United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-F010-2014-0217

LOGOS RESOURCES, LLC.
SARAH B1H & B2H Wells Project

July 2014

U.S. Department of the Interior
Bureau of Land Management
Farmington District
Farmington Field Office
6251 N. College Blvd., Ste. A
Farmington, NM 87402
Phone: (505) 564-7600
FAX: (505) 564-7608

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

TABLE OF CONTENTS

1. Purpose and Need for Action 1
   1.1. Background 1
   1.2. Purpose and Need for Action 1
   1.3. Conformance with Applicable Land Use Plan(s) 1
   1.4. Relationship to Statutes, Regulations or Other Plans 2
   1.5. Scoping, Public Involvement, and Issues 6
2. Proposed Action and Alternative(s) 7
   2.1. Proposed Action 7
   2.2. No Action 11
   2.3. Alternatives Analyzed in Detail 11
   2.4. Alternatives Considered but Eliminated from Detailed Study 11
3. Affected Environment and Environmental Consequences 12
   3.1. Air Resources 12

Table 4. 2012 Criteria Pollutant Monitored Values in San Juan County (U.S. Environmental Protection Agency, 2014) 13

Table 3. Climate Normals for the Farmington Area, 1981-2010 14

Table 4. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well; Average 25 Days to Drill and Complete 15

Table 5. Analysis Area Emissions in Tons/Year, 2011 16

Table 6. Percent Increase in Analysis Area Emissions from the Proposed Action 16

   3.2. Cultural Resources 18
   3.3. Soils 19
   3.4. Water Resources 20
   3.5. Vegetation 22
   3.6. Livestock Grazing 23
   3.7. Migratory Birds 24

Table 3.8 Migratory bird Species of Concern with potential to occur in the analysis area. 25

   3.8. Threatened, Endangered, Sensitive Species 27
4. Supporting Information 30
   4.1. Tribes, Individuals, Organizations, or Agencies Consulted 30
   4.2. List of Preparers 30
   4.3. References 31

APPENDICES A-C 33
   A. SURVEY PLATS 33
   B. PROJECT AREA TOPOGRAPHIC MAP 33
   C. BIOLOGICAL SURVEY REPORT 33

This page intentionally left blank.

1. PURPOSE AND NEED FOR ACTION

1.1. Background

A representative of Logos Resources, LLC (Logos) filed an Application for a Permit to Drill (APD) with the Bureau of Land Management, Farmington Field Office (BLM/FFO), for the Sarah B1H & B2H wells project. The proposed project would drill two (2) horizontal oil wells into the Mancos Formation from one (1) well pad location. Logos has also applied for a Rights-Of-Way (ROW) grant from the New Mexico State Land Office (NMSO) to construct an access road and well-tie pipeline for the Sarah B1H & B2H Wells Project across NM-state land. The proposed project would be constructed on federal lands administered by the BLM/FFO and would be located in Sections 2 & 11, Township 23 North, Range 8 West, in San Juan County, New Mexico. The proposed access road/pipeline ROW would cross a portion of New Mexico State land with a legal description of SW/4 SW/4 of Section 2, T23N, R8W, N.M.P.M. in San Juan County, New Mexico.

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

1.2. Purpose and Need for Action

The purpose for the proposal is to provide Logos reasonable access to BLM managed lands to develop their mineral leases.

The need for the action is established by the BLM's responsibility under the Mineral Leasing Act to respond to an 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. Approved APDs, issued by the BLM, authorizes the applicant to construct and drill the proposed wells.

1.3. Conformance with Applicable Land Use Plan(s)

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan/Final Environmental Impact Statement [(PRMP/FEIS) BLM 2003a]. This EA is in conformance with the management goals set forth in the Resource Management Plan (RMP) for the Farmington Field Office (FFO) of the BLM, which was approved by the Record of Decision (ROD) signed September 29, 2003, and updated in December 2003 (BLM 2003b).

Specifically, this action is in conformance with the following objective: It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands (2003b, 2-2). The PRMP/FEIS, RMP, and ROD are available for

review at the BLM Farmington Field Office, 6251 College Blvd., Ste. A, Farmington, NM, or electronically at:

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

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

1.4. Relationship to Statutes, Regulations or Other Plans

1.4.1 Clean Water Act

Recognizing the potential for the continued or accelerated degradation of the Nation's waters, the U.S. Congress enacted the Clean Water Act, formerly known as the Federal Water Pollution Control Act (33 U.S.C. 1344), in 1977. The objective of the Act is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States.

Under Section 402 of the Act (as amended), the U.S. Environmental Protection Agency (EPA), was directed to develop a phased approach to regulate storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. Industrial activities disturbing land may require permit coverage through a NPDES storm water discharge. Depending on the acreage disturbed, either a Phase I industrial activity (five or more acres disturbance) or a Phase II small construction activities (between one and five acres disturbance) permit may be required. However, gas and oil activities have been exempt from NPDES permitting regulations in New Mexico.

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

1.4.2 Endangered Species Act

The Endangered Species Act (ESA) of 1973 requires all federal departments and agencies to conserve threatened, endangered, and critical and sensitive species and the habitats on which they depend, and to consult with the U.S. Fish and Wildlife Service (USFWS) on all actions authorized, funded, or carried out by the agency to ensure that the action will not likely jeopardize the continued existence of any threatened and endangered species or adversely modify critical habitat. Consultation with the USFWS, as required by Section 7 of the ESA, was conducted as part of the Farmington PRMP/FEIS (Consultation No. 2-22-01-I-389) to address cumulative effects of RMP implementation. The consultation is summarized in Appendix M of the PRMP/FEIS. Farmington Field Office staff reviewed the action alternatives and determined they would be in compliance with threatened and endangered species management guidelines outlined in the September 2002 Biological Assessment (Consultation No. 2-22-01-I-389). Water supply for the Sarah wells will be POD# SJ-01979 (Blanco Trading Post) located at U.S. Highway 550 and NM-State Route 57 in Section 32, T24N, R09W. Water supply may also be acquired at POD# SJ-00077 Hilltop water hole located at U.S. Highway 550 and County Road 7150 in Section 26, T23N, R11W, N.M.P.M. No further consultation with the U.S. Fish and Wildlife Service is required.

Comment [KJB1]: This number is not valid, according to NM State Engineer's office.

1.4.3 National Historic Preservation Act

Compliance with Section 106 responsibilities of the National Historic Preservation Act of 1966 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 FFO will work with industry and NMAQB to help facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

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.

1.4.6 Wastes, Hazardous or Solid

The Resource Conservation and Recovery Act (RCRA), passed in 1976, established 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, corrosiveness, 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 action would include trash, sewage, produced water, and produced hydrocarbons. During construction, a trash receptacle and a chemically treated portable toilet would be on location for trash and sewer disposal. 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 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 a facility site is required under the Comprehensive Environmental Response Compensation and Liability Act, 1980 (CERCLA) and under BLM NTL-3A. All oil and gas facilities must have an informational sign, as directed under 43 CFR 3160.

Additional hazards to the general public in the project area include safety hazards associated with increased traffic during construction, drilling, and reclamation activities. General hazards around producing oil and gas fields such as accidental pipeline failure and moving equipment like pump jacks are

potential/present in the project area. Hydrogen sulfide gas is not known to be or expected to be a problem within the project area.

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 discussed at an interdisciplinary team meeting on March 17, 2014. Internal scoping through a BLM (Interdisciplinary Team) IDT generated resource issues pertinent to the proposed project.

Potential issues include:

- What would be the effect of the alternatives on air resources/air quality?
- What would be the effect of the alternatives on archaeological/cultural resources?
- How would the alternatives affect soils?
- 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?
- How would the alternatives affect the livestock grazing allotment(s) within the analysis area?
- What would be the effect of the alternatives on migratory bird habitat?
- What would be the effect of the alternatives on FFO-designated SMS flora and fauna?

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 this well, including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.

· Certify that a Surface Use Agreement has been reached with private landowners where applicable.

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

Logos proposes to construct one (1) well pad; access road and well-tie pipeline, in order to horizontally drill two (2) oil wells, and develop federal minerals administered by the BLM/FFO. The proposed project area can be accessed by traveling south on U.S. Highway 550 from Bloomfield, New Mexico, then south on a developed oil field service road to the beginning of the proposed access road. The proposed project is located in Sections 2 & 11, Township 23 North, Range 8 West, in San Juan County. New surface disturbance for the proposed project would be approximately 13.50 acres on BLM/FFO-managed lands.

Logos would construct an access road approximately 6,151.86 linear feet with an average clearing width of 30 feet. The proposed pipeline would be constructed within a 40-foot ROW. The proposed well-tie pipeline and access road ROWs would overlap with the pipeline approximately 20 feet from the road centerline. The access road would be developed to BLM Gold Book standards. The proposed access road follows an existing two track road for the majority of the route. New surface disturbance as a result of access road and pipeline construction would be approximately 5.65 acres.

Comment [KJB2]: How much is cross country? According to my numbers, it would be ~1185 feet of cross country

The proposed well pad would be 400 feet by 400 feet with an additional 50-foot temporary construction buffer zone around the perimeter. The pad would require between 5-10 feet of cut and no fill on the south side of the location, approximately 10 feet of cut and 15 feet of fill on the north side of the location, and approximately 10 feet of cut and fill across the center of the location (Appendix A). The construction disturbance zone may be used to stockpile topsoil or vegetative material that would be utilized during reclamation. Production pits, if used, would be lined and meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and requirements, NMAC 19.15.17. Cut and fill slopes would be returned to the original contour upon final reclamation. New surface disturbance as a result of well pad construction would be approximately 3.67 acres. Table 2.1 below lists the well heads and bottom-hole locations for the wells. Table 2.2 below summarizes the individual project disturbance components.

When the well site layout and construction is finalized, drainages and diversions would be established to drain potential surface water run-off around and away from the pad. During interim reclamation, the placement of silt traps, diversion ditches, culverts, and other necessary hydrological BMP's would eliminate excessive erosion of exposed surfaces.

Table 2.1 Surface and bottom locations for the proposed Sarah B1H & B2H Well Project.

Well Number	Surface Hole Location	Bottom Hole Location
Sarah B1H	335' Feet North Line & 1047' Feet East Line Section 11, Township 23 North, Range 8 West	335' Feet North Line & 330' Feet East Line Section 12, Township 23 North, Range 8 West
Sarah B2H	385' Feet North Line &1062' Feet East Line Section 10, Township 23 North, Range 8 West	1655' Feet North Line & 330' Feet East Line Section 12, Township 23 North, Range 8 West

Table 2.2 Surface Disturbance Details for the Proposed Sarah B1H & B2H Well Project.

Facility	Total Acres Disturbed	Acreage Reclaimed[1]	Acres of Long-term Disturbance
Well Pad (400x400 Feet)	3.67	1.83	1.84
Construction Disturbance Zone (90,000 sq.ft.)	2.07	2.07	0.0
Access Road (6,151.86 x40 feet)	5.65	0.0	5.65
Well-tie Pipeline (6,136.26 x15 feet)	2.11	2.11	0.0
TOTALS	**13.50**	**6.01**	**7.49**

[1]These acreages are from interim reclamation, which would begin within 90 days of the well completion and installation of the buried pipeline tie. Reclamation and long-term disturbance areas were calculated by assuming 50% of the 3.67-acre well pad, zero percent of the access road, 100% of the 2.11-acre pipeline disturbance, 100% of the 2.07-acre Construction Zone would be reclaimed after completion (rounded to the nearest hundredth of an acre). Final reclamation would begin within 90 days of well plug and abandonment.

Upon completion of the well and the determination that the well is viable, an associated 6,136.26-foot well-tie pipeline would be constructed within a 40-foot Right-of-Way (ROW) to transport produced fluids to pipeline infrastructure in the S 1/2 of Section 2. The proposed well-tie pipeline would be constructed parallel to the proposed access road. New surface disturbance as a result of well-tie pipeline construction would be approximately 2.11 acres.

Construction of the well-tie pipeline would consist of digging a trench with excavation equipment such as a rock saw or tracked excavator, laying pipe, and back filling the trench. The well-tie would be up to 3-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. 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 segregated from the excavated subsoil to provide rock-free pipeline padding and bedding. In rocky areas, padding material or 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 well may include two (2) 3-phase separator - dehydrator, a meter run, two (2) 400-barrel tanks and/or smaller fiberglass or galvanized tanks for water disposal, and six (6) 400-barrel tanks for storage of produced oil. Two (2) pump jacks will be installed, one for each well head, for the duration of the wells operation.

Farmington Field Office established environmental Best Management Practices (BMP's) will be followed during construction and reclamation of the well site pad, pipeline tie, 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 Appendix 7.1). Also see the subject APD for additional maps showing the proposed well location 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.

Prior to the development of this document, onsite inspections of the proposed project area were conducted by representatives of BLM/FFO, JD Ritter Construction, Western Cultural Resource Management, Logos Resources, Souder, Miller & Associates, and Southwest Environmental, Inc. Design features that were agreed upon during onsite inspections and surveys include the following:

- Migratory bird nest survey required for any new vegetation disturbing activities from May 15 – July 31.
- Brack's cactus located within the project area would be transplanted in accordance with the BLM-FFO Brack's Cactus Transplanting Guidelines 2012. Any permits required by the State of New Mexico will be acquired prior to any transplantation.
- All construction and/or maintenance resulting in surface disturbance would be done in accordance to the BLM Surface Operating Standards and Guidelines for Oil and Gas Development, Fourth Edition-Revised 2007 (The Gold Book). Construction design practices could include culverts, diversion ditches, berms, and other such soil erosion control structures. Additional hydrological BMP's would be installed where needed to maintain drainages along access roads and within the action area (see attached COA's). Excavated materials from the cuts on the proposed location would be used on the fill portions. Reclaimed slopes would be re-contoured to pre-construction topographical contours.
- SPCC structures would meet State of New Mexico, Oil Conservation Division (NMOCD) guidelines and requirements, NMAC 19.15.17.
- Grazing permittees must be notified when construction is scheduled to begin. No livestock improvements will be affected.
- Construction design features and BMPs are intended 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 reestablishment would minimize impacts to migratory birds. All hazards associated with construction and operation of the proposed action would be fenced or contained in storage tanks.
- The dominant vegetation community within the analysis area is sagebrush. The proponent has chosen the following seed mixture for reclamation

purposes: fourwing saltbush (*Atriplex canescens*), winterfat (*Krascheninikova lanata*), Indian ricegrass (*Achnatherum hymenoides*), sand dropseed (*Sporobolus cryptandrus*), galletagrass (*Hilaria jamesii*), Siberian wheatgrass (*Agropyron fragile*), small burnet (*Sanguisorba minor*), and blue flax (*Linum lewisii*).

- Vegetation to be removed would be mowed, mulched, and incorporated into the topsoil. Trees to be removed that are greater than 6 inches in diameter would be cut, de-limbed, and stacked for public firewood gathering access within the project area.
- Re-vegetation will reduce or minimize impacts created by water and/or wind erosion to exposed surfaces. Approximately half of the well location and the entire well-tie pipeline disturbances would be reclaimed, totaling approximately 7.49 acres. The remaining surface disturbance (approximately 6.01 acres) would remain disturbed for the life of the well for production equipment and vehicle travel surfaces. Following final down-hole plugging and abandonment of the well, the entire well pad and access road would be reclaimed.
- It would be the operator's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the proposed project. The operator would contact the BLM-FFO regarding acceptable weed-control methods. If the operator does not hold a current Pesticide Use Permit, a Pesticide Use Permit would be submitted prior to pesticide application. Only pesticides authorized for use on BLM lands would be used. The use of pesticides would comply with federal and state laws. Pesticides would be used only in accordance with their registered use and limitations. The operator would contact the BLM-FFO prior to using these chemicals.
- Above ground structures would be painted to blend with the natural color of the landscape. Paint color would be Covert Green.
- All FFO cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review, attached to the R-O-W/APD. These stipulations may include, but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment, and that it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and or administrative penalties under the provisions of the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm). In the event of a discovery during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM. The BLM would then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., National Register, NAGPRA, ARPA), it will be protected in place until mitigating measures can be developed and implemented according to guidelines set by the BLM.
- Water supply for the Sarah wells will be POD# SJ-01979 (Blanco Trading Post) located at U.S. Highway 550 and NM-State Route 57 in Section 32, T24N, R09W. Water supply may also be acquired at POD# SJ-00077 Hilltop

Comment [KJB3]: This water well number is not usuable, according the NM State Engineer's office

water hole located at U.S. Highway 550 and County Road 7150 in Section 26, T23N, R11W, N.M.P.M.

- The operator proposes to set surface casing to a depth of 500 feet to protect any overlying freshwater aquifers. An operation plan with the proposed casing program to protect these resources would be submitted with the APD.
- All BLM/FFO paleontological resource stipulations will be followed as indicated in the COAs, attached to the ROW application. These stipulations may include, but are not limited to altering the location or scope of the project or permanent fencing or other physical, temporary barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and fossil recovery. If the assessment of proposed action indicates a reasonable expectation of adverse impacts to significant paleontological resources, a field survey will be necessary to properly document and recover any fossil material and associated data. Upon review, a determination for final project clearance and stipulations shall be issued by the BLM/FFO. The proposed project is not located within an FFO-designated paleontological SDA.
- 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.

2.2. No Action

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

2.3. Alternatives Analyzed in Detail

No additional alternatives were considered for this proposed project.

2.4. Alternatives Considered but Eliminated from Detailed Study

Two alternative access road routes were staked and considered. The first route staked was a very direct route leading almost due north from the proposed well site. The total distance was approximately 3,053 feet, but traversed some very difficult terrain and paralleled the drainage coming from the well site. This route was eliminated due to the high impacts from construction and potential impacts to a water course from construction. The second staked alternative approached the well site from the southeast along an existing two-track and was approximately 7,000 feet total length. This route was eliminated due to the greater distance and equally challenging construction details.

Comment [KJB4]: Need more detail. During my site visit, I did not encounter any unusual terrain challenges with this alternative. I was able to drive to the proposed well location without difficulty.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environment that would be affected by implementation of the proposed action 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

3.1.1. Affected Environment

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

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Resources Technical Report; (U.S. Department of Interior Bureau of Land Management, 2014)). This document summarizes the technical information related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved New Mexico's State Implementation Plan and the state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands and within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. EPA has proposed or completed actions recently to implement Clean Air Act requirements for greenhouse gas emissions. Climate has the potential to influence renewable and non-renewable resource management.

3.1.1.1 Air Quality, *Criteria Air Pollutants*

The Air Resources 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. EPA's Green Book web page (U.S. Environmental Protection Agency, 2013) reports that all counties in the Farmington Field

Office area are in attainment of all National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act. The area is also in attainment of all state air quality standards (NMAAQS*). The current status of criteria pollutant levels in the Farmington Field Office are described below. Total emissions of criteria pollutants from each source sector were calculated by adding together the emissions from the four counties that are located in FFO: San Juan, McKinley, Rio Arriba, and Sandoval.*

"Design Concentrations" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design concentrations of criteria pollutants are listed below in Table 4. There is no monitoring for CO and lead in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM10 design concentrations are not available for San Juan County.

TABLE 1. 2012 CRITERIA POLLUTANT MONITORED VALUES IN SAN JUAN COUNTY (U.S. ENVIRONMENTAL PROTECTION AGENCY, 2014)

Pollutant	2012 Design Concentration	Averaging Time	NAAQS	NMAAQS
O_3	0.071 ppm	8-hour	0.075 ppm[1]	
NO_2	13 ppb	Annual	53 ppb[2]	50 ppb
NO_2	38 ppb	1-hour	100 ppb[3]	
$PM_{2.5}$	4.7 µg/m^3	Annual	12 µg/m^3[3,4]	60 µg/m^3[3,6]
$PM_{2.5}$	14 µg/m^3	24 hour	35 µg/m^3[3,3]	150 µg/m^3[3,6]
SO_2	19 ppb	1-hour	75 ppb[5]	

[1] Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
[2] Not to be exceeded during the year
[3] 98th percentile, averaged over 3 years
[4] Annual mean, averaged over 3 years
[5] 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
6 The NMAAQS is for Total Suspended Particulate (TSP)

In 2005, the EPA estimates that there was less than 0.01 ton per square mile of lead emitted in FFO counties, which is less than 2 tons total (U.S. Environmental Protection Agency, 2012). Lead emissions are not an issue in this area, and will not be discussed further.

Air quality in a given region can be measured by its Air Quality Index value. The air quality index (AQI) is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI<50), moderate (50-100), unhealthy for sensitive groups (100-150), unhealthy (>150), very unhealthy and hazardous. The AQI is a national index, the air quality rating and the associated level of health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

Mean AQI values for San Juan County were generally in the good range (AQI<50) in 2013 with 80% of the days in that range. The median AQI in 2013 was 42, which indicates "good" air quality. The maximum AQI in 2013 was 156, which is "unhealthy".

Although the AQI in the region has reached the level considered unhealthy for sensitive groups on several days almost every year in the last decade, there are no patterns or trends to the occurrences (Table 2). On 8 days in the past decade, air quality has reached the level of "unhealthy" and on two days, air quality reached the level of "very unhealthy". In 2009 and 2012, there were no days that were "unhealthy for sensitive groups" or worse in air quality. In 2005 and 2013, there was one day

that was "unhealthy" during each year. In 2010, there were five "unhealthy" days and two "very unhealthy days".

Table 2. Number of Days classified as "unhealthy for sensitive groups" (AQI 101-150) or worse (U.S. Environmental Protection Agency, 2013a)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Days	3	6	9	18	1	0	12	9	0	1

Hazardous Air Pollutants

The Air Resources 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 (U.S. Department of Interior Bureau of Land Management, 2014). The EPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the U.S. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. A review of the results of the 2005 NATA shows that cancer, neurological and respiratory risks in San Juan County are generally lower than statewide and national levels as well as those for Bernalillo County where urban sources are concentrated in the Albuquerque area (U.S. Environmental Protection Agency, 2012).

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

TABLE 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: data collected at New Mexico State Agricultural Science Center - Farmington
[(1)] degrees Fahrenheit

The Air Resources Technical Report summarizes information about greenhouse gas emissions from oil and gas development and their effects on national and global climate conditions. While it is difficult to

determine the spatial and temporal variability and change of climatic conditions; what is known is that increasing concentrations of GHGs are likely to accelerate the rate of climate change.

3.1.2. Impacts from the No Action Alternative

Direct and Indirect Impacts

There would be no impacts to air resources as a result of the No Action alternative.

3.1.3. Impacts from the Proposed Action

Direct and Indirect Impacts

Criteria Pollutants

Methodology and assumptions for calculating air pollutant and greenhouse gas emissions are described in the Air Resources Technical Report (USDI/BLM 2013b). 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. Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (U.S. Department of Interior Bureau of Land Management, 2014).

For comparison, Table 5 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on USEPA's 2011 emissions inventory .

Table 4 shows estimated emissions from one proposed horizontal oil well for criteria pollutants, volatile organic compounds (VOC) and greenhouse gas (GHG). For comparison, Table 5 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on USEPA's 2011 emissions inventory (U.S. Environmental Protection Agency, 2014).

TABLE 4. CRITERIA POLLUTANT AND VOC EMISSIONS ESTIMATED FOR CONSTRUCTION OF ONE HORIZONTAL OIL WELL; AVERAGE 25 DAYS TO DRILL AND COMPLETE

Activity	NOx	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH4	CO2
One time operations (tons)*								
Construction	5.5	1.5	0.5	2.5	0.25	0.1	0.007	598.85
Completion	0.5	0.1	0.03	0.025	0.025	-	-	55.00
Interim Reclamation	0.006	0.006	0.006	0.001	-	0.003	-	1.24
Final Reclamation	0.006	0.006	0.006	0.001	-	0.004	-	1.66
Ancillary Operations (tons)								
Workover	0.129	0.04	0.01	0.01	0.01	-	-	10.59
Road Maintenance	-	-	-	-	-	-	-	0.26
Road Traffic	-	-	-	-	-	-	-	0.06
Annual operations (tons/yr)								

Oil Haul Truck and Small Truck (100 bbl/day)	0.009	0.006	0.0012	0.0009	0.0008	-	0.0001	3.88
Total	**6.13**	**1.64**	**0.55**	**2.54**	**0.29**	**0.11**	**0.01**	**671.54**

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

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

TABLE 5. ANALYSIS AREA EMISSIONS IN TONS/YEAR, 2011

County	NO_X (1)	CO (2)	VOC (3)	PM_{10} (4)	$PM_{2.5}$ (5)	SO_2 (6)
McKinley	11,952.9	17,007.8	3,891.2	70,096.4	7,645.2	1,381.1
Rio Arriba	12,012.3	27,344.6	19,149.8	33,761.2	4,130.6	60.4
San Juan	42,231.5	63,568.9	26,110.8	76,638.3	9,201.0	5,559.3
Sandoval	4,143.8	19,513.9	4,373.1	39,343.0	4,510.8	109.3
Total	**70,340.5**	**127,435.2**	**53,525.0**	**219,838.9**	**25,487.6**	**7,110.0**

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

TABLE 6. PERCENT INCREASE IN ANALYSIS AREA EMISSIONS FROM THE PROPOSED ACTION

	NO_X(1)	CO(2)	VOC(3)	PM_{10}(4,5)	$PM_{2.5}$(5,6)	SO_2(5,7)
Total Emissions	70,340.5	127,435.2	53,525.0	219,838.9	25,487.6	7,110.0
Conventional Gas Well Emissions	6.13	1.64	12.55(8)	2.54	0.29	0.11
Percent Increase	**0.009**	**0.001**	**0.02**	**0.001**	**0.001**	**0.002**

(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
(8) Current EPA regulations require operators to reduce VOC emissions by 95% if their oil storage tanks emit over six tons of VOC emissions per year

Hazardous Air Pollutants

The formulas used for calculating HAPs in the calculators are very imprecise. For many processes it is assumed that emission of HAPs will be equivalent to 10 percent of VOC emissions. Therefore, the

estimated HAP emissions of 1.25 tons/year should be considered a very gross estimate. Most of the VOC emissions estimated for one horizontal oil well result from venting from oil storage tanks. Current EPA regulations require operators to reduce VOC emissions by 95% if their oil storage tanks emit over 6 tons of VOC emissions per year. A reduction of 95% of oil storage tank VOC emissions would reduce the estimated HAP emissions to 0.12 tons/year.

Total Greenhouse Gases

The available statewide GHG summary combines GHG emissions from CO2 and CH4. To compare the GHG emissions from the Proposed Action estimated by the calculator with statewide GHG emissions, CO2e emissions for both CH4 and CO2 were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO2e (76.2 million metric tons; (New Mexico Environment Department, 2010). The estimated CO2e metric tons emissions from one horizontal oil well (609.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO2 emissions.

Cumulative Impacts

The FFO manages Federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley Counties. There are approximately 21,150 active oil and gas wells in the San Juan Basin. About 14,843 of the wells in these counties are Federal wells. Analysis of cumulative impacts for reasonable development scenarios and RFDS of oil and gas wells on public lands in the FFO was presented in the 2003 RMP. This included modeling of impacts on air quality. A more detailed discussion of Cumulative Effects can be found in the Air Resources Technical Report (U.S. Department of Interior Bureau of Land Management, 2014).

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (U.S. Department of Interior Bureau of Land Management, 2014). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

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

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

The Air Resources Technical Report (U.S. Department of Interior Bureau of Land Management, 2014) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

Mitigation Measures and Residual Impacts

Well head valves and piping would be regularly inspected for integrity to prevent fugitive vapor emissions. Bradenhead testing program would be implemented. Pump jack motors would be properly tuned and maintained for maximum efficiency.

3.2. Cultural Resources

3.2.1. Affected Environment

The proposed action 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 Western Cultural Resource Management, Inc. (WCRM) 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). 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.

A total area of approximately 61.34 acres was surveyed, approximately 50.93 acres on FFO/BLM lands and approximately 10.41 acres on New Mexico State lands (WCRM(F)1309; BLM2014(III)062F). During the field survey ten (10) newly discovered sites, one (1) previously recorded site, and nine (9) isolated occurrences were encountered. WCRM has recommended five (5) sites as eligible for the National Register of Historical Places (NRHP).

3.2.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impacts from the No Action alternative.

3.2.3. Impacts from the Proposed Action

Direct and Indirect Impacts

Direct impacts normally include alterations to the physical integrity of a cultural site. If a cultural site is significant for other than its scientific information, direct impacts may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. A potential indirect

impact from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural sites in the area.

Significant cultural sites (e.g. National Register eligible/listed) are being avoided with the implementation of design features such as, but not limited to, reduction of construction areas, temporary barriers, and site monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the COA in the APD/ROW as the case may be. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals.

Cumulative Impacts

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

3.3. Soils

3.3.1. Affected Environment

The San Juan Basin is bordered by the Defiance Uplift and Chuska Mountains to the west, San Juan Dome to the north, Chaco Slope and Zuni Uplift to the south and the Nacimiento Uplift to the east. In total, the San Juan Basin covers a surface of approximately 4,600 square miles. The soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and 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 primarily comprised of the *Badland* soil map unit.

The *Badland* soil unit is found on land form breaks and side slopes. The soil unit's parent material is shale and has slopes ranging from 5 to 80 percent. The depth to a restrictive feature is 0 to 2 inches to paralithic bedrock. The soil unit is described as somewhat excessively drained with a very low to moderately high capacity to transmit water in its most limiting layer. The maximum content of Calcium Carbonate is 5 percent and maximum Gypsum content is 5 percent. It is described as nonsaline to very slightly saline, and the available water capacity is very low (USDA NRCS 2013).

3.3.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impacts from the No Action alternative.

3.3.3. Impacts from the Proposed Action

Direct and Indirect Impacts

Due to the nature of drilling for oil and gas there would be soil disturbance within the action area. 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 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 proposed action would directly disturb approximately 13.50 acres. The heaviest amounts of erosion will be short-term (one to two growing seasons) until the vegetation has established. Effects to soils would likely be low to moderate for the proposed action.

Cumulative Impacts

The PRMP/FEIS determined that "cumulative impacts on soils in the San Juan Basin would comprise the total amount of short term and long term surface disturbance due to all new oil and gas development and other activities" (USDI/BLM 2003a, page 4-123). The PRMP/FEIS projected that 6,756 acres of initial surface disturbance would occur in the Chaco Wash watershed (USDI/BLM 2003a, page 4-7). The proposed action would cumulatively contribute approximately 13.50 acres of short-term disturbance to soils in the watershed, of which approximately 6.01 acres would be reclaimed.

Mitigation Measures and Residual Impacts

Logos will exercise Best Management Practices to protect the integrity of project area soils. The top 6-8 inches of topsoil will be stripped, stockpiled, and stored for later use during reclamation. After completion of construction activities and interim reclamation approximately 6.01 acres would be recontoured and reseeded.

3.4. Water Resources

3.4.1. Affected Environment

The San Juan Basin consists of broad mesas interspersed with many deep canyons with steep canyon walls, dry washes, entrenched narrow valleys, and alluvial fans and floodplains. The planning area is divided into watersheds based on the Hydrologic Units (4th level) delineated by the 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 action is located within the Blanco watershed.

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) has jurisdiction over "waters of the U.S.". These jurisdictional waters include those that have a "significant nexus" to traditional navigable waters. Determining jurisdiction and/or significant nexus can be a time consuming process, therefore the BLM/FFO assumes the USACE has jurisdiction over any U.S. Geological Survey (USGS) watercourse (i.e., "blue line" on USGS 1:24,000 topographic maps). The proposed action would not impact a "blue line" watercourse as documented on the USGS Crow Mesa West, NM 7.5- minute series topographic map.

There are no perennial surface water resources within the analysis area. The project area is situated within the Chaco Watershed. The proposed well site is located in a topographic basin, with surface waters flowing north from the well pad. No ground water resources are anticipated to be affected by the proposed development.

3.4.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impacts from the No Action alternative.

3.4.3. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would comply with water quality, quantity, and ground water protection standards under the Clean Water Act of 1977 and the Safe Drinking Water Act of 1974, as amended. The proposed action would disturb approximately 13.50 acres; currently, a Storm Water Pollution Prevention Plan for the Environmental Protection Agency (EPA) under the Clean Water Act would be required.

The Operator would be required to comply with any future changes to the National Pollutant Discharge Elimination System permitting process for storm water discharge from construction activities enacted by the EPA prior to the completion of well site construction and site stabilization. There are no perennial water resources within the analysis area. The proposed action would not impact any USACE jurisdictional waters of the U.S., including wetlands. Proposed site BMPs would be installed prior to construction activities.

Impacts to Surface Waters: There would be no impacts to surface water resources as a result of the proposed development. The proposed road meets the requirements to be covered under the USACE Nationwide Permit #14, and the proposed pipeline meets the requirements to be covered under Nationwide Permit #12.

Impacts to Ground Waters: Stimulation (i.e., hydraulic fracturing or "fracking") is a process used to maximize the extraction of underground resources by allowing oil or natural gas to move more freely from the rock pores to production wells that bring the oil or gas to the surface. Fluids, commonly made up of water (99 percent) and chemical additives (1 percent), are pumped into a geologic formation at high pressure during hydraulic fracturing (USEPA 2004). Chemicals added to stimulation fluids may include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents, and clay stabilizers. When the fracking pressure exceeds the rock strength, the fluids open or enlarge fractures that typically extend several hundred feet away from the well bore, and may occasionally extend up to 1,000 feet from the well bore. After the fractures are created, a propping agent (usually sand) is pumped into the fractures to keep them from closing when the pumping pressure is released. After fracturing is completed, a portion of the injected fracturing fluids returns to the wellbore and is recovered for future fracturing operations (USEPA 2004) or disposal. Stimulation techniques have been used in the United States since 1949 and in the San Juan Basin since the 1950s. Over the last 10 years, advances in multi-stage and multi-zone hydraulic fracturing have allowed development of gas fields that previously were uneconomic, including the San Juan Basin.

Hydraulic fracturing is a common process in the San Juan Basin and applied to nearly all wells drilled. The producing zone targeted by the proposed action is well below any underground sources of drinking water. The Mancos Shale formation is also overlain by a continuous confining layer. The geological confining layer is the Lewis Shale formation that is located above both the Mancos Shale and Mesaverde formations and provides an impermeable layer that isolates the Mancos Shale and Mesaverde formations from both identified sources of drinking water and surface water. On average, total depth of the proposed well bore would be about 5,000 feet below the ground surface. Fracturing in the Basin Mancos formation is not expected to occur above depths of 4,000 feet below the ground surface. Fracturing could possibly extend into the Mesaverde formation overlying the Basin Mancos; however, the formation has not been identified as an underground source of drinking water based on its depth and relative high levels of TDS.

No impacts to surface water or freshwater-bearing groundwater aquifers are expected to occur from hydraulic fracturing of this proposed well. Effects to ground water resources would be low due to mitigation measures such as casing, and any pits would be lined to meet NMOCD requirements. Below casing depth, losses of produced water or mud may occur to differing degrees in various formations, but

the losses are considered to be low and contained to within a few feet of the well bore. These losses are not considered to be substantial because of the very small amount of groundwater that could be affected (BLM 2003a, p. 4-14).

Cumulative Impacts

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

Mitigation Measures and Residual Impacts

Logos will exercise Best Management Practices to protect project area washes and arroyos. Logos will apply for a Nationwide Permit #12 & #14 through the USACE. Upon completion of construction activities and interim reclamation approximately 6.01 acres would be recontoured and reseeded.

3.5. Vegetation

3.5.1. Affected Environment

Project area vegetation was predominately Piñon–Juniper woodland intermixed with Great Basin sagebrush scrubland. Several large ponderosa pines are visible on surrounding ridges and drainage slopes adjacent to the project area. Vegetation throughout the project area is mostly undisturbed. The project area is grazed by horse and cattle. The proposed access road follows an existing two track road beginning at an existing well location. The two-track road then connects to an additional old two-track road that traverses through the southern portion of the proposed well site. Approximately two hundred (200) piñon and juniper trees would be removed throughout the well pad and access road/pipeline ROW.

Dominant trees and shrubs noted throughout the project area included: piñon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), big sagebrush (*Artemesia tridentata*), golden rabbitbrush (*Chrysothamnus nauseosus*), mountain mahogany (*Cercocarpus montanus*), broom snakeweed (*Gutierrezia sarothrae*), Mormon tea (*Ephedra torreyana*), and greasewood (*Sarcobatus vermiculatus*). Tree cover comprised approximately 35%-45% of ground cover, shrubs accounted for 20%-30% ground cover. Dominant forbs and grasses observed included: spiny phlox (*Phlox hoodii*), golden aster (*Heterotheca villosa*), indian parsley (*Cymopterus bulbosus*), penstemon (*Penstemon strictus*), Blue grama grass (*Bouteloua gracilis*), galleta (*Pleuraphis jamesii*), perennial buckwheat (*Eriogonum effusum*), and Russian thistle (*Salsola iberica*). Forbs and grasses occupied approximately 20%-30% of ground cover, with bare ground approximately 10%-15% of ground cover. A complete list of plants observed is included in Appendix C.

3.5.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impacts to vegetation as a result of the No Action alternative.

3.5.3. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would result in the loss of approximately 13.50 acres of Piñon–Juniper woodland and Great Basin sagebrush scrubland. The proposed well-tie pipeline would be constructed parallel to the access road, minimizing excessive surface disturbance and habitat fragmentation. Approximately 200 trees were documented within the analysis area. Following installation of the proposed well-tie pipeline and interim reclamation of unused portions of the well location, approximately 6.01 acres would be recontoured and reseeded with the seed mixture chosen by the proponent and noted in the design features that were agreed upon during onsite inspections. There would be a long-term loss of approximately 7.49 acres of Piñon–Juniper woodland and Great Basin sagebrush scrubland within the action area.

Cumulative Impacts

Within the FFO planning area there are approximately 633,400 acres of Piñon–Juniper woodland and approximately 435,500 acres of Great Basin Desert shrub habitat type (USDI/BLM 2003a, page 3-31). Based on the acres of plant community types within the planning area and the estimated total disturbance of future activities, approximately 2.1 percent of the various communities represented would be disturbed within the planning area over 20 years from reasonably foreseeable future actions (USDI/BLM 2003a, page 3-31 and 4-7).

The spatial analysis area is the proposed project area and immediately adjacent lands. Within the spatial analysis area, the following vegetative disturbances have occurred or are anticipated to occur in the reasonably foreseeable future:

- Proposed Logos Sarah B1H & B2H Well Location
- Proposed Logos Sarah B1H & B2H Access Road & Pipeline
- Active wildlife and livestock grazing occurs in the area. The proposed project area is within BLM-FFO grazing allotment Largo Community Allotment No. 05083.

Mitigation Measures and Residual Impacts

The proposed well-tie pipeline would be constructed parallel to the access road, minimizing excessive surface disturbance and habitat fragmentation. Vegetation to be removed would be mowed, mulched, and incorporated into the topsoil. Trees to be removed that are greater than 6 inches in diameter would be cut, de-limbed, and stacked for public firewood gathering access within the project area. Following installation of the proposed well-tie pipeline and interim reclamation of unused portions of the well location, approximately 6.01 acres would be recontoured and reseeded with the seed mixture chosen by the proponent and noted in the design features that were agreed upon during onsite inspections. There would be a long-term loss of approximately 7.49 acres of Piñon-Juniper woodland and Great Basin Desert scrub within the action area. Project mitigation conditions will prevent the spread of noxious/invasive species. See design features.

3.6. Livestock Grazing

3.6.1. Affected Environment

The proposed project is within the Largo Community Allotment #05083. Federal lands managed by the Farmington Field Office (FFO) are leased under Section 15 of the Taylor Grazing Act to the Navajo

Nation for the purpose of providing grazing for livestock owned by the Navajo people that live in the area. The Largo Community Allotment is leased to the Navajo Nation and grazing permits are administered by the Eastern Navajo Agency Bureau of Indian Affairs in Crownpoint, NM under a memorandum of agreement between the BLM, BIA and Navajo Nation. The BIA administers the grazing and is responsible for issuing individual grazing permits to Navajo residents of the area.

The BLM authorizes the removal of 1,356 Animal Unit Months (AUM) of forage from the scattered federal land in the Largo Community Allotment. An AUM is the amount of forage required to sustain a 1,000 lb cow and her calf, or five sheep, or the equivalent for one month. Grazing in this area is yearlong and is expressed on the BLM permit as sheep units (even though BIA permits may permit cattle). In most cases BIA issues permits to individuals or families for small amounts of livestock to supplement their livelihood. The Largo Community Allotment is approximately 47,729 acres of BLM, Tribal and State lands. There are approximately 12,400 acres of BLM managed federal land in the allotment. The average stocking rate of these lands is approximately 9ac/aum.

3.6.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impacts to livestock grazing as a result of the No Action alternative.

3.6.3. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would disturb approximately 13.50 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 and long-term loss of existing forage within the project footprint. The direct effects from maintenance would result from human activity and 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 7.49 acres.

Cumulative Impacts

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

Mitigation Measures and Residual Impacts

After interim reclamation of the well-tie pipeline and unused portions of the well pad there would be approximately 7.49 acres of long-term surface disturbance. Reseeding efforts will result in approximately 6.01 acres of native vegetation available for forage.

3.7. Migratory Birds

3.7.1. Affected Environment

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 (USFWS) that shall promote the conservation of migratory bird populations. Section 3 (c) of the EO states that the MOU shall recognize that the agency may not be able to implement some elements of the MOU until such time as the agency has successfully included 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 USFWS was not completed during the development of the revised RMP. Consultation on the Biological Assessment (BA) with the USFWS 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 USFWS 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. In February 2010, the BLM/FFO developed a Migratory Bird Policy (BLM/FFO Instruction Memorandum No. NM-F00-2010-001), in anticipation of the issuance of the National MOU. This management policy establishes a consistent approach for addressing migratory bird populations and their habitat when making project level implementation decisions.

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 3.8 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.	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.	S
Pi on jay (*Gymnorhinus cyanocephalus*)	Generally seen in large flocks, often numbering in hundreds; nests in loose colonies. Common in piñon- juniper woodlands of interior mountains and high plateaus; also yellow pine (ponderosa) woodlands.	NS
Loggerhead shrike (*Lanius ludovicianus*)	Relatively xeric habitats dominated by shrubs and grasses; occurs in many lowland habitats statewide.	S
Sage thrasher (*Oreoscoptes montanus*)	Summer residents in northwest NM, extending east to Taos and south to Mount Taylor and, locally, to the northern Plains of San Agustin. In winter, this species is present in desert scrub habitats in southern NM as well as pin on-juniper north to the Manzano mountains.	NS
Green-tailed towhee (*Pipilo chlorurus*)	Prefer high diversity of shrub species - sagebrush, greasewood or pi on-juniper. Breeds in Great Basin shrub in the northwest quadrant of the state.	NS
Vesper sparrow (*Pooecetes gramineus*)	Uncommon to fairly common in dry grasslands, farmlands, forest clearings, and sagebrush scrub.	S
Mountain bluebird (*Sialia currucoides*)	Inhabits open rangelands, meadows, generally above 5,000 ft; in winter primarily found in open lowlands, desert. Nests in tree cavities and buildings.	NS
Western bluebird (*Sialia mexicana*)	Nests in holes in trees, posts: common in woodlands, farmlands, orchards; in desert areas during winter, fond in mesquite-mistletoe groves.	NS
Black-chinned sparrow (*Spizella atrogularis*)	Regularly occurs in appropriate habitat across the central and southern parts of NM, west of the plains. Breeding records extend north to Taos County, San Miguel County, and probably San Juan County. The species is uncommon at best in winter in southwest New Mexico	NS
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.	NS
Presence* K = Known, documented observation within project area. S = Habitat suitable and species suspected to occur within the project area. NS = Habitat suitable but species is not suspected to occur within the project area.		

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

3.7.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impact to migratory birds as a result of the No Action alternative.

3.7.3. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would result in the removal of approximately 13.50 acres of potential migratory bird habitat. Adult migratory birds would not be directly harmed by the proposed action because of their mobility and ability to avoid areas of human activity. No active nests within the action area are expected to be directly impacted since any construction activity would likely occur outside of the breeding season. The increased human presence during construction and maintenance activities may indirectly disturb or displace adults from nests and foraging habitats for a short period of time, three months or less. Effects to the population status of migratory birds are not anticipated due to the mobility of individuals and the abundance of adjacent habitat for these species. In consideration of these factors, there would be moderate short-term effects to migratory birds, and low long-term effects as a result of the action. Direct impacts include the removal of approximately 200 piñon and juniper trees and the removal and modification of 13.50-acres of piñon and juniper woodland and desert shrub habitat. Direct impacts would be greater if construction occurs during the breeding season from May 15 to July 31.

Cumulative Impacts

Cumulative impacts to migratory birds would result from the long-term loss of approximately 13.50 acres of Piñon–Juniper woodland and Great Basin sagebrush habitat and habitat fragmentation from new well pads and road construction/upgrade. Although these impacts may affect individuals, given the level of habitat loss and fragmentation, no population level effects are anticipated from the proposed action.

Mitigation Measures and Residual Impacts

If construction were to occur within the May 15 - July 31 breeding season, a migratory bird nest survey would be conducted to minimize impacts to nesting birds. Upon completion of construction and drilling activities, interim reclamation would reseed approximately 6.01 acres of habitat.

3.8. Threatened, Endangered, Sensitive Species

3.8.1. Affected Environment

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 3.9 below.

As documented in the Biological Survey Report (Appendix C), the analysis area provides potential foraging habitat for the American peregrine falcon, prairie falcon, golden eagle, and ferruginous hawk. The analysis area does not provide nesting habitat for the raptors. Several historically known ferruginous hawk nest sites have been documented within 18 miles of the project area. No birds of prey or signs of their presence were observed within the analysis area during onsite inspections

Table 3.9 – 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	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.	N S
Ferruginous hawk (*Buteo regalis*)	SMS	Occur in open areas containing broad expanses of prairie grassland or shrub-steppe vegetation. Breed in open country, usually prairies, plains and badlands across the northern two-thirds of the state, and may be found statewide during winter; also found in semi-desert grass-shrub, sagebrush- grass & piñon-juniper plant associations. Breeding generally occurs north from Clovis in the eastern plains, north from San Antonio in the Rio Grande valley, and north from the Plains of San Agustin in the western part of the state.	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.	N S
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.	N S
Sources: BLM 2005, New Mexico Natural Heritage Program 2005, NM Rare Plant 1999, USFWS 2007			

Status*	**Presence****
SMS = BLM Special Management Species SoC = USFWS Species of Concern NM-E = State of NM Endangered NM-T= State of NM Threatened	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 in project area.

3.8.2. Impacts from the No Action

Direct and Indirect Impacts

There would be no impacts to BLM Special Management Species as a result of the No Action alternative.

3.8.3. Impacts from the Proposed Action

Direct and Indirect Impacts

The analysis area contains potential foraging habitat for the American peregrine falcon, prairie falcon, golden eagle, and ferruginous hawk. There would be a permanent, long-term loss of approximately 7.49 acres of potential foraging habitat as a result of the proposed action. 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.

Several small populations totaling over 30 individuals of Brack's hardwall cactus were observed within the proposed access road/pipeline ROW and well pad site during the biological surveys conducted on February 18th, March 11th, and March 21, 2014 (BSR, June 10, 2014).

Cumulative Impacts

The FFO would continue to manage non-federally listed species according to BLM policies and guidelines, with the goal of contributing to the conservation of these species to reduce the potential for being listed under the ESA of 1973, as amended (USDI/BLM 2003a, 4-111). For reasonably foreseeable actions on federal lands, direct impacts to nesting special status raptor species would be avoided through the BLM's siting criteria. Development on federal and private land would result in the removal or modification of potential foraging habitat. These effects would be related to availability of undisturbed habitat in the area and the amount of disturbance that would occur within the area. The PRMP/FEIS determined that cumulatively up to 5.5 percent (128,000 acres) of vegetation in the planning area could be impacted by oil and gas development (USDI/BLM 2003a, page 4-125). Other reasonably foreseeable actions within the planning area that could impact special status species would include livestock grazing, agriculture, commercial and residential development, mining, wildfire, and vegetation management. The proposed action would contribute approximately 7.495 acres of long-term habitat loss for BLM special management species within the planning area.

Mitigation Measures and Residual Impacts

A Biological Survey Report (Appendix C) was completed for the proposed action. Interim reclamation will reseed approximately 6.01 acres of foraging habitat. Individual cactus located within the proposed project area would be transplanted in accordance with the BLM-FFO Brack's Cactus Transplanting Guidelines 2012. See design features.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

Deb Gibson – Western Cultural Resources Management, Inc.

Gene Reininger – Souder, Miller & Associates

Jeffery Tafoya – Bureau of Land Management

John Kendall – Bureau of Land Management

Adrian Denetchee – United Field Services, Inc.

Tamra Sessions – Logos Resources, LLC.

Wayne Ritter – Logos Resources, LLC.

4.2. List of Preparers

Jeffery Tafoya – Supervisory Range Specialist - Bureau of Land Management- Farmington Field Office

Scott Hall – Realty Specialist - Bureau of Land Management – Farmington Field Office

Mike Flaniken – Bureau of Land Management – Farmington Field Office

Jim Copeland– Bureau of Land Management – Farmington Field Office

Sheila Williams, District Botanist-Bureau of Land Management-Farmington Field Office

Dale Wirth, Branch Chief-Bureau of Land Management-Farmington Field Office

Stan Dykes, Natural Resource Specialist-Bureau of Land Management-Farmington Field Office

Amanda Nisula, Planning & Environmental Specialist-Bureau of Land Management-Farmington Field Office

Sherri Landon, Paleontologist, BLM-Farmington Field Office

John Hansen, Wildlife Biologist, BLM-Farmington Field Office

Curtis Pattillo, Biologist / NEPA Specialist – Southwest Environmental, Inc.

4.3. 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

Fuller, Steve. 2012. *Cultural Resources Survey of Encana Oil and Gas (USA) Inc.'s Good Times L10- 2410 Number 01H Well Pad, Access Road, and Pipeline, San Juan County, New Mexico.* LAC Report 2012-1zz. La Plata Archaeological Consultants (LAC), Dolores, Colorado.

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.

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

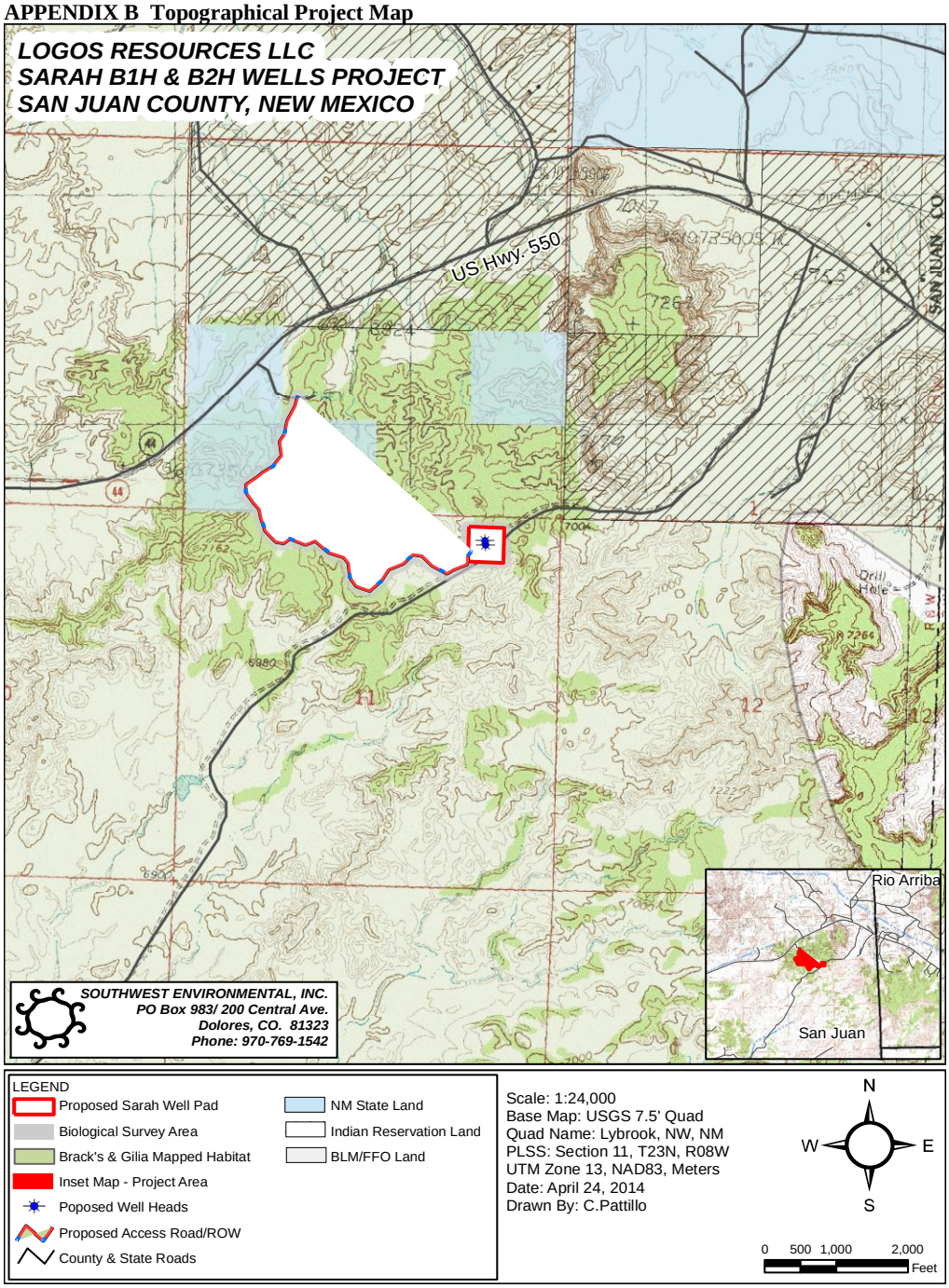
APPENDICES A-C

A. SURVEY PLATS

B. PROJECT AREA TOPOGRAPHIC MAP

C. BIOLOGICAL SURVEY REPORT

APPENDIX B Topographical Project Map



LEGEND

- Proposed Sarah Well Pad
- Biological Survey Area
- Brack's & Gilia Mapped Habitat
- Inset Map - Project Area
- Poposed Well Heads
- Proposed Access Road/ROW
- County & State Roads
- NM State Land
- Indian Reservation Land
- BLM/FFO Land

Scale: 1:24,000
Base Map: USGS 7.5' Quad
Quad Name: Lybrook, NW, NM
PLSS: Section 11, T23N, R08W
UTM Zone 13, NAD83, Meters
Date: April 24, 2014
Drawn By: C.Pattillo

N
W E
S

0 500 1,000 2,000
Feet