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Escrito A31-2409
&
Escrito H31-2409

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

A representative of Encana Oil & Gas (USA) Inc. has filed an Application for a Permit to Drill (APD) with the Bureau of Land Management, Farmington Field Office (BLM/FFO) for the proposed Escrito A31-2409 and Escrito H31-2409 mineral resources well projects. The proposed well locations would contain one horizontal exploratory (wildcat) well intended to target liquid (oil) reserves within the Mancos Shale Formation. The horizontal drilling technique utilized by Encana is relatively new to the San Juan Basin and utilizes a foam hydraulic fracturing method minimizing the excessive use of fresh water. The wells would develop federal minerals administered by the BLM/FFO in Section 31, Township 24 North, Range 9 West, New Mexico Principle Meridian. Construction of the access roads, well pads, and natural gas well-tie pipelines would take place on surface managed by the BLM in Section 31, Township 24 North, Range 9 West, in San Juan County, New Mexico.

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan Final Environmental Impact Statement (PRMP/FEIS). This project EA addresses site-specific resources and/or impacts that are not specifically covered within the PRMP/FEIS, as required by the National Environmental Policy Act of 1969 (NEPA), as amended (Public Law 91-90, 42 U.S.C. 4321 et seq.).

1.2. Purpose and Need for Action

The purpose for the proposal is to provide the applicant with reasonable access to their mineral lease. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act to respond to the APD. It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs in accordance with BLM's multiple-use mandate under the Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC [United States Code] 2800 et seq.). The Mineral Leasing Act (MLA) of 1920, as amended (30 USC 181 et seq.), authorizes the BLM to issue oil and gas leases for the exploration of mineral resources and permit the development of those leases. The existing lease is a binding legal contract that allows development of the mineral by the holder. The need for the action is established by the BLM's authority under the Title V of the FLPMA, as amended (43 USC 1761-1771) and Section 28 of the MLA (43 USC 185).

1.3. Decision to be Made

Based on the information in this environmental assessment (EA), the BLM/FFO will decide whether to approve the APD, and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA) (Public Law [PL] 91-90, 42 USC 4321 et seq.), the FFO must determine if there are any significant environmental impacts associated with the proposed actions, warranting further analysis in an Environmental Impact Statement (EIS). The BLM/FFO Field Manager is the responsible officer who will decide either:

- To approve the APD with design features as submitted;
- To approve the APD with additional mitigations;
- To analyze the effects of the proposal in an EIS; or
- To deny the APD.

An approved APD, issued by the BLM, authorizes the applicant to construct the well pads, subsurface pipelines, and access roads to develop their lease.

1.4. Conformance with Applicable Land Use Plan(s)

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan/Final Environmental Impact Statement [(PRMP/FEIS) BLM 2003a]. This EA is in conformance with the management goals set forth in the Resource Management Plan (RMP) for the Farmington Field Office (FFO) of the BLM, which was approved by the Record of Decision (ROD) signed September 29, 2003, and updated in December 2003 (BLM 2003b). Specifically, this action is in conformance with the following objective: It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands (2003b, 2-2). The PRMP/FEIS, RMP, and ROD are available for review at the BLM Farmington Field Office, 6251 College Blvd., Ste. A, Farmington, NM, or electronically at:

http://www.nm.blm.gov/ffo/ffo_home.html

This EA addresses the resources and impacts on a site-specific basis as required by the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, 42 USC 4321 et seq.). The proposed project would not be in conflict with any local, county, or state plans.

1.5. Relationship to Statutes, Regulations or Other Plans

1.5.1. Clean Water Act of 1977

Recognizing the potential for the continued or accelerated degradation of the Nation's waters, the U.S. Congress enacted the Clean Water Act, formerly known as the Federal Water Pollution Control Act (33 U.S.C. 1344). The objective of the Act is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States.

Under Section 402 of the Act (as amended), the U.S. Environmental Protection Agency (EPA), was directed to develop a phased approach to regulate storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. Industrial activities disturbing land may require permit coverage through a NPDES storm water discharge. Depending on the acreage disturbed, either a Phase I industrial activity (five or more acres disturbance) or a Phase II small construction activities (between one and five acres disturbance) permit may be required. Section 402(l)(2) of the CWA exempts entities that carry out certain oil and gas activities from obtaining storm water permits, including site preparation and associated activities (i.e., construction of access roads, drilling sites, waste management pits, pipelines, etc.). This rule exempts the oil and gas industry, including associated construction activities, from Federal NPDES storm water permits, except in very limited instances. Facilities that have a discharge of a reportable quantity release or that contribute pollutants (other than non-contaminated sediment) to a violation of a water quality standard are required to obtain and maintain NPDES permit coverage for storm water for the entire operating life of the facility.

Section 404 of the Act authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into the waters of the United States, including wetlands. It would be the proponent's responsibility to obtain all necessary permits prior to project implementation.

1.5.2. Endangered Species Act of 1973

The Endangered Species Act (ESA) of 1973 requires all federal departments and agencies to conserve threatened, endangered, and critical and sensitive species and the habitats on which they depend, and to

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

1.5.3. Cultural Resources

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

Native American Religious Concerns: For the Proposed Action, identification efforts were limited to reviewing existing published and unpublished literature (e.g. Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), the site-specific Class III survey report prepared for the Proposed Action, and a review by the BLM's cultural resources program regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts. There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) or the Archaeological Resources Protection Act (ARPA; 16 USC 470) within the Proposed Action area. The Proposed Action would not impact any known Traditional Cultural Properties, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with or hinder the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act of 1978 (42 USC 1996) or Executive Order (EO) 13007.

1.5.4. Paleontological Resources

Fossils found on BLM-managed lands are considered part of our national heritage and afforded protection. The BLM manages fossil resources for their scientific, educational, and recreational values. On public lands paleontological resources are managed under authorities and policy's that govern the management and preservation of the resource. Paleontological resources are managed under numerous authorities including the BLM Field Office 2003 Resource Management Plan (2003b:4-117), Paleontological Resources Preservation Act of 2009 (Sections 6301-6312 of the Omnibus Public Lands Act of 2009, 16 USC 470aaa), Federal Land Policy and Management Act of 1976 (P.L. 94-579), National Environmental Policy Act of 1969 (P.O. 91-190), Potential Fossil Yield Classification System for Paleontological Resources on Public Lands (IM 2008-009), and the Assessment and Mitigation of Potential Impacts to Paleontological Resources (IM 2009-011). The authorities provide for civil and criminal penalties and also require that public lands be managed to preserve and protect the quality of scientific values of paleontological resources.

The BLM's Potential Fossil Yield Classification (PFYC, BLM 2008-009) 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. It is intended to be utilized at an intermediate point in analyses, and should be used to assist in determining the need for further mitigation assessment or actions (IM 2008-011). The PFYC is based on the fact that occurrences of paleontological resources are often closely tied to the geologic units that contain them. This classification does not reflect rare or isolated occurrences of significant fossils or individual localities, only the relative occurrence on a formation- or member-wide basis. Although, it is recognized that local differences have to be taken into account. Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts.

The BLM FFO recognized eight Paleontological Special Designated Areas (SDA) in the current Resource Management Plan (more than 135,000 acres) in order to preserve important paleontological resources for scientific study, protection, and other public benefits (BLM 2003b:4-117). The BLM has determined that these areas require special management attention in order to protect, and prevent irreparable damage to important paleontological resources. The proposed project is not located within an FFO-designated paleontological SDA.

1.5.5. Wastes, Hazardous or Solid

The Resource Conservation and Recovery Act (RCRA) passed in 1976, establishes a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The U.S. Environmental Protection Agency (EPA) regulations define solid wastes as any “discarded materials” subject to a number of exclusions. A “hazardous waste” is a solid waste that is (1) is listed by the EPA as a hazardous waste, (2) exhibits any of the characteristics of hazardous wastes (ignitability, corrosivity, reactivity, or toxicity) or (3) is a mixture of solid and hazardous waste.

A 1980, amendment to RCRA conditionally exempted from regulation as hazardous wastes, “drilling fluids, production waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas. On July 6, 1988, EPA determined that oil and gas exploration, development and production (ED&P) wastes would not be regulated as hazardous wastes under RCRA. A simple rule of thumb was developed for determining if an ED&P waste is likely to be considered exempt or non-exempt from RCRA regulations: If (1) the waste came from down-hole, or (2) the waste was generated by contact with the oil and gas production stream during removal of produced water or other contaminants, the waste is most likely to be considered exempt by EPA.

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

Typical wastes associated with the proposed project would include trash, sewage, produced water, and produced hydrocarbons. During drilling and completion, a trash receptacle and a chemically treated portable toilet would be on location for trash and sewer disposal. All produced hydrocarbons would be put in tanks on location during completion work. Produced water would be put in onsite tanks or within lined reserve pits during completion work. All wastes would be disposed of in a proper manner as required by federal and state law, and as described in the COAs. No hazardous or solid waste materials are present within the proposed project area. The notification of releases such as natural gas, natural gas liquids, and petroleum, outside a facility site is required under CERCLA and under BLM NTL-3A.

1.5.6. Public Health and Safety

All worker safety is governed by Occupational Safety and Health Administration (OSHA) safety laws and regulations. Worker safety incidents must also be reported to the BLM under the procedures of Notice to Lessee (NTL)-3A. Pipeline safety regulations are administered by OSHA as well as Department of Transportation (DOT) regulations. Pipeline safety regulations (49 CFR Parts 190 and 192) govern design, construction and operation of gas transmission lines. Any incidents involving DOT-regulated pipelines must be reported under these regulations (District 2003a).

Most substances and wastes generated at oil and gas facilities are exempt from regulation under the Resource Conservation and Recovery Act (1976). The Environmental Protection Agency (EPA) and DOT regulate materials associated with well construction and production activities that are classified as hazardous. When significant amounts of chemicals are stored on-site, governmental agencies will be notified as required under the Emergency Planning and Community Right to Know Act (1986). The

notification of releases such as natural gas, natural gas liquids, and petroleum, outside the facility site is required under the Comprehensive Environmental Response Compensation and Liability Act, 1980 (CERCLA) and under BLM NTL-3A. The well locations must have an informational sign, as directed under 43 CFR 3160.

Additional hazards to the general public in the proposed action area include safety hazards associated with increased traffic during the construction of the proposed well pads, access roads, and natural gas well-tie pipelines. General hazards around producing oil and gas fields such as accidental pipeline failures and moving equipment like pump jacks are potential/present in the action area. Hydrogen sulfide gas is not known to be or expected to be a problem within the project area.

1.6. Scoping, Public Involvement, and Issues

The Farmington Field Office (FFO) publishes a NEPA log for public inspection. This log contains a list of proposed and approved actions in the field office. The log is located on the BLM New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html). No public comments were received for this proposed action.

The project was circulated among FFO resource specialists. Internal scoping through a BLM Interdisciplinary Team (IDT) generated resource issues pertinent to the proposed project.

Potential issues include:

- What would be the effect of the alternatives on air resources/air quality?
- What would be the effect of the alternatives on cultural resources within the analysis area?
- How would the alternatives affect soils in the analysis area?
- What would be the effect of the alternatives on water resources within the analysis area?
- How would the alternatives affect the natural vegetation/plant communities in the analysis area?
- What would be the effect of the alternatives on FFO-managed livestock grazing allotments?
- What would be the effect of the alternatives on migratory bird nesting and/or foraging habitat?
- What would be the effect of the alternatives on FFO-designated SMS species?

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

Encana proposes to construct two well locations and associated access roads in order to horizontally drill and develop mineral resources in the Mancos Shale Formation. The proposed project area can be accessed by traveling south on U.S. Highway 550 from Bloomfield for approximately 28 miles to State Route 57 on the right. The proposed project area would be accessed by traveling existing roads on private surface in Sections 12 and 13, Township 24 North, Range 10 West, and Sections 21 and 29, Township 24 North, Range 9 West. The proposed project is located on surface managed by the BLM in Section 31, Township 24 North, Range 9 West, New Mexico Principle Meridian, in San Juan County. The proposed wells would develop federal minerals administered by the BLM/FFO in Section 31, Township 24 North, Range 9 West. New surface disturbance from the proposed project would be approximately 8.21 acres on surface managed by the BLM.

The proposed well pads would be 300 feet by 300 feet with an additional 50-foot construction buffer zone around the perimeter of the pad. The Escrito A31-2409 well pad would require between 12 and 13 feet of cut on the north side of the location, and between 4 and 14 feet of fill on the south side of the location. The Escrito H31-2409 well pad would require between 2 and 5 feet of cut on the north side of the location, and between 2 and 8 feet of fill on the south side of the location. The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Cut and fill slopes would be returned to the original contour upon reclamation. New surface disturbance from the proposed well locations would be approximately 7.36 acres.

A new access road approximately 15 feet in length with an average clearing width of 30 feet would be developed to provide access to the proposed Escrito A31-2409 well pad. A new access road approximately 715 feet in length with an average clearing width of 30 feet would be developed to provide access to the proposed Escrito H31-2409 well pad. New surface disturbance from the construction of proposed access roadway would be approximately 0.5 acres.

Once the proposed Escrito A31-2409 well is completed, an associated 185-foot well-tie pipeline would be constructed to transport produced natural gas to the existing Dugan Production April Surprise No. 7 pipeline. The proposed pipeline would be constructed on proposed well pad surface and parallel to the proposed access road, resulting in approximately 0.01 acres of new surface disturbance. Once the proposed Escrito H31-2409 well is completed, an associated 858-foot well-tie pipeline would be constructed to transport produced natural gas to the existing Dugan Production April Surprise No. 7 pipeline. The proposed pipeline would be constructed on proposed well pad surface and parallel to the proposed access road, resulting in approximately 0.49 acres of new surface disturbance. The proposed well-tie pipelines would be constructed within granted 40-foot ROW's.

Construction of the well-tie pipelines would consist of digging a trench with excavation equipment such as a wheel-ditcher or backhoe, laying pipe, and back filling the trench. The well-ties would be up to a 6-inch outside diameter buried steel pipeline with a maximum allowable operating pressure (MAOP) of 500 pounds per square inch gauge (psig).

The trenchline, or ditch, will be excavated and sloped in accordance with Occupational Safety and Health Administration (OSHA) specifications. The cover from top of pipe to ground level will be a minimum of 36 inches through typical soil and rock, and a minimum depth of 48 inches at road crossings. Where rock is encountered, tractor-mounted mechanical rippers or rock trenching equipment may be used to facilitate excavation. Excavated material will be stockpiled at the edge of the workspace and would not impede traffic on existing roads. Based on field conditions, gaps will be made in subsoil stockpiles to allow for wildlife crossing and to avoid ponding or excessive diversion of natural runoff during storm events. Wildlife escape ramps will be constructed every 300 feet of open ditch. The ramps will be cut down and through the ditch resulting in a slope exiting either side of the ditch no steeper than a 5:1 ratio. The ramps will be a minimum of 10 to 12 feet wide.

The trenching operation will be followed by pipe installation, which will include stringing, bending for horizontal or vertical angles in the alignment, welding pipe segments together, inspection, coating joint areas to prevent corrosion, and lowering-into the trench. Inspection will be conducted to verify that minimum cover is provided; the trench bottom is free of rocks, debris, etc.; external pipe coating is not damaged; and the pipe is properly fitted and installed into the ditch. Fine soil will then be sifted from the excavated subsoil to provide rock-free pipeline padding and bedding. In rocky areas, padding material or a rock shield will be used to protect the pipe. Backfilling will begin after a section of the pipe has been successfully placed in the ditch and final inspection has been completed.

Production equipment used during the life of the wells may include a 3-phase separator - dehydrator, a meter run, 400-barrel tanks and/or smaller fiberglass or galvanized tanks for water disposal, and 400-barrel tanks for storage of produced oil. It is also likely that a compressor would be placed on location during the life of the wells. The use of compressors provides an increase in the economic life of a well, increases the ultimate recovery of gas from low-pressure reservoirs, and prevents waste of the resources.

Farmington Field Office established environmental Best Management Practices (BMP's) will be followed during construction and reclamation of the well site pads, pipeline ties, access roads, facility placement, or any other surface disturbing activity associated with this project. Bureau-wide standard BMP's are found in the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, Fourth Edition-Revised 2007 (The Gold Book). Farmington Field Office BMP's are integrated into the general and site-specific stipulations.

For a detailed description of design features and construction practices associated with the proposed actions, refer to the APD (attached as Appendix A). Also see the subject APD for additional maps showing the proposed well locations and associated facilities described above. Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) are also listed in Appendix A and incorporated and analyzed in this alternative.

Tables 1 - 2. Proposed Well Information

Property Name	Well Number	Township	Range	Section	Footages	Dedicated Acres	Lease No.
Escrito A31-2409	01H	24N	9W	31	Surface: 959' FNL, 300' FEL Bottom Hole: 959' FNL, 330' FWL	160.0 Ac. N/2 N/2	NMNM 004958 NMNM 051000

Property Name	Well Number	Township	Range	Section	Footages	Dedicated Acres	Lease No.
Escrito H31-2409	01H	24N	9W	31	Surface: 1985' FNL, 341' FEL Bottom Hole: 1985' FNL, 330' FWL	160.0 Ac. S/2 N/2	NMNM 004958 NMNM 051000

Prior to the development of this document, onsite inspections of the proposed project area were conducted by representatives of Adkins Consulting, Adobe Contractors, BLM, Encana, La Plata Archaeological Consultants (LAC) and NCE Surveys. Design features that were agreed upon during onsite inspections and surveys include the following:

- All construction and/or maintenance resulting in surface disturbance would be done in accordance to the BLM Surface Operating Standards and Guidelines for Oil and Gas Development, Fourth Edition-Revised 2007 (The Gold Book). Construction design practices could include culverts, diversion ditches, berms, and other such soil erosion control structures. Additional hydrological BMP's would be installed where needed to maintain drainages along access roads and within the action area (see attached COA's and Exhibit A). Excavated materials from the cuts on the proposed well location would be used on the fill portions. Reclaimed slopes would be re-contoured to pre-construction topographical contours.
- If used, all pits would meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and requirements, NMAC 19.15.17.
- The dominant vegetation communities within the analysis area are piñon-juniper woodland, sagebrush, and badlands. Trees to be removed would be cut, de-limbed, and stacked within the project area for public firewood gathering. All other vegetation to be removed would be mowed, mulched, and incorporated into the topsoil. The BLM-designated standard seed mixture would be used for reclamation purposes. Re-vegetation will reduce or minimize impacts created by water and/or wind erosion to exposed surfaces. Approximately half of the well locations and the entire well-tie pipeline disturbances would be reclaimed. The remaining surface disturbance would remain disturbed for the life of the wells for production equipment and vehicle travel surfaces. Following final down-hole plugging and abandonment of the wells, the entire well pads and access roads would be reclaimed.
- The proposed project is located within the FFO-designated Tanner Lake Scenic Quality Rating Unit with a Scenic Quality Rating of B. All above ground structures would be painted to blend with the natural color of the landscape. Paint color would be Juniper Green.
- All FFO/BLM cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review, attached to the APD. These stipulations may include, but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment, and that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and or administrative penalties under the provisions of the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm). In the event of a discovery during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM. The BLM would then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., National Register, NAGPRA, ARPA), it will be protected in place until mitigating measures can be developed and implemented according to guidelines set by the BLM.
- Design features and BMPs are designed to minimize effects on migratory birds. These measures include netting of any permanently open pits and vent caps on all open pipes to prevent bird entry and nesting. All construction activities would be confined to permitted areas only. If construction is scheduled to begin within the typical migratory bird breeding season of May 15 to July 31, an FFO-approved bird nest survey must be conducted within the proposed action area. Rapid and permanent vegetation and cover reestablishment would minimize impacts to migratory birds. All hazards associated with construction and operation of the proposed action would be fenced or contained in storage tanks.
- Water acquired to construct, produce and maintain actions authorized by a permit to drill must be acquired from permitted water sources, or water authorized for use by the New Mexico Oil Conservation Division (OCD). Upon request, the Authorizing Officer (AO) shall be provided with documentation of water source(s). Encana has secured water at the Blanco Trading Post water hole (WR-711).

- Grazing permittees must be notified when construction is scheduled to begin. All hazards to livestock would be fenced or contained. All project activities would be confined to permitted areas only. All areas not needed for production equipment or vehicle travel surfaces would be seeded upon reclamation. No livestock improvements will be affected by the proposed project.
- The operator proposes to set surface casing to a depth of approximately 500 feet to stabilize the wellbore and provide protection to any overlying freshwater aquifers by isolating hydrocarbon zones. An operation plan with the proposed casing program to protect these resources would be submitted with the APD.
- All BLM/FFO paleontological resource stipulations will be followed as indicated in the COAs, attached to the APD. These stipulations may include, but are not limited to altering the location or scope of the project or permanent fencing or other physical, temporary barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and fossil recovery. If the assessment of proposed action indicates a reasonable expectation of adverse impacts to significant paleontological resources, a field survey will be necessary to properly document and recover any fossil material and associated data. Upon review, a determination for final project clearance and stipulations shall be issued by the BLM/FFO.

2.2. No Action

The BLM NEPA Handbook (H-1790-1) states that for Environmental Assessments (EAs) on externally initiated proposed actions, the No Action Alternative generally means that the proposed activity will not take place. This option is provided in 43 CFR 3162.3-1 (h) (2). This alternative would deny the approval of the proposed applications, and the current land and resource uses would continue to occur in the proposed project area. No mitigation measures would be required.

2.3. Alternatives Considered but Eliminated from Detailed Study

No alternatives have been developed that would result in significantly fewer impacts or any clear advantages over the proposed action. The proposed action was selected for the best drainage of subsurface resources while protecting surface resources to the maximum extent possible.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environment that would be affected by implementation of the alternatives described in Chapter 2. Aspects of the affected environment described in this chapter focus on the relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. These items are included above in Section 1.6.

Under the No Action Alternative, the proposed actions would not be approved and carried forward. There would be no new impacts from oil and gas exploration or production to the resources in the analysis area. The No Action Alternative would result in the continuation of the current land and resource uses in the analysis area and is used as the baseline for comparison of alternatives.

3.1. Air Resources

3.1.1. Affected Environment

The proposed wells are located in San Juan County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington PRMP/FEIS. In addition, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this document was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO_2) methane (CH_4); nitrous oxide (N_2O); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Quality Technical Report; USDI/BLM 2011b). This document summarizes the technical information related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM10 & PM2.5), sulfur dioxide (SO_2) and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved New Mexico's State Implementation Plan and the state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands and within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. EPA has proposed or completed actions recently to implement Clean Air Act requirements for greenhouse gas emissions. Climate has the potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

The Air Quality Technical Report describes the types of data used for description of the existing conditions of criteria pollutants, how the criteria pollutants are related to the activities involved in oil and

gas development, and provides a table of current national and state standards (USDI/BLM 2011b). The EPA Green Book web page reports that all counties in the analysis area, San Juan, McKinley, Rio Arriba, and Sandoval Counties in New Mexico and La Plata County, Colorado, are in attainment of all National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act. The area also does not violate any New Mexico Ambient Air Quality Standards (NMAAQS). The current criteria pollutant "design concentrations" in the analysis area are described below. Design Concentrations are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. Table 3 shows monitored design values for ozone in recent years for each of the three San Juan County ozone monitoring stations.

Table 3. Reported Ozone Values for San Juan County Ozone Monitoring Stations

State Air Monitoring Station	8-hour Ozone Design Value (ppm[(1)])			NAAQS
	2007-2009	2008-2010	2009-2011	2008
Substation	0.067	0.063	0.063	0.075
Bloomfield	0.061	0.060	0.061	0.075
Navajo Lake	0.069	0.066	0.068	0.075

Source: NMED 2012
(1) parts per million

Table 4 summarizes monitored design values for other criteria pollutants in San Juan County.

Table 4. Criteria Pollutant Design Value Concentrations monitored in San Juan County (EPA, 2012)

Pollutant	Design Value	Averaging Time	NAAQS	NMAAQS
NO_2	13 ppb	Annual	53 ppb	50 ppb
NO_2	39 ppb	1-hour	100 ppb[1]	0.10 ppm (24-hour)
PM_{10}	Data incomplete	24-hour	150 µg/m[3,4]	150 µg/m[3,4]
$PM_{2.5}$	4.5µg/m^3	Annual	12 µg/m[3,5]	60 µg/m[3,4]
$PM_{2.5}$	14µg/m^3	24-hour	35 µg/m[1,3]	
SO_2	0.001ppm	Annual	None	0.02 ppm
SO_2	20ppb	1-hour	75 ppb[6]	None
SO_2	0.008 ppm	24-hour	None	0.10ppm

(1) 98th percentile, averaged over 3 years
(2) Not to be exceeded more than once per year
(3) Not to be exceeded more than once per year on average over 3 years
(4) The NMAAQS is a standard for total suspended particulate matter
(5) Annual mean, averaged over 3 years
(6) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

In 2005, the EPA estimated that there was less than 0.01 ton per square mile of lead emitted in the analysis area, which is less than 2 tons total (USDI/BLM 2011b). There is no monitoring conducted for lead and CO in northwestern New Mexico; however, concentrations of these pollutants are expected to be low in rural areas and are therefore not monitored.

Hazardous Air Pollutants

The Air Quality Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (USDI/BLM 2011b). EPA has identified 187 toxic air pollutants as HAPs. In March 2011, the EPA published the fourth in a series of National Scale Air Toxics Assessments (NATA) that quantifies HAP emissions for 2005 by U.S. counties. The purpose of the NATA is to identify areas where HAP emissions result in high health risk. Computer models are used to develop estimates of risk of cancer or other health impacts. NATA presents risk hazard indexes for cancer, neurological, and respiratory problems for each county and census tract. Because techniques have changed over the years, each NATA is not comparable to those previously issued. EPA also cautions that because data availability varies from state to state, the results are not necessarily comparable from one geographic area to another. The 2005 NATA analysis estimated tract level total cancer risk for the analysis area as 25 to 50 per one million, and the estimated tract level

total respiratory hazard index was zero to 1. The EPA estimates the average national cancer risk for 2005 was 50 per one million, meaning 1 person out of every 20,000 had an increased likelihood of contracting cancer from breathing air toxics from outdoor sources if exposed to 2005 emission levels over their lifetime. A respiratory hazard index below 1 indicates that exposures in the area do not exceed reference levels that would have adverse effects for human health.

Climate

The analysis area is located in a semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F), and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100°F in June and July and have dipped below zero in December and January. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico. Table 5 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 5. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (^{O}F)	Average Maximum Temperature (^{O}F)	Average Minimum Temperature (^{O}F)	Average Precipitation (inches)
January	30.5	40.8	20.3	0.53
February	35.8	46.8	24.8	0.59
March	43.2	56.1	30.3	0.78
April	50.4	64.7	36.2	0.65
May	60.4	74.8	46.1	0.54
June	69.8	85.1	54.5	0.21
July	75.4	89.6	61.2	0.90
August	73.2	86.5	59.8	1.26
September	65.4	79.1	51.7	1.04
October	53.3	66.4	40.1	0.91
November	40.5	52.2	28.8	0.68
December	31.0	41.2	20.7	0.50
Source: USDI/BLM 2011b; data collected at New Mexico State Agricultural Science Center - Farmington				

3.1.2. Impacts from the Proposed Action

Methodology and assumptions for calculating air pollutant and greenhouse gas emissions are described in the Air Resources Technical Report (USDI/BLM 2011b). This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one horizontal oil well. The calculators give an approximation of criteria pollutant, HAP, and greenhouse gas (GHG) emissions to be compared to regional and national emissions levels (USDI/BLM 2011b). Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (USDI/BLM 2011b).

Direct and Indirect Impacts

Criteria Pollutants

Table 6 shows estimated emissions from one proposed horizontal oil well for criteria pollutants, volatile organic compounds (VOC) and greenhouse gas (GHG). For comparison, Table 7 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on USEPA's 2008 emissions inventory (USEPA 2011).

Table 6. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well; Average 25 Days to Drill and Complete

Activity	NOx	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH_4	CO_2
One Time Operations (tons)								
Construction	5.5	1.5	0.5	2.5	0.25	0.1	0.007	598.85
Completion	0.5	0.1	0.03	0.025	0.025	-	-	55.00
Interim Reclamation	0.006	0.006	0.006	0.001	-	0.003	-	1.24
Final Reclamation	0.006	0.006	0.006	0.001	-	0.004	-	1.66
Ancillary Operations (tons)								
Workover	0.129	0.04	0.01	0.01	0.01	-	-	10.59
Road Maintenance	-	-	-	-	-	-	-	0.26
Road Traffic	-	-	-	-	-	-	-	0.06
Annual Operations (tons/year)								
Oil Haul Truck and small truck (100 bbl/day)	0.009	0.006	0.0012	0.0009	0.0008	-	0.0001	3.88
Total	**6.13**	**1.64**	**0.55**	**2.54**	**0.29**	**0.11**	**0.01**	**671.54**

Oil storage tanks on the well location may result in venting of VOC. Oil well production is generally presented as barrels per day produced. The emissions calculator estimated that for every barrel per day produced there may be 0.12 tons of VOC vented per year.

The average horizontal oil well in the planning area produces approximately 100 barrels per day. One hundred barrels per day is estimated to result in 12 tons of VOC emissions per year. Oil storage tanks would be subject to current EPA regulations regarding the capture or flaring of VOC emissions.

Table 7. Analysis Area Emissions in Tons/Year, 2008

County	NO_X	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2
McKinley	12,595.0	31,885.2	37,509.0	66,590.7	6,977.5	1,659.8
Rio Arriba	4,276.6	27,352.9	45,841.5	46,321.6	4,746.2	89.1
San Juan	35,651.7	54,549.5	46,994.9	69,655.7	8,108.3	11,471.0
Sandoval	4,780.1	33,290.5	31,733.6	36,232.3	4,056.3	123.4
Total	57,303.4	147,078.1	160,079	218,800.3	23,897.3	13,343.3
Source: EPA 2008 National Emissions Inventory (http://www.epa.gov/ttn/chief/net/2008inventory.html)						

Table 8 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one horizontal oil well.

Table 8. Percent Increase in Analysis Area Emissions from the Proposed Action

	NO_X	CO	VOC	PM_{10} (1)	$PM_{2.5}$ (1)	SO_2 (1)
Total Emissions tons/year	57,303.4	147,078.1	160,079.0	218,800.3	23,897.3	13,343.3
Horizontal Oil Well Emissions tons/year	6.13	1.64	12.55 (2)	2.54	0.29	0.11
Percent Increase	**0.011**	**0.0011**	**0.0078**	**0.0012**	**0.0012**	**0.00082**

(1) Values derived from average emissions for any well drilling in the analysis area. Calculated results available upon request.
(2) Current EPA regulations require operators to reduce VOC emissions by 95% if their oil storage tanks emit over 6 tons of VOC emissions per year.

Hazardous Air Pollutants

The formulas used for calculating HAPs in the calculators are very imprecise. For many processes it is assumed that emission of HAPs will be equivalent to 10 percent of VOC emissions. Therefore, the estimated HAP emissions of 1.25 tons/year should be considered a very gross estimate. Most of the VOC emissions estimated for one horizontal oil well result from venting from oil storage tanks. Current EPA regulations require operators to reduce VOC emissions by 95% if their oil storage tanks emit over 6 tons of VOC emissions per year. A reduction of 95% of oil storage tank VOC emissions would reduce the estimated HAP emissions to 0.12 tons/year.

Total Greenhouse Gases

The available statewide GHG summary (NMED 2010) combines GHG emissions from CO_2 and CH_4. To compare the GHG emissions from the Proposed Action estimated by the calculator with statewide GHG emissions, CO_2e emissions for both CH_4 and CO_2 were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO_2e (76.2 million metric tons; NMED 2010). The estimated CO_2e metric tons emissions from one horizontal oil well (609.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO_2 emissions.

Cumulative Impacts

The FFO manages Federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley counties. There are approximately 23,522 wells in the San Juan Basin. About 16,435 of the wells in these counties are Federal wells. Analysis of cumulative impacts for reasonable development scenarios and RFDS of oil and gas wells on public lands in the FFO was presented in the 2003 RMP. This included modeling of impacts on air quality. A more detailed discussion of Cumulative Effects can be found in the Air Resources Technical Report (USDI/BLM 2011b).

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (USDI/BLM 2011b). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

The emissions calculator estimated that there could be very small direct and indirect increases in several criteria pollutants, HAPs, and GHGs as a result of implementing the proposed alternative. The very small increase in emissions that could result would not be expected to result in exceeding the NAAQS for any criteria pollutants in the analysis area.

The very small increase in GHG emissions that could result from implementing the proposed alternative would not produce climate change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the action alternatives cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the action alternatives on global or regional climate.

The Air Resources Technical Report (USDI/BLM 2011b) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.2. Cultural Resources

3.2.1. Affected Environment

The proposed project is located within the archaeologically rich San Juan Basin of northwest New Mexico. In general, the history of the San Juan Basin can be divided into five major periods: PaleoIndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 B.C. to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (aka Anasazi; A.D. 1-1540), and the historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed descriptions of these various periods are provided in the Bureau of Land Management Farmington Field Office Final Environmental Impact Statement (2003) and will not be reiterated here. Additional information can also be found in an associated documented, Cultural Resources Technical Report (CRTR; SAIC 2002).

Cultural sites vary considerably, and can include but are not limited to simple artifact scatters, domiciles of various types with a myriad of associated features, rock art and inscriptions, ceremonial/religious features, and roads and trails. Traditional Cultural Properties (TCP's; Parker and King 1998) are a separate class of cultural resources and 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, and may or may not coincide with archaeological sites.

The entire Area of Potential Effect (APE) for the Proposed Action was archaeologically surveyed by La Plata Archaeological Consultants (LAC) at a BLM Class III level (100%) and a report was prepared and submitted to the BLM in accordance with the Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities (BLM 2005).

The Class III inventory identified no cultural sites within the APE (LAC Reports 2012-1k and 2012-1L: BLM 2012(III)007F and 2012(III)009F). No TCP's are known to exist in the APE.

3.2.2. Impacts from the Proposed Action

Direct and Indirect Impacts

There are no cultural sites within the APE. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The Proposed Action will have no direct or indirect impacts on cultural sites.

Cumulative Impacts

There will be no negative cumulative impact on cultural resources as no cultural sites are present. A positive cumulative effect is the additional scientific information yielded by the archaeological survey.

3.3. Soils

3.3.1. Affected Environment

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 abandoned 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.

According to the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) Web Soil Survey, soils in the analysis area are comprised of Blancot-Notal association and the Fruitland-Persayo-Sheppard complex.

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

The Fruitland-Persayo-Sheppard complex is composed of approximately 40 percent Fruitland and similar soils, 30 percent Persayo and similar soils, and 25 percent Sheppard and similar soils. The Fruitland series consists of very deep, well drained and somewhat excessively drained soils that formed in eolian material and moderately coarse textured alluvium and stream alluvium derived from sandstone and shale. Fruitland soils are on stream terraces on valley floors, alluvial fans on valley sides, and summits of mesas. The Persayo series consists of shallow and very shallow, well drained soils on hills, terraces, and ridges. These soils formed in thin sediments weathered from underlying soft sedimentary bedrock. The Sheppard series consists of very deep, somewhat excessively drained soils that formed in eolian material derived from sandstone. Sheppard soils are on structural benches, alluvial fans, dunes on structural benches, and terraces.

Table 9. Characteristics of the Blancot-Notal association present within the analysis area

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

Table 10. Characteristics of the Fruitland-Persayo-Sheppard complex present within the analysis area

Characteristic	Fruitland	Persayo	Sheppard
Surface Layer	Brown sandy loam	Light yellowish brown silty clay loam	Reddish yellow fine sand
Slope	0-30%	1-50%	0-60%
Depth	More than 80"	5-20"	More than 80"
Surface Runoff	Very low to medium	Medium to high	Negligible to low
Typical Use	Irrigated cropland and livestock grazing	Native pastureland	Livestock grazing
Moisture Regime	Typic aridic	Aridic	Typic aridic
Drainage Class	Well drained	Well drained	Somewhat excessive
Available Water Capacity	Moderate	Very low	Low
Permeability	Moderate	Moderate	Rapid
Parent Material	Fan alluvium derived from sandstone and shale	Residuum weathered from shale	Eolian deposits over mixed alluvium

3.3.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Due to the nature of drilling for oil and gas there would be soil disturbance within the action area. The proposed project would affect approximately 8.2 acres of soils that have been classified as having variable surface runoff and are well drained. Compaction of the soils during construction of the proposed action, coupled with the implementation of conditions of approval, would limit soil impacts from erosion. All areas to be disturbed would be bladed as needed to create flat surfaces for operating equipment and vehicles. Depth of soil disturbance would increase with rougher topography. Available topsoil would be stockpiled for reclamation. The cut and fill slopes on the proposed action would be especially susceptible to wind and water erosion until vegetation has been reestablished (one to two growing seasons). The potential impacts would be dependent, in part, on seasonal variation in rainfall and snowmelt run-off, terrain, soil type, prevailing winds, and vegetative cover. The heaviest amounts of erosion will be short-term (one to two growing seasons) until the vegetation has established. Effects to soils would likely be low to moderate for the proposed action.

Cumulative Impacts

The PRMP/FEIS determined that “cumulative impacts on soils in the San Juan Basin would comprise the total amount of short term and long term surface disturbance due to all new oil and gas development and other activities” (USDI/BLM 2003a, page 4-123). The PRMP/FEIS projected that 264 acres of initial surface disturbance would occur in the Chaco watershed (USDI/BLM 2003a, page 4-7). The proposed action would cumulatively contribute approximately 8.2 acres of short-term disturbance to soils in the watershed, of which approximately 6.2 acres would be reclaimed.

3.4. Water Resources

3.4.1. Affected Environment

The San Juan Basin consists of broad mesas interspersed with many deep canyons with steep canyon walls, dry washes, entrenched narrow valleys, and alluvial fans and floodplains. The planning area is divided into watersheds based on the Hydrologic Units (4th level) delineated by the United States Geological Survey (USGS). Principally, the administrative area under the jurisdiction of the Farmington Field Office consists of five of these 4th level hydrologic watershed units. These watershed units are: (1) Middle San Juan, (2) Animas, (3) Upper San Juan, (4) Blanco Canyon, and (5) Chaco. The proposed project is located within the Chaco watershed.

There are no perennial surface water resources within the analysis area. There are no perennial water resources within the immediate vicinity of the proposed project area. The action area is located above an unnamed ephemeral drainage which flows south into Kimbeto Wash, approximately 6.4 miles from the action area.

Under the Clean Water Act, the US Army Corps of Engineers (USACE) has jurisdiction over “waters of the U.S.” These jurisdictional waters include those that have a “significant nexus” to traditional navigable waters. The BLM/FFO and USACE Durango Regulatory Division have determined that jurisdictional waters may include USGS watercourses (i.e., “blue line” on USGS 1:24,000 topographic maps). The proposed actions would not cross a USGS watercourse.

3.4.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would comply with water quality, quantity, and ground water protection standards under the Clean Water Act of 1977 and the Safe Drinking Water Act of 1974, as amended. The proposed

action would disturb approximately 8.2 acres; currently, a Storm Water Pollution Prevention Plan for the Environmental Protection Agency (EPA) under the Clean Water Act would not be required.

The Operator would be required to comply with any future changes to the National Pollutant Discharge Elimination System permitting process for storm water discharge from construction activities enacted by the EPA prior to the completion of project construction and site stabilization.

Effects to ground water resources would be low due to mitigation measures such as casing, and any pits would be lined to meet NMOCD requirements. Below casing depth, losses of produced water or mud may occur to differing degrees in various formations, but the losses are considered to be low and contained to within a few feet of the well bore. These losses are not considered to be substantial because of the very small amount of groundwater that could be affected (BLM 2003a, p. 4-14).

Cumulative Impacts

Cumulative impacts to surface waters would be related to short-term sedimentation or flow changes. Surface-disturbing activities other than the proposed action that may cause accelerated erosion include, but are not limited to, construction of roads, other facilities, and installation of trenches for utilities; road maintenance such as grading or ditch-cleaning; public recreational activities; vegetation manipulation and management activities; prescribed and natural fires; and livestock grazing. Because the proposed action would have a negligible impact to downstream surface water quality, the cumulative impact also would be negligible when added to other past, present, and reasonably foreseeable activities downstream.

3.5. Vegetation

3.5.1. Affected Environment

The analysis area is located within the United States Environmental Protection Agency (USEPA) designated Arizona/New Mexico Plateau Level III Ecoregion. The Arizona/New Mexico Plateau occurs primarily in Arizona, Colorado, and New Mexico, with a small portion in Nevada. This ecoregion is approximately 45,870,500 acres (185,632 km^2), and the elevation ranges from 2,165 to 11,949 feet (660 to 3,642 meters). The ecoregion's landscapes include low mountains, hills, mesas, foothills, irregular plains, alkaline basins, some sand dunes, and wetlands. This ecoregion is a large transitional region between the semiarid grasslands to the east, the drier shrublands and woodlands to the north, and the lower, hotter, less vegetated areas to the west and south. Vegetation communities include shrublands with big sagebrush, rabbitbrush, winterfat, shadscale saltbush, and greasewood; and grasslands of blue grama, western wheatgrass, green needlegrass, and needle-and-thread grass. Higher elevations may support piñon pine and juniper woodlands. The ecoregion includes the urban areas of Santa Fe and Albuquerque. Important land uses include irrigated farming, recreation, rangeland, wildlife habitat, and some natural gas production.

The analysis area contains sagebrush, piñon-juniper woodland, and badland vegetation communities. The proposed Escrito A31-2409 project area is located within a transitional area between sagebrush and piñon-juniper woodland. Dominant vegetation within the Escrito A31-2409 analysis area includes big sagebrush (*Seriphidium tridentatum*), piñon pine (*Pinus edulis*), Utah juniper (*Sabina osteosperma*), blue grama (*Bouteloua gracilis*), broom snakeweed (*Gutierrezia sarothrae*), and New Mexican prickly pear cactus (*Opuntia phaeacantha*). A minor component of galletagrass (*Hilaria jamesii*), narrowleaf yucca (*yucca angustissima*), and Indian paintbrush (*Castilleja* sp.) was also present. The proposed Escrito H31-2409 project area is located within a sparsely vegetated badland area. Dominant vegetation within the Escrito H31-2409 analysis area includes greasewood (*Sarcobatus vermiculatus*), big sagebrush, and broom snakeweed.

3.5.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Potential impacts on the vegetation communities present within the analysis area from the development of the proposed project would include direct impacts from habitat removal as well as a wide variety of indirect impacts. Impacts would be incurred during initial site preparation and would continue throughout the operational life of the project, typically extending over a period of several decades. Plant communities and habitats affected by direct or indirect impacts from project activities could incur short- or long-term changes in species composition, abundance, and distribution. Some impacts may also continue after the decommissioning of the project. Land areas available for project development support a wide variety of plant communities and habitats.

In some areas, restoration may potentially include species that are not locally native or plant communities different from local native communities. Although the replanting of disturbed soils may successfully establish vegetation in some locations (i.e., with a biomass and species richness similar to those of local native communities), the resulting plant community may be quite different from native communities in terms of species composition and representation of particular vegetation types, such as shrubs. The community composition of replanted areas would likely be greatly influenced by the species that are initially seeded, and colonization by species from nearby native communities may be slow. In addition, the planting of non-native species may result in the introduction of those species into nearby natural areas. The establishment of mature native plant communities may require decades, and some community types may never fully recover from disturbance. Successful reestablishment of some habitat types, such as some shrubland communities, may be difficult and may require considerably greater periods of time. Restoration of plant communities in areas with arid climates (e.g., averaging less than 9 in. (20 cm) of annual precipitation) would be especially difficult (Monsen et al. 2004).

Indirect impacts on terrestrial and wetland habitats on or off the project site could result from land clearing and exposed soil; soil compaction; and changes in topography, surface drainage, and infiltration characteristics. Indirect impacts could include the degradation of habitat from construction activities occurring in adjacent areas or, in the case of wetlands, activities occurring within the watershed or groundwater recharge area.

In addition to habitat removal, the operation of heavy equipment within the action area may result in injury or destruction of existing vegetation and biological (microbiological) soil crusts and the compaction and disturbance of soils (Belnap and Herrick 2006). Soil aeration, infiltration rates, and moisture content could be impacted. Biological soil crusts occur in deserts and other sparsely vegetated arid habitats and are important for soil stability, nutrient cycling, and water infiltration; their disturbance may affect the development of plant communities (Fleischner 1994; Belnap et al. 2001; Gelbard and Belnap 2003). All these factors could affect the rate or success of vegetation reestablishment.

Cumulative Impacts

Within the FFO planning area there are approximately 435,500 acres of Great Basin desert shrub and 633,400 acres of Piñon-Juniper Woodland habitat types (USDI/BLM 2003a, page 3-31). Based on the acres of plant community types within the planning area and the estimated total disturbance of future activities, approximately 2.7 percent of the various communities represented would be disturbed within the planning area over 20 years from reasonably foreseeable future actions (USDI/BLM 2003a, page 3-31 and 4-7). The proposed action would contribute approximately 8.2 acres of initial vegetative disturbance to cumulative impacts in the planning area. Changes in vegetation composition and the potential for invasive, non-native species to establish would also cumulatively impact vegetation in the project area.

3.6. Livestock Grazing

3.6.1. Affected Environment

The proposed project is located in the Kimbeto Community Allotment No. 6013. The term grazing authorization permits the utilization of 6,329 active AUMs (Animal Unit Months) of forage. An AUM is the amount of forage needed to sustain a cow (1,000 lbs.) or cow/calf pair for one month. The average rangeland carrying capacity for the Venado Allotment is 9.75 acres/AUM for a total of 61,684 acres and 6,329 AUMs.

3.6.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The project is proposed to be constructed within the Kimbeto Community Allotment No. 6013. The associated disturbance for construction of the well pads, access roads, and well-tie pipelines will be approximately 8.2 acres. The estimated short-term impact to range carrying capacity would be a loss of 0.85 AUM (8.2 acres/9.75 acres/AUM). After successful reclamation of the pipeline and construction areas, the long term-loss of AUMs would be 0.2 AUM.

Additional short term impacts may include displacement of permitted livestock during construction activities or exposure of livestock to hazards. After construction, livestock should become acclimated to the wells and traffic associated with its maintenance. Vehicle traffic associated with these wells could pose impacts to livestock considering that the area is open range and livestock may be found on roads in the area.

Direct impacts to livestock occur when holes or ditches are not excluded properly. Any type of hole or ditch is potentially a hazard to livestock while grazing. Cow or calf injuries may occur when they fall into a ditch-type cavity or in process of trying to get out. Cow or calf leg injuries also may occur when any type of small hole is left uncovered. Livestock can step into the hole and break a leg.

Impacts to livestock may occur when containment of livestock is compromised (i.e., fencing cutting). This could result in injury to livestock or individuals in the event of a vehicular accident. Indirect impacts include extra time required by the permittee to locate livestock or potential trespass issues for the respective livestock owner if the livestock cross allotment boundaries.

Cumulative Impacts

Other reasonably foreseeable activities within the planning area that would impact forage resources include off highway vehicle (OHV) traffic and grazing. The PRMP determined that total surface disturbance from oil and gas development in the planning area would affect about 1.6 percent of the San Juan Basin. Added to other surface disturbance from urban development, the overall effect of removing rangeland acreage from production would still be minimal when compared to the acreage of available forage (USDI/BLM 2003a, pages 4-126 to 4-127). When added to past, present, and reasonable foreseeable activities within the grazing allotment, the proposed action would not result in changes to the allotment's carrying capacity or a measurable change to available AUMs. Reseeding of disturbed areas with the seed mixture chosen, which is composed of grasses and palatable shrubs, may result in an increase in available forage within the affected allotment. This increase is not expected to be measurable.

3.7. Migratory Birds

3.7.1. Affected Environment

Executive Order 13186 dated January 17, 2001 calls for increased efforts to more fully implement the Migratory Bird treaty Act of 1918. In keeping with this mandate, the BLM/FFO has issued an interim policy to minimize unintentional take as defined by the EO 13186 and to better optimize migratory bird efforts related to BLM/FFO activities (BLM 2010). In keeping with this policy, a list of priority birds of conservation

concern which occur in similar eco-regions as the proposed action area was compiled through a review of existing bird conservation plans including:

- Fish and Wildlife Service (USFWS) Birds of Conservation Concern (BCC)
- New Mexico Partners in Flight (NMPIF) New Mexico Bird Conservation Plan
- Comprehensive Wildlife Conservation Strategy for New Mexico (CWCS)
- Gray Vireo Recovery Plan
- The North American Waterbird Conservation Plan
- Recovery plans and conservation plans/strategies prepared for federally-listed candidate species.

The selected species have a known distribution in the FFO area and may be affected by various types of perturbations. These species and a brief assessment of their habitat are identified in Table 11.

Table 11. Migratory Birds with Potential to Occur in the Project Area

Species Name	Habitat Associations	Potential to Occur in the Project Area
Bendire's thrasher (*Toxostoma bendirei*)	On the Colorado Plateau, inhabits open sagebrush with scattered junipers; sparse or degraded understory, lower elevations. Avoids riparian areas and arroyos with dense shrub cover	Sagebrush and scattered trees provide suitable habitat for Bendire's thrasher within the action area.
Black-throated sparrow (*Amphispiza bilineata*)	Xeric habitats dominated by open shrubs with areas of bare ground.	Potential habitat documented within the action area.
Brewer's sparrow (*Spizella breweri*)	Closely associated with sagebrush, preferring dense stands broken up with grassy areas.	Suitable habitat is present within the action area in the form of sagebrush.
Gray vireo (*Vireo vicinior*)	In northern NM, stands of piñon pine and Utah juniper 5800 - 7200 ft, open with a shrub component and mostly bare ground; antelope bitterbrush, mountain mahogany, Utah serviceberry and big sagebrush often present. Broad, flat or gently sloped canyons, in areas with rock outcroppings, or near ridge-tops.	Piñon-juniper woodland within the action area provides suitable habitat for the gray vireo.
Loggerhead shrike (*Lanius ludovicianus*)	Open country interspersed with improved pastures, grasslands, and hayfields. Nests in sagebrush areas, desert scrub, and woodland edges.	Desert scrub in the analysis area could provide suitable habitat for the species, although significant grassy areas are lacking.
Mountain bluebird (*Sialia currucoides*)	Open piñon-juniper woodlands, mountain meadows, and sagebrush shrublands; requires larger trees and snags for cavity nesting.	Desert scrub in the analysis area could provide suitable habitat for the species; although nest habitat lacking.
Mourning dove (*Zenaida macroura*)	Open country, scattered trees, and woodland edges. Feeds on ground in grasslands and agricultural fields. Roost in woodlands in the winter. Nests in trees or on ground.	Desert scrub in the analysis area could provide suitable habitat for the species; although lack of significant woodlands or woodland edges may be limiting factor.
Sage sparrow (*Amphispiza belli*)	Large and contiguous areas of tall and dense sagebrush. Negatively associated with seral mosaics and patchy shrublands and abundance of greasewood.	Suitable habitat is present within the action area in the form of sagebrush.
Sage thrasher (*Oreoscoptes montanus*)	Shrub-steppe dominated by big sagebrush.	Suitable habitat is present within the action area in the form of sagebrush.
Scaled quail (*Callipepla squamata*)	Brushy arroyos, cactus flats, sagebrush or mesquite plains, desert grasslands, Plains grasslands, and agricultural areas. Good breeding habitat has a diverse grass composition, with varied forbs and scattered shrubs.	Desert scrub in the analysis area could provide suitable habitat for the species; although suitable breeding habitat is lacking.
Swainson's hawk	A mixture of grassland, cropland, and shrub	Desert scrub in the analysis area

(*Buteo swainsoni*)	vegetation; nests on utility poles and in isolated trees in rangeland. Nest densities higher in agricultural areas.	could provide suitable habitat for the species; although suitable breeding habitat is lacking.
Vesper sparrow (*Pooecetes gramineus*)	Dry montane meadows, grasslands, prairie, and sagebrush steppe with grass component; nests on ground at base of grass clumps.	Desert scrub in the analysis area could provide suitable habitat for the species.

3.7.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would result in the removal of approximately 8.2 acres of potential migratory bird habitat. Adult migratory birds would not be directly harmed by the proposed action because of their mobility and ability to avoid areas of human activity. No active nests within the action area are expected to be directly impacted since any drilling and construction activity would likely occur outside of the breeding season. If construction activities are scheduled to begin within the typical migratory bird breeding season of 15 May to 31 July, an FFO-approved nest survey of the action area must be conducted. The increased human presence during construction, drilling, and reclamation activities may indirectly disturb or displace adults from nests and foraging habitats for a short period of time, three months or less. Following the reclamation of the affected environment, long term production operations would result in only a slight increase in human activity in the immediate area. Effects to the population status of migratory birds are not anticipated due to the mobility of individuals and the abundance of adjacent habitat for these species. In consideration of these factors, there would be moderate short-term effects to migratory birds, and low long-term effects as a result of the action.

Cumulative Impacts

Cumulative impacts to migratory birds would result from the long-term loss of approximately 2 acres of habitat and habitat fragmentation from new well pad and road construction, and ROW development. Although these impacts may affect individuals, given the level of habitat loss and fragmentation, no population level effects are anticipated from the proposed action.

3.8. Special Management Species

3.8.1. Affected Environment

In accordance with BLM Manual 6840, the Farmington Field Office of the Bureau of Land Management (FFO) has prepared a list of special management species to focus species management efforts toward maintaining habitats under a multiple use mandate, called FFO Special Management Species (SMS). The BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. 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. FFO SMS are listed below in Table 12.

The proposed action area provides potential foraging habitat for American peregrine falcon (*Falco peregrinus anatum*), prairie falcon (*Falco mexicanus*), golden eagle (*Aquila chrysaetos*), and ferruginous hawk (*Buteo regalis*). The proposed project and action area were visually scanned for raptors, raptor nests, and whitewash. No raptors or their sign were observed during the on-site field survey. According to the most recent BLM/FFO raptor nest geographic information system (GIS) data, no historically documented nest sites are located within 1/3 mile of the action area. The proposed action area is not within the BLM/FFO designated potential habitat area for Brack's hardwall cactus (*Sclerocactus cloveriae* var. *brackii*) or Aztec gilia *(Aliciella formosa*). No prairie dog burrows or towns were documented within the proposed action area to support potential burrowing owl (*Athene cunicularia*) breeding habitat. No significant grassland characteristics were documented within the proposed action area to support potential mountain plover (*Charadrius montanus*) breeding habitat. No significant surface water resources

or suitable roosting sites were documented within or in the vicinity of the proposed action area to support bald eagle (*Haliaeetus leucocephalus*). No riparian habitat or wetlands were documented within or in the vicinity of the proposed action area to support yellow-billed cuckoo (*Coccyzus americanus*).

Table 12 provides an evaluation of the potential for Special Management Species to occur in the analysis area. None of these species were observed during the field survey of the proposed action, and their potential presence determination is based on evaluation of the proposed action area habitat and the known habitat requirements of the listed species.

Table 12. Special Management Species with Potential to Occur in the Analysis Area

Species Name	Conservation Status		Habitat Associations	Potential to Occur in Analysis Area
	FFO	State of New Mexico		
Birds				
Golden Eagle (*Aquila chrysaetos*)	SMS		In the West, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	The action area contains suitable habitat for foraging, but not nesting.
Ferruginous hawk *(Buteo regalis)*	SMS		Grasslands and semi-desert shrub; occasionally piñon-juniper edge habitat. Nest on rock spires in NW New Mexico.	The action area contains suitable habitat for foraging, but not nesting.
Prairie falcon *(Falco mexicanus)*	SMS		Arid, open country, grasslands or desert scrub, rangeland; nests on cliff ledges, trees, power structures.	The action area contains suitable habitat for foraging.
Mountain plover *(Charadrius montanus)*	SMS		Semi desert, grasslands, open arid areas, bare fields, breeds in open plains or prairie.	Proposed action area does not contain flat, open grasslands for suitable breeding habitat.
Yellow-billed cuckoo *(Coccyzus americanus*)	SMS		Low to mid-elevation riparian woodlands, deciduous woodlands, and abandoned farms and orchards. Rare in the San Juan River valley.	Proposed action area does not contain riparian areas for suitable habitat.
American peregrine falcon (*Falco peregrinus anatum*)	SMS	NM-T	Open country near lakes or rivers with rocky cliffs and canyons. Tall city bridges and buildings also inhabited.	The action area contains suitable habitat for foraging, but not nesting.
Bald eagle (*Haliaeetus leucocephalus)*	SMS	NM-T	Near lakes, rivers and cottonwood galleries. Nests near surface water in large trees. May forage terrestrially in winter	The action area does not contain suitable habitat for nesting, foraging, or roosting activities.
Burrowing owl *(Athene cunicularia)*	SMS		Associated with prairie dog towns. In dry, open, short-grass, treeless plains	Proposed action area does not contain suitable habitat for foraging or nesting. No associated prairie dog colonies occur in the action area.
Plants				
Brack's hardwall cactus (*Sclerocactus cloveriae* ssp. *brackii*)	SMS	NM-E	Sandy clay slopes of the Nacimiento Formation in sparse semi desert, piñon-juniper grasslands and open arid areas of badland habitat (5,000-6,000 ft).	Surface soils do not reflect those typical of other type localities; proposed action area not within FFO-designated

				potential habitat area.
Aztec gilia (*Aliciella formosa*)	SMS	NM-E	Arid and sparsely vegetated Badland /Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	Surface soils do not reflect those typical of other type localities; proposed action area not within FFO-designated potential habitat area.

3.8.2. Impacts from the Proposed Action

Direct and Indirect Impacts

There would be a temporary loss of approximately 8.2 acres of potential SMS raptor foraging habitat prior to rehabilitation and reseeding of the affected environment. The analysis area does not contain suitable nesting habitat for SMS raptor species, and is not within a 1/3 mile buffer zone to any historically documented raptor nest site. The proposed action would result in the long-term loss of approximately 2 acres of foraging habitat for BLM special management raptor species.

Cumulative Impacts

The FFO would continue to manage non-federally listed species according to BLM policies and guidelines, with the goal of contributing to the conservation of these species to reduce the potential for being listed under the ESA of 1973, as amended (USDI/BLM 2003a, 4-111). For reasonably foreseeable actions on federal lands, direct impacts to nesting special status raptor species would be avoided through the BLM's siting criteria. Development on federal and private land would result in the removal or modification of potential foraging habitat. These effects would be related to availability of undisturbed habitat in the area and the amount of disturbance that would occur within the area. The PRMP/FEIS determined that cumulatively up to 5.5 percent (128,000 acres) of vegetation in the planning area could be impacted by oil and gas development (USDI/BLM 2003a, page 4-125). Other reasonably foreseeable actions within the planning area that could impact special status species would include livestock grazing, agriculture, commercial and residential development, mining, wildfire, and vegetation management. The proposed action would contribute approximately 2 acres of long-term habitat loss for BLM special management species within the planning area.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

Jason Eckman, Field Regulatory Analyst, San Juan Basin – Encana Oil & Gas (USA) Inc.

Holly Hill, Regulatory Analyst, San Juan Basin – Encana Oil & Gas (USA) Inc.

Steven Fuller – La Plata Archaeological Consultants, Dolores, Colorado

Brenda Linster, Regulatory Lead, San Juan and New Ventures – Encana Oil & Gas (USA) Inc.

Johnny Stinson – Adobe Contractors, Bloomfield, New Mexico

Katie Wegner, Regulatory Analyst, North Rockies – San Juan – Encana Oil & Gas (USA) Inc.

4.2. List of Preparers

Steven Craig Willems, Environmental Protection Specialist – Bureau of Land Management, Farmington Field Office

Matthew Zabka, Environmental Specialist – Adkins Consulting, Inc.

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APPENDIX A.

A.1. APD with COA / ROW Grant (Exhibit A)

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

A.2. Authorities

Code of Federal Regulations (CFR)

40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of July 1, 2001.

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

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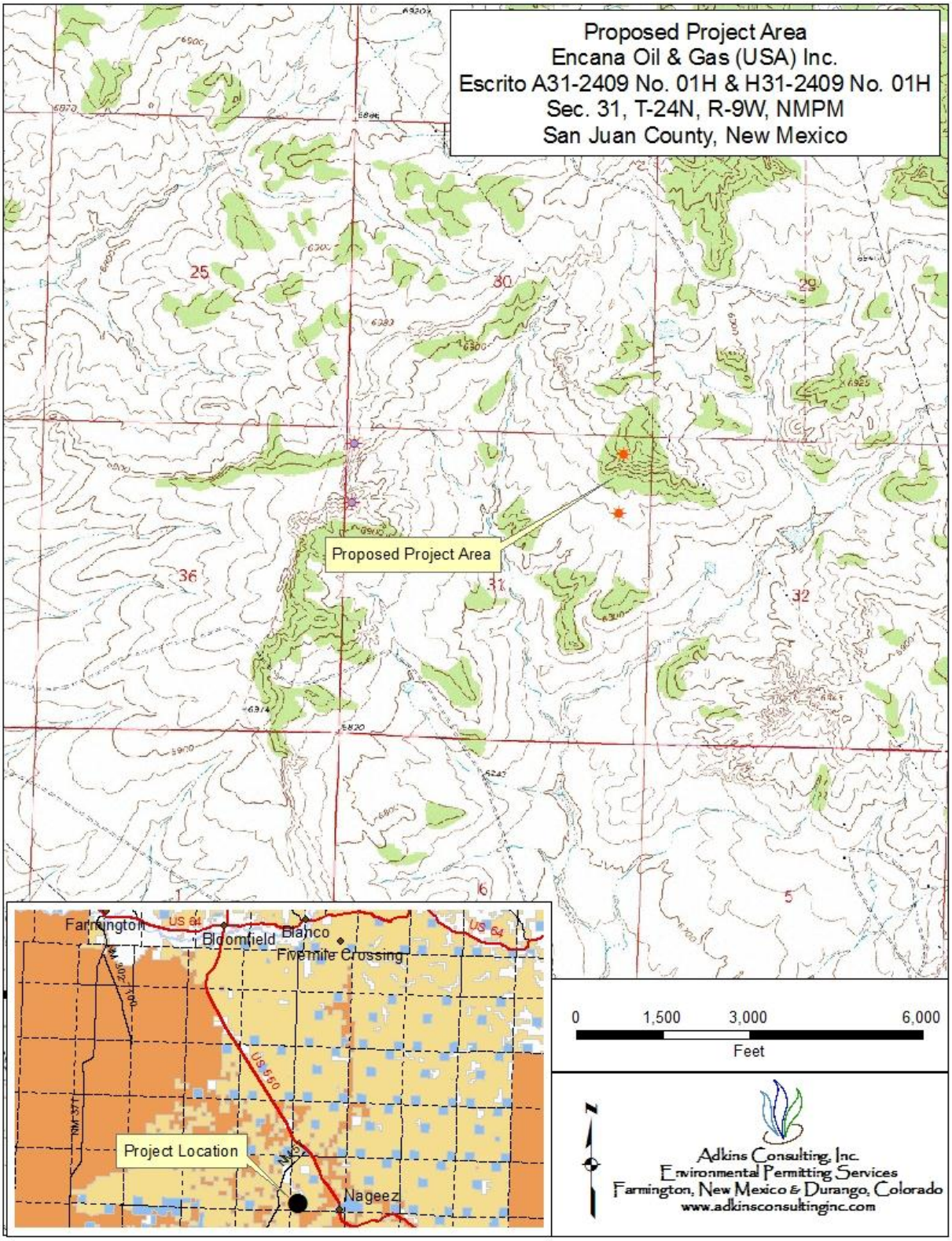
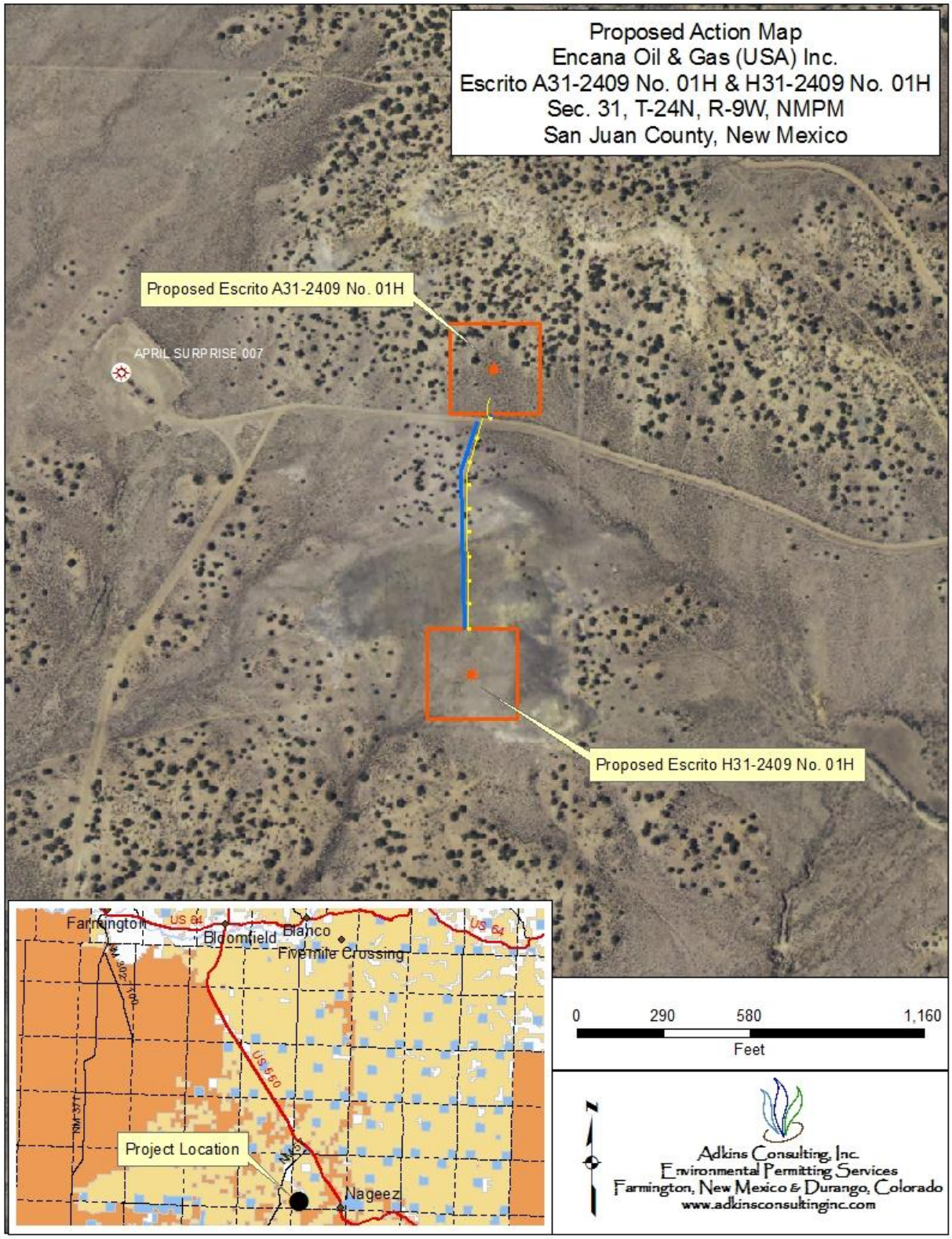
The Federal Land Policy and Management Act, as amended. Public Law 94-579.

APPENDIX B.

B.1. Proposed Project Area



B.2. Proposed Development