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Lybrook A32-2306 No. 01H
Lybrook H32-2306 No. 01H

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TABLE OF CONTENTS

	Page
1.0 Introduction	**1**
Background	1
Purpose & Need	1
Conformance with Applicable Land Use Plan and Other Environmental Assessments	1
Federal, State or Local Permits, Licenses or Other Consultation Requirements	4
Scoping, Public Involvement, and Issues	7
2.0 Alternatives Including the Proposed Action	**8**
Alternative A – No Action	8
Alternative B – Proposed Action	8
Alternatives Considered But Not Analyzed In Detail	11
3.0 Description of Affected Environment	**12**
Air Resources	12
Cultural Resources	14
Soils	14
Water Resources	15
Vegetation	16
Livestock Grazing	16
Migratory Birds	16
Special Management Species	19
Public Health and Safety	20
4.0 Environmental Consequences and Proposed Mitigation Measures	**22**
Air Resources	23
Cultural Resources	23
Soils	24
Water Resources	24
Vegetation	25
Livestock Grazing	25
Migratory Birds	25
Special Management Species	26
Public Health and Safety	26
5.0 Cumulative Impacts	**27**
6.0 Supporting Information	**29**
7.0 Appendices	**31**
Project Area Map	32
Proposed Development	33

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1.0 Introduction

1.1 Background

A representative of Encana Oil & Gas (USA) Inc. (Encana) filed an Application for a Permit to Drill (APD) with the Bureau of Land Management, Farmington Field Office (BLM/FFO), for the Lybrook A32-2306 No. 01H and Lybrook H32-2306 No. 01H horizontal oil wells. Encana has recently concentrated production efforts in the San Juan Basin, and is targeting liquid petroleum reserves within the Mancos Shale Formation. The proposed project is located in the north half of Section 32 and the northeast quarter of Section 31, Township 23N, Range 6W, in Sandoval 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

The purpose for the proposal is to provide Encana 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 Application for Permit to Drill (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. The Mineral Leasing Act of 1920 (MLA), as amended [30 USC 181 et seq.], authorizes the BLM to issue oil and gas leases for the exploration of oil and gas and permit the development of those leases. The existing lease is a binding legal contract that allows development of the mineral by the holder. An approved Application for Permit to Drill (APD), issued by the BLM, authorizes the applicant to construct and drill the proposed wells.

1.3 Conformance with Applicable Land Use Plan and Other Environmental Assessments

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 (BLM 2003b). Specifically, this action is in conformance with the following: "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., Farmington, NM, or electronically at:

http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office.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.

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

1.4.1 Clean Water Act

Recognizing the potential for the continued or accelerated degradation of the Nation's waters, the U.S. Congress enacted the Clean Water Act in 1977, 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. However, gas and oil activities have been exempt from NPDES permitting regulations in New Mexico.

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.

1.4.2 Endangered Species Act

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.

1.4.3 National Historic Preservation Act of 1966

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.

1.4.4 Air Resources

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

legislation, developing new outreach and information programs, and developing and/or expanding voluntary programs for emission reductions.

Additional air quality modeling conducted since completion of the 2003 FEIS/RMP 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 or less. The FFO has complied with this directive through a condition of approval (COA) which has been in effect since August 1, 2005. To date, NMAQB has made no other such requests.

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

The EPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total US sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total CO_2 and CH_4 emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the EPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" sub-activities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

The BLM's regulatory jurisdiction over field production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; placement of compressors engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour; re-vegetate disturbed areas not required for production facilities to reduce the amount of dust; and water dirt roads during periods of high use in order to reduce fugitive dust emission.

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

1.4.5 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 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 RMP (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 a Paleontological SDA.

All BLM/FFO paleontological resource stipulations will be followed as indicated in the COAs, attached to an 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.

The need for additional mitigation to protect paleontological resources will be determined on a case-by-case basis. The Paleontology Resource Staff, in collaboration with the Authorized Officer, will analyze the Survey Report for survey findings and determine any mitigation recommendations. If no further mitigation is needed, the Authorized Officer should promptly notify the project proponent that there will be no additional paleontological surveys or mitigation required, and the project may proceed, pending any other approvals.

If previously undocumented paleontological sites are encountered during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery. The proponent with then immediately notify the paleontological monitor (if required), or the BLM/FFO paleontology resource staff. It is necessary to protect fossil material and their geological context upon discovered during construction. The BLM would then evaluate the site. Should the discovery be evaluated as significant, it will be protected in place until mitigation measures can be developed and implemented according to guidelines set by the BLM. Mitigation measures such as data and fossil recovery may be required by the BLM to prevent impacts to newly identified paleontological resources.

1.4.6 Hazardous and Solid Wastes

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.

No hazardous or solid waste materials are present at the proposed action site. 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 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 archaeological/cultural resources?
- How would the alternatives affect soils in the analysis area?
- What would be the effect of the alternatives on the 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 livestock grazing?
- 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?
- What would be the effect of the alternatives on public health and safety?

Additionally, the proponent is required to:
· Comply with all applicable Federal, State and Local laws and regulations.
· Obtain the necessary permits for the drilling, completion and production of this well, including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
· Certify that a Surface Use Agreement has been reached with private landowners where applicable.

2.0 Alternatives Including the Proposed Action

2.1 Alternative A - 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.

2.2 Alternative B – Proposed Action

Encana proposes to construct two well pads, and associated well-tie pipelines and access roads, in order to horizontally drill and develop federal and state minerals in the Lybrook Gallup pool of the Mancos Shale Formation. Access to the proposed project area would be gained via US Highway 550 south from Bloomfield, New Mexico, to the Lybrook area. An unnamed dirt road travels south off the highway at mile post 100.9 near the head of Escrito Canyon. The proposed access road takes off from the existing Yates Petroleum Gus YJ State No. 1 well pad. The proposed project is located on surface managed by the New Mexico State Land Office (SLO) in Section 32, Township 23 North, Range 6 West, in Sandoval County. The project would develop state minerals in Section 32, and federal minerals in Section 31 administered by the BLM/FFO. New surface disturbance as a result of the proposed project would be approximately 9.80 acres on NMLO-managed surface.

The proposed well pads would be 300 feet by 300 feet with an additional 50-foot construction buffer zone on all four sides. The A32 well pad would require 5 feet of fill at corners five and six on the northeast side of the location, and between 9 and 11 feet of cut between corners two and three on the southwest side of the location. The H32 well pad would require between 1 and 2 feet of fill on the east side of the location, and between 1 and 2 feet of cut on the west side of the location. The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Production pits, if used, would be lined and would meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and requirements, NMAC 19.15.17. Cut and fill slopes would be returned to the original contour upon reclamation. New surface disturbance from the proposed well pad locations would be approximately 7.35 acres.

Drainages, diversions, and silt traps would be established upon reclamation as needed once the construction phases have been completed. Potential surface water would be diverted around and away from the well pads for the life of the project.

New access road would be required from the existing Yates Gus YJ State No. 1 well location. The proposed access road for the A32 location is approximately 2,005 feet in length, and the proposed access road for the H32 location is approximately 900 feet in length. The roads would be developed with an average clearing width of 30 feet and be constructed to BLM Gold Book standards. New surface disturbance as a result of new access road construction would be approximately 2.0 acres. The resurfacing and repair of deteriorated sections of the existing access road may be required. Dust abatement measures would be implemented on all affected roads.

Once the proposed wells are completed and prove to be viable, associated well-tie pipelines would be constructed within a granted 40-foot Right-of-Way (ROW) parallel to proposed access road development. The proposed A32 well-tie pipeline would be approximately 718 feet length, while the proposed H32 well-tie pipeline would be approximately 235 feet in length. Both well-ties would transport produced natural gas to Encana's Lybrook Trunk No. 1. New surface disturbance as a result of well-tie pipeline construction would be approximately 0.44 acres.

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 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 applicable. 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. 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 the well, increases the ultimate recovery of gas from low-pressure reservoirs, and prevents waste of the resource.

Farmington Field Office established environmental Best Management Practices (BMPs) will be followed during construction and reclamation of the well site pads, pipeline ties, facility placement, or any other surface disturbing activity associated with this project. Bureau-wide standard BMPs 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 BMPs are integrated into the general and site-specific stipulations.

For a detailed description of design features and construction practices associated with the proposed action, refer to the APDs (attached as Appendix 7.1). Also see the subject APDs 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 7.1 and incorporated and analyzed in this alternative.

Table 2.2 – Proposed Well Information

Well Name	Well Number	Township	Range	Section	Footages	Lease #	Issue Date
Lybrook A32-2306	01H	23N	6W	32	Surface: 556' FNL 222' FEL	NMNM 089021	06/01/1992
				31	BHL: 556' FNL 2285' FEL		
Lybrook H32-2306	01H			32	Surface: 1785' FNL 250' FEL		
				31	BHL: 1785' FNL 2285' FEL		

County: Sandoval

Applicant: Encana Oil & Gas (USA) Inc.

Surface Management: New Mexico State Land Office

Administrative Agency: Bureau of Land Management, Farmington Field Office

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

- If used, all pits would meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and requirements, NMAC 19.15.17.
- Excavated materials from the cuts would be used on the fill portions of the locations.
- Reclaimed slopes would be re-contoured to pre-construction topographical contours.
- All disturbed areas not needed for production would be seeded with an FFO-specified seed mixture. The dominant vegetation community within the project area is piñon-juniper woodland.
- Above ground structures would be painted to blend with the natural color of the landscape. Paint color would be Covert Green.
- All cultural resource stipulations would be followed.
- The operator shall ensure that dust abatement measures be taken on all affected roads, as the potential for high volumes of heavy truck traffic exists.
- If project construction is scheduled to take place within the typical migratory bird breeding season of May 15 – July 31, a BLM approved migratory bird nest survey must be conducted.
- 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 sources.
- Affected grazing permittees must be notified when construction is scheduled to begin.
- 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).

2.3 Alternatives Considered But Not Analyzed

No alternatives have been developed. The proposed project design was selected for the best drainage of subsurface resources while protecting surface resources to the maximum extent possible.

3.0 Description of Affected Environment

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. These items are included above in Section 1.5.

3.1 Air Resources

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

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

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

In addition, the Environmental Protection Agency (EPA), on October 17, 2006, issued a final ruling on the lowering of the National Ambient Air Quality Standard (NAAQS) for particulate matter ranging from 2.5 micron or smaller particle size. This ruling became effective on December 18, 2006, stating that the 24-hour standard for $PM_{2.5}$, was lowered to 35 ug/m³ from the previous standard of 65 ug/m³. This revised $PM_{2.5}$ daily NAAQS was promulgated to better protect the public from short-term particle exposure.

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

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

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

3.1.1 Air Quality

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

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

3.1.2 Climate

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) predicted a warming of about 0.2°C per decade for the next two decades, and then a further warming of about 0.1°C per decade. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures.

A 2007 US Government Accountability Office (GAO) Report on Climate Change found that, "federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, among others: 1) physical effects such as droughts, floods, glacial melting, and sea level rise; 2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and 3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses." It is not, however, possible to predict with any certainty regional or site specific effects on climate relative to the proposed action and subsequent actions.

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

Greenhouse gases, including carbon dioxide (CO_2) and methane (CH_4), and the potential effects of GHG emissions on climate, are not regulated by the EPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The EPA’s Inventory of US Greenhouse Gas Emissions and Sinks found that in 2007, total U.S. GHG emissions were over 7 billion metric tons and that total U.S. GHG emissions have increased by 17% from 1990 to 2007. Emissions

increased from 2006 to 2007 by 1.4 percent (99.0 Tg CO_2 Eq.). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (EPA 2009).

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

3.2 Cultural Resources

The proposed project is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: PaleoIndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 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 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 (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 FFO's jurisdiction (BLM 2003a:3-88). The proposed action is within the Largo watershed. Based on the CRTR, a total of 2,051 sites representing 2,815 temporal/cultural components have been documented within the watershed (BLM 2003b). Of the 19 categories of sites defined based on temporal/cultural 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 recorded in the Largo watershed are Pueblo I-III (ca. A.D. 700 to 1300) and Dinétah/Gobernador Phases (ca. A.D. 1500 to 1753) period components. Features common to these sites include hearths, petroglyphs, charcoal stains, middens, hogans, sweat lodges, and corrals.

The entire area of potential affect for the action alternatives was surveyed by La Plata Archaeological Consultants (LAC) at a BLM Class III level (100%) and inventory reports were 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).

One archaeological site was encountered within the area surveyed for the proposed Lybrook H32-2306 well-tie pipeline (LAC Report No. 2012-1y).

3.3 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.

Soils in the immediate area of the proposed project are comprised of the Vessilla-Menefee-Orlie association, 0 to 30 percent slopes.

The Vessilla-Menefee-Orlie complex is composed of approximately 45 percent Vessilla and similar soils, 25 percent Menefee and similar soils, and 20 percent Orlie and similar soils. The Vessilla series consists of shallow and very shallow, well drained, moderately rapid permeable soils that formed in eolian and alluvial material weathered from sandstone. Vessilla soils are on narrow ridges, hills, breaks and mesas of bedrock controlled landscapes. The Menefee series consists very shallow and shallow, well drained soils that formed in colluvium and residuum from shale. Menefee soils are on hillslopes mesas, breaks and mountainsides. The Orlie series consists of very deep, well drained, moderately slowly permeable soils that formed in alluvium and eolian materials derived from shale and sandstone on summits of mesas, dipslopes of cuestas, hills, summits of plateaus and fan remnants on valley sides.

The different characteristics of these soil types are listed in the tables below.

Table 3.3.1

Characteristic	Vessilla	Menefee	Orlie
Surface Layer	Light yellowish brown gravelly fine sandy loam	Brown clay loam	Pale brown loam
Slope	1-65%	2-80%	0-8%
Depth	4-20”	8-20”	More than 80”
Surface Runoff	Medium to rapid	Rapid	Medium
Typical Use	Wood products, livestock grazing, recreation, and wildlife habitat	Rangeland, woodland, recreation, and wildlife habitat	Livestock grazing
Moisture Regime	Aridic ustic	-	Aridic ustic
Drainage Class	Well drained	Well drained	Well drained
Available Water Cap.	Very low	Very low	High
Permeability	Moderately rapid	Slow	Moderately slow
Parent Material	Slope alluvium over residuum weathered from sandstone	Colluvium over residuum weathered from shale	Slope alluvium from sandstone and shale

3.4 Water Resources

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. Elevations range from approximately 4,800 feet, where the San Juan River flows into Utah, to approximately 8,800 feet near the Jicarilla Apache Reservation, and near 7,300 feet near Lindrith, New Mexico. 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 FFO 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 action is within the Blanco Canyon USGS 4th Level watershed. This watershed contains the Cañon Largo and Carrizo Canyon drainage systems. Several ephemeral drainages are located within the analysis area, and generally flow either southeasterly into Venado Canyon or northwesterly into Escrito Canyon. These drainages provide summer storm water and spring run-off to the watershed.

Under Section 404 of the Clean Water Act, the U.S. 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. Determining jurisdiction and/or significant nexus can be a time consuming process, therefore the BLM/FFO assumes the USACE has jurisdiction over any USGS watercourse (i.e., “blue line” on USGS 1:24,000 topographic maps). The proposed project would not impact any jurisdictional waters of the U.S. as documented on the Counselor, NM 7.5-minute series topographic map.

The operator proposes to set surface casing to a depth of 250 feet, or as specified by the BLM, to protect ground water resources, including any shallow aquifers. An operation plan with the proposed casing program to protect the aquifers would be submitted with the APDs.

3.5 Vegetation

The proposed action is located within piñon-juniper woodland interspersed with areas of Great Basin Desert scrub. Dominant vegetation throughout the project area consists of piñon pine (*Pinus edulis*) and Utah juniper (*Sabina osteosperma*) trees with an understory of antelope bitterbrush (*Purshia tridentata*), scrub oak (*Quercus gambelii*), broom snakeweed (*Gutierrezia sarothrae*), and blue grama (*Bouteloua gracilis*). The Great Basin Desert scrub areas consist mainly of sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus nauseosus*), New Mexican prickly pear cactus (*Opuntia phaeacantha*), Indian ricegrass (*Achnatherum hymenoides*), and various native forbs and cacti.

The objective of the FFO weed management program is to detect invasive plant species populations, prevent the spread of new invasive populations, manage existing populations using the tools of integrated weed management and eradicate invasive populations, using the safest environmental methods available. For all actions on public lands that involve surface disturbance or rehabilitation, reasonable steps would be required to prevent the introduction or spread of noxious weeds, including requirements for using weed seed–free hay, mulch and straw.

No invasive or noxious weeds were encountered during the onsite inspection of the analysis area. BLM GIS data of known invasive or noxious weed populations indicate no known weed populations to be within the analysis area.

3.6 Livestock Grazing

The BLM/FFO manages 167 grazing allotments with 351 grazing authorizations that permit cattle, sheep, and horse grazing within the planning area. Of the 351 grazing authorizations, 317 are permitted under Section 3 of the Taylor Grazing Act. Additional authorizations under Section 15 permit grazing on 30 allotments in the Lindrith, NM area.

The proposed action is located within the FFO-managed grazing allotment No. 5112 (Venado). Table 3.6 lists the details of this allotment.

Allotment Number	Livestock Number	Livestock Type	Period Begin Date	Period End Date	AUMs
5112	101	Cattle	1-Mar	28-Feb	1,030

3.7 Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC §§ 701-715s, as amended), established protections for migratory birds and their parts (i.e. eggs, nests, and feathers) from taking, hunting, capture, transport, sale, or purchase. The Migratory Bird Treaty Act 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 Act, 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 Migratory Bird Treaty

Act. 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 2 years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) 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 them in each agency's formal planning process (such as revision of agency land management plans) including public participation and NEPA analysis, as appropriate.

A National MOU to promote the conservation of migratory bird populations between BLM and the Service was not completed during the development of the revised RMP. Consultation on the Biological Assessment (BA) with the Service for the RMP was completed on October 2, 2002, the Environmental Impact Statement (EIS) was completed in March 2003, and the Record of Decision (ROD) for the RMP was signed in September of 2003. There are no management constrains or mitigation measures pertaining to the Migratory Bird Treaty Act listed within the RMP, BA, EIS, or ROD. There are no applicable mitigation measures pertaining to the MBTA to attach to proposed actions.

A National MOU between BLM and the Service was signed on April 4, 2010. Section XI (I) of the MOU states that the BLM may not be able to implement all elements of this MOU upon signature of the MOU. Incorporation of all elements of the MOU into land use planning will be facilitated by land use plan maintenance, amendment, or revision. Until such time, the BLM will continue to analyze impacts to migratory birds in NEPA documents, list the Migratory Bird Treaty Act as a Law that the owner of any BLM permit must comply with, and recommend that construction activities occur in a manner that minimizes impacts to migratory birds.

Information from the New Mexico Avian Conservation Partners website (http://nmpartnersinflight.org), the New Mexico Partners In Flight highest priority list of species of concern by vegetation type, and the 2002 Birds of Conservation Concern Report for the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR) No. 16 have been used to develop a list of migratory bird species with potential to occur in the analysis area in the following table.

Table 3.7.1 Migratory bird Species of Concern with potential to occur in the analysis area.

Common Name (Scientific name)	Habitat Associations	Presence*
Sage sparrow (*Amphispiza belli*)	Sagebrush-grassland habitat.	S
Black-throated sparrow (*Amphispiza bilineata*)	Xeric habitats dominated by open shrubs with areas of bare ground.	NS
Western scrub-jay (*Aphelocoma californica*)	Interior *woodhouseii* race shy, inhabits lower mountain woodland; all subspecies hold individual territories.	K
Juniper titmouse (*Baeolophus griseus*)	Uncommon to fairly common in juniper or piñon-juniper woodland.	NS
Bridled titmouse (*Baeolophus wollweberi*)	Common resident of woodland stands of oak, juniper, and sycamore in mountains of New Mexico.	NS
Ferruginous hawk (*Buteo regalis*)	Inhabits dry, open country. Often hovers when foraging or soars in a dihedral. Perches in trees, on poles, on the ground.	NS
Swainson's hawk (*Buteo swainsoni*)	Soars over open plains and prairie with uptilted wings in teetering, vulture-like flight. Gregarious, usually	NS

	migrates in large flocks.	
Scaled quail (*Callipepla squamata*)	Barren mesas and plateaus, semidesert scrublands, and grasslands with mixed scrub.	NS
Montezuma quail (*Cyrtonyx montezumae*)	Uncommon, secretive and local in grassy understory of open juniper-oak or pine-oak woodlands on semi-arid mountain slopes.	NS
Black-throated gray warbler *(Dendroica nigrescens)*	Breed in foothill and lower mountain areas throughout most of New Mexico, primarily west of the plains; prefer large stands of piñon-dominated woodland, often found in dense forests with a canopy.	NS
Piñon jay (*Gymnorhinus cyanocephalus*)	Generally seen in large flocks, often numbering in hundreds; nests in loose colonies. Common in piñon-juniper woodlands of interior mountains and high plateaus; also yellow pine (ponderosa) woodlands.	NS
Loggerhead shrike (*Lanius ludovicianus*)	Relatively xeric habitats dominated by shrubs and grasses; occurs in many lowland habitats statewide.	S
Sage thrasher (*Oreoscoptes montanus*)	Summer residents in northwest NM, extending east to Taos and south to Mount Taylor and, locally, to the northern Plains of San Agustin. In winter, this species is present in desert scrub habitats in southern NM as well as piñon-juniper north to the Manzano mountains.	NS
Green-tailed towhee (*Pipilo chlorurus*)	Prefer high diversity of shrub species - sagebrush, greasewood or piñon-juniper. Breeds in Great Basin shrub in the northwest quadrant of the state.	NS
Vesper sparrow (*Pooecetes gramineus*)	Uncommon to fairly common in dry grasslands, farmlands, forest clearings, and sagebrush scrub.	NS
Broad-tailed hummingbird (*Selasphorus platycercus)*	Breeds in mountain ranges nearly statewide, mainly above 6,000 feet. It is a rare to uncommon migrant through lowlands, being least numerous on the eastern plains.	NS
Mountain bluebird (*Sialia currucoides*)	Inhabits open rangelands, meadows, generally above 5,000 ft; in winter primarily found in open lowlands, desert. Nests in tree cavities and buildings.	NS
Western bluebird (*Sialia mexicana*)	Nests in holes in trees, posts: common in woodlands, farmlands, orchards; in desert areas during winter, fond in mesquite-mistletoe groves.	NS
Black-chinned sparrow (*Spizella atrogularis*)	Regularly occurs in appropriate habitat across the central and southern parts of NM, west of the plains. Breeding records extend north to Taos County, San Miguel County, and probably San Juan County. The species is uncommon at best in winter in southwest New Mexico	NS
Bendire's thrasher (*Toxostoma bendirei*)	Brushy desert, especially areas of tall vegetation, cholla cactus, creosote bush and yucca.	NS
Crissal thrasher (*Toxostoma crissale*)	Very secretive, hiding in underbrush. Found mainly in dense mesquite and willows along streams and	NS

	washes; sometimes on lower mountain slopes.	
Cassin's kingbird (*Tyrannus vociferans*)	Breeds nearly statewide at elevations ranging from 1300 - 2400 m. It is most often found on plains with scattered trees, mountain foothills, riparian areas, and oases, but is rare on most of the southeastern plains	NS
Virginia's warbler (*Vermivora virginiae*)	Breeds throughout the western two-thirds of New Mexico. Summer populations of this species occur in the northern mountains, along the Mogollon Rim, throughout the Gila, and mountain ranges of central and western New Mexico.	NS
Plumbeous vireo (*Vireo plumbeus*)	Breeds in lower mountain canyons statewide, favoring areas with a mix of pines and deciduous trees. It is an uncommon spring and rare fall migrant through lowlands statewide.	NS
Gray vireo (*Vireo vicinior*)	In northwest New Mexico, found in broad-bottomed, flat or gently sloped canyons, in areas with rock outcroppings on near ridgetops.	S
Presence* K = Known, documented observation within project area. S = Habitat suitable and species suspected to occur within the project area. NS = Habitat suitable but species is not suspected to occur within the project area.		

Sources: New Mexico Avian Conservation Partners, New Mexico Partners In Flight, 2011. National Geographic Society, *Field Guide to the Birds of North America*. 1999.

3.8 FFO Special Management Species

In accordance with BLM Manual 6840, 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. Included in this category are state listed endangered species and federal candidate species which receive no special protections under the Endangered Species Act. Special Management Species with potential to occur in the analysis area are listed in Table 3.8.

Table 3.8– Special Management Species of the FFO and their potential to occur in the analysis area.

Common Name *(Scientific name)*	Status*	Habitat Associations	Presence**
BIRDS			
Ferruginous hawk (*Buteo regalis*)	SMS	Occur in open areas containing broad expanses of prairie grassland or shrub-steppe vegetation. Breed in open country, usually prairies, plains and badlands across the northern two-thirds of the state, and may be found statewide during winter; also found in semi-desert grass-shrub, sagebrush-grass & piñon-juniper plant associations. Breeding generally occurs north from Clovis in the eastern plains, north from San Antonio in the Rio Grande valley, and north from the Plains of San Agustin in the western part of the state.	NS

Golden eagle (*Aquila chrysaetos*)	SMS NM-T	Typically forage in open grassland or shrubland habitat, and tend to avoid agricultural areas. Resident in all western states, with a breeding range extending east into the Great Plains. U.S. populations increase in winter with the arrival of migrants from northern breeding areas. In the west, inhabit mostly open areas in mountainous, desert canyon terrain. Nest primarily on cliffs and in trees; breed locally in suitable habitat throughout NM.	NS
Prairie falcon (*Falco mexicanus*)	SMS NM-T	Inhabit arid plains and steppes at all elevations, wherever cliffs or bluffs are present for nesting. Breeds across much of western North America, from southern Canada south to central Mexico and from interior portions of the Pacific states east to the Dakotas, eastern Colorado and New Mexico, and west Texas. In winter, the range extends further east, and west to the Pacific coast. Prairie falcons are sparsely distributed in New Mexico, but may occur in appropriate habitat statewide.	NS
Sources: BLM 2005, New Mexico Natural Heritage Program 2005, NM Rare Plant 1999, USFWS 2007			
Status* SMS = BLM Special Management Species NM-T = State of New Mexico Threatened		**Presence**** NS = Habitat suitable but species is not suspected to occur within the project area.	

The analysis area provides potential foraging habitat for the prairie falcon, golden eagle, and ferruginous hawk. The analysis area does not provide nesting habitat for the three raptors and according to the most recent FFO raptor nest geographic information system (GIS) data is not within a 1/3-mile buffer to an active SMS raptor nest. No SMS birds of prey or signs of their presence were observed during onsite inspections of the project area.

3.9 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. A well location must have an informational sign, as directed under 43 CFR 3160.

One residence is located within 1,000 feet of the proposed action. Existing topographical contours and tree screens would be maintained to minimize impacts to public health and safety, including visual resources and noise. There would be an approximate two week period of intensive water hauling to the well location that would most likely be noticeable to area residents. Additionally, noise would increase in the area during construction and drilling phases.

Additional hazards to the general public include safety hazards associated with increased traffic during construction, drilling, and reclamation activities. General hazards around producing oil and gas fields such as accidental pipeline failures and moving equipment like pump jacks are also potential/present. Hydrogen sulfide gas is not known to be or expected to be a problem within the analysis area.

4.0 Environmental Consequences and Proposed Mitigation Measures

No Action

Under the No Action Alternative, the proposed wells would not be drilled. There would be no new impacts from oil and gas production to the resources. The No Action Alternative would result in the continuation of the current land and resource uses in the project area and is used as the baseline for comparison of alternatives.

Proposed Action

A summary of potential surface disturbance is presented in Table 4.0.1. Descriptions of potential effects on individual resources for the Proposed Action are presented in the following text. Also described are potential mitigation measures that could be incorporated by the BLM where appropriate as Conditions of Approval attached to the permit.

Table 4.0.1 – Summary of Disturbance

Facility			Proposed Actions		Duration
			Feet	Acres	
Lybrook A32-2306 No. 01H	Well Pad	New Disturbance	300 x 300	2.07	Short Term
			-	0.75*	Long Term
	Construction Zone		1,400 x 50	1.61	Short Term
	Access Road		2,005 x 30	1.38	Long Term
	Well-tie Pipeline		718 x 20	0.33	Short Term
Lybrook H32-2306 No. 01H	Well Pad		300 x 300	2.07	Short Term
			-	0.75*	Long Term
	Construction Zone		1,400 x 50	1.61	Short Term
	Access Road		900 x 30	0.62	Long Term
	Well-tie Pipeline		235 x 20	0.11	Short Term
Total New Disturbance				**9.80**	**Short Term**
				3.50	**Long Term**

* All well pads will have interim reclamation, average long-term disturbance has been determined by the BLM to be approximately 0.75 acres.

Short-term impacts are those which can be stabilized or mitigated rapidly (within 5 years). Long-term impacts are those that would substantially remain for more than 5 years.

4.1 Air Resources

4.1.1 Direct and Indirect Effects

4.1.1.1 Air Quality

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

4.1.1.2 Climate

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

The proposed action would result in very small direct and indirect short-term increases in several criteria pollutants, hazardous air pollutants, and GHGs. These emissions are not expected to impact the 8-hour average ozone concentrations, or any other criteria pollutants in the southern San Juan Basin.

4.2 Cultural Resources

4.2.1 Direct and Indirect Effects

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

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

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

4.3 Soils

4.3.1 Direct and Indirect Effects

Due to the nature of drilling for oil and gas there would be soil disturbance within the analysis area. 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. The proposed A32 well location would require a maximum cut of approximately 11 feet and a maximum fill of 5 feet, while the proposed H32 well location would require a maximum cut of approximately 2 feet and a maximum fill of 2 feet. Available topsoil would be stockpiled for reclamation. The cut and fill slopes on each location would be especially susceptible to wind and water erosion until vegetation has been re-established (typically 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 project.

Approximately 6.3 acres of new surface disturbances would be reclaimed (approximately half of the well locations and the entire well-tie pipeline disturbances). Re-vegetation will reduce or minimize impacts created by water and/or wind erosion. The remaining surface disturbances 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.

Other construction design practices could include culverts, diversion ditches, berms, and other such soil erosion control structures (see attached COAs). Existing dirt roadways may be re-ditched and re-crowned or surfaced at the direction of the BLM, to minimize sedimentation.

4.4 Water Resources

4.4.1 Direct and Indirect Effects

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 more than 5 acres; however, *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 well and well-tie pipeline construction and site stabilization.

A U.S. Army Corps of Engineers Section 404 permit for the discharge of dredged and fill material into jurisdictional waters of the U.S. and other special aquatic sites would not be required for the proposed activities.

Typical construction design practices implemented include drainage diversions constructed such that water would drain around and away from the well pads, minimizing impacts to watershed health. Drainages and diversions would be established upon reclamation once the construction phases have

been completed. Additional hydrological BMPs would be installed where needed to maintain drainages along roads and throughout the action area (see attached COA's). Rapid and permanent vegetation and cover re-establishment would minimize impacts to watershed health. The areas not used for vehicle operating surfaces would be reseeded with a BLM/FFO designated seed mixture.

There are no perennial water sources within the analysis area. Effects to ground water resources would be low due to mitigation measures such as casing. 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).

The proponent would obtain a documented and allotted amount of water for use in drilling these wells. 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 sources.

4.5 Vegetation

4.5.1 Direct and Indirect Effects

The proposed action would result in the loss of approximately 9.80 acres of established vegetation, including the removal of between 75 and 100 juniper and piñon pine trees. Following installation of the proposed well-tie pipelines and the reclamation of unused portions of the well locations, approximately 6.3 acres would be recontoured and reseeded with an FFO-designated seed mixture. There would be a long-term loss of approximately 3.50 acres of vegetation within the analysis area.

4.6 Livestock Grazing

4.6.1 Direct and Indirect Effects

The proposed action would remove approximately 9.80 acres of potential livestock forage, resulting in a change to the vegetative species composition within the analysis area. Impacts to grazing resources would occur from the direct short-term loss of existing forage within the project area. The disturbed areas not needed for long-term use (approximately 6.3 acres) would be expected to re-vegetate within 1 to 2 years following reclamation. Indirect effects from maintenance and well servicing would result from human activity that may disturb livestock occurring within or near the project area. Depending on the time of year, cattle, horse, or sheep may occur in or near the proposed project area. Long term disturbance is anticipated to be approximately 3.50 acres.

All hazards to livestock and wildlife 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.

4.7 Migratory Birds

4.7.1 Direct and Indirect Effects

The proposed action would result in the removal of approximately 9.80 acres of potential migratory bird habitat. Adult migratory birds would not be directly harmed by the proposed actions because of their mobility and ability to avoid areas of human activity. Any nests within the action area may be directly impacted, along with eggs and juveniles. 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. Long term production operations would result in only a slight

increase in human activity in the immediate proposed action area. Following the reclamation of approximately 6.3 acres 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 low short-term effects to migratory birds, and minimal long-term effects as a result of the proposed project.

Design features and BMPs designed to minimize effects on migratory birds 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. Rapid and permanent vegetation and cover re-establishment 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.

4.8 Special Management Species

4.8.1 Direct and Indirect Effects

The proposed project area provides potential foraging habitat for the prairie falcon, golden eagle, and ferruginous hawk. There would be a temporary loss of approximately 9.80 acres of potential foraging habitat prior to rehabilitation and reseeding. Increases in noise and activity would be minimal and consistent with current activities in the area. The proposed action would result in the long-term loss of approximately 3.50 acres of foraging habitat for SMS raptor species.

4.9 Public Health and Safety

4.9.1 Direct and Indirect Effects

The proposed action is located in a somewhat remote area on surface managed by the New Mexico SLO. Approximately seven wells have been drilled within a one mile radius to the proposed project area. The project area is not located near any designated recreational areas, major highways, or residential areas. Noise in the area would increase during construction and drilling in the immediate vicinity. Effects to public safety would be low for the short and long term, and would include increased traffic risks, chemical spills, pipeline failures, and equipment accidents.

The operator is responsible for the proper training and the health of its employees. Occupational Safety and Health Administration (OSHA) safety laws and regulations, BLM Notice to Lessee (NTL)-3A, pipeline safety regulations 49 CFR Parts 190 and 192, the Emergency Planning and Community Right to Know Act (1986), and CERCLA 1980, amongst other legislation, have been enacted to ensure the health and safety of workers and the public at large. A well location must have an informational sign, as directed under 43 CFR 3160.

5.0 Cumulative Impacts

The analysis area is located within the San Juan Basin which has been industrialized with oil and gas well development. The surface disturbance for each project that has been permitted throughout the Basin has created a spreading out of land use fragmentation. The cumulative impacts fluctuate with the gradual reclamation of well abandonments and the creation of new additional surface disturbances in the construction of new access roads, well pads, and associated well-tie pipelines and larger distribution lines. The on-going process of restoration of abandonments and creating new disturbances for drilling new wells gradually accumulates as the minerals are extracted from the land. Preserving as much land as possible and applying appropriate mitigation measures will alleviate the cumulative impacts.

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

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

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

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 these wells 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 dependent 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.

6.0 Supporting Information

6.1 Tribes, Individuals, Organizations, or Agencies Consulted

Jason Edwards – NCE Surveys

Steven Fuller – La Plata Archaeological Consultants

Brenda Linster – Encana Oil & Gas (USA) Inc.

6.2 List of Preparers

Jillian Aragon – Bureau of Land Management – Farmington Field Office

Steven 'Craig' Willems – Bureau of Land Management – Farmington Field Office

Matthew Zabka, Environmental Specialist – Adkins Consulting, Inc.

Lori Gregory, Wildlife Biologist – Adkins Consulting, Inc.

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7.0 Appendices

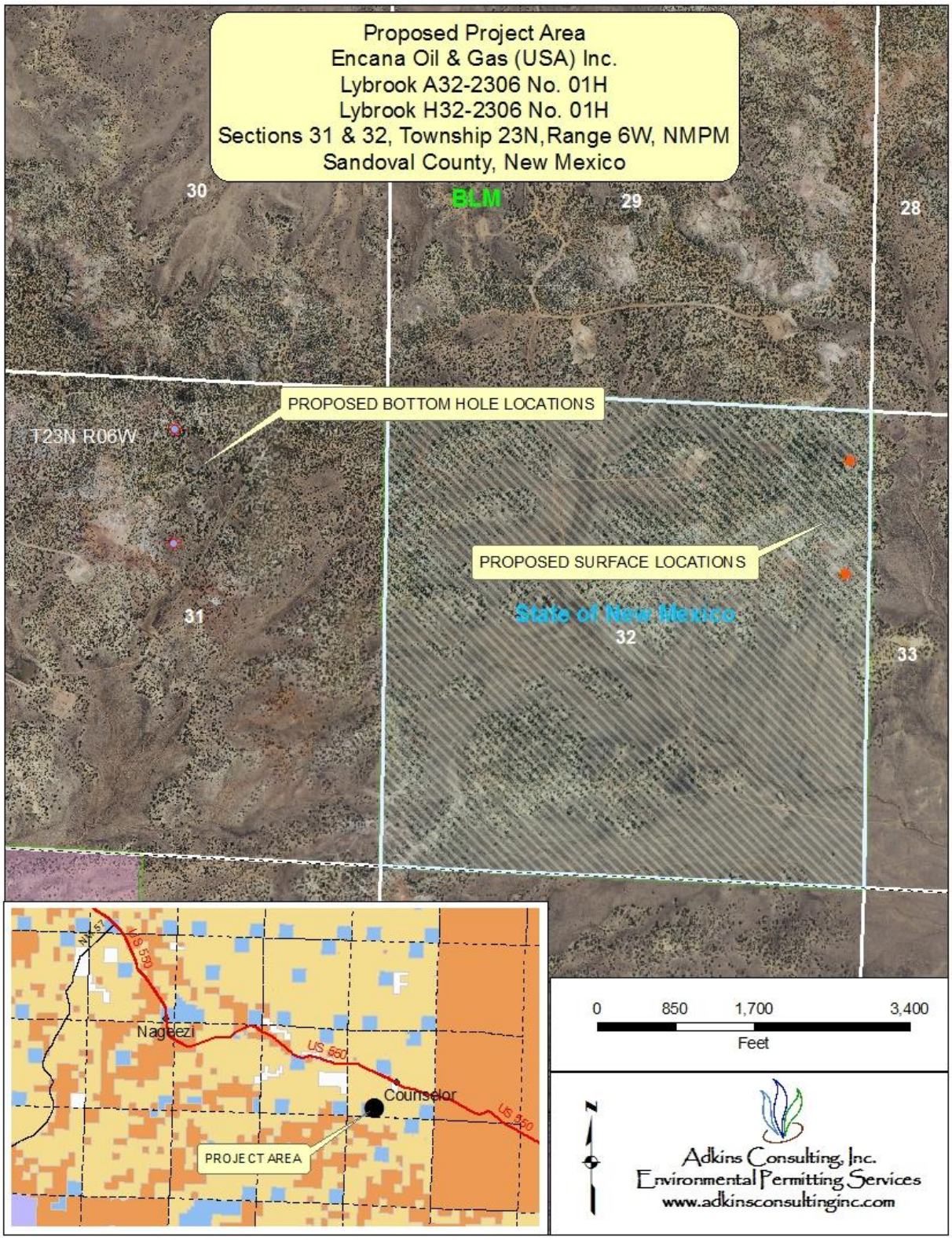
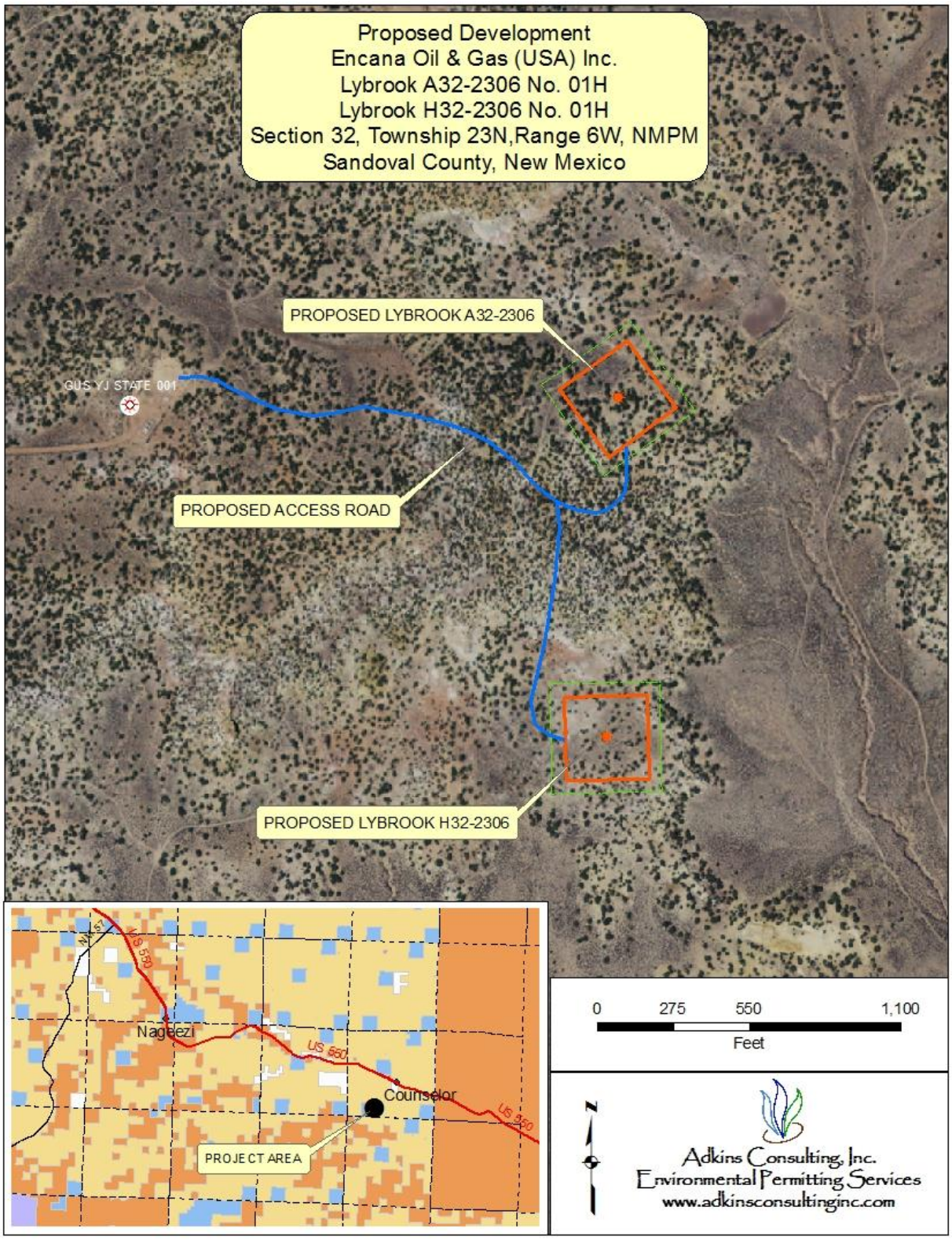
7.1 APD/COA

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

7.2 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.
U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.

7.3 Proposed Project Area



7.4 Proposed Development