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Encana Oil & Gas (USA) Inc.

Good Times P36A-2410
&
Good Times P36-2410

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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 Good Times P36A-2410 and Good Times P36-2410 oil and natural gas well projects. The proposed well locations would each contain four exploratory (wildcat) wells, and are intended to target liquid (oil) reserves within the Bisti Gallup Pool of 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 proposed well locations, including the associated well-tie pipelines and access roads, are located in Section 36, Township 24 North, Range 10 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

The purpose for the proposal is to provide Encana with reasonable access to their mineral leases. The need for the action is established by the BLM's responsibility under the Mineral Leasing Act to respond to an 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, 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.

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

1.4.1 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. 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 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.

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

The EPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total 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 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. None of the proposed project is located within an FFO-designated paleontological SDA.

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

1.4.7 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 pad, well-tie pipeline, and access road. 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.

Additionally, the Operator 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 these wells, including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
· Certify that a Surface Use Agreement has been reached with private landowners where applicable.

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 cultural resources?
- 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 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?

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 application, 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 Bisti Gallup Pool of the Mancos Shale Formation. The proposed project area can be accessed via US Highway 550 south from Bloomfield, New Mexico, and is located approximately 5.7 miles west of Nageezi and 5.7 miles north of Kimbeto in Section 36 of Township 24 North, Range 10 West. The proposed project is located on surface managed by the BLM and would develop federal minerals administered by the BLM/FFO in Section 1 of Township 23 North, Range 10 West (Lease No. NM-042059), and state minerals administered by the State of New Mexico Oil Conservation Division (NMOCD) in Section 36 of Township 24 North, Range 10 West (Lease No. LG9804 and LG5686). New surface disturbance for the proposed project would be approximately 14 acres.

The proposed well pads would be 400 feet by 490 feet with an additional 50-foot temporary construction buffer zone on all four sides. The proposed P36A well pad would require a fill of 12 feet at corner three, and therefore this corner of the well pad would be rounded to minimize excessive disturbance. The P36A well pad would require a maximum cut of 13 feet at center left. Silt traps would be established within the construction zone above the cut near center left between corners five and six, and between corner six and the proposed access road, to provide for the proper containment of potential surface water run-off and avoid excessive erosion. The proposed P36 well pad would require cuts of 21 feet at corner three and 15 feet at corner five, as well as 23 feet of fill at corner six. These corners would be rounded to avoid excessive site disturbance and to avoid fill being placed on the existing pipeline near corner six. In addition, a silt trap would be established within the construction zone above the cut between the center rear of the pad and corner five. 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 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 13.55 acres.

To provide access to the well locations, Encana is proposing to construct 310 feet of new road for the P36A location, and 170 feet of new road for the P36 location. The access roads would be constructed with an average clearing width of 30 feet, and would be developed to BLM 'Gold Book' standards. A 24-inch culvert would be placed at the entrance to the P36A well location to provide for the proper drainage of potential surface water run-off around and away from the pad. To provide access to the proposed Good Times D06-2309 location, Encana is proposing to utilize the P36A pad, with the access exiting near the center rear of the pad. New surface disturbance as a result of the proposed access roads would be approximately 0.33 acres.

Once the proposed wells are completed, associated well-tie pipelines would be constructed within granted 40-foot wide Right-of-Ways (ROWs) to transport produced natural gas to the proposed Encana Good Times Trunk No. 1. The proposed P36A well-tie pipeline would be constructed parallel to proposed access road for approximately 364 feet. The proposed P36 well-tie pipeline would be approximately 269 feet in length, and would be constructed entirely within the proposed well pad area and temporary construction zone. New surface disturbance from well-tie pipeline construction would be approximately 0.17 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 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 the wells, 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 action, refer to the APD (attached as Appendix 7.1). 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 7.1 and incorporated and analyzed in this alternative.

Proposed Well Information:

Good Times P36A-2410

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36A-2410	01H	24 North	10 West	36	Surface: 287' FSL 862' FEL	LG9804 & LG5686 (NMOCD)

		23 North		1	Bottom Hole: 330' FSL 1730' FEL	NM042059 (BLM)

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36A-2410	02H	24 North	10 West	36	Surface: 314' FSL 850' FEL	LG9804 & LG5686 (NMOCD)
		23 North		1	Bottom Hole: 330' FSL 1430' FEL	NM042059 (BLM)

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36A-2410	03H	24 North	10 West	36	Surface: 341' FSL 837' FEL	LG9804 & LG5686 (NMOCD)
		23 North		1	Bottom Hole: 330' FSL 730' FEL	NM042059 (BLM)

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36A-2410	04H	24 North	10 West	36	Surface: 368' FSL 824' FEL	LG9804 & LG5686 (NMOCD)
		23 North		1	Bottom Hole: 330' FSL 430' FEL	NM042059 (BLM)

Good Times P36-2410

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36-2410	01H	24 North	10 West	36	Surface: 1341' FSL 255' FEL	LG9804 & LG5686 (NMOCD)
					Bottom Hole: 2180' FSL 330' FWL	

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36-2410	02H	24 North	10 West	36	Surface: 314' FSL 850' FEL Bottom Hole: 330' FSL 1430' FEL	LG9804 & LG5686 (NMOCD)

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36-2410	03H	24 North	10 West	36	Surface: 341' FSL 837' FEL Bottom Hole: 330' FSL 730' FEL	LG9804 & LG5686 (NMOCD)

Property Name	Well Number	Township	Range	Section	Footages	Lease Number(s)
Good Times P36-2410	04H	24 North	10 West	36	Surface: 368' FSL 824' FEL Bottom Hole: 330' FSL 430' FEL	LG9804 & LG5686 (NMOCD)

County: San Juan, New Mexico

Applicant: Encana Oil & Gas (USA) Inc.

Surface Management: Bureau of Land Management, Farmington (NM) Field Office

Administrative Agency: State of New Mexico Oil Conservation Division (Lease No. LG9804 & LG5686); Bureau of Land Management, Farmington (NM) Field Office (Lease No. NM042059)

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, La Plata Archaeological Consultants, and Adobe Contractors. 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).
- 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 on the proposed well locations would be used on the fill portions. 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 proposed P36A project area is piñon-juniper woodland, while that within the proposed P36 project area is sagebrush.
- 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 ROW / 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.
- The operator shall ensure that dust abatement measures be taken on all applicable roadway surfaces, 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, an approved bird nest survey must be conducted. Activities would not be permitted without written approval from the BLM/FFO. 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. 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.
- 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.
- 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 250 feet, or as specified by the BLM, to protect any shallow aquifers or ground water resources. An operation plan with the proposed casing program to protect these resources would be submitted with the APD.
- Proposed construction design practices include drainage diversions constructed such that potential surface water would drain around and away from the well pads. Natural drainages and

diversions would be re-established upon reclamation once the final layout and construction phases have been completed. Additional hydrological BMP's would be installed where needed to maintain drainages along access roads and within 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 an FFO-designated seed mixture.

- Approximately 12.22 acres of new surface disturbances would be reclaimed. Re-vegetation will reduce or minimize impacts created by water and/or wind erosion. Approximately half of the well locations and the entire well-tie pipeline disturbances would be reclaimed. 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.

2.3 Alternatives Considered But Not Analyzed

No alternatives have been developed that would result in fewer disturbances than the proposed activities. The proposed project was selected for the best drainage of subsurface resources while protecting surface resources to the maximum extent possible. There will be four wells on each well pad which will reduce impacts to the surrounding area.

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 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 (CO2), methane (CH4), nitrous oxide (N2O), 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 seven nationally regulated ambient air pollutants (criteria 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

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 concentrations in the analysis area are described below. Total emissions of criteria pollutants from each source sector were calculated by adding together the emissions from San Juan, McKinley, Rio Arriba, and Sandoval Counties.

Table 3.1.1 shows monitoring values for ozone in recent years for each of the three San Juan County ozone monitoring stations.

Table 3.1.1. Reported Ozone Values for San Juan County Ozone Monitoring Stations

State Air Monitoring Station	8-hour Ozone Design Value (ppm[1])			NAAQS[2]
	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
(2) NAAQS – National Ambient Air Quality Standards

Table 3.1.23.1.2 summarizes monitored values for other criteria pollutants in San Juan County.

Table 3.1.2. Criteria Pollutant Concentrations Monitored Values in San Juan County

Pollutant	Range of Design Values	Averaging Time	Observation Period	NAAQS[1]	NMAAQS[2]
NO_2 [3]	7-16 ppb[4]	Annual	2005-2010	53 ppb	50 ppb
NO_2	37-50 ppb	1-hour	2005-2010	100 ppb	None
CO [5]	4.6-10.6 ppm[6]	1-hour	1990-2000	35 ppm	13.1 ppm
CO	1.7-5.2 ppm	8-hour	1990-2000	9 ppm	8.7 ppm
PM_{10} [7]	15-116[8] µg/m^3 [9]	24-hour	1990-2011	150 µg/m^3	150 µg/m^3 [9]
$PM_{2.5}$ [10]	4.3-6.6 µg/m^3	Annual	2000-2010	15 µg/m^3	60 µg/m^3 [9]
$PM_{2.5}$	10-15 µg/m^3	24-hour	2000-2010	35 µg/m^3	None
SO_2 [11]	0.001-0.002 ppm	Annual	2005-2010	None	0.02 ppm
SO_2	5-40 ppb	1-hour	2008-2010	75 ppb	None
SO_2	0.002-0.004 ppm	24-hour	2005-2010	None	0.01 ppm

Source: USDI/BLM 2011*b*
(1) NAAQS – National Ambient Air Quality Standards
(2) NMAAQS – New Mexico Ambient Air Quality Standards
(3) NO_2 – Nitrogen dioxide
(4) ppb – parts per billion
(5) CO_2 – carbon dioxide
(6) ppm – parts per million
(7) PM_{10} – particulate matter within an aerodynamic diameter equal or less than 10 microns
(8) These values represent the maximum values.
(9) µg/m3 – micrograms per cubic meter
(10) $PM_{2.5}$ – particulate matter within an aerodynamic diameter equal or less than 2.5 microns
(11) SO_2 – sulfur dioxide

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 2011*b*). Lead emissions are not an issue in this area and will not be discussed further.

Updates to the NAAQS since the Farmington PRMP/FEIS include a change to the ozone standard and the addition of hourly standards for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2). The most significant change relevant to this analysis is the NO_2 hourly standard of 100 parts per billion (ppb). The form of the standard is the 3-year average of the annual 98th percentile of the daily 1-hour maximum. The design value is a statistic that describes the air quality status of a given area relative to the NAAQS. The analysis area is in attainment for the NO_2 hourly standard.

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 2011*b*). 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.

3.1.2 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 3.1.3 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 3.1.3. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (^{O}F [(1)])	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 2011*b*; data collected at New Mexico State Agricultural Science Center - Farmington
(1) degrees Fahrenheit

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). Traditional cultural properties (Parker and King 1998) are a separate class of cultural resources which may occur in the EA analysis area, 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 and artifact loci.
The entire area of potential affect for the proposed project 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; LAC Reports 2012-1jjj and 2012-1r; BLM reports 2013(I)039F and 2013(I)040F). For the Proposed Action, identification of traditional cultural properties were limited to reviewing existing published and unpublished literature (e.g. Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), and the site-specific cultural resources survey report conducted for the Proposed Action. In addition, the BLM's cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts.

Three cultural resource sites (LA173838, LA 174202, LA 174578) were located and these have been determined eligible for the National Register of Historic Places. No traditional cultural properties are known to exist in the area of potential effect.

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.

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 the Fruitland-Persayo-Sheppard complex.

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.

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

Table 3.3.1

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 Cap.	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

3.4 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. 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.

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers 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 U.S. Army Corps of Engineers (USACE) has jurisdiction over any USGS watercourse (i.e., “blue line” on USGS 1:24,000 topographic maps). There are no “blue line” watercourses within the analysis area as documented on the USGS Blanco Trading Post, NM 7.5-minute series topographic map.

There are no perennial water resources within the analysis area. An unnamed, ephemeral tributary to Kimbeto Wash is located approximately 1 mile east of the project area. A second unnamed, ephemeral drainage is located just to the southwest of the project area and drains southwest over 13 miles into Black Lake. No aquifers or ground water resources are expected to be impacted as a result of the proposed project.

3.5 Vegetation

The analysis area is located in gently rolling terrain consisting of Great Basin Desert scrub and piñon-juniper woodland. A majority of the proposed P36A well pad is located within a piñon-juniper woodland, while a majority of the proposed P36 well pad is located within Great Basin Desert scrub dominated by big sagebrush (*Seriphidium tridentatum*). A typical minor ground cover component of blue grama (*Bouteloua gracilis*), New Mexican prickly pear cactus (*Opuntia phaeacantha*), and broom snakeweed (*Gutierrezia sarothrae*) was present within the sagebrush flat. Rabbitbrush (*Chrysothamnus nauseosus*) and claret-cup cactus (*Coryphantha vivipara*) was also scattered throughout the sagebrush scrub area. A typical very sparse understory of antelope bitterbrush (*Purshia tridentata*), Bailey’s yucca (*Yucca baileyi*), blue grama, rabbitbrush, and galletagrass (*Hilaria jamesii*) was present within the piñon-juniper woodland. Approximately 30 to 40 piñon pine (*Pinus edulis*) and Utah juniper (*Sabina osteosperma*) trees would be removed as a result of the proposed project. No invasive, non-native species listed by the BLM/FFO were identified in the analysis area.

3.6 Livestock Grazing

The proposed project is located within the FFO-managed Kimbeto Community grazing allotment No. 6013. The grazing allotment is approximately 103,413 acres in size. Table 3.6 lists the details of the allotment.

Table 3.6. Details of the Kimbeto Community grazing allotment in the proposed project area.

Allottee	Livestock Number	Livestock Type	Period Begin Date	Period End Date
ATENCIO, CHEE ESTATE	13	SHEEP	3/1	2/28
AUGUSTINE, DAVIS ESTATE	6	SHEEP	3/1	2/28
AUGUSTINE, HERMAN	21	SHEEP	3/1	2/28
AUGUSTINE, JOHN ESTATE	34	SHEEP	3/1	2/28
AUGUSTINE, KEE	9	CATTLE	3/1	2/28
AUGUSTINE, KEE	1	SHEEP	3/1	2/28
MARTINEZ, ALICE	4	CATTLE	3/1	2/28
NORBERTO, BESSIE	21	SHEEP	3/1	2/28
BEGAY-MARTINEZ RAMONA	5	CATTLE	4/1	9/30
HARRISON, STEVEN SR.	27	SHEEP	3/1	2/28
BEGAY, PAULINE	14	SHEEP	3/1	2/28
BENALLY, KARL, SR. ESTATE	21	SHEEP	3/1	2/28
BENALLY, KARL, JR. ESTATE	57	SHEEP	3/1	2/28
BEYALE, DICK SR. AND BEYALE, BESSIE ESTATE	55	SHEEP	3/15	11/15
MANYGOATS, MARY; WELLITO, NELWOOD AND	45	SHEEP	3/1	2/28
EATON, ETHELENE	2	HORSE	8/1	10/31
EATON, ETHELENE	45	SHEEP	8/1	10/31
CHARLEY, ERNEST; BLUEEYES, MARGARET;	3	SHEEP	5/1	10/31
PIOCHE, MARY L. AND CHARLEY, JOHN	17	CATTLE	3/1	2/28
CLY, ELLA JOE (ESTATE)	21	SHEEP	3/1	2/28
CLY, BESSIE AND CLY, GERALD B.	20	SHEEP	10/1	2/28
DEMPSEY, TEDDY LEO (ESTATE) & DOROTHY	17	SHEEP	3/1	2/28
DEMPSEY, TEDDY LEO (ESTATE) & DOROTHY	10	CATTLE	3/1	2/28
DENNISON, JOE AND NANCY (ESTATE)	18	CATTLE	3/1	2/28
DENNISON, JOE AND NANCY (ESTATE)	2	SHEEP	3/1	2/28
DOMINGO, LILLIE	1	HORSE	3/1	2/28
DOMINGO, LILLIE	74	SHEEP	3/1	2/28
EDWAY, MAMIE P. & STANLEY	6	CATTLE	3/1	2/28
EDWAY, MAMIE P. & STANLEY	6	GOAT	3/1	2/28
EDWAY, JEANETT	10	CATTLE	3/1	2/28
EDWAY, JEANETT	51	SHEEP	3/1	2/28
GEORGE, BILLIE (ESTATE)	21	SHEEP	3/1	2/28
HARRISON, LOUISE (ESTATE)	28	SHEEP	3/1	2/28
HARRISON, MARY JANE	4	CATTLE	3/1	2/28
HARRISON, EUGENE & HAROLD	38	CATTLE	11/15	6/15
RENTZ, ELVA	50	SHEEP	1/1	3/31
HESUSE, HENRY & HESUSE, ANDY (ESTATE)	2	HORSE	3/1	2/28
HESUSE, HENRY & HESUSE, ANDY (ESTATE)	24	SHEEP	3/1	2/28
JOHNSON, JOHN FRANK ESTATE	38	SHEEP	3/1	2/28
LANEL, DOROTHY	15	SHEEP	3/1	2/28
KEE, JAMES & FANNIE ESTATE	10	SHEEP	3/1	2/28
LANEL, CHARLES ESTATE	25	SHEEP	3/1	2/28
LOPE, FRED, JR. ESTATE	1	HORSE	3/1	2/28

LOPE, FRED, JR. ESTATE	82	SHEEP	3/1	2/28
LOPE, FRED, SR. ESTATE	4	SHEEP	3/1	2/28
LOPE, MONTOY	18	CATTLE	3/1	2/28
LOPE, MONTOY	1	HORSE	3/1	2/28
LOPEZ, CHIS CHILLIE ESTATE	3	SHEEP	3/1	2/28
HARRISON, HAROLD	7	CATTLE	3/1	2/28
NEWTON, DAVID	10	SHEEP	3/1	10/15
NORBERTO, BETTY T.	37	SHEEP	3/1	2/28
NORBERTO, GRACE (ESTATE)	31	SHEEP	3/1	2/28
NORBERTO, LEE	9	CATTLE	3/1	2/28
NORBERTO, NELSON	16	CATTLE	4/16	11/15
PADILLA, LOUISE	15	SHEEP	3/1	2/28
PIOCHE, HARRY (ESTATE)	20	CATTLE	5/1	10/31
PIOCHE, HARRY (ESTATE)	14	CATTLE	5/1	10/31
SALES, CECIL	7	SHEEP	3/1	2/28
SAM, LUCY	12	SHEEP	3/1	2/28
SCOTT, DICK (ESTATE), SCOTT, ROSIE & LEONARD	3	CATTLE	3/1	2/28
SCOTT, DICK (ESTATE), SCOTT, ROSIE & LEONARD	18	SHEEP	3/1	2/28
TRUJILLO, MAE	23	SHEEP	3/1	2/28
TRUJILLO, KEE YAZZIE & KATHERINE	34	SHEEP	3/1	2/28
TRUJILLO, KEE YAZZIE & KATHERINE	4	HORSE	3/1	2/28
TRUJILLO, JAKE ESTATE	50	SHEEP	3/1	2/28
TRUJILLO, JAKE ESTATE	45	SHEEP	3/1	2/28
TRUJILLO, OSCAR	38	SHEEP	3/1	2/28
TRUJILLO, ROSITA	35	SHEEP	3/1	2/28
TRUJILLO, ROSITA	36	SHEEP	3/1	2/28
TSO, CLARENCE ESTATE	45	SHEEP	3/1	2/28
TSO, CLARENCE ESTATE	7	CATTLE	3/1	2/28
TSO, CLARENCE ESTATE	13	SHEEP	3/1	2/28
TSO, PAUL & MARY	2	HORSE	3/1	2/28
TSO, PAUL & MARY	54	SHEEP	3/1	2/28
TSOSIE, GRACE S. AND LEE, STELLA T. (ESTATE)	100	SHEEP	6/1	2/28
TSOSIE, GRACE S. AND LEE, STELLA T. (ESTATE)	37	SHEEP	6/1	2/28
VALINO, FRANK ESTATE	15	SHEEP	3/1	2/28
WERITO, ART, ADA AND ARCHIE (ESTATE)	4	SHEEP	3/1	2/28
WERITO, ART, ADA AND ARCHIE (ESTATE)	4	GOAT	3/1	2/28
WERITO, CECIL	7	CATTLE	3/1	2/28
WERITO, PAULINE	13	SHEEP	3/1	2/28
WERO, WILLITO ESTATE	4	SHEEP	3/1	2/28
WILLITO, NELWOOD	38	SHEEP	3/1	2/28
WILLITO, NELWOOD	29	SHEEP	3/1	2/28
WILLITO, NELWOOD	2	HORSE	3/1	2/28
NEZ, LOUISE R.	9	SHEEP	3/1	2/28
YAZHE, KATIE	27	SHEEP	3/1	2/28
ATENCIO, ELSIE Y.	18	SHEEP	3/1	2/28
WERITO, BOBBY; HARRY & GILBERT YAZZIE;	20	CATTLE	3/1	2/28
WERITO, BOBBY; HARRY & GILBERT YAZZIE;	15	CATTLE	3/1	2/28
YAZZIE, KEE TSO	4	CATTLE	3/1	2/28
LOPEZ, WILSON	30	SHEEP	3/1	6/30
RENTZ, ELVA	50	SHEEP	3/1	3/31
MARTINEZ, SAM	7	SHEEP	3/1	2/28
CANUTO, JOE, JR. ESTATE & CANUTO, EVELYN	10	SHEEP	3/1	8/31

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 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.	K
Black-throated sparrow (*Amphispiza bilineata*)	Xeric habitats dominated by open shrubs with areas of bare ground.	S
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

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.	S
Swainson's hawk (*Buteo swainsoni*)	Soars over open plains and prairie with uptilted wings in teetering, vulture-like flight. Gregarious, usually migrates in large flocks.	NS
Scaled quail (*Callipepla squamata*)	Barren mesas and plateaus, semidesert scrublands, and grasslands with mixed scrub.	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.	S
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.	S
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
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.	S
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.	S
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
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. NP = Habitat not present and species unlikely to occur within the project area.		

Sources: New Mexico Avian Conservation Partners, New Mexico Partners-In-Flight (nmpartnersinflight.org); National Geographic Society, *Field Guide to the Birds of North America*. 1999.

3.8 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 BLM/FFO and their potential to occur in the analysis area.

Common Name (*Scientific name*)	Status*	Habitat Associations/Distribution	Presence**
BIRDS			
American peregrine falcon (*Falco peregrinus anatum*)	SoC SMS NM-T Sen	Nest in ledges or potholes on cliffs in wooded/forested habitats; forage over riparian woodlands, coniferous & deciduous forests, shrublands, prairies; breed locally in mountains and river canyons of western New Mexico east to the Sangre de Cristo, Sandia/Manzano, and Sacramento mountains. The species is a rare winter visitor in lowlands statewide.	NS
Ferruginous hawk (*Buteo regalis*)	SMS Sen	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.	S
Golden eagle (*Aquila chrysaetos*)	SMS	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	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 Falcon is 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* SoC = USFWS Species of Concern SMS = FFO Special Management Species NM-T = State of New Mexico Threatened Sen = BLM New Mexico State Office Sensitive	**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.

The analysis area provides the most suitable foraging habitat for ferruginous hawk. Although it is not suspected for the American peregrine falcon, golden eagle, or prairie falcon to occur within the analysis area, marginal foraging habitat exists. The analysis area does not provide nesting habitat for any of the raptors. No birds of prey or signs of their presence were observed in the analysis area during onsite inspection.

4.0 Environmental Consequences and Proposed Mitigation Measures

No Action

Under the No Action Alternative, the proposed wells would not be drilled, nor would the proposed well-tie pipelines or access roads be constructed. There would be no new impacts from oil and gas production and/or exploration 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.

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 permits.

Table 4.0.1 – Summary of Disturbance

Facility		Proposed Development		Duration
		Feet	Acres	
Good Times P36A-2410	Well Pad	400 x 490	4.50	Short Term
		-	0.75*	Long Term
	Construction Zone	1,980 x 50	2.27	Short Term
	Access Road	310 x 30	0.21	Long Term
	Well-tie Pipeline	364 x 20	0.17	Short Term
Good Times P36-2410	Well Pad	400 x 490	4.50	Short Term
		-	0.75*	Long Term
	Construction Zone	1,980 x 50	2.27	Short Term
	Access Road	170 x 30	0.12	Long Term
Total New Disturbance			**14.05**	**Short Term**
			1.83	**Long Term**

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

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

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).

4.1.1 Direct and Indirect Effects

Criteria Pollutants

Table 4.1.1 shows estimated emissions from one proposed horizontal oil well for criteria pollutants, volatile organic compounds (VOCs), and greenhouse gases. For comparison, Table 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 4.1.1. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well

Equipment Type	Horse-power	Hours Operated/ Day	Days to Completion	Total Hours	NO_X (1) (tons)	CO (2) (tons)	VOC (3) (tons)	CH_4 (4) (tons CO_{2eq}) (5)	CO_2 (6) (tons)
Construction									
Pad and Road Construction									
Dozer	175	10	4-6	40-60	.03-.04	.03-.03	.01-.01	.21-.21	3.67-5.51
Blade/ Track Hoe	150	10	4-6	40-60	.02-.04	.01-.01	0-0	0-.21	2.95-5.15
Drilling Operations									
Main Deck Engine	1,000	24	18-20	432-480	1.71-1.90	.43-.48	.12-.14	.002-.002	176.6-196.3
Mud Pump	1,100	24	18-20	432-480	1.51-1.68	.44-.49	.11-.12	.002-.002	222.2-246.9
Auxiliary Pump Engine	600	8	15-20	120-160	.23-.31	.07-.09	.02-.03	.006-.008	33.67-44.9
Generators (2)	300 total	24	10-15	240-432	.43-.77	.12-.21	.04-.07	.001-.001	63.1-113.6
Completion Operations									
Main Deck Engine	600	11	7-9	77-99	.09-.12	.03-.03	.01-.01	.002-.002	13.5-17.4
Auxiliary Pump Engine	225	8	5-7	40-56	.03-.04	0-0	0-0	0-0	4.21-5.89
Power Swivel	150	8	4-6	32-48	.02-.02	0-0	0-0	0-0	2.08-3.16
Generator	55	12	10-14	120-168	.02-.04	.02-.02	0-0	0-0	3.22-4.50
Interim Reclamation									

Dozer	175	10	4-6	40-60	.03-.04	.02-.03	.01-.01	0-0	3.67-5.51
Blade/ Track Hoe	150	10	4-6	40-60	.03-.04	.01-.01	0-0	0-0	3.44-5.16
Truck		6 trips	50 miles/trip	300 miles	.01	0	0	0	.013
Totals					**4.16-5.05**	**1.18-1.40**	**1.04-1.29**	**.221-.435**	**532.5-654.1**
Operations									
Annual Operations									
Pickup Truck Traffic		20 miles	12	240 miles/ year	0.00	0.00	0.00	0.00	0.126
Oil Haul Truck Traffic per bbl (7) Produced		20 miles	5	100 miles/ year	0.0004	0.0002	0.00	0.00	0.956
Final Reclamation									
Dozer	175	10	4-6	40-60	.03-.04	.02-.03	.01-.01	0-0	3.67-5.51
Blade/ Track Hoe	150	10	4-6	40-60	.03-.04	.01-.01	0-0	0-0	3.44-5.16
Truck		6 trips	50 miles/trip	300 miles	.01	0	0	0	.13
Total					**.07-.09**	**.03-.04**	**.01-.01**	**0**	**8.35-11.9**

(1) NO_X – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) CH4 – methane
(5) CO2eq – carbon dioxide equivalent
(6) CO_2 – carbon dioxide
(7) bbl – billions of barrels

Table 4.1.2. Analysis Area Emissions in Tons/Year, 2008

County	NO_X (1)	CO (2)	VOC (3)	PM_{10} (4)	$PM_{2.5}$ (5)	SO_2 (6)
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)
(1) NO_X – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM_{10} – particulate matter with an aerodynamic diameter equal to or less than 10 microns
(5) $PM_{2.5}$ – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
(6) SO_2 – sulfur dioxide

Table 4.4.1.3 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one horizontal oil well.

Table 4.1.3. Percent Increase in Analysis Area Emissions from the Proposed Action

	NOX [1]	CO [2]	VOC [3]	PM_{10} [4,5]	$PM_{2.5}$ [5,6]	SO_2 [5,7]
Total Emissions	57,303.4	147,078.1	160,079.0	218,800.3	23,897.3	13,343.3
Horizontal Oil Well Emissions	5.41	1.4	2.0	3.47	0.35	0.51
Percent Increase	**.0009**	**.000009**	**.00001**	**.00002**	**.00001**	**.00004**

[1] NO_X – nitrogen oxides
[2] CO – carbon monoxide
[3] VOC – volatile organic compounds
[4] PM_{10} – particulate matter with an aerodynamic diameter equal to or less than 10 microns
[5] Values derived from average emissions for any well drilling in the analysis area. Calculated results available upon request.
[6] $PM_{2.5}$ – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
[7] SO_2 – sulfur dioxide

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 HAP emissions reported here should be considered a very gross estimate. The calculator estimates that a total of 0.051 tons/year of HAPs would be emitted during construction, drilling, and first year of operation of a proposed horizontal oil well in the San Juan Basin.

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_{2eq} emissions of both CH_4 and CO_2 were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO_{2eq} (76.2 million metric tons; NMED 2010). The estimated CO_{2eq} metric tons emissions from one horizontal oil well (312.5) would represent a 0.000004 percent increase in New Mexico CO_2 emissions.

4.2 Cultural Resources

4.2.1 Direct and Indirect Effects

Direct effects may 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 project 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 project will have no effect on cultural resources.
No significant cultural resources would be affected as a result of the proposed project. Project design features such as temporary barriers will be erected to protect cultural sites during construction and drilling activities. Archaeological monitoring of all ground-disturbing activity within 100 feet of the sites will be required. Effects to significant cultural sites will be avoided by adherence to BLM/FFO cultural resources requirements, based on the archaeological survey report recommendations and the results of the BLM field check. These requirements would be detailed in the Cultural Resource Record of Review, attached to the COAs in the APD.

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 action 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. 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 re-established (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.

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 five (5) 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 bores. 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). No effects to surface water resources are anticipated.

4.5 Vegetation

4.5.1 Direct and Indirect Effects

The proposed action would result in the loss of approximately 14 acres of established vegetation, including the removal of between 30 and 40 juniper and piñon pine trees. Following installation of the proposed well-tie pipelines and interim reclamation of the unused portions of the well locations, approximately 12.2 acres would be recontoured and reseeded with an FFO-designated seed mixture. There would be a long-term loss of approximately 1.8 acres of vegetation within the action area.

4.6 Livestock Grazing

4.6.1 Direct and Indirect Effects

The proposed action would have a total footprint of approximately 14 acres, resulting in a reduction in forage and 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 projected footprint. The disturbed areas not needed for long-term use (approximately 12.2 acres) would be expected to revegetate 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 1.8 acres.

4.7 Migratory Birds

4.7.1 Direct and Indirect Effects

The proposed action would result in the removal of approximately 14 acres of potential migratory bird habitat. Adult migratory birds would not be directly harmed by the proposed project 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. Following the reclamation of approximately 12.2 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 moderate short-term effects to migratory birds, and low long-term effects as a result of the proposed project.

4.8 Special Management Species

4.8.1 Direct and Indirect Effects

The analysis area contains suitable foraging habitat for the ferruginous hawk, and marginal foraging habitat for the American peregrine falcon, golden eagle, and prairie falcon, in the form of extensive open sagebrush scrub. There would be a temporary loss of approximately 14 acres of potential foraging habitat prior to rehabilitation and reseeding of the affected environment. The analysis area does not contain suitable nesting habitat for the raptor species and is not within a 1/3 mile buffer zone to any historically documented raptor nest sites. The proposed project would result in the long-term loss of approximately 1.8 acres of foraging habitat for BLM special management raptor species.

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.

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

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), 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 Eckman – Encana Oil & Gas (USA) Inc.

Jason Edwards – NCE Surveys

Steven Fuller – La Plata Archaeological Consultants

Holly Hill – Encana Oil & Gas (USA) Inc.

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

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6.2 List of Preparers

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

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Lori Gregory, Wildlife Biologist – Adkins Consulting, Inc.

6.3 References

Brugge, David M. 1993. *An Investigation of AIRFA Concerns Relating to the Fruitland Coal Gas Development Area.* Office of Contract Archaeology, University of New Mexico. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

Enquist, Carolyn and Gori, Dave. 2008. *Implications of Recent Climate Change on Conservation Priorities in New Mexico*. April 2008.

EPA Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007. Environmental Protection Agency, Washington, D.C. April 2009

Goddard Institute for Space Studies. 2007. *Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots*. New York, New York. (Available on the Internet: http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif)

Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: The Physical Basis (Summary for Policymakers)*. Cambridge University Press. Cambridge, England and New York, New York. (Available on the Internet: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf)

Intergovernmental Panel on Climate Change (IPCC). *Climate Change 2007, Synthesis Report. A Report of the Intergovernmental Panel on Climate Change.*

Kelly, Klara, Rena Martin, Richard Begay, Ted Neff, and Clifford Werito. 2006 "We Will Help You With What We Know": Diné Traditional Cultural Places In Dinétah. Museum of Northern Arizona Environmental Solutions, Inc, Flagstaff. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

National Academy of Sciences. 2006. *Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies.* National Academy of Sciences. Washington, D.C. (Available on the Internet: http://dels.nas.edu/basc/Climate-HIGH.pdf)

New Mexico Natural Heritage Program. 2005. (Available at:http://nmnhp.unm.edu Latest update: 3 February 2006)

New Mexico Rare Plant Technical Council. 1999. *New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page.* (Available at: http://nmrareplants.unm.edu Latest update: 18 January 2006).

Parker, Patricia L. and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service, *National Register Bulletin 38*. Washington.

Science Applications International Corporation. 2002. *Cultural Resources Technical Report: Background Information on Cultural Resources for the Farmington Draft RMP/EIS*. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

Sesler, Leslie. 2012. *A Cultural Resources Survey of Encana Oil and Gas (USA) Inc.'s Good Times P36A-2410 Number 01H/02H/03H/04H Multiple Well Pad, Access Road, and Pipeline, San Juan County, New Mexico.* La Plata Archaeological Consultants, Report 2012-1jjj. Dolores, Colorado.

Sesler, Leslie and Greg Hovezak. 2012. *Cultural Resources Survey of Encana Oil and Gas (USA) Inc.'s Good Times P36-2410 Number 01H/02H/03H/04H Multiple Well Pad, Access Road, and Pipeline, San Juan County, New Mexico.* La Plata Archaeological Consultants, Report 2012-1r. Dolores, Colorado.

U.S. Department of the Interior and U.S. Department of Agriculture. 2007. *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development.* BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2006. *Web Soil Survey*. Version 1.1. NRCS. http://websoilsurvey.nrcs.usda.gov/app.

U.S. Department of the Interior, Bureau of Land Management. 2003a. *Farmington Proposed Resource Management Plan and Final Environmental Impact Statement*. Farmington, New Mexico.

U.S. Department of the Interior, Bureau of Land Management. 2003b. *Farmington Resource Management Plan with Record of Decision*. Farmington, New Mexico.

U.S. Department of the Interior, Bureau of Land Management and U.S. Department of Agriculture Forest Service, San Juan Public Lands Center (SJPLC). 2006. *Final Environmental Impact Statement, Northern San Juan Basin Coal Bed Methane Project*. Durango, Colorado.

U.S. Department of the Interior, Bureau of Land Management, Farmington Field Office. 2005. *Farmington Field Office Special Status Species Management Policy*. Instruction Memorandum No. IM-NM200-2005-02.

U.S. Department of the Interior, Bureau of Land Management, Farmington Field Office. 2010. *Migratory Bird Treaty Act - BLM/FFO Interim Management Policy*. Instruction Memorandum No. NM-F00-2010-001.

U.S. Fish and Wildlife Service (USFWS).W.S. 2005. (Available at: http://ifw2es.fws.gov/EndangeredSpecies/lists/ListSpecies.cfm)

Valkenburgh, Richard F. Van. 1941. *Diné Bikeyah*. Department of the Interior, Office of Indian Affairs, Navajo Services, Window Rock. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

Van Valkenburgh, Richard F. 1974. *Navajo Sacred Places*. Edited by Clyde Kluckhohn. Garland Publishing. New York.

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7.0 Appendices

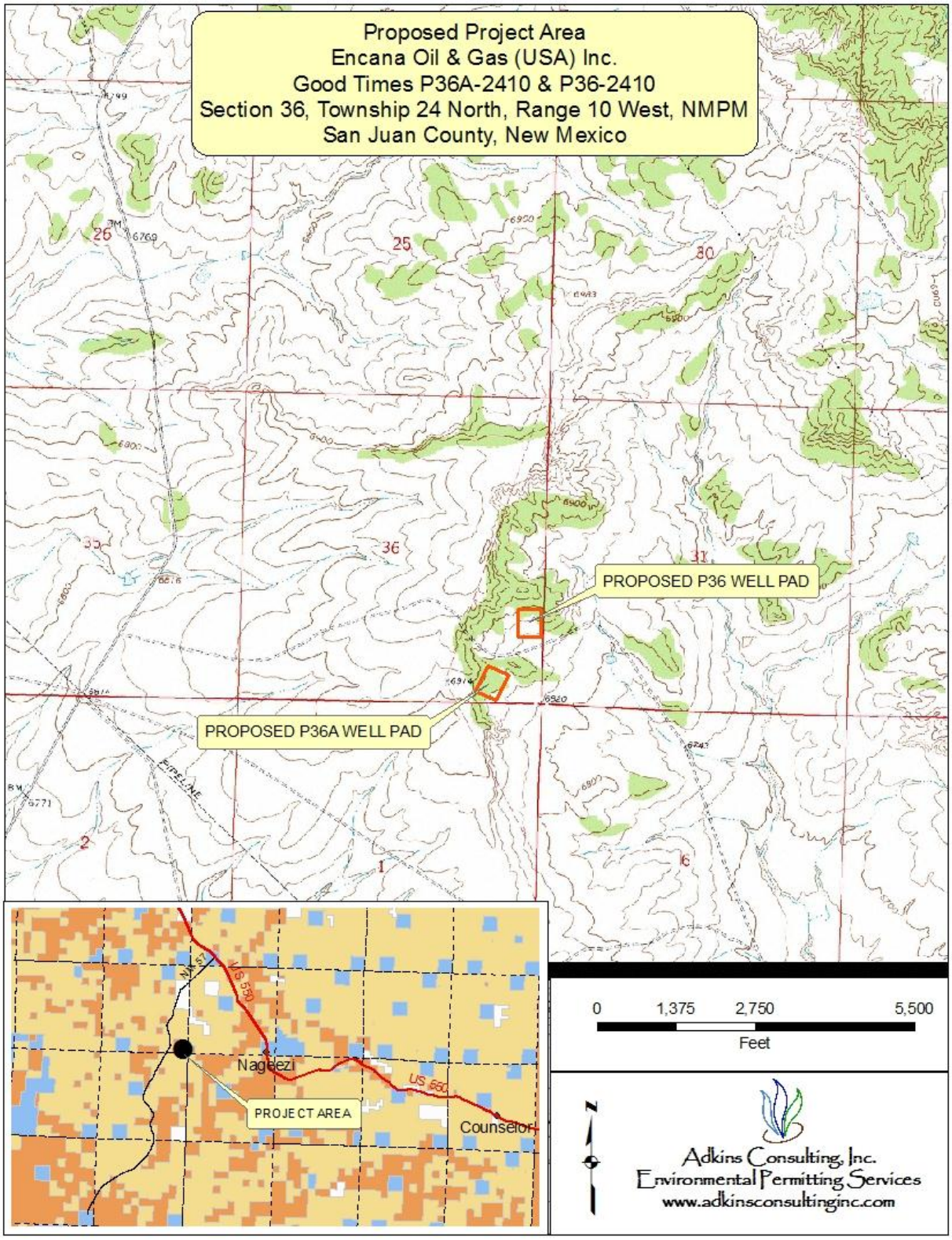
7.1 APD/COA

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

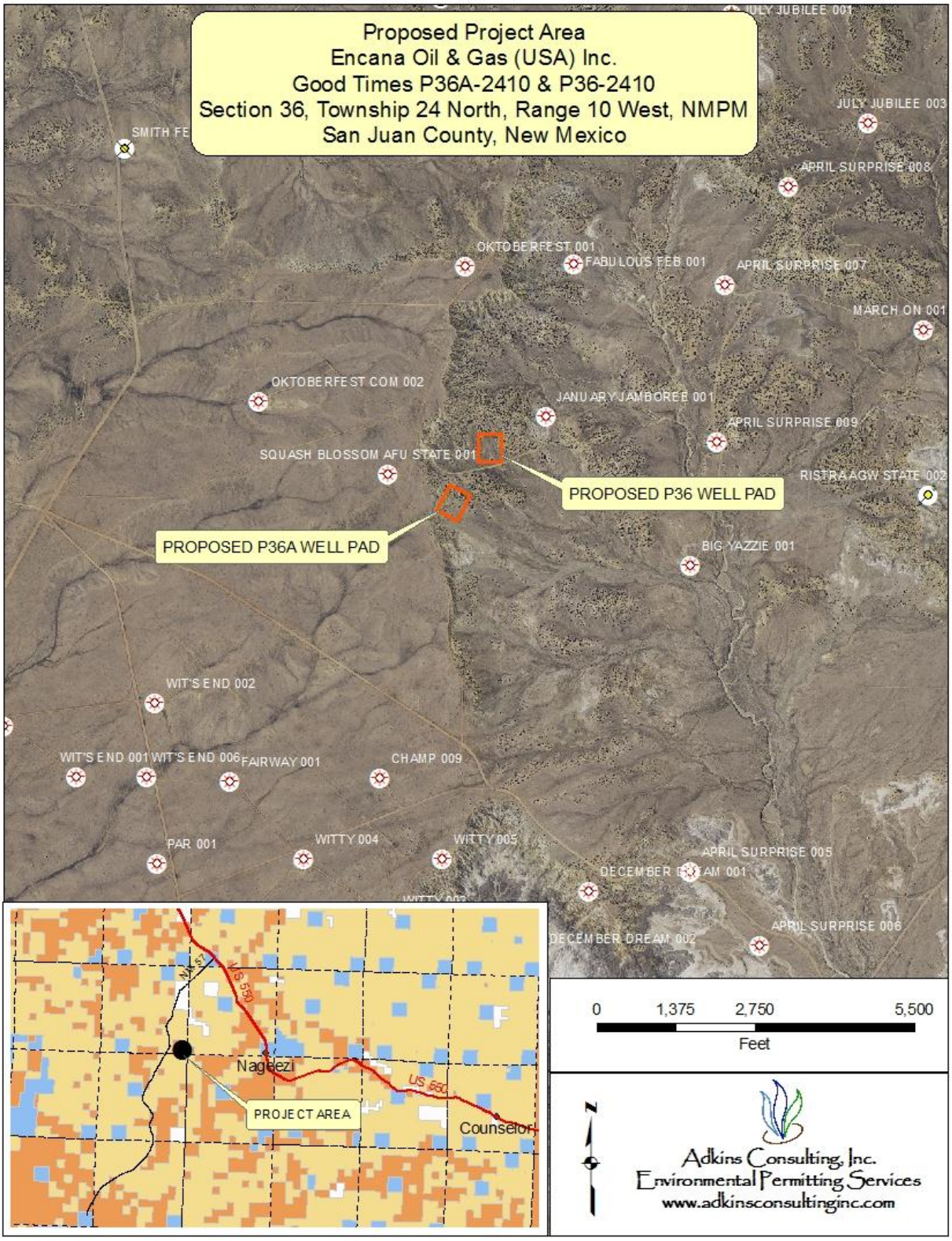
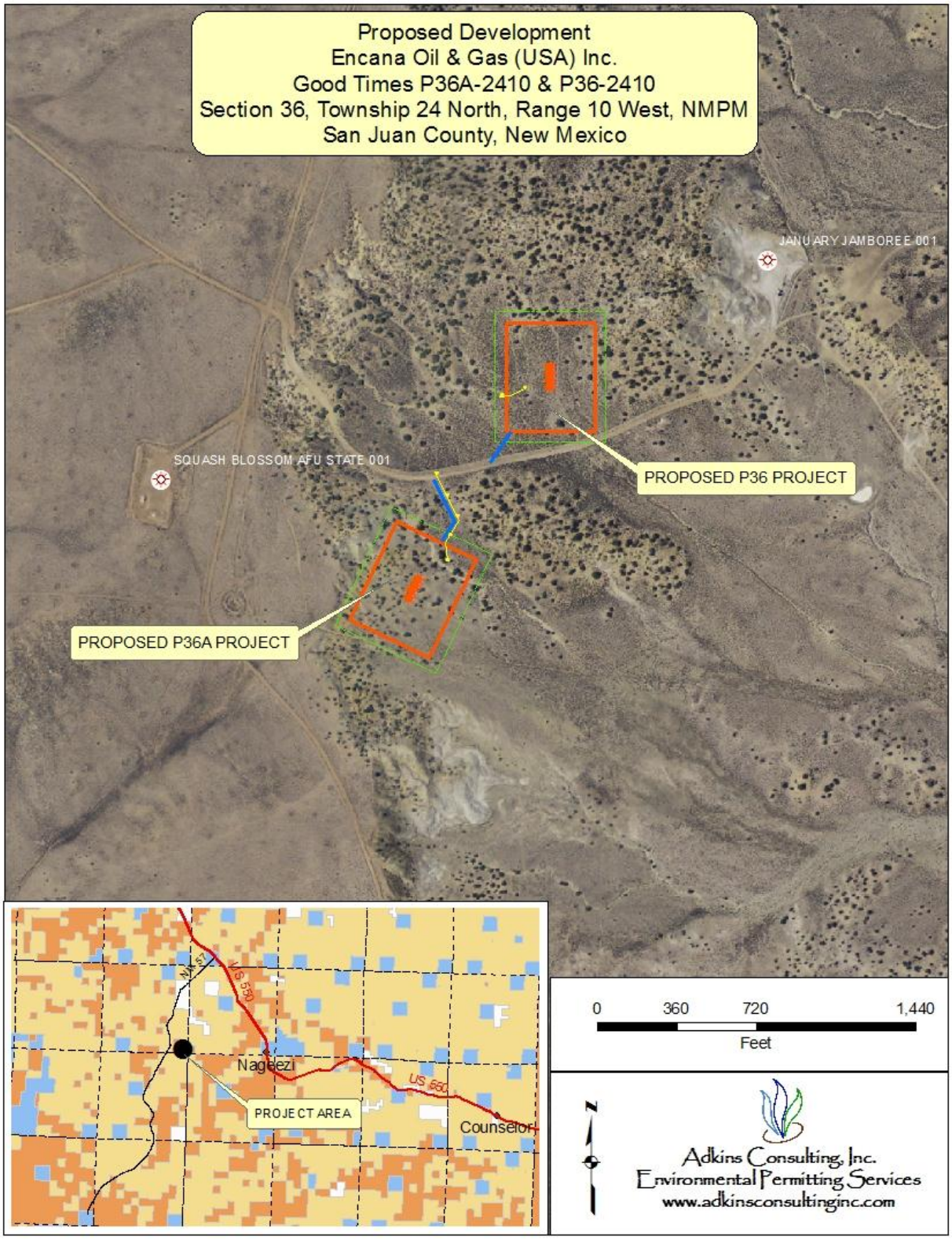
7.2 Authorities

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 (USGS Blanco Trading Post, NM 7.5-minute topographic map)



7.4 Proposed Project Area (Aerial - Digital Orthophoto)



7.5 Proposed Development