), and power plant emissions from the west are

also parts of the equation. In August 2006, regional air quality modeling conducted for the Northern San Juan Basin Coal Bed Methane FEIS Project determined tha potential cumulative visibility impacts to Federal Prevention of Significant Deterioration (PSD) Class I Areas (Mesa Verde National Park and the Wenirnuche 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.

Climate

The assessment of GHG emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net impacts from the proposed action on climate. The inconsistency in results of scientific models used to predict climate change at the global scale, coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level. When further information on the impacts to climate change is known, such information would be incorporated into the ELM's planning and NEPA documents as appropriate.

4.1.2 Mitigation

The BLM-FFO has been a parttctpant in the Four Comers Air Quality Task Force (FCAQTF) since its inception in 2002, when it was known as the Four Comers Ozone Task Force. Because of the unanswered questions raised by modeling efforts, the FCAQTF ha continued to look at air quality issues in the Four Carriers region. The FCAQTF is comprised of a broad base of representatives including federal, state, Indian, and local governments; 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 regulations, 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 grams per horsepower hour of N_2O for engines of 300 horsepower orless. The FFO has complied with this directive through a COA, which has been in effect since August 1, 2005. To date, NMAQB has made no other such requests.

Currently, development of Federal minerals in New Mexico's San Juan Basin is at a lower level than forecast in the Reasonable Foreseeable Development (RFD) Scenario prepared in 2001 for the EISIRMP. 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 U.S. sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total C02 and C emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other GHGs). 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 refming. 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 flaring hydrocarbons and gases at high temperatures in order to reduce emissions of incomplete combustion, requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored, ensuring that compressor engines 300 horsepower or less have NOx emissions limited to 2 grams per horsepower hour, revegetating areas not required for production facilities to reduce the amount of dust, and watering dirt roads during periods of high use in order to reduce fugitive dust emission. The significant threshold for particulate matter of 35 ug/m³ daily PM2.5 NAAQS is not expected to be exceeded under the proposed action.

The EPA data shows that improved practices, improved 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 BLM-FFO will work with industry and NMAQB to help facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

4.2 Surface and Groundwater Quality and Quantity

4.2.1 Direct and Indirect Effects

The disruption of area soils and the increase of barren surface associate with the proposed well pacf and access road would result in augmented surface flows with associated increased sedimentation and TDS. Sedimentation, resulting from both wind and water erosion, could be realized downgradient of the proposed action area. The quality and quantity of this surface sedimentation would be dependent upon wind and water events in relation to soil disturbance, the timing and success of reclamation, and erosion control configuration. There would be low short- and long-term effects on surface water resources.

Under the proposed action, the storage of drilling fluids and improper well casing and cementing represents the potential for seepage of petroleum products to groundwate1 aquifers, such as the local San Jose Formation. Accidental spill or discharge of drilling and production fluids stored onsite is also a latent hazard, as displaced fluids could migrate to surface or groundwater resources. There would be moderate short- and long-term effects on groundwater.

4.2.2 Mitigation

Fresh water for drilling and completion would be trucked to the location from permitted sources. Fluids stored on location or associated with the pipeline would be contained in tanks during all operations. Large, permanent storage tanks(s) would be enclosed within compacted, gravel-covered, earthen berms to contain any potential spills. All pits would be lined. Lining and berming would prevent fluid seepage into washes, surface water, or shallow groundwater. Surface casing would be set at a depth specified by the BLM-FFO to protect shallow groundwater aquifers. The swift implementation of mitigation measures outlined for soils, topography, and vegetation would also curtail short- and long-term impacts to surface and groundwater quality and quantity. Re-establishment of perennial vegetation and installation of functional erosion-control devices outlined in BLM BMPs would decrease long-term soil erosion impacts and, consequently, impacts to surface and groundwater resources.

4.3 Hazardous or Solid Waste Materials

4.3.1 Direct and Indirect Effects

Typical wastes associated with the proposed action would include trash, sewage, produced water, and produced hydrocarbons. With mitigation, impacts are expected to be low for the short and long term.

4.3.2 Mitigation

During drilling and completion, a trash receptacle and a chemically treated portable toilet would be on location for trash and sewer disposal. All produced hydrocarbons would be put in tanks on location during completion work. Produced water would be put in onsite tanks or within lined reserVe pits during completion work. All waste would be disposed of in a proper manner as required by Federal and State law, as described in the COAs.

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

4.4 Environmental Justice/SoCio-Economics

4.4.1 Direct and Indirect Effects

Local and regional companies may be employed during construction, drilling, and production of the proposed well and construction and operation of associated facilities. This employment would result in an economic benefit to the local and regional community. No disruptions or disproportionate negative impacts to any communities or groups are

anticipated. A moderate, short-term mcrease and low, long-term increase tn socio-economics is anticipated.

4.4.2 Mitigation

No mitigation is proposed.

4.5 Cultural Resources

4.5.1 Direct and Indirect Effects

Direct effects normally include alterations to the physical integrity of a cultural resource. If a cultural resource is significant for other than its scientific information, direct effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. A potential indirect effect from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural resources in the area. Based on a review of the archaeological reports and the assessment of the undertaking in this area, the BLM cultural resources staff has determined that, with mitigation, the proposed action would have no effect on cultural resources (BLM Report No. 20 II [IIT]003F). This determination would be included with the BLM-FFO cultural resources stipulations, if any, attached to the sundry.

4.5.2 Mitigation

To protect LA67598, a temporary fence would be installed around the western comer of the proposed construction zone. All BLM-FFO cultural resources stipulations would be followed as indicated in the Cultural Resource Records of Review, attached to the sundry. These stipulations may include, but are not limited to, additional temporary or permanent fencing or other physical barriers, monitoring of earth-disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. All employees, contractors, and sub-contractors of the project would be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment, and that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and or administrative penalties under the provisions of the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm).

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

4.6 Native American Religious Concerns

4.6.1 Direct and Indirect Effects

The proposed action is not known to physically threaten the integrity of any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies and rituals pursuant to AIRFA or EO 13007. There are currently no known threats to remains that fall within the purview of

NAGPRA or ARPA. Although none have been identified, any heretofore unidentified effect of the proposed action to Native American Religious concerns is expected to be negligible in both the short and long term.

4.6.2 Mitigation

No mitigation is proposed.

4.7 Federally Listed Threatened or Endangered Species

4.7.1 Direct and Indirect Effects

Based on habitat and range, the potential does not exist for any Federally listed species to occur within the proposed action area. No Federally listed species were observed during the survey of the proposed action area. As required under Section 7 of the Endangered Species Act of 1973, the BLM-FFO submitted a Biological Assessment (BA) to the U.S. FWS in association with the BLM-FFO 2003 Draft RMP/Draft EIS. This assessment described the potential impacts on threatened and endangered species, as a result of management actions presented in the BLM-FFO Draft RMP/Draft EIS. In a letter dated October 2, 2002, the USFWS concurred with the BLM-FFO (Consultation No. 2-22-01-389). The USFWS states:

> "The [USFWS] concurs with the BLM's determination in the BA of "may affect, not likely to adversely affect" Knowlton cactus, Mesa Verde cactus, Mancos milkvetch, Colorado pikeminnow and its critical habitat, razorback sucker, bald eagle, mountain plover, Mexican spotted owl and its critical habitat, and the southwestern willow flycatcher."

No further consultation with the USFWS is required.

4.7.2 Mitigation

No mitigation is proposed.

4.8 Invasive, Non-Native Species

4.8.1 Direct and Indirect Effects

Indirect effects of increased human traffic in the area, especially any interstate traffic, may result in establishment of invasive/noxious weeds. Invasive/noxious plants generally outcompete native species where bare ground is created. Given successful mitigation measures, effects from invasive, non-native species are expected to be low for the short and long term.

4.8.2 Mitigation

The proposed action area-would be seeded with certified weed-free seed. It-would-be-ConocoPhillips' and Williams' responsibility to monitor, control, and eradicate all noxious/invasive weeds within the proposed action area during the life of the project.

4.9 Mineral Resources/Geology

4.9.1 Direct and Indirect Effects

Development of the Fruitland Coal reservoir would result in extraction of a non-renewable resource. Cross-contamination between geologic zones could occur without adequate cementing and casing of the proposed well bore. With implementation of BLM-FFO standard drilling and completion requirements, short- and long-term effects to mineral resources and geology are anticipated to be low.

4.9.2 Mitigation

Sufficient well-control equipment and reserve pit volume are necessary to ensure control of the well during drilling and completion operations. Adequate casing, cementing, mud weights, blow-out preventors, and reserve pit volumes are proposed in the sundry to mitigate any potential down-hole impacts.

4.10 Soils

4.10.1 Direct and Indirect Effects

New disturbance associated with the proposed action would be approximately 3.14 acres; there would be 1.3 I acres of long-term disturbance. Soils that would be disturbed would be structurally mixed, displaced, and exposed to the elements of wind and water erosion. In some areas, these soils would also be compacted. Once disturbed, these soils (especially in cut-and-fill slope areas) can be subject to increased erosion, dependent upon storm events of water and/or wind, until reseeding has been established (one to two growing seasons). The heaviest erosion into the Watershed would be low for the short term until revegetation is established. The heaviest amounts of wind and water erosion would be low for the short and long term.

4.10.2 Mitigation

Interim reclamation would occur following drilling. During interim reclamation, 1.83 acres of new disturbance would be reclaimed. Site-specific drainage and erosion mitigation measures for the well pad and associated facilities are detailed in Section 2.2 Alternative B-Proposed Action. Re-establishment of perennial vegetation and installation of functional erosion-control devices outlined in BLM BMPs would decrease long-term soil erosion effects.

4.11 Watershed/Hydrology

4.11.1 Direct and Indirect Effects

The proposed action would affect the Navajo Reservoir Watershed and its hydrology, as discussed in Section 4.2.1 Surface and Groundwater Quality and Quantity - Direct and Tndtrect Effects. With the implementation ofmittgafton measures described in Section 4.2.2 Surface and Groundwater Quality and Quantity – Mitigation, impacts to the Watershed and its hydrology would be low for the short and long term.

4.11.2 Mitigation

Mitigation measures described in Section 4.2.2 Surface and Groundwater Quality and Quantity – Mitigation would be applied to curtail impacts to the watershed and its hydrology.

4.12 Vegetation/Forestry

4.12.1 Direct and Indirect Effects

The proposed action would result in the disturbance of approximately 3.14 acres of open pinon-juniper woodland habitat. Disturbance would require the removal of all vegetation within the limits of the proposed action area, including 75 to 100 trees. Following interim reclamation, the re-establishment of vegetation is expected to take three to five growing seasons, depending on precipitation. The reestablishment of mature woodland would take many years. There would be 1.31 acres of long-term disturbance associated with the proposed action. With mitigation, the proposed action is projected to have moderate short- and long-term effects on area vegetation.

4.12.2 Mitigation

Following completion of the well, interim reclamation would occur. During interim reclamation, 1.83 acres of new disturba[lce would be reclaimed. A BLM-FFO-approved seed mixture would be used.

4.13 Wildlife

4.13.1 Direct and Indirect Effects

The proposed action would result in habitat fragmentation and the removal of approximately 3.14 acres of open pinon-juniper woodland habitat within Middle Mesa Wildlife SDA. All vegetation within this acreage would be removed. Following interim reclamation, the re-establishment of vegetation is expected to take three to five growing seasons, depending on precipitation. The reestablishment of mature woodland would take many years. There would be 1.31 acres of new, long-term disturbance.

Effects of oil and gas development on terrestrial flora and fauna can result from dust, noise, increased human activity due to greater road access, and habitat fragmentation (BLM 2003b). Some wildlife species react positively to certain oil and gas activities, some react negatively, and some show no reaction at all. Species would continue to inhabit the area or conversely move out of the area, and populations may increase or decrease depending on the available adjacent forage and habitat present.

Increased vehicular traffic and human activity in the area could have a negative impact due to disturbance and potential road kills to big game and other wildlife species, especially during construction andorillinight truck– traffiC woula confmue yearlong, at approximately the present level following construction and drilling. There are no published studies of effects of oil and gas development on deer or elk in the San Juan Basin. Recent research in other areas may or may not be applicable. Sawyer et al. (2005) examined winter habitat selection of mule deer before and during development of a natural gas field, in the sagebrush and sagebrush-grassland communities of the Pinedale Anticline Action area of Wyoming. Results of this study recorded mule deer avoidance of otherwise suitable

habitats within 2.7-3.7 kilometers of natural gas wells and suggested substantial indirect habitat .Joss from energy development. Observed shifts in deer distribution as the study 'progressed were toward less-preferred and presumably less suitable habitats Sawyer et a! (2005) conducted their study in an area of extensive rolling sagebrush with little topographic relief, high deer populations, and little oil and gas development. The high level of existing development in the BLM-FFO, as well as the more diverse habitat types and broken topography, make assumptions of similar impacts difficult.

The BLM-FFO area contains approximately 633,000 acres of pinon-juniper habitat (BLM 2003b). The woodland habitat may offer greater cover and seclusion for wintering wildlife than in the aforementioned study. Road densities within the BLM-FFO area are already approximately 10 times greater than those in the Wyoming study, yet the area still supports deer and elk populations.

With implementation of proposed mitigation measures, direct and indirect wildlife effects are anticipated to be moderate for the short and long term.

4.13.2 Mitigation

All construction activities would be confined to permitted areas only. All wildlife hazards associated with construction and operation would be fenced or contained in storage tanks. During interim reclamation, 1.83 acres of new disturbance would be reclaimed. Following reclamation, cover reestablishment would minimize impacts to wildlife. Per Middle Mesa Wildlife SDA management prescriptions, no drilling or construction would be allowed between December 1 and March 31.

4.14 Migratory Birds

4.14.1 Direct and Indirect Effects

The proposed action would require the removal of approximately 3.14 acres of open pifion-juniper woodland habitat. All vegetation within the proposed action area would be removed, including 75 to 100 trees. Following interim reclamation, the re-establishment of vegetation is expected to take three to five growing seasons, depending on precipitation. The reestablishment of mature woodland would take many years. Following interim reclamation, 1.3 acres of long-term disturbance would remain.

Based on the information available from the North American Breeding Bird Survey routes, it appears that the likelihood of more than one migratory bird nest in the project area is low. The amount of projected habitat removal is negligible when compared to the total amount of available habitat. Actual potential effects on birds in the proposed action area are difficult to predict. Ongoing studies have shown mixed effects of oil and gas development, including compressor noise, on nesting migratory birds. Frances and Ortega (2006 unpUETished report to BLM) found no significant difference in nest density or nest success between sites with or without wellhead compressors. Some species, such as the black-chinned hummingbird and house finch, were more common on sites with compressors while others, such as the mourning dove and spotted towhee, appeared to either avoid or nest further from compressors. Holmes and King (2006) found that the sage sparrow had lower nest survival in an area with ongoing gas development, while the Brewer's sparrow had higher survival rates when compared with populations in an undeveloped control area.

With the implementation of any proposed mitigation measures, effects to migratory birds are anticipated to be moderate for the short and long term.

4.14.2 Mitigation

The BLM-FFO Interim Management Policy regarding the Migratory Bird Treaty Act (per Instruction Memorandum No. NM-F00-2010-001, dated February 2010) establishes mitigation measures to minimize the possibility of unintentional take of migratory birds. For projects with less than 4.0 acres of vegetative disturbance, should active nests be observed within the proposed action area, construction would cease and a BLM-FFO biologist should be contacted immediately.

Following drilling, 1.83 acres of new disturbance would be reclaimed. All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover reestablishment would minimize impacts to migratory birds. All bird hazards associated with construction and operation of the proposed action would be contained in storage tanks.

4.15 Range

4.15.1 Direct and Indirect Effects

The proposed project surface disturbance would result in the temporary loss of 0.2 AUM. Following successful interim reclamation, it is estimated that 0.1 AUM would be lost for the long term. If the area is successfully and immediately revegetated following initial construction and following final abandonment, the proposed project may benefit livestock grazing by providing additional forage above the existing indigenous rate of production. Impacts to range and grazing livestock are anticipated to be low for the short and long term.

4.15.2 Mitigation

During interim reclamation, approximately 1.83 acres of new disturbance would be reclaimed. All hazards to livestock and wildlife would be fenced or contained. All project activities would be confmed to permitted areas only. No livestock improvements would be impacted.

4.16 BLM-FFO Special Management Species

4.16.1 Direct and Indirect Effects

The American peregrine falcon, bald eagle, and golden eagle could potentially use the proposed action area for foraging. Impacts of the proposed action would include changes in vegetation composition and a temporary increase in human intrusion into the area, which may affect the movements of prey species. This human intrusion would result in increased noise, dust, and vehicles. Short- and long-term effects to SMS are expected to be low.

4.16.2 Mitigation

No mitigation measures are proposed.

4.17 Visual Resources

4.17.1 Direct and Indirect Effects

The proposed action would result in the long-term removal of 1.31 acres of open pifion-juniper woodland habitat, as well as visual scars to the landscape. The proposed action area would not be visible from any residential areas, commercial areas, recreation areas, or highways. The proposed well pad and access road would be constructed adjacent to an existing well pad and access road. Under the proposed action, the management goals associated with VRM Class II would be achieved. With the implementation of BLM-FFO standard and site-specific mitigation measures, the effects of the proposed action on visual resources are anticipated to be low for the short and long term.

4.17.2 Mitigation

Rapid construction and reclamation would decrease the period of greatest visual impact. Using low-profile equipment painted Juniper Green would lessen visual impacts (for safety purposes, some equipment or parts of equipment may be required to be painted other, appropriate colors). During interim reclamation, 1.83 acres of new disturbance would be reclaimed. The goal of reclamation would be to diminish evidence of cuts, fills, and flat well pad surfaces.

4.18 Noise

4.18.1 Direct and Indirect Effects

During project construction, short-term noise within the vtctmty would moderately increase. Noise impacts during the construction phase would result from the operation of vehicles and construction equipment. Not all construction equipment operates continuously, so the average noise level during well pad and pipeline construction is estimated to be 85 dBA. Although modified by topography, the average noise levels decrease below 55 dBA about l,700 feet from construction sites (SJPLC 2006). Generally, any areas within 1,500 feet of construction would experience temporary noise levels above 55 dBA during daylight hours. Nighttime noise levels are not usually affected, because construction occurs between 7:00 a.m. and 7:00 p.m. Noise during the drilling phase would also be elevated above pre-existing levels. Subject to area topography, typically the noise from a drilling rig is 74 dBA at 200 feet. Noise from drilling rigs would decrease from 60 dBA at 1,000 feet to 50 dBA at 3,000 feet (SJPLC 2006). These levels are experienced for 24 hours per day for the time required to drill and complete the proposed well.

Under the proposed action, noise levels would decrease substantially after the well pad and pipeline tie have been constructed and the well drilled. Sources of operational noise would involve periodic vehicle trips to the well sites and the operation of production equipment. Subject to topography, typical noise from a pumping unit is 6ldBA at 100 feet for up to 24 hours per day. Noise from pump jacks would decrease to 55 dBA at 200 feet and 41 dBA at 1,000 feet. The noise from a pump jack is rhythmic, rather than the steady sound of smoothly running equipment. Therefore, although the noise level would be well below the 55-dBA significance threshold, it may be perceived as higher noise levels for some people. Noise from one (1) compressor engine enclosed itJ a building is about 89 dBA at five (5) feet. Noise from a compressor engine enclosed in a building typically is 69 dBA measured 50 feet from the edge of the building (SJPLC 2006). Therefore, under the proposed action (Alternative B), a moderate short-term noise increase in both the project and existing road

area is anticipated. Given the implementation of the mitigation measures under the proposed action, during the production phase area noise would be low for the long term.

4.18.2 Mitigation

The BLM-FFO may require sound abatement on any production equipment used during the production phase of the proposed action. If so, all proposed activities would be required to comply with the noise standards as established in NTL 04-2 FFO (Appendix C).

4.19 Paleontology

4.19.1 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 from the proposed project to fossil localities could result from ground-disturbing activities or the disturbance of the stratigraphic context in which they are located. This project could also create indirect impacts to areas by changing erosion patterns. Additionally, there could be an increase in off-road vehicular access from the project area for recreational activities. An increase in human activity in the area could increase the possibility of unauthorized removal or other alterations to paleontological resources in the area. Potential impacts to paleontological resources as a result of the proposed action would be low for the short and long term.

4.19.2 Mitigation

All BLM-FFO paleontological resources stipulations would be followed as indicated in the COAs attached to the sundry. 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 detennination 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 would be immediately notified. The site would then be evaluated. Mitigation measures such as data recovery may be required by the BLM to prevent impacts to newly identified paleontological resources.

4.20 Residual Effects

The effects of the proposed action that remain after mitigation are residual impacts. Residual impacts of the proposed action include effects to local air quality by increased combustion emissions, changes in site topography, changes in soil constitution, and changes in vegetation composition. Combustion emissions may increase during the production phase of the proposed project. The proposed action would result in 1.31 acres of new, long-term surface disturbance. An unquantitiecl amount of increased soiTioss, erosion, sedimentation, andaegraoation of surface water quality and quantity would result. Additionally, the potential for the loss of cultural materials or paleontological resources exists, primarily as a result of indirect human actions. The proposed action would alter the landscape and increase visual scarring in the area surrounding the proposed well. However, the proposed action would comply with VRM Class II requirements. Noise in the vicinity of the proposed well would increase for the short term. Long-term vicinity noise may also increase, dependent upon the production equipment utilized. To keep all impacts below the level of significance, implementation of recommended COAs would be necessary.

4.21 Cumulative Effects

The leased area of the proposed action has been industrialized with oil and gas well development. For each project that has been permitted, there has been an increase in long-term surface disturbance and fragmentation. As wells become unproductive, well pads and access roads are reclaimed. Thus, cumulative impacts fluctuate with the construction and reclamation of well pads and facilities. Preserving as much land as possible and applying appropriate mitigation measures would alleviate the cumulative impacts.

Within a one-mile radius of the proposed action area, there are 22 new or active wells on 12 well pads, and approximately 4.3 miles of existing roads. Assuming an average disturbance area of 1.2 acres per well pad and an average road width of 30 feet, this totals 30.0 acres of existing disturbance. The proposed action, with 1.52 acres of long-term disturbance, would increase long-term disturbance in the region by 4.3 percent. The proposed access road would increase habitat fragmentation by 156.66 feet, or 0.7 percent.

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

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

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

The foremost past, present and potential future human activity resulting in environmental disturbance in the Navajo Reservoir Watershed is oil and gas development. Other human activities within the sub-watershed include big game hunting, general public recreation, and livestock grazing operations. Impacts from these activities on the Navajo Reservoir sub-watershed environment are categorized as low, for the present and future (long-term). Energy development activities can be separated into short- and long-term disturbances. Short-term disturbance consists of pipeline routes and reclaimed portions of well pads. This acreage is usually reclaimed within one to two years. Long-term acreage disturbance are those areas needed for well production and vehicular travel (roads), estimated at one acre per well location. Some wells are twinned, or share a well pad location, decreasing the long-term surface acreage requirement. For this analysis, it is assumed that reclamation and mitigation measures have been successful, with each past, present and future well representing an estimated 0.78 acre per well.

The Navajo Reservoir Watershed contains approximately 378,389 acres, with an estimated 1334 existing oil and gas wells and 7951 acres of existing disturbance. Given the current NMOCC spacing orders of 18 wells per section, the "twinning" of many Mesa-Verde and Dakota wells, and the reasonably foreseeable development identified in the 2003 PRMP/FEIS, the potential exists for approximately 2444 total wells within the Watershed. Therefore, anticipated future development can be estimated at 1110 additional wells. Assuming that the existing access roads are adequate, this calculates to approximately 9061 acres of total long-term development that is expected to be realized in the Navajo Reservoir Watershed. The proposed action, with 1.31 acres of long-term disturbance, would contribute 0.01 percent of this development.

The short-term use of the area for the proposed action is not expected to adversely impact or limit the long-term productivity of the land, or nearby lands. There is no irreversible or irretrievable commitment of surface resources that would occur from the proposed action.

5.0 Consultation/Coordination

The following agencies and individuals contributed to the preparation of this document:

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Nelson Consulting, Inc. has prepared this environmental assessment document to the standards and guidelines set by the BLM-FFO. Selected sections and information within this document were specifically written by the BLM-FFO. This document is the property of the BLM-FFO.

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APPENDIX A

Selected Laws & Regulations Governing Federal Oil & Gas Development

SELECTED LAWS AND REGULATIONS THAT GOVERN FEDERAL OIL AND GAS DEVELOPMENT

LAW/REGULATION	RESOURCE PROTECTED	AUTHORITY
Clean Air Act (CAA)	Air Quality, Air Emissions and Permits.	New Mexico Environment Depar (NMED)
Clean Water Act (CWA) 1977, as amended. Section 404 F	Surface waters of the U.S.. crossing/diversion ephemeral washes	U.S. Army Corps of Engineers
Federal Water Pollution Control Act and Section 404 oftll	Discharges into surface waters from point sot	New Mexico Water Quality Cont Commission (NMWQCC)
Storm Water Pollution Prevention Plan (SWPPP), Section the CWA	Construction projects disturbing greater than Minimize erosion	USEPA
Safe Drinking Water Act 1974, as amended.	Surface and groundwater	U.S. Environmental Protection A (USEPA)
Colorado River Salinity Control Act 1974, amendment of Public Law 93-320	Mandated Control of Salinity Runoff into the Colorado River Basin	BLM
Federal Land Management and Policy Act (FLPMA) of IS	BLM unique areas, ACECs. Issuing of energ ROWS. Wilderness Areas	BLM
Surface Minin&Control and Reclamation Act (SMCRA) o	Prime and Unique Farm Lands.	Natural Resource Conservation S (NRCS)
Executive Order 11988 as amended.	Floodplains	All Agencies
Executive Order 11990.	Wetlands/Riparian Zones	All Agencies
Wild and Scenic Rivers Act of 1968 as amended.	Wild and Scenic Rivers	All Agencies
National Historic Preservation Act of 1966 as amended. Antiquities Act of 1906.	Cultural resources	All Agencies
American Indian Religious Freedom Act 1978. Native Ar Graves Protection and Repatriation Act (NAGPRA) 1990.	Native American Religious Concerns	All Agencies
Endangered Species Act (ESA) 1973 as amended. (Sectio	Threatened and Endangered plant and animal	U. S. Fish and Wildlife Service 0 FWS)
Bald and Golden Eagle Protection Act	Protection of Eagles	
Migratory Bird Treaty Act	Protection to Migratory Birds, Nests and Egg:	U.S. FWS
National and New Mexico BLM Instruction Memoranda	BLM and New Mexico State Sensitive Specie Habitat.	BLM
Resource Conservation and Recovery Act (RCRA) of 197	Use of Hazardous Materials	USEPA
Comprehensive Environmental Response, Compensation Liability Act (CERCLA) 660 as amended.	Use and Disposal of listed Hazardous Materia	USEPA
Executive Order No.22898, February 1994.	Environmental Justice for environmental and conditions in minority and low-income comm	All Agencies
Federal Noxious Weed Act 1974, as amended and Executi Order 13112.	Designated Certain Plants as Noxious Weeds.	All Agencies
New Mexico Noxious Weed List	Noxious weeds for the State of New Mexico.	New Mexico Department of Agri
Mineral Leasing Act (MLA) 1929, as amended. Associat< Onshore Orders; National, State and Local.	Issue and managed federal oil and gas leases related transportation pipelines.	BLM

APPENDIXB

Plats

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State of New Mexico
tnorv, Kinerab /t I!le.tural Re110urcn De rtment

on, CONSERVATION DMSION
1220 Soutb st. Francis: Dr.
Santa Fe, NI! 87 0!1

•orm C-102
Revised July 16, 2010
Submit one copy to appropriate District Office

O AMEKDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

'.&PI!iwnl>er	'Pool Co4o	[11] Pool lf•m• FRUITLAND COAL
'I'roporiJ Cod.o	'I'roprrtJ ..,. SAN JUAN 32-5 UNIT	'WoU.If- 118H
·OG«<D .0.	•O)>e'ratot ..... CONOCOPHILLIPS COMPANY	ltlnatkm 6385'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	21	32-N	6-W		2140	NORTH	2305	EAST	SAN JUAN

[11] Bottom Hole IJ>cation U Different From Surface

tiL or lot ne.	S«tJooo	'I:WIWIIp	.lliu&•	ILolld.o	7'ol'l ftelll. tlle	•ortll/3o•UO	Ilae	J'oet t:oa Ute	Eul/11eol	lll>e	COilrtJ
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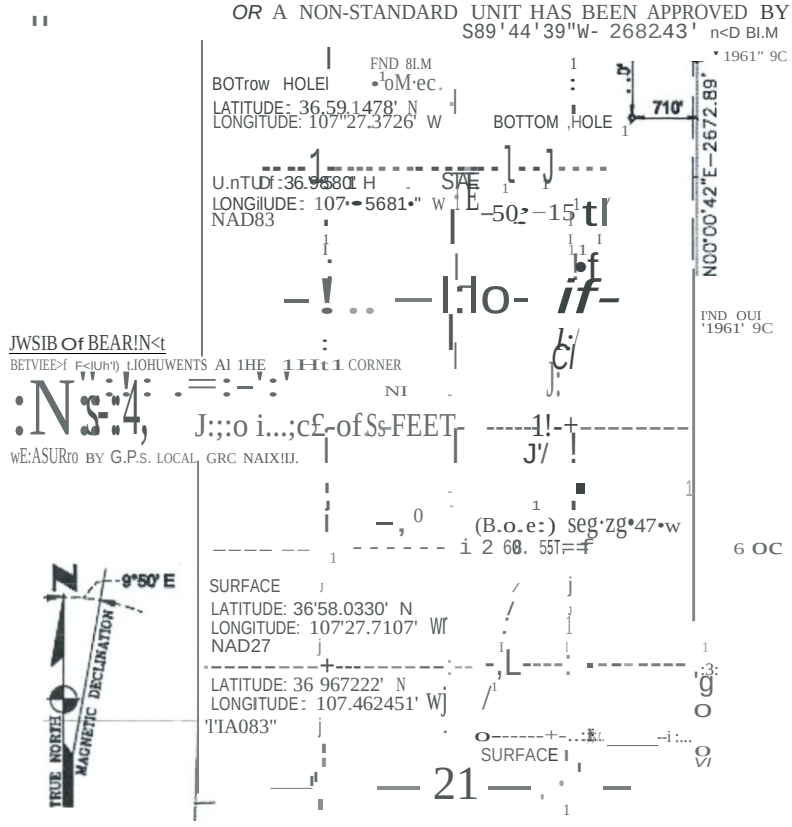
Dodlcot.d. Aorta	"1o1Dt ar Inlll	[11]CoDaoUdatkm CodAl	•ord.u Io.
FC 320.00 ACRES E/2			

- NO AlLOWABLE ViliL BE ASSIGNED TO THIS COllPLETION UNTIL AIL INTERESTS HAVE BEEN CONSOUDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



IT OPERATOR CERTrFlCATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or a working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Ilate

Printed Name

E-mail Address

II SURVEYOR CERTIFIC.ATION

March 3, 2011
Date of Survey

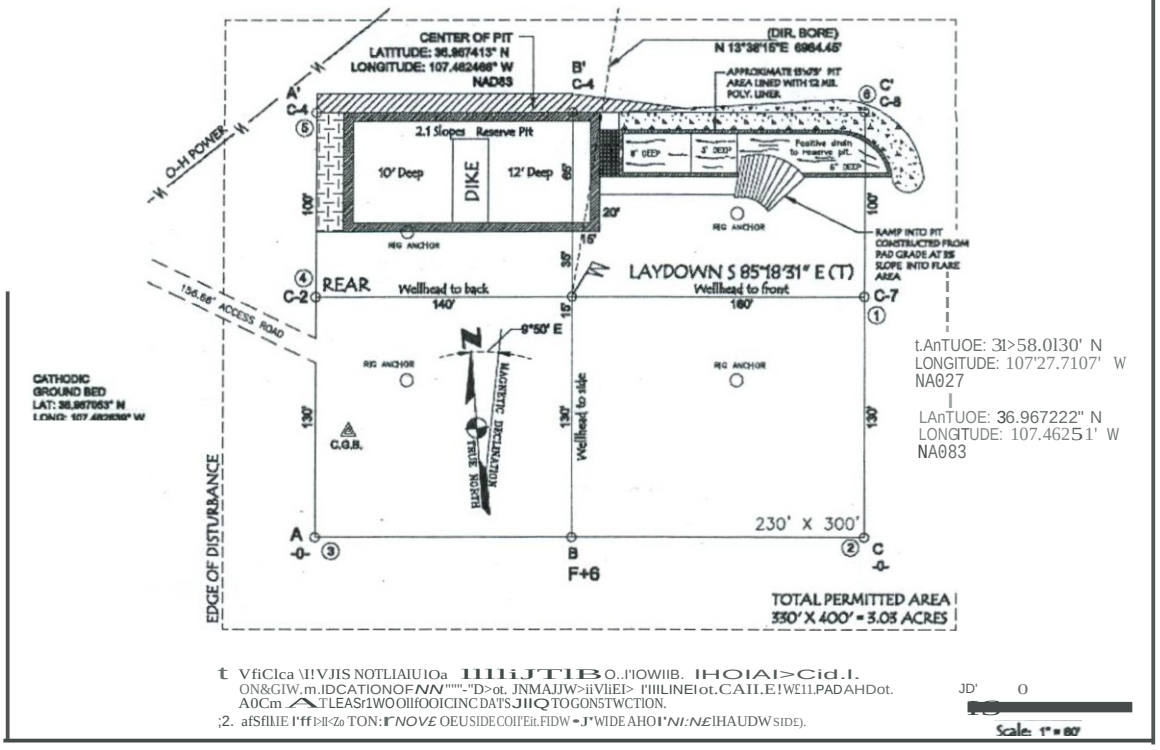
Signature and Seal of Professional Surveyor

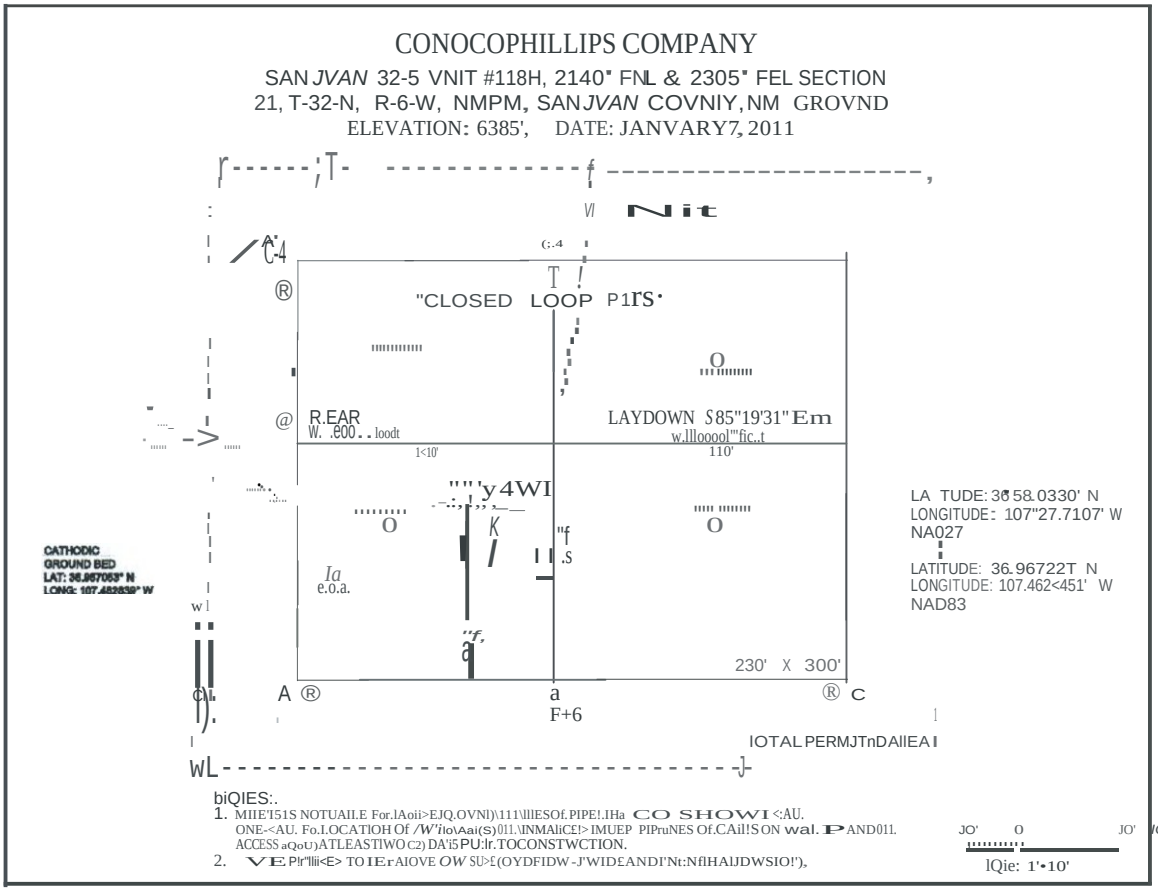
GLEN W. RUSSELL
NEW MEXICO
15703
LICENSED PROFESSIONAL SURVEYOR

GLEN W. RUSSELL
Certificate Number 15703

CONOCOPHILLIPS COMPANY

SAN JVAN 32-5 VNIT #118H, 2140' FNL & 2305' FEL SECTION
21, T-32-N, R.-6-W, NMPM, SANJVAN COVNIY, NM
GWVND aEVAnON: 6385', DATE: JANVARY 7, 2011




CONOCOPHILLIPS COMPANY
SAN JVAN 32-5 VNIT #118H, 2140" FNL & 2305" FEL SECTION
21, T-32-N, R-6-W, NMPM, SAN JVAN COVNIY, NM GROVND
ELEVATION: 6385', DATE: JANVARY 7, 2011
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LONG: 107.482830" W
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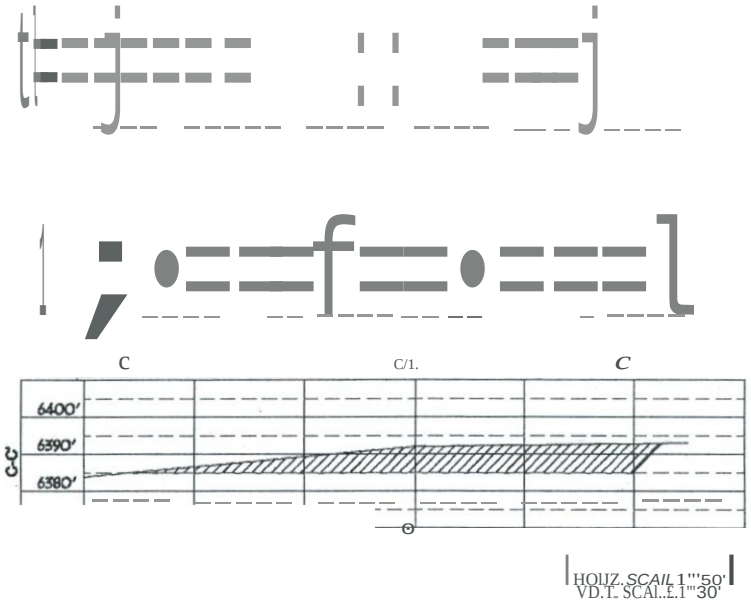
CONOCOPHILLIPS COMPANY

SAN JVAN 32-S VNIT #11BH, 2140' FNL & 2305' FEL

SECTION 21, T-32-N, RW. NMPM, *SAN JVAN* COVNIY, *NM*

GP.OVND ELEVATION: 6385', DATE: JANVARY7,2011



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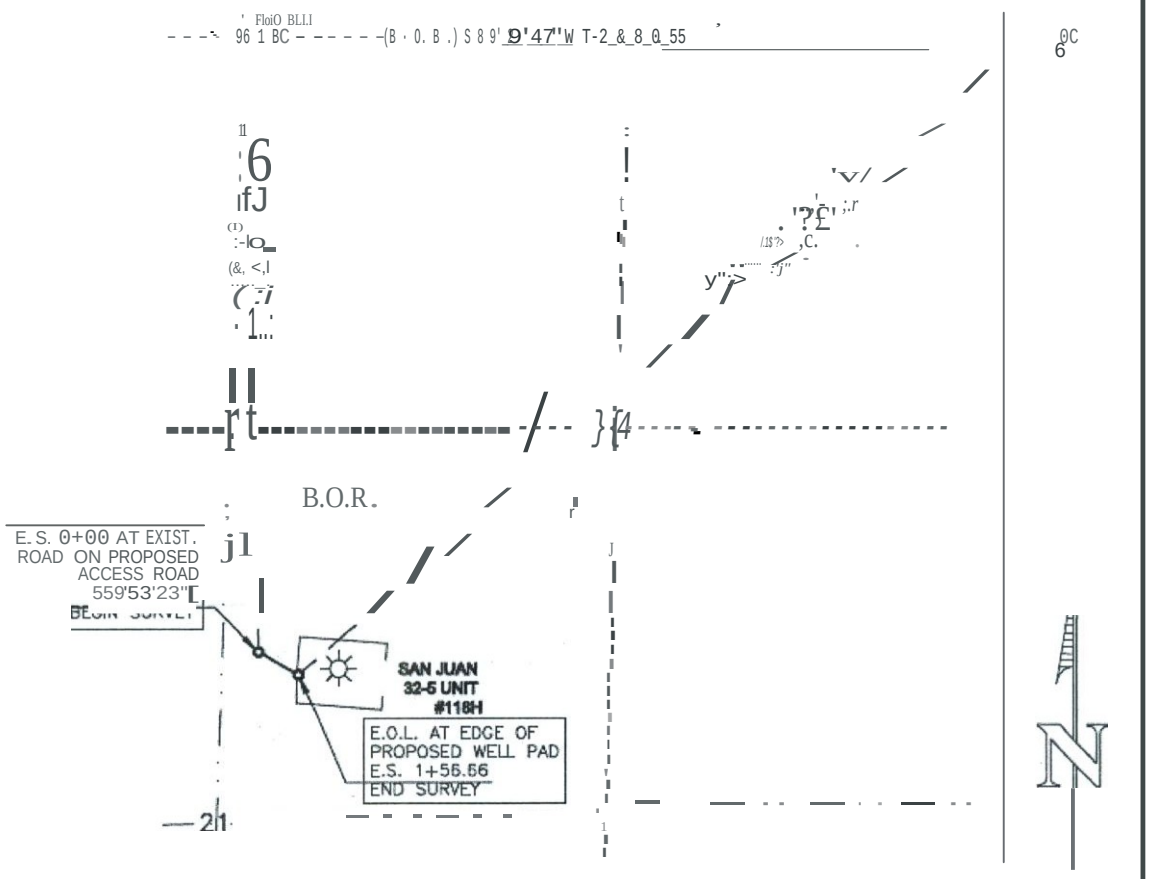
CONOCOPHILLIPS COMPANY

SAN JUAN 32-5 VNIT #118H

156.66' PROPOSED ACCESS ROAD

LOCATED IN THE NE/40F5EcnON 21,T-32-N,R-6-W,N.M.P.M.

SAN JVAN COUNTY,NEW MEXICO



OWNERSHIP

LOCATION	OWNER	STATIOH	FT./RODS
S21, T32N, R6W	B.O.R.	E.!i. 0+00 TO E.S. 1+56.66	156.66/9.49

BASIS OF BEARING: BETWEEN FOUND MONUMENTS AT THE NORTHEAST CORNER AND THE NORTH QUARTER CORNER OF SECTION 21, TOWNSHIP 32 NORTH, RANGE 6 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO.

LINE BEARS: S 89°29'47" W A DISTANCE OF 2680.55 FEET AS MEASURED BY G.P.S. LOCAL GRID NAD83.

SURVEY CREW	JPB	DRAWN BY	TD
DATE OF SURVEY	1/7/11	DATE	2/15/11

C/IDfILE COPC135

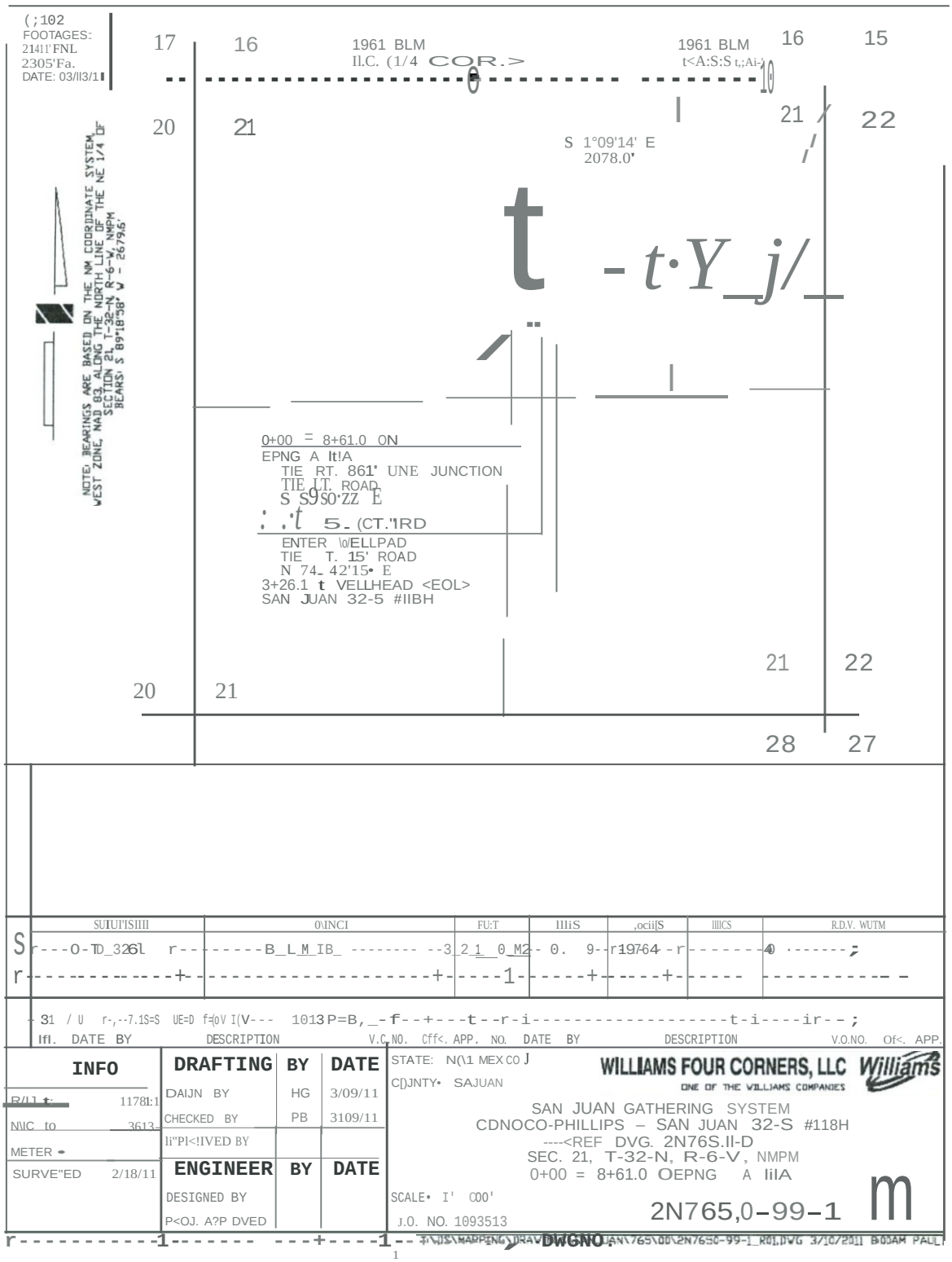
Vector Surveys, LLC

Professional Land Surveys, Mapping, GPS Surveys & Oil Field Services

122 N Wall Avenue, Farmington, NM 87401

Phone (505) 564-3445 or 320-9595

E-Mail: vectorgr001@msn.com



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WILLIAMS FOUR CORNERS, LLC Williams
ONE OF THE WILLIAMS COMPANIES

SAN JUAN GATHERING SYSTEM
CDNOCO-PHILLIPS – SAN JUAN 32-S #118H
----<REF DVG. 2N76S.II-D
SEC. 21, T-32-N, R-6-V, NMPM
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ConocoPh illips Company
Williams Four Comers, LLC
San Juan 32-5 Unit No. !I SH
Well Pad, Access Road, and Pipeline Tie

APPENDIXC

BLM-FFO Noise NTL (04-02 FFO)

Notice to Lessees and Operators on Onshore Oil and Gas Leases Within the Jurisdiction of the Farmington Field Office (FFO) (NTL 04-2 FFO)

Management of Sound Generated By 011 and Gas Production and Transportation

I. Introduction – Increases in the level of sound (noise) generated from the production and pipeline transportation of oil and gas has occurred in the San Juan Basin over the last four years. These increases are generated primarily from the escalating need to use equipment such as compressors and pumping units, which operate on a continual basis. The increase in noise affects natural resource values and management of a number of agency designated special areas [special management areas (SMAs), areas of critical environmental concern (ACECs), research natural areas (RNAs), etc.]. Noise sensitive areas (NSAs) were determined as visitor use areas, wilderness, semi-primitive recreation areas, habitat for threatened or endangered species, raptor nesting/roosting sites, recreational trails and sites where people live and work.

II. Purpose – The Bureau of Land Management (BLM) recognizes solitude (lack of or limited sound) as a part of the natural environment that requires protection and reduction of noise in some instances. The following requirements are for reducing noise levels on federal and Indian oil and gas leases under the jurisdiction of the Farmington Field Office (FFO). The BLM will use adaptive management principles to monitor and adjust implementation of this NTL as additional data becomes available.

III. Noise Sensitive Areas – All or a portion of approximately 61 specially designated areas (SDAs) established through the BLM land use planning process are being identified as noise sensitive areas (NSAs).

IV. Noise Standards- Noise will be measured on the "A" scale, using the attached protocol. The sound level (A scale) must be less than or equal to .48.6 dB(A) over a cont!nuous 24-hour period (i.e., 48.6 dB[A]Leq). This requirement applies to oil and gas lease operations that operate on a continual (>8 hours/day), long-term basis (>1 week in duration). The NTL will not apply to transient operations such as construction, drilling, completion or workover activities or temporary non-oil and gas sound sources. These acflvii1es will oehandled on a case-by-case basis should a conflict be identified during the permitting process. The NTL does not apply to short-term events such as venting a well, compressor start-ups, etc.

V. Application of Standards within NSAs – Noise control will be receptor- or boundary-focused, as determined by agency management guidelines established for the designated SMAs, ACECs, or other designations. Receptor-focused control will apply to 45 BLM and 4

USFS NSAs. Receptor-focused areas may include campgrounds, picnic areas, shorelines, etc. Boundary-focused control will include all designated acreage within 7 BLM (refer to the tables table listed below), 3 USFS, and 1 NPS NSAs, in addition to all USBR land around Navajo Reservoir.

Receptor-Focused NSAs

- Noise standards of 48.6 dB(A) Leq will be achieved at established agency receptor points within the NSAs. Established receptors are generally defined as visitor use areas, camp or picnic areas, habitat for threatened or endangered species, archaeological sites, and recreation trails. Receptors may vary in size from a single point source to several acres based on the features and resource components that are being managed for sound. The agency will work with the operator to establish the applicable receptor points. Buffers of 0 to 100 feet from the defined receptor may be established. The SDAs within which receptors will be designated are as follows (***notes areas where stricter standards may apply):

BLM Receptor-Focused NSAs

1. ***Andrews Ranch	16. Haynes Trading Post	31. Tapacito and Split Rock
2. ***Bee Burrow	17. Holmes Group	32. ***Toh-la-kai
3. ***Bis sa'ani	18. ***Indian Creek	33. ***Twin Angels
4. BiYaazh	19. ***Jacques Chacoan Community	34. ***Upper Kin Klizhen
5. Blanco Star Panel	20. ***Kin Nizhoni	35. Aiien Run
6. ***Casamero Community	21. Margarita Martinez Homestead	36. ***Angel Peak Scenic Area
7. Christmas Tree Ruin	22. Martin Apodaca Homestead	37. Glade Run
8. Church Rock Outlier	23. ***Morris 41	38. ***Navajo Lake Horse Trail
9. ***Crow Canyon	24. Moss Trail	39. Negro Canyon
10. Delgadito-Pueblo Canyons	25. North Road (Segments 1, 2, ***6, 7)	40. Pinon Mesa
11. Dogie Canyon Schools	26. ***Pierre's Site	41. ***Simon Canyon
12. Encinada Mesa-Carrizo Canyor (Gomez Point, Gomez Canyon, Hill Road Ruin)	27. Rockhouse-Nestor Martin Homestead	42. ***Bald Eagle
13. Frances Mesa (Frances Ruin)	28. San Rafael Canyon	43. Reese Canyon
14. Gonzalez Canyon-Senon S. Vigil Homestead	29. Simon Ruin	44. River Tracts
15. Halfway House	30. Superior Mesa	45. Mexican Spotted Owl

USFS Receptor-Focused NSAs

1. ***Buzzard Park Campground	3. ***Gasbuggy
2. ***Cedar Springs Campground	4. Carracas Mesa Administrative Site

Boundary-Focused NSAs

- For noise sources located inside NSAs, the standard is 48.6 dB(A) Leq at 400 feet in all directions from the noise source. For noise sources located outside of designated NSAs, the standard of 48.6 dB(A) Leq must be met at the boundaries of the NSAs. Noise sources located within 400 feet of the NSA boundary will generally be allowed

to meet the standard 400 feet from the source. The SDAs that will be boundary-focused NSAs are as follows (***notes areas where stricter standards may apply):

BLM Boundary-Focused NSAs

1. ***Cho'li'i (Gobernador Knob)
2. Dzil'na'oodlii (Huerfano Mesa)
3. Fossil Forest RNA
4. Carracas Mesa
5. Thomas Canyon (original acreage)
6. ***Ah-shi-sle-pah WSA
7. ***Bisti j De-Na-Zin Wilderness

USFS Boundary-Focused NSAs

1. Middle Mesa Raptor Area (prior approval required)
2. Ulibarri Raptor Area (prior approval required)
3. Munoz Canyon Raptor Area (prior approval required)

NPS Boundary-Focused NSA

1. ***Aztec Ruins National Monument

USBR Boundary-FocuseNSA

1. All USBR land around Navajo Reservoir

Occupied Dwellings, Residences, and Buildings

- For noise sources involving federal or Indian leases located near occupied dwellings or buildings, the standard of 48.6 dB(A) Leq will be met 100 feet from such structure. Policy will not apply to unoccupied lands but can be enforced when those lands are developed. When oil and gas operations pre-date occupancy, the new resident will be asked to contribute to noise mitigation. For noise sources located within incorporated city or township limits, the standards of that municipal jurisdiction will normally be applied. However, if there isn't a municipal standard, BLM will enforce this NTL for noise sources associated with federal minerals.

Stricter Standards

- Stricter standards may be applied to NSAs identified by a triple asterisk in the tables listed above. In these instances, BLM may need the flexibility to adjust the general noise standard. BLM, USFS, USBR and NPS staffs will work with the operator on a case-by-case basis to achieve an acceptable level of noise mitigation. Factors considered in this process would be: (1) the particular aspects of the area (i.e., landscape, topography, etc.), (2) resource values and uses, (3) public values and uses and (4) the extent the 48.6 dB(A) Leq impairs values and uses.

New NSAs

- In addition to the 61areas listed in the tables, new SMAs, camping, picnic or trail areas may be identified and j or developed by land management agencies. This policy would be implemented, in and j or near these areas after a 30-day notice to the affected parties, using section VI schedules.

VI. Implementation of NTL – Upon implementation of the NTL, affected operators in or adjacent to NSAs will be provided general ownership maps depicting the NSAs. Detailed descriptions of the NSAs will be maintained and available at local administering agency offices.

With the exception of the NSAs identified by a triple asterisk in the tables, newly installed noise sources that affect NSAs (inside or adjacent to exterior boundaries) must meet the noise standard 60 days from the date the source is set in the field. All major renovation and/or replaced noise sources must meet the standard 60 days from the date the equipment is renovated and/or replaced. A condition of approval will be included with approved Applications for Permit to Drill (APDs) requiring the operator to meet the noise standard for sources at new well locations that are permitted within or adjacent to an NSA. These standards apply to rights-of-way grants.

For existing sources of noise within defined NSAs, within 90 days of approval of the NTL, the operator shall inventory these locations and submit them to the BLM along with a proposed plan for meeting the NTL standard. The compliance plan submitted by the operator must demonstrate compliance of all applicable noise sources within 5 years, incorporating the agency time-frame compliance priority goals. All major renovation and/or replaced noise sources must meet the standard 60 days from the date the equipment is renovated and/or replaced.

VII. Procedures – A subsequent report (SR) Sundry (Form 3160.5) must be submitted to the BLM for approval by the authorized officer (AO) within 5 days of setting the equipment, which exceeds the noise standard and must be mitigated. A notification Sundry Is not required for existing and new noise sources that do not exceed the 48.6 dB(A) Leq standard. A copy of the SR should be sent to the appropriate surface managing agency. Prior approval is required before setting a noise source that could affect the threatened or endangered species and raptor NSAs. The notice must include: (1) the location of the proposed noise source [township, range, section, footage or quarter/quarter (i.e., NE/4SE/4)], (2) name of the well location or facility type, (3) type of noise source (i.e., compressor, pumping unit, etc.), (4) serious safety considerations, and (5) any other information required by the AO.

- For existing and new noise sources, the surface managing agency will initially work with the applicant to establish the applicable receptor points to which the NTL standard will apply. In addition, the BLM will work with applicants and use flexibility for mitigation of sound with boundary-focused areas.

- For new noise sources, once a receptor is permanently defined and noted on NSA maps provided by BLM to the operator, the operator must comply with the 48.6 dB(A) Leq standard and provide the BLM with noise level measurements (if needed) within the 60-day period.

  For existing noise sources, once a receptor is permanently defined and noted on NSA maps provided by BLM to the operator, the operator must comply with the noise standard according to the schedule of the 5-year plan for existing noise

sources. If a new receptor has been defined in an area that has passed the schedule of the 5-year plan, the operator must comply with the noise standard and provide the BLM with noise level measurements (if needed) within 60 days of receiving a 30-day notice for newly defined receptor.

- The standard defined in Section IV or determined during the approval process must be met after the 60-day period. Measurements must be taken following the established protocol at points designated by BLM or other land management agencies.

VIII. Variances - Variances may be granted on a case-by-case basis by the AO. To obtain a variance, a Notice of Intent Sundry (NOI-Form 3160.5) or a letter must be submitted to BLM for approval. Copies of the Sundry or letter should be sent to any appropriate surface managing agency. The sundry or letter must include the same information as an NOI.

IX. Compliance - Failure to comply with the above policy and conditions of approval may result in an assessment for noncompliance being issued pursuant to 43 Code of Federal Regulations (CFR) 3163.1 by BLM staff. Any and all instructions, orders, or decisions issued are subject to administrative review pursuant to 43 CFR 3165.3 and appeal pursuant to 43 CFR 3164 and 43 CFR 4.700.

This NTL will be reviewed annually and may be modified based on monitoring and current results of implementation, a changing environment, and evolving technologies.

APPROVED: Date_____ _____

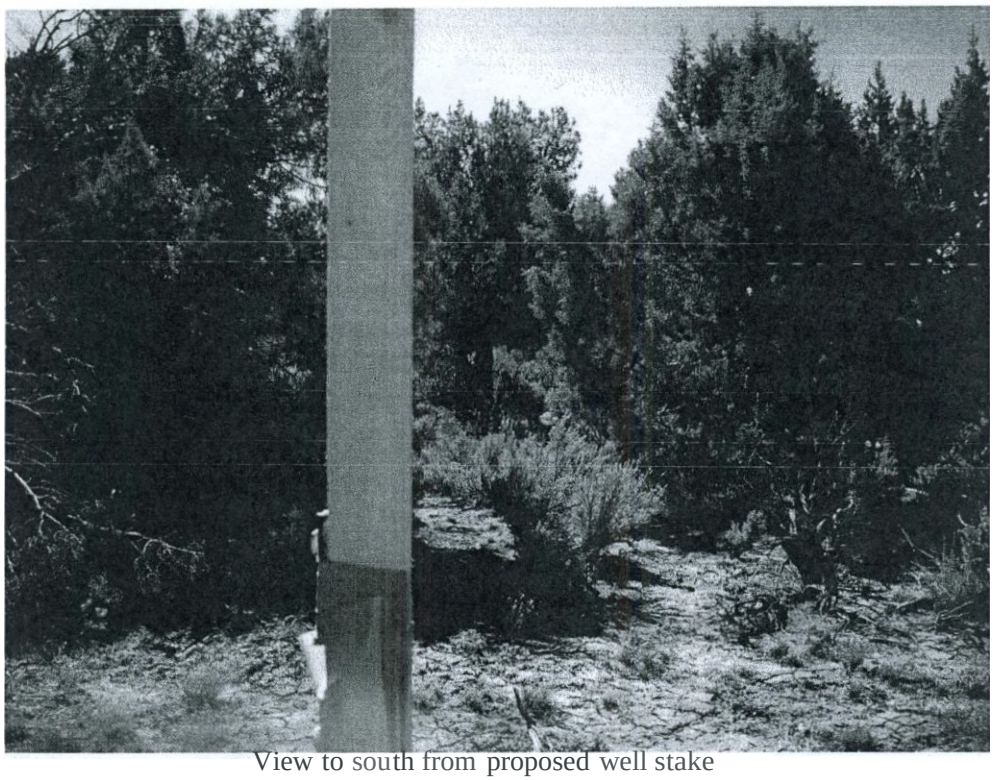
Farmington Field Manager

APPENDIXD

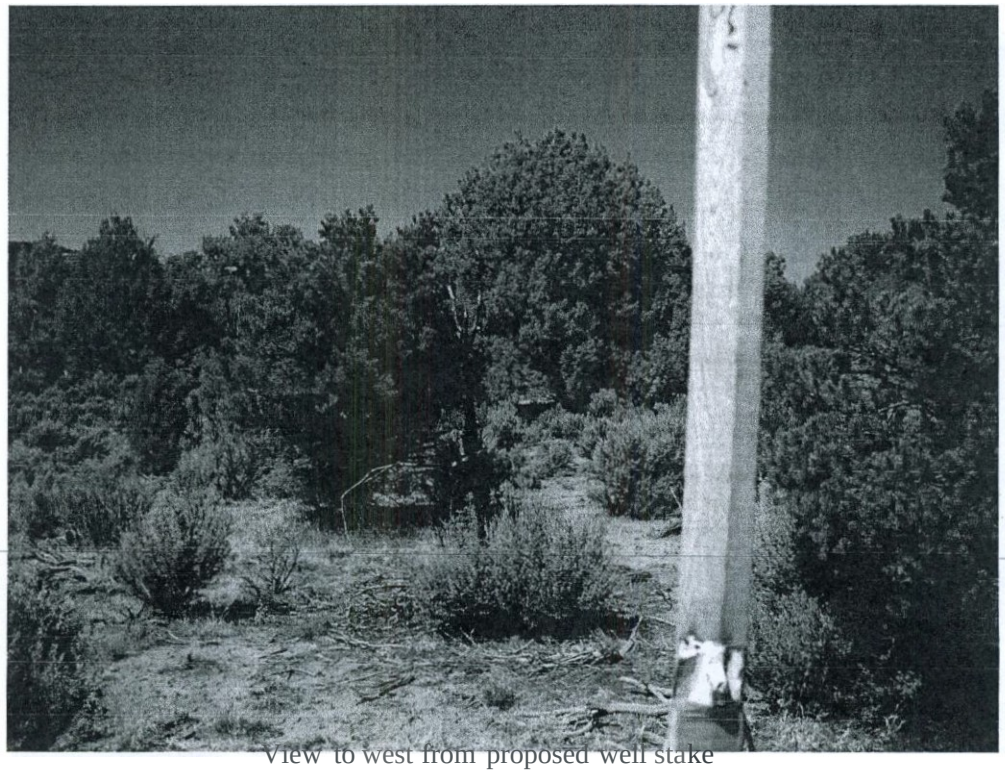
Photographs

View to north from proposed well stake

View to east from proposed well stake



View to south from proposed well stake



View to west from proposed well stake

View from road takeoff (intersection with existing access road), along proposed road/pipeline tie route