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BP America Production Company's
AL Elliott D 10 - 1H
Well Pad, Access Road and Pipeline
Natural Gas Well Project

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

BP America Production Company (BP) has submitted an Application for Permit to Drill (APD) with the Bureau of Land Management - Farmington Field Office (BLM-FFO) for the AL Elliott D10 - 1H natural gas well and associated access road and pipeline. The proposed project includes the construction of a single well pad in order to directionally drill and develop federal mineral resources from the Basin Fruitland Coal pool. BP also proposes to construct approximately 361-feet of access roads and roughly 1,627.83-feet of subsurface well-tie pipeline as part of the project. Please see Table 2 in Section 2.2.2. (Proposed Surface Disturbance) for a summary of the ROW footages and acreages. The proposed action is the approval of the APD and ROW Grant by the BLM-FFO, located in Farmington, New Mexico. The proposed project is located entirely on public lands managed by the BLM-FFO.

New surface disturbance associated with the well pad, access road and pipeline would be reclaimed to a BLM-approved working area. Production equipment will be placed on the location in such a manner to allow proper safe access to produce and service the well/facilities while minimizing long-term disturbance and maximizing interim reclamation. As practical, access will be provided by a tear-drop shaped road through the production area. All new surface disturbance associated with the proposed project would be reclaimed during interim reclamation.

Oil and natural gas, vital components of the nation's energy supply, account for approximately 36 and 25 percent of total energy consumed in the U.S., respectively (U.S. Energy Information Administration 2012). Natural gas is used in homes, commercially, in industry, and in the transportation sector. Common uses for natural gas include space heating, water heating, cooling, cooking, waste treatment and incineration, metals preheating, drying and humidification, glass melting, food processing, fueling industrial boilers, vehicle fueling, and electricity generation. Gases such as butane, methane, and propane can be extracted from natural gas to be used for products such as fertilizers and pharmaceuticals. Natural gas can also be used to create methanol, which is utilized in the production of formaldehyde, acetic acid, fuel cell sources, and additives for cleaner burning gasoline (Natural Gas Supply Association 2010). Most oil goes into fuels, including gasoline, jet fuel, and home-heating oil. Additionally, non-fuel compounds extracted from oil are used to develop lubricants; asphalt for roads; tar for roofing; waxes for food wrapping; solvents for paints; cosmetics and dry-cleaning products; plastics; and foams (U.S. Energy Information Administration 2012).

Most of the oil and natural gas found in North America is concentrated in distinct basins. The BLM-FFO management area is within the San Juan Basin, one of the most prolific gas-producing basins in the country. Currently, the San Juan Basin produces small amounts of oil (BLM 2003a).

Taxes and royalties on oil, natural gas, and carbon dioxide production contribute approximately 25 percent of New Mexico's general fund, and the oil and gas industry is one of the largest private sector employers in the state (New Mexico Bureau of Geology and Mineral Resources 2012). Additionally, the federal government receives royalties, or a share of the production income, for extracted federal minerals. In 2011, federal natural gas royalties totaled over 2 billion dollars (Office of Natural Resources Revenue 2012).

1.2. Purpose and Need for Action

The purpose of the proposed action is to allow BP reasonable access to BLM managed lands to develop their mineral lease.

The need for the proposed action is established by the BLM's responsibility to respond to the APD under the Mineral Leasing Act of 1920, as amended (30 USC [United States Code] 181 et seq.) and the Federal Land Policy and Management Act (FLPMA) of 1976.

1.3. Decision to be Made

Based on the information in this EA, the BLM-FFO will decide whether or not to issue the APD and/or ROW, and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA) (Public Law [PL] 91-90, 42 USC 4321 et seq.), the BLM-FFO must determine if there are any significant environmental impacts associated with the proposed actions warranting further analysis in an Environmental Impact Statement (EIS). The BLM-FFO Field Manager is the responsible officer who will decide either:

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

1.4. Conformance with Applicable Land Use Plan(s)

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific 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, the proposed action supports the following BLM policy:

> 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 (BLM 2003b, 2-2 – 2-3).

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.

1.5. Relationship to Statutes, Regulations or Other Plans

BP would comply with applicable federal, state, and local laws and regulations. Necessary permits and approvals for the proposed project would be obtained prior to project implementation.

Many requirements regulating specific environmental elements are found in the appropriate elements sections of this EA (Chapter 3). Several permits, licenses, consultations, or other requirements are discussed below.

1.5.1. 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 (CWA), formerly known as the Federal Water Pollution Control

Act (33 USC 1344). The objective of the CWA is to maintain and restore the chemical, physical, and biological integrity of the waters of the United States. The proposed action is in conformance with the CWA (33 USC 1251 et seq.).

Under Section 401 of the CWA, an applicant for a federal license or permit to conduct an activity that may result in a discharge into a water of the U.S. must provide the federal agency with a Section 401 certification declaring that the discharge would comply with the CWA. The certification would be granted by the New Mexico Environment Department (NMED).

Under Section 402 of the CWA, the U.S. Environmental Protection Agency (EPA) regulates storm water discharges from industrial and construction activities under the National Pollution Discharge Elimination System (NPDES) program. Permits are required if discharge results in a reportable quantity for which notification is required (pursuant to 40 CFR 117.21, 40 CFR 302.6, or 40 CFR 110.6) or if the discharge contributes to a violation of a water quality standard.

Section 404 of the CWA 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 U.S., including wetlands. 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. The BLM-FFO and USACE Durango Regulatory Office have determined that jurisdictional waters may include USGS watercourses (i.e., “blue lines” on USGS 1:24,000 topographic maps).

Two intermittent/ephemeral watercourse is located along the northern end of the proposed pipeline corridor. The watercourses have a defined stream channel (i.e., Ordinary High Water Mark) and would thereby likely be subject to regulatory jurisdiction under the USACE. Assuming the watercourses are jurisdictional, the proposed actions would be authorized under Nationwide Permit No. 12 (Utility Line Activities). The proposed project would be designed to avoid discharge into other watercourses that are potentially USACE jurisdictional and would not result in the loss of greater than ½ acre of waters of the U.S.

1.5.2. National Historic Preservation Act

Compliance with Section 106 responsibilities of the National Historic Preservation Act are adhered to by following the BLM – New Mexico SHPO protocol agreement (BLM-SHPO 2014), 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* (NPA 2012), and other applicable BLM handbooks.

1.5.3. Clean Air Act

The Clean Air Act of 1972, as amended (CAA; 42 USC 7401 et seq.), establishes national ambient air quality standards (NAAQS) to control air pollution. In New Mexico, the NMED has adopted most of the CAA into the New Mexico Administrative Code (NMAC). The NMED issues construction and operating permits for air quality and enforces air quality regulations and permit conditions.

1.6. Scoping, Public Involvement, and Issues

1.6.1. Scoping and Public Involvement

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

An onsite meeting, attended by BP, BLM-FFO representatives, Enterprise and an environmental consultant (Adkins Consulting, Inc. [ACI]), was held for the AL Elliott D 10 - 1H on July 23rd, 2015. A public invitation to the on-site meetings was posted online, no private citizens or groups attended the meeting:

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

A BLM-FFO Interdisciplinary Team meeting was held on August 24th, 2015 to discuss the proposed action. At the aforementioned meetings, potential issues of concern (Section 1.6.2) were identified by the BLM-FFO and ACI.

Based on the size and scale, routine nature, and potential impacts associated with the proposed action, no additional external scoping was conducted. No public comments were received for the proposed action.

1.6.2. Issues

Issues Analyzed

The following issues were identified during internal scoping as potential issues of concern for the proposed action. These issues will be addressed in this EA.

- How would dust, equipment emissions, and consumption of hydrocarbons associated with the proposed project impact air resources?
- How would surface-disturbing activities associated with construction of the proposed project impact cultural resources?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact upland vegetation?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact the establishment and distribution of noxious weeds and invasive species?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact migratory birds?
- How would vegetation-clearing, proposed project activities, and final reclamation associated with the proposed project impact the following BLM Special Status Species (SSS): Bendire's thrasher (*Toxostoma bendirei*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*) and prairie falcon (*Falco mexicanus*)?
- What effects would the proposed action have on transportation and travel?

Issues Considered but not Analyzed

The following issues were identified during scoping as issues of concern that would not be impacted by the proposed action or that have been covered by prior environmental review. These issues will not be analyzed in this EA.

Groundwater

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.

Endangered Species Act Species

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. Water used to construct, produce, and maintain the proposed wells would be acquired from one of the following locations:

- City of Bloomfield -- Point of Diversion # SD-01675
- Burlington (ConocoPhillips) Manzanarez Water Well #1 / #1R -- Point of Diversion # SJ 0196

No unaccounted-for water depletions within USFWS-listed fish habitat would occur. Therefore, there is no need for additional Section 7 consultation.

Native American Religious Concerns

For the proposed actions, identification efforts for Native American Religious Concerns were limited to a review of existing published and unpublished literature (e.g., Van Valkenburgh 1941, 1974; Brugge 1993; Kelly, et al. 2006), development of the site-specific Class III survey report prepared for the proposed action (SJ County Museum Association, Division of Conservation Archaeology Report No.: 15-DCA-020 [Meininger 2015]), and a review by the BLM's cultural resources program regarding the presence of Traditional Cultural Properties (TCPs) identified through ongoing BLM tribal consultation efforts. There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001) or the Archaeological Resources Protection Act (ARPA; 16 USC 470) within the proposed project area. The proposed action would not impact any known TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with or

hinder the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996) or Executive Order (EO) 13007.

Paleontology

The San Juan Basin in northwestern New Mexico is rich in paleontological resources. The BLM used the Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands (Instruction Manual 2008-009) to identify areas with a high potential to produce significant fossil resources (BLM 2008d). Under this system, all lands within the BLM-FFO management area were designated as Class 5 (Very High Potential) for paleontological resources. Class 5 areas require an assessment of paleontological resources at the project level (BLM 2009). If a paleontological site is discovered during the construction phase of the proposed project, the site would be avoided by personnel, personal vehicles, and company equipment. Therefore, no impacts to paleontological resources are anticipated as a result of the proposed project.

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. No Action

Under the No Action Alternative, the APD and ROW Grant associated with the proposed AL Elliott D 10 - 1H well would not be approved. The proposed well pad, access road, and pipeline corridor would not be constructed. Current land and resource uses would continue to occur in the proposed project area.

2.2. Proposed Action

The proposed action is the BLM-FFO approval of an APD and ROW Grant associated with BPs' AL Elliott D 10 - 1H. The proposed action includes the construction of a directional natural gas well and associated access road. If the well is successful and prove to be viable, a subsurface well tie pipeline would be constructed by Enterprise to transport produced gas to the existing pipeline infrastructure. The proposed project would commence after the APD and ROW Grant are issued.

The proposed project includes the construction of a new 400-foot by 300-foot well pad with a 50-foot construction buffer, a 361-foot access road with a 30-foot right-of-way and a 1,627.83-foot, subsurface well tie pipeline with a 40-foot right-of-way.

BP has also applied for a single Temporary Use Area (TUA) with the BLM-FFO for the construction of the portion of the proposed pipeline across Manzanarez Wash. The disturbance of the TUA would total approximately 0.275 acres on public lands managed by the BLM-FFO.

2.2.1. Location of Proposed Project Area

The proposed project area (PPA) is located within the BLM-FFO management area on public lands in San Juan County, New Mexico. The proposed project area is located approximately 15.1 miles east of Bloomfield, NM and 7.9 miles southwest of Navajo Dam. Legal locations of the well are provided in Table 1.

Table 1. Legal Location of Proposed Well Head

Surface Location								
UL or Lot No.	Section	Township	Range	Feet from the	North/ South Line	Feet from the	East/West Line	County
P	**11**	**29N**	**09W**	**985**	**SOUTH**	**55**	**EAST**	**SAN JUAN**
Bottom Location								
UL or Lot No.	Section	Township	Range	Feet from the	North/ South Line	Feet from the	East/West Line	County

M	**11**	**29N**	**09W**	**1276**	**SOUTH**	**710**	**WEST**	**SAN JUAN**

The general region surrounding the proposed project areas is characterized by relatively flat sagebrush lowland valleys interspersed with open pinon-juniper woodlands with cliffs transitioning to mesatops to the south of the proposed well pad.

2.2.2. Description of Proposed Project

A detailed description of design features and construction practices associated with the proposed action can be found below.

Design Features and Best Management Practices

BP would adhere to the stipulations attached to the approved APD and ROW from the BLM-FFO. The following general design features and best management practices (BMPs) would occur.

Control of Waste

Liquid and solid wastes would be disposed of at an appropriate waste-disposal site. The proposed project area would be maintained in a sanitary condition. Hazardous substances would be handled and disposed of according to federal law. Waste resulting from construction activities would be removed from the proposed project area and disposed of in an authorized area, such as an approved landfill.

Protection of Paleontological Resources

If a paleontological site is discovered, the BLM would be notified and the site would be avoided by personnel, personal vehicles, and company equipment. Workers would be informed that it is illegal to collect, damage, or disturb some such resources, and that such activities are punishable by criminal and/or administrative penalties.

Protection of Cultural Resources

The nearest Area of Critical Environmental Concern (ACEC) to the proposed action is the *Pregnant Basketmaker ACEC* 4 miles to the northeast (BLM 2014d).

All cultural resource stipulations would be followed as indicated in the Cultural Resource Records of Review, attached to the stipulations in an approved APD. These stipulations could include, but would not be limited to, temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, reduction of the proposed project areas and/or establishment of specific construction avoidance zones, and employee education.

Employees, contractors, and sub-contractors associated with the proposed project would be informed by BP that cultural sites are to be avoided by personnel, personal vehicles, and company equipment. These individuals would be informed 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 ARPA.

In the event of a cultural discovery during construction, BP would immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM. The BLM would then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., eligible for the National Register of Historic Places [NRHP] or protected under NAGPRA or ARPA), it would be protected in place until mitigating measures could be developed and implemented according to guidelines set by the BLM.

Protection of Flora and Fauna, including SSS and Livestock

The proposed project area is approximately 0.24 miles south of the BLM-FFO-designated potential habitat area for Aztec gilia and Brack's hardwall cactus (BLM 2015; Figure A.3 [Appendix A]). Both plants

are designated SMS by the BLM-FFO and listed endangered species by the State of New Mexico. Soils derived from the Nacimiento Formation, which provides the appropriate geologic substrate for the two plants, were not present within the proposed project area.

Should any active raptor nests be observed within one-third mile of the proposed project area or should any additional SSS (listed by the USFWS or BLM) be observed within the proposed project area prior to or during project implementation, construction would cease and the BLM-FFO would be immediately contacted. The BLM-FFO would then ensure evaluation of the resource. Should a discovery be evaluated as significant (protected under the ESA, etc.), it would be protected in place until mitigation could be developed and implemented according to guidelines set by the BLM.

Under the Migratory Bird Treaty Act – BLM/FFO Interim Management Policy (IM No. NM-F00-2010-001), timing limitations on use authorizations will be enforced for projects during the nesting period of May 15 to July 31 to avoid or minimize the possibility of the unintentional take of migratory birds. These timing limitations will be enforced for projects during the nesting period of May 15 to July 31 under the following conditions:

- For proposed projects 4.0 acres or more of vegetative disturbance, no construction activities from May 15 to July 31 will be permitted without a migratory bird nest survey. These surveys will be conducted by a BLM/FFO approved biologist using a survey protocol provided by a BLM/FFO biologist. If any active nests are located within the proposed project area, projects activities will not be permitted until written approval by a BLM/FFO biologist. The BLM/FFO will monitor any active nests located from a nest survey.

- The use of prescribed fire and mechanical thinning equipment (i.e. hydromower and tree axe) during this period (5/15-7/31) will be avoided. Exceptions to this policy will be considered where repeated complications due to weather have prevented the attainment of resource objectives through the use of prescribed fire. In these situations a thorough environmental analysis will be prepared assessing the effects of conducting the burn during the restricted period. The decision to proceed or not will be based upon this analysis. It should be noted also that this policy does not apply to natural ignitions in areas that the District Fire Management Plan has designated as a "wildland fire use area" nor does it apply to treatments 4.0 acres or less in size. In addition, should state or national guidance be issued that differs from this policy; the FFO policy will be modified to conform to it.

- Should active nests be observed, the contractor has determined that project activities cannot be avoided until after the birds have fledged (left the nest), and if no practicable or reasonable avoidance alternatives are identified, then the contractor must contact the USFWS's Migratory Bird Permit Office in Albuquerque, NM at (505) 248-7882. The contractor may proceed with work on the affected project activities following receipt of the approved permit from the USFWS.

The project area is located within the Blanco Community grazing allotment No. 05039 managed by the BLM-FFO. Grazing lease operator(s) would be notified at least 10 business days prior to beginning the construction phase of the proposed project in order to ensure that there would be no conflicts between construction activities and livestock grazing operations. Construction would not cease or delay unless directed by the authorized BLM-FFO officer. If present, any range improvements (e.g., fences, pipelines, and ponds) disturbed by construction activities would be repaired to the condition they were in prior to disturbance. Repairs, if needed, would take place immediately following construction.

The following design features would apply to the proposed project:

- 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).

- Backfilling operations would be performed within a reasonable amount of time to ensure that a pipeline trench is not left open for more than 24 hours. If a trench is left open overnight, it will be fenced with a temporary fence or a night watchman will be utilized.
- If used, all pits would meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and requirements, NMAC 19.15.17.

Protection of Topsoil

Topsoil, which would be stripped from the surface during the construction phase of the proposed project, would be stored and protected until it is redistributed during reclamation. The topsoil would be stored separately from subsoil or other excavated material within the permitted project area. The topsoil would be free of brush and tree limbs, trunks, and roots. Vehicle/equipment traffic would not be allowed to cross topsoil stockpiles. The topsoil would be protected using wattles or other BMPs so that erosion is minimized. If topsoil is stored for a length of time such that nutrients are depleted from the topsoil, amendments would be added to the topsoil as advised by an appropriate agent/contractor. Vegetation within the TUA would be brush-hogged; however, no topsoil-stripping or contouring would take place.

Protection of the Public

The hauling of equipment and materials for the proposed project on public roads would comply with Department of Transportation regulations. No toxic substances would be stored or used within the proposed project area. BP would have inspectors present during construction. Any accidents involving persons or property would immediately be reported to the BLM-FFO. BP would notify the public of potential hazards by posting signage, as necessary.

Prevention and Control of Weeds

Prior to construction equipment entering the proposed project area, construction equipment would be inspected for noxious weeds and cleaned.

It would be BP's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the project. BP's weed-control contractor would contact the BLM-FFO regarding acceptable weed-control methods. BP would be required to submit a Pesticide Use Proposal (PUP) for the location if one does not currently exist. BP's weed-contractor would need to hold a current pesticide applicator's permit 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 and used only in accordance with their registered use and limitations. BP's weed-control contractor would contact the BLM-FFO prior to using these chemicals and provide quarterly Pesticide Use Reports (PURs).

Protection of Air Resources

BMPs for dust suppression would be utilized within the proposed project area to reduce fugitive dust during the construction phase of the proposed project. Water application, using a rear-spraying truck or other suitable means, would be the primary method of dust suppression within the proposed project area. Any additional dust-suppression practices would include the BLM-standard BMPs found in the Gold Book (BLM and USFS 2007) and the BMPs outlined in the stipulations attached to an approved APD.

Protection of Water Resources

The proposed project would cross two ephemeral USGS watercourses within Manzanerez Wash. A TUA will be installed on either side of the washes to minimize disturbance within the ordinary high water mark (OHWM) of the watercourse.

Additional Design Features and BMPs

Vehicles would be restricted to proposed disturbance areas and existing areas of surface disturbance, such as existing roads and well pads.

Worker safety incidents would be reported to the BLM-FFO as required under Notice to Lessees (NTL) - 3A (USGS 1979). BP would adhere to company safety policies, Occupational Safety and Health Administration regulations, and Department of Transportation regulations.

BP would comply with Onshore Oil and Gas Order No. 2, issued under Onshore Oil and Gas Operations (43 CFR 3160).

Construction and maintenance activities would cease when soil or road surfaces become saturated to the extent that construction equipment is unable to stay within the proposed project area and/or when activities would cause irreparable harm to roads, soils, or watercourses.

Erosion-control and water-management features, such as berms, culverts, diversion ditches, and waterbars, would be applied as specified by the BLM-FFO Authorized Officer. Features suggested by the BLM-FFO representative during the on-site visits include:

- Divert the stormwater flow from the highest elevation point at the southern edge of the pad to both the east and west. The eastern diversion will head east from the split point, around corner D' and travel north into existing washes to the east of the well pad. The western diversion will head west from the split point, around corner B' and fan out in the sagebrush flats to the west of the well pad.

Installation and maintenance of erosion-control features would be done in accordance to BLM Gold Book standards. Additional resource protection design features and mitigation associated with construction are listed above, in "Design Features and Best Management Practices", or would be established upon reclamation following construction and drilling activities.

Proposed Project Phases

Under the proposed action, the following phases would occur.

Construction Phase

Once the APD and ROW Grant are approved, well site and pipeline construction can begin. The BLM-FFO would be notified at least 48 hours prior to the start of construction.

Within the proposed project area, all vegetation would be cleared, and approximately the top 6 inches of topsoil would be salvaged and stockpiled. Vegetation removed during construction, including slash/brush and trees that measure less than 3 inches in diameter (at ground level) would be chipped or mulched and incorporated into the topsoil as additional organic matter. Trees 3 inches in diameter or greater (at ground level) will be cut to ground level, delimbed and stacked. The subsurface portion of any trees (tree stumps) would be placed in adjacent areas needing soil stabilization, or hauled to an approved disposal facility.

Construction of the well pad would involve preparing a level area for the equipment that would drill and complete the well. The proposed well pad would be approximately 400 feet by 300 feet with a 50-foot buffer around the entire well pad area. Disturbance would be confined to the permitted area of 4.59 acres. The well pad area would require a maximum cut of 13.6 on the southwest (corner B') side of the well pad, and a maximum fill of 10.3 feet on the north side of the pad. The well pad would be constructed from the earthen materials present on-site and gravel brought in from off-site. No concrete or other foreign materials would be brought in for use in construction of the well pad. Construction would involve preparing a level area for the equipment that would drill and complete the wells. Following removal of vegetation and stockpiling of viable soil material, the pad would be graded using standard, cut-and-fill techniques of construction using a bulldozer, grader, front-end loader, and/or backhoe. Cuts and fills required for the construction of the well pad are described below.

BP would construct a 361-foot resource road to provide access to the proposed facilities. Proposed road construction and upgrades will be designed and constructed in accordance with BLM Gold Book Standards, BLM 9113-1 (Roads Design Handbook), and BLM 9113-2 (Roads Inventory and Condition Assessment Guidance and Instructions Handbook). Average right-of-way width for resource road development is 30-feet. Final travel surface width on resource roads is approximately 15-feet.

Once the proposed well is completed and proves to be viable, roughly 1,627.83-feet of well-tie pipeline would be constructed to connect with existing Blanco Trunk A pipeline infrastructure operated by Enterprise. The pipeline with be built within a 40-foot ROW within a single trench.

Please see Table 2 for a summary of the ROW footages and acreages. Additional, related appurtenances, such as above ground valve assembly and above and below ground cathodic protection, would be installed within the proposed pipeline corridor as necessary.

Trenching activities would be conducted using a trencher or backhoe. The trenches would be 16 inches in width if a trencher is used or 24 inches in width if a backhoe is used. After a pipe has been welded and coated, a side-boom tractor would be used to place the pipe into a trench. The pipeline would be buried to a minimum depth of 3 feet.

After trenching and pipe placement in the trench, the soils excavated from the trench would be returned and compacted to prevent subsidence. The trench would be compacted after approximately two feet of fill is placed within the trench and after the ground surface has been leveled.

Prior to the pipeline being placed in service, the pipes would be pressure tested. Pipeline markers would be installed along the proposed pipeline corridors within the line of sight, without voiding safety measures.

Drilling Operations

A drilling rig would be transported in sections and erected on the well site following construction of the well pad. Additional equipment and materials needed for drilling operations would be trucked into the well site. Drilling is a 24-hour operation taking an average of 9 days to drill a conventional gas well. To protect fresh water zone, surface casing is utilized. A 12 ¼-inch (diameter) hole is drilled to a depth of 500 to 1,000 feet, depending on the depth necessary to penetrate the fresh-water zones. Steel casing is lowered into the hole, and then specially designed cement is pumped down inside the casing out the shoe (at the bottom of the pipe) and up the outer annulus of the pipe to protect aquifers above the top of the casing shoe and to secure the base of the pipe. Surface casing is set to below the depth of the nearest potable water well within ½ mile of the surface location, or as specified by the BLM-FFO. After setting the surface casing, drilling resumes. Depending on well bore conditions, additional strings of casings may be run, using the same cementing practices before the well reaches the objective depth (total depth).

After setting the surface casing, directional drilling would begin with a “kick-off” (kick-off point) at which drilling would “build angle” and begin angle drilling which typically cumulates at an angle of 0-50 degrees to reach the bottom hole location and the target formation. A pipe casing is then installed from the surface of the bore hole through the production zone and cemented in place to prevent interzonal communication between gas bearing zones and water zones.

Most of the water used during the life of a producing well is consumed during drilling operations. A small amount of water is used for dust suppression or equipment installation during other phases of development. Recirculating mud systems are used to reduce the total volume of water needed. Drilling mud can be recycled to the next drilling location. Produced water from wells in the area can be used for most drilling operations except mixing cement. Water used to construct, produce, and maintain the proposed well would be acquired from one of the following locations:

- City of Bloomfield -- Point of Diversion # SD-01675
- Burlington (ConocoPhillips) Manzanarez Water Well #1 / #1R -- Point of Diversion # SJ 0196

The drilling fluid, called “mud,” is a mixture of water, bentonite, caustic soda, barite, and polymers. Drilling mud cools and lubricates the bit, while lifting the well cuttings caused by the bit to the surface for examination and disposal. The mud in the well bore prevents the hole walls from sloughing off into the hole, keeps underground pressures stable, and seals the sides of the well bore through formation of a thin “mud cake”. Mud properties are carefully supervised, and several measurements of the mud are made by a mud specialist during daily visits to the well site. The drilling mud is mixed on location and stored in steel bins or lined earthen pits. Drill cuttings are separated from the drilling mud and buried in a trench dug on the well location at the end of the drilling operation. The mud can be recycled to another drilling operation. If not recycled, it remains in the pit until the water has evaporated, and then is buried on location.

In the event formation evaluation determines the well would not be economically feasible to complete, then the well would be a dry hole, and would be plugged and abandoned in accordance with current BLM procedures.

Completion Operations

A smaller completion rig is used for the final phase of completing the well. Casing is run to the producing zone and cemented in place. To ensure isolation and protection of all zones between the surface and total depth, the BLM requires cement to be circulated from total depth to surface on the production casing, as well as on the surface casing. Remedial measures are taken if cement cannot be circulated to the surface.

If formation pressure can raise oil/gas to the surface, the well would be completed as a flowing well. Several downhole acid or fracture treatments may be necessary to enhance the formation permeability, to make the well flow. At the end of the treatment, the treatment water flows back to the surface and is captured in temporary tanks on location. This fluid is hauled to injection wells or evaporation ponds for disposal with other produced water.

Acidizing a well requires introducing acid in the well bore across the productive interval, which causes the solution of some of the mineral materials (e.g., calcite, dolomite, etc.) around the pore space. Upon solution and removal of these minerals, porosity and permeability are enhanced.

Hydrofracturing is conducted using fluid pumped down the well through perforations in the casing and into the formation. Pressures are increased to the point that the formation fractures or breaks, and sand is added to the injection fluid to “prop open” the crack, once the pressure is released. The pressure required to fracture a given formation is generally predictable. However, some coals require very high pressures to fracture the formation.

Before a well can begin producing gas for sale, the well bore and surrounding reservoir must be "cleaned up" (e.g., any fluids, sand, coal particles, or drill cuttings within the well bore must be removed). The conventional method for doing this is to pump air down the well bore, which lifts the waste fluids and solids out. The solid and liquid waste materials are then dumped into a pit or tank, and any gas that is removed is flared or vented to the atmosphere. In some flareless or green completions, natural gas, rather than air, is pumped down the well bore to clean it out.

The green completion technique is used on some wells in the San Juan Basin, which eliminates flaring and testing. The gas from flowback is run through a special separator and then placed in the pipeline for gathering. This technique reduces flaring and venting overall. The additional equipment for green completion may include considerably more tankage, special gas-liquid-sand separator traps, and portable gas dehydration. In addition to reducing methane emissions, green completions produce an immediate revenue stream with the produced natural gas and gas liquids, less solid waste and water pollution, and a safer operating practice.

During completion and testing of wells, flaring may be used to safely removed gas from the rig and work area. During the process produced gas is ignited and burned rather than directing that gas to sales.

Produced gas is piped away from the well bore into a pit constructed on the well pad, ignited and allowed to burn. A berm is usually constructed around the pit to aid in containing the flame and any materials that might be blown out with the gas.

A free flowing well is closed off with an assemblage of valves, pipes, and fittings to control the flow of oil and gas to other production facilities. If the well is not free flowing, artificial-lift (pump) methods would be used.

Production Facilities

The production equipment and facility layout will be deferred until the well's production characteristics can be evaluated after completion. Above ground equipment will be painted Juniper Green to reduce visual impacts to the surrounding environment.

Routine production operations occur throughout the year and require use and maintenance of access roads and well pads on a periodic, as needed basis. Maintenance of the various mechanical components used in production occurs at intervals recommended by manufacturers or as needed, based on site inspections. A pumper would visit the producing well to ensure that equipment is functioning properly. Pumpers may visit the well on a daily basis. A pumper may visit the well site once a week by utilizing off site computer based automation systems. Solar panels are used to power the radio telemetry equipment. When a problem is identified through the system a pumper is dispatched to the location. Control and monitoring of well production by radio telemetry reduces regular site inspections of the well, and vehicular traffic.

Periodically, a workover on a well is required. A unit similar to a completion rig is used to conduct maintenance procedures for efficient operation. Workover rigs can include repairs to the well bore equipment (casing, tubing, etc.), the well head, or the production formation itself. These repairs occur during daylight hours only and are usually completed in one day. Some situations may require several days to finish a workover. The frequency for this type of work cannot be accurately projected, since workover rigs vary and depend on site specific circumstances.

Interim Reclamation

Following construction activities, interim reclamation would occur within all new disturbance areas associated with the proposed project. The BLM-FFO would be notified at least 48 hours prior to surface reclamation activities. During this phase, a tractor with seeding capabilities would be used for reclamation purposes.

In areas that would be reclaimed within the proposed project area, slopes would be re-contoured to pre-construction topographical contours, if possible. Additionally, stockpiled topsoil would be redistributed and the surface would be ripped and seeded. The well pad would be reclaimed to a BLM-approved working area. All new surface disturbances associated with the pipeline corridor would be reclaimed.

The well pad would be reclaimed to a BLM-approved working area. Access to the well site would be maintained in accordance with the BLM Gold Book Standards, BLM 9113-1 (Roads Design Handbook), and BLM 9113-2 (Roads Inventory and Condition Assessment Guidance and Instructions Handbook).

During the pre-disturbance onsite meeting, it was determined that the Sagebrush vegetation community best represents the project area. Details of the interim reclamation process (including species included in the seed mixture), monitoring and reporting are discussed in the Surface Reclamation Plan.

Operation

During the operation phase of the proposed project, BP personnel would perform routine or emergency maintenance on the proposed well location. One light-duty vehicle would continue to access the area on near daily basis. Heavy-duty vehicles (semi-trucks) would access the well site 1 to 2 times a day for approximately 6 months after which traffic trips would decrease to approximately 1 trip per month.

Final Reclamation and Abandonment

Once the well site is no longer necessary and would not be expected to be utilized in the foreseeable future, it would be abandoned. Abandonment of the well would be carried out under current BLM regulations. Aboveground facilities would also be removed.

Final reclamation would occur within any portion of the project area that would be disturbed to bare soil during the abandonment phase of the proposed project, if these areas meet the acreage requirements for reclamation. These acreage requirements are summarized below:

- If final abandonment activities would disturb less than or equal to 0.1 acre to bare soil, the area(s) would be expected to re-vegetate naturally (no reclamation or monitoring activities will be required).
- If final abandonment activities would disturb more than 0.1 acre to bare soil, final abandonment reclamation activities would be the same as described for interim reclamation.

Details of the Final Reclamation and Abandonment process are provided in the Surface Reclamation Plan.

2.2.3. Proposed Surface Disturbance

Total surface disturbance associated with the proposed project area would be approximately 6.62 acres. Proposed new surface disturbances would include 2.75 acres for the construction of a 400-foot by 300-foot well pad, 1.84 acres for the 50-foot edge of disturbance around the well pad, 0.25 acres for the construction of a 361-foot access road with a 30-foot wide right-of-way, 1.40 acres for the construction of a 1,627.83-foot subsurface pipeline with a 40-foot wide right-of-way and 0.275 acres for a TUA where the pipeline crosses Manzanares Wash. Details of individual project disturbances can be found in Table 2. Depictions of the surface-disturbing activity locations are provided in Appendices A (Maps) and B (Plats).

Table 2. Proposed Project Surface Impacts

Facility	Proposed Action Overlaps Existing or Previously Permitted Disturbance (Station Numbers)	New Disturbance from Proposed Action in feet (Station Numbers)	Existing Disturbance in Acres	New Disturbance in Acres
Well Pad	-	400’ x 300’ well pad	-	2.75
Well Pad Construction Buffer	-	50’ wide Buffer	-	1.84
Access Road	-	361’ long x 30’ ROW (0+00 to 3+61.00)	-	0.25
Pipeline TUA	-	-	-	0.275
Subsurface Well-tie Pipeline	-	1,214.29 ’long x 40’ ROW (0+00 to 12+14.29)	-	1.12
	Crosses U.S. Highway 64 25.61 ’long x 40’ ROW (12+14.29 to 12+39.90)	-	0.02	-
	Overlaps Access Road ROW 342.9 ’long x 5’ ROW (12+39.90 to 15+82.83)	342.9 ’long x 35’ ROW (12+39.90 to 15+82.83)	0.04	0.28

	Overlaps Well Pad 45'long x 40' ROW (15+82.83 to 16+27.83)	-	0.04	-
		Total Disturbance	**0.1**	**6.52**

2.3. Alternatives Considered but Eliminated from Detailed Study

No other alternatives have been developed that would result in significantly fewer impacts or any clear advantages over the proposed action. Overall impacts to the natural resources, if an alternative well location were required, would be substantially identical to the proposed action with only minor differences in disturbances to soil, vegetation, range management, and wildlife occurring. The proposed action was selected for the best drainage of subsurface resources while protecting surface resources to the maximum extent possible.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Alternative A: No Action

Under the No Action alternative, current land and resource issues within the proposed project area would continue; there would be no new impacts from oil and gas development. The No Action alternative will serve as the baseline for comparing the environmental impacts of the analyzed alternatives, and will not be further evaluated in this EA (BLM 2008a).

Alternative B: Proposed Action

Under the Proposed Action, the AL Elliott D 10 - 1H project would continue as proposed, all proposed actions outlined in Section 2.2 Alternative B – Proposed Action, would occur. The potential affected environment and environmental consequences for the Proposed Action are described in the following sections.

3.1. Methodology

3.1.1. Direct and Indirect Impacts

In the following discussion of affected environment and potential environmental consequences, the action area is defined as any area that may be directly or indirectly impacted by the proposed action described in Chapter 2. Impacts to the action area are based on predicted trends and typical current land uses. Impacts can either be direct, referring to immediate impacts in time, or indirect impacts which are effects that occur later in time but are still reasonably likely to occur as a result of project implementation. The analysis area will be a defined area with either a natural or human delineated boundary. Often, the analysis area is the watershed in which the action occurs. For some issues, the analysis area may be a county or grazing allotment boundary.

Environmental consequences of the proposed action can be either long term (permanent or residual) or short term (incidental or temporary). Short-term impacts (usually less than 5-years) affect the environment for only a limited period and then the environment reverts rapidly back to pre-action conditions. Long-term impacts are substantial and permanent alterations to the pre-existing environmental condition.

3.1.2. Cumulative Impacts

Reasonably foreseeable future actions within the geographic scope and the timeframe of the proposed AL Elliott D 10 – 1H project include BP's proposed AL Elliott B 8 – 1H natural gas well and associated

access road and pipeline. The proposed AL Elliott B 8 – 1H project area is approximately 1-mile west of AL Elliott D 10 – 1H along U.S. Highway 64. Combined total surface disturbance associated with the proposed AL Elliott B 8 – 1H project would be approximately 5.32 acres. Proposed new surface disturbances would include 2.75 acres for the construction of a 400-foot by 300-foot well pad, 1.84 acres for the 50-foot edge of disturbance around the well pad, 0.17 acres for the construction of a 245-foot access road with a 30-foot wide right-of-way and 0.57 acres for the construction of a 618.88-foot subsurface pipeline with a 40-foot wide right-of-way.

A Reasonably Foreseeable Development scenario (RFD) was prepared for the FFO in October 2014 (Engler, et al., 2014). The RFD identified high, moderate, and low potential regions for oil development of the Mancos-Gallup Formation. Within the high potential region, full development would include 5 wells per section, resulting in 1,600 completions. Within the moderate potential region, full development would include one well per section, resulting in 330 completions. Within the low potential region, full development would include one well per township, resulting in 30 well completions. Additionally, the RFD predicted 2,000 gas wells could be development in the northeastern corner of the FFO.

The following methods and assumptions were used to predict the potential impact of the development predicted in the RFD.

Past Oil and Gas Development

Past oil and gas wells were identified using Ongard. Following interim reclamation, the average well pad size for past development is 0.75 acres per well pad.

Present and Future Oil Development

Based on previous development, it was assumed that development of the high potential region would involve the twinning of well pads. This is the placement of two or more wells on one well pad. The assumption for the analysis is that the development of a section would include two twinned well pads and one single well pad, resulting in three well pads for five wells. In the moderate and low potential regions, it was assumed that development would involve single well pads. The proposed action is located in a Wet Gas prone area.

The average well pad size for a twinned well pad was assumed to be 500 feet by 530 feet, or 6.08 acres. An additional 0.6 acres was added to account for any associated road or pipeline development, resulting 6.68 acres of short-term disturbance. Following completion of the well, interim reclamation of the well pad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The average well pad size for a single well pad was assumed to be 500 feet by 500 feet, or 5.74 acres. Again, an additional 0.6 acres was added to account for associated road or pipeline development, resulting in 6.34 acres of long-term disturbance. Following completion of the well, interim reclamation of the well pad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The Random Point Tool in ArcMap was used to randomly assign points representing well pads and associated disturbance based on the RFD assumptions: five wells per section in the high potential region, one well per section in the moderate potential region, and one well per township in the low potential region. This allowed both long-term and short-term disturbance from oil development of the Mancos-Gallup Formation to be calculated for the analysis areas used in this EA.

Present and Future Gas Development

The RFD predicted 2,000 wells could be developed in the gas prone area. The average well pad size was assumed to be 555 feet by 410 feet, or 5.22 acres. An additional 0.6 acres of disturbance was added to account for associated roads and pipelines, resulting in total disturbance of 5.82 acres. Following completion of the well, interim reclamation of the well pad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

3.2. Air Resources

3.2.1. Affected Environment

The proposed well 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.

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.*

"Design Values" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design values for criteria pollutants are listed below in Table 3. 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 3. 2012 Criteria Pollutant Monitored Design Values in San Juan County

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]	

Source: U.S. Environmental Protection Agency, 2014
[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 4). 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 4. Number of Days classified as “unhealthy for sensitive groups” (AQI 101-150) or worse

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

Source: U.S. Environmental Protection Agency, 2013a

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).

Climate

The analysis area is located in a semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F),

and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100°F in June and July and have dipped below zero in December and January. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico. Table 5 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

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

Month	Average Temperature (^{O}F [(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

Very recently, pioneering research using space-borne (satellite and aircraft) determination of methane concentrations have indicated anomalously large methane concentrations may occur in the Four Corners region (Kort, Frankenberg, Costigan, Lindenmaier, Dubey, & Wunch, 2014). A subsequent study (Schneising, Burrows, Dickerson, Buchwitz, Reuter, & Bovensmann, 2014) indicated larger anomalies over other oil and gas basins in the U.S. Methane is 34 times more potent at trapping greenhouse gas emissions than CO_2 when considering a time horizon of 100 years (Intergovernmental Panel on Climate Change, 2013). While space-borne studies can determine the pollutant concentration in a column of air, these studies cannot pinpoint the specific sources of air pollution. Further study is required to determine the sources responsible for methane concentrations in the Four Corners region; however, it is known that a significant amount of methane is emitted during oil and gas well completion (Howarth, Santoro, & A.Ingraffea, 2011). Methane is also emitted from process equipment, such as pneumatic controllers and liquids unloading, at oil and gas production sites. Ground-based, direct source monitoring of pneumatic controllers conducted by the Center for Energy and Environmental Resources (Allen, et al., 2014) show that methane emissions from controllers exhibit a wide range of emissions and a small subset of pneumatic controllers emitted more methane than most. Emissions measured in the study varied significantly by region of the U.S., the application of the controller and whether the controller was continuous or intermittently venting. The Center for Energy and Environmental Resources had similar findings of variability of methane emissions from liquid unloading (Allen, et al., 2014a). In October 2012, USEPA promulgated air quality regulations controlling VOC emissions at gas wells. These rules require air pollution mitigation measures that reduce the emissions of volatile organic compounds. These same mitigation measures have a co-benefit of reducing methane emissions. Future ground-based and space-borne studies planned in the Four Corners region with emerging pollutant measurement technology may help to pinpoint significant, specific sources of methane emissions in the region.

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.

3.2.2. Impacts from the Proposed Action

Methodology and assumptions for calculating air pollutant and greenhouse gas emissions are described in the Air Resources Technical Report. This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one horizontal gas 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).

Direct and Indirect Impacts

Criteria Pollutants

Table 6 shows estimated emissions from one proposed horizontal gas well for criteria pollutants, volatile organic compounds (VOC) and greenhouse gas (GHG). For comparison, Table 7 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on USEPA's 2011 emissions inventory (U.S. Environmental Protection Agency, 2014).

Table 6. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Gas 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)								
Equipment Leaks	-	-	-	-	-	-	0.013	-
Field Compression	0.14	0.29	0.10	0.01	0.01	-	-	19.30
Total	**6.28**	**1.94**	**0.65**	**2.55**	**0.30**	**0.11**	**0.02**	**686.96**

Table 7. 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
La Plata	4,838.2	17,116.3	3,740.1	2,330.0	919.6	127.9
Total	**75,187.7**	**144,551.5**	**57,265.1**	**222,168.9**	**26,407.2**	**7,237.9**

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

Table 8. 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	75,187.7	144,551.5	57,265.1	222,168.9	26,407.2	7,237.9
Horizontal Gas Well Emissions	6.28	1.94	0.65	2.55	0.30	0.13
Percent Increase	**0.008**	**0.001**	**0.001**	**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

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 0.065 tons/year should be considered a very gross estimate.

Total Greenhouse Gases

The available statewide GHG summary combines GHG emissions from CO_2 and CH_4. To compare the GHG emissions from the Proposed Action estimated by the calculator with statewide GHG emissions, CO_2e emissions for both CH_4 and CO_2 were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO_2e (76.2 million metric tons; (New Mexico Environment Department, 2010)). The estimated CO_2e metric tons emissions from one conventional gas well (623.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO_2 emissions.

Cumulative Impacts

The FFO manages federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley Counties. There are approximately 21,150 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.

3.3. Cultural Resources

3.3.1. Affected Environment

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

BLM Manual 8100, The Foundations for Managing Cultural Resources (2004) defines a cultural resource as *"a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups. (cf. "traditional cultural property"). Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit described in this Manual series. They may be but are not necessarily eligible for the National Register (a.k.a. "historic property")."*

In the broadest sense cultural resources include sites, buildings, structures, objects, and districts/landscapes (NPS 1997). Cultural resources (prehistoric or historic) vary considerably, and can include but are not limited to simple artifact scatters, domiciles of various types with a myriad of associated features, rock art and inscriptions, ceremonial/religious features, and roads and trails. Traditional Cultural Properties (TCPs) are cultural resources that are eligible for the National Register of Historic Places (NRHP) and have cultural values, sometimes sacred, 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 (Parker and King 1998). Historically Native American communities are most likely to identify TCPs, although TCPs are not restricted to those associations. Some TCPs are well known while others may only be known to a small group or otherwise only vaguely known. Native American tribal perspectives on what is considered a TCP are not necessarily limited by a places National Register eligibility or lack thereof.

The National Register of Historic Places (NRHP; 36 CFR Part 60) is the basic benchmark by which the significance of cultural resources are evaluated by a federal agency when considering what effects its actions may have on those resources. To summarize, to be considered eligible for the NRHP a cultural resource must meet one or more of the following criteria: a) are associated with events that have significantly contributed to the broad patterns of our history; or b) are associated with the lives of persons significant in our past; or c) embody distinctive characteristics of the type, period, or method of

construction, or represents the work of a master, or possesses high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or d) have yielded, or may be likely to yield, information that is important in a pre-history or history. The resource, as applicable, must possess one or more of the following aspects of integrity; location, design, setting, materials, workmanship, feeling, and association. In the event a determination of eligibility cannot be made, the resource is treated as eligible (a historic property).

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR Part 800) requires federal agencies to consider what effect their licensing, permitting, funding or otherwise authorizing an undertaking, such as an APD or R-O-W, may have on properties eligible for the National Register. Pursuant to 36 CFR 800.16 (i), “Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” Effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Area of Potential Effect (APE) means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is typically defined as areas to be directly disturbed and areas in immediate close proximity. Cultural resources are identified through a combination of literature review and pedestrian survey consistent with guidelines set forth in the Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities (BLM 2005).

Cultural resources within the entire APE for the Proposed Action were identified by a literature review and an archaeological BLM Class III level (100%) pedestrian survey by San Juan County Museum Association, Division of Conservation Archaeology. The archaeological report (15-DCA-020 [Meininger 2015]/ BLM Report No.: 2016(I)009F) was prepared and submitted to the BLM.

The Class III inventory identified one (1) new archeological site, three (3) previously recorded sites and four (4) isolated occurrences (IOs) within the APE. All of the new and previously recorded sites (4 sites total) are eligible for inclusion on the National Register of Historic Places (NRHP) based on criterion d. Measures to protect these sites have been recommended and include temporary barrier fencing and site monitoring of any ground-disturbing activity. None of the four IOs were determined eligible for inclusion in the NRHP. No TCPs are known to exist in the APE.

3.3.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Cultural resources tend to degrade over time from natural forces; however, many survive for hundreds or thousands of years. Any land-disturbing activity can disturb, damage, or uncover cultural resources. Direct impacts normally include alterations to the physical integrity of a historic property. If a historic property is significant for other than its information potential, direct impacts may also include the introduction of audible, atmospheric, or visual elements that are out of character for the property. A potential indirect impact from the proposed action, particularly in undeveloped areas is the increase in human activity or access to the area with an increased potential of unauthorized damage to historic properties.

Historic properties are being avoided with the implementation of design features such as but not limited to temporary barrier fencing and site monitoring of any ground-disturbing activity. These design features are detailed in the Cultural Resource Record of Review, attached to the COA in the ROW. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The proposed action will have no direct or indirect impact on historic properties (no historic properties affected).

Cumulative Impacts

The Cumulative Impacts Analysis Area (CIAA) is the associated watershed(s).The United States is divided and sub-divided into successively smaller hydrologic units which are classified into six levels nested within each other, from the largest geographic area (region) to the smallest geographic area (subwatershed). The boundaries are distinguished by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters (USGS 2013, NRCS 2013). Hydrologic units can be viewed as a naturally defined landscape and impacts to cultural resources in one part of that landscape could, theoretically, affect a broader understanding of the interrelationships between sites in the landscape as a whole. The smallest hydrologic unit area, typically from 10 to 40 K acres (15 to 62 mi^2; HUC 12) or combination thereof are used as the CIAA.

The CIAA for cultural resources is the proposed project area and the Canon Largo-San Juan River subwatershed which total 30,287 acres. Based on New Mexico Cultural Resource Information System data (NMCRIS; July 2015), within the subwatershed there are 396 recorded sites and approximately 20% of the subwatershed (5,922 ac) have been inventoried for cultural resources by 632 unique investigations since 1976. The cultural inventory coverage for the CIAA is likely higher as not all survey data is digitally available (e.g., surveys since July 2015). There are no properties listed on the National Register of Historic Places, Chaco Protection Sites, World Heritage Sites, or National Historic Trails within the CIAA. The Citizens Ditch, located on the north side of the San Juan River, is listed on the New Mexico State Register of Cultural Properties.

- What impacts would surface disturbance for the proposed action have on historic properties in the CIAA?

There will be no negative cumulative impact on known historic properties as they are being avoided by relocating the surface disturbing components of the proposed action away from the property. There will be no known negative cumulative impact on the landscape that would affect the seven aspects of integrity (location, design, setting, materials, workmanship, feeling, association) of known historic properties. A positive cumulative effect is the additional scientific information yielded by the archaeological survey both in terms of site specific information and the amount of the landscape inventoried for cultural resources.

- What impacts would the project have on unknown (buried, not visible) historic properties in the CIAA?

Risks of impacting unknown (i.e., buried) historic properties is normally negligible as cultural resources “discoveries” during surface disturbing components of a proposed action are infrequent in the FFO. Since FY2000, 28 discoveries have occurred in association with 21,290 actions (e.g. road, well, pipeline, etc.), or 1:760. During that period 153,626 ac of land were inspected for cultural resources, with an average of 7.2 ac per action and one discovery per 5,472 ac. All authorizations (e.g., APDs, R-O-Ws) have stipulations, under penalty of law, requiring the reporting of and avoidance of further disturbing cultural discoveries during a proposed action. Where the risk of discoveries can be reasonably expected (e.g., ≤ 100' of a known historic property, or in environmental settings known or suspected to be conducive to buried sites), archaeological monitoring by a qualified and permitted archaeologist during initial disturbance (e.g., blading, trenching) is normally required. If buried historic properties are discovered, collaborative steps are taken to protect them in place or recover their important information.

3.4. Upland Vegetation

3.4.1. Affected Environment

The analysis area is located within the United States Environmental Protection Agency (USEPA) designated Arizona/New Mexico Plateau Level III ecoregion. The Arizona/New Mexico Plateau occurs primarily in Arizona, Colorado, and New Mexico, with a small portion in Nevada. This ecoregion is approximately 45,870,500 acres (185,632 square kilometers [km2]), and the elevation ranges from 2,165 to 11,949 feet AMSL (660 to 3,642 meters). The ecoregion’s landscapes include low mountains, hills, mesas, foothills, irregular plains, alkaline basins, some sand dunes, and wetlands. This ecoregion is a

large transitional region between the semiarid grasslands to the east, the drier shrublands and woodlands to the north, and the lower, hotter, less vegetated areas to the west and south. Vegetation communities include shrublands with big sagebrush, rabbitbrush, winterfat, shadscale saltbush, and greasewood; and grasslands of blue grama, western wheatgrass, green needlegrass, and needle-and-thread grass. Higher elevations may support piñon pine and juniper forests. The ecoregion includes the urban areas of Santa Fe and Albuquerque. Important land uses include irrigated farming, recreation, rangeland, wildlife habitat, and some natural gas production (Griffith, et al. 2006).

The general region surrounding the proposed AL Elliott D 10 – 1H project area is characterized by dense shrublands, semiarid grasslands, sparse woodlands and mesas. The proposed project is located within Sagebrush / Shrubland vegetation community with moderate desert grassland characteristics and piñon-juniper woodland hills (Lowry 2005). Dominant vegetation consists of big sagebrush, Utah Juniper interspersed with various native grasses, including galleta grass, blue grama and Indian ricegrass. Minor components include Cholla cactus (Cylindropuntia sp.) and Russian thistle. There are approximately 40-50 trees documented within the proposed project area.

During the onsite field inspections of the proposed project area no USDA-listed noxious weeds (NRCS 2010), NMDA-listed noxious weeds (NMDA 2009), or BLM-FFO invasive or poisonous weed species (BLM 2003a, 3-34 – 3-35) were identified within the proposed project area.

3.4.2. Impacts from the Proposed Action

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation within the proposed project area would be cleared. The proposed action would result in the removal of approximately 6.52 acres of Sagebrush / Shrubland vegetation community. Approximately 40-50 trees would be removed as a result of the proposed action.

Details of the proposed actions during interim reclamation can be found in the Surface Reclamation Plan. During final reclamation, BP would fully reclaim any portions of the proposed project area that would be disturbed to bare soil as a result of final abandonment earthwork activities (if such areas total greater than 0.1 acre). During interim and final reclamation, the BLM-FFO approved “Sagebrush” seed-mix would be utilized. The species included in this mixture are included in the Surface Reclamation Plan. Reestablished vegetation would consist of native grass, forb, and shrub species included in the seed mixture, as well as native species that are not deliberately planted. It is also possible that invasive, nonnative species could become established within the proposed project area, as such species could be transported by project equipment and tend to thrive in disturbed areas. Following the reclamation process, the resulting vegetation communities could differ from the native plant communities surrounding the proposed project area. Within reclaimed areas, it is not expected that the vegetation communities would return to native conditions within 20 years (BLM 2003a, 4-18).

The deposition of fugitive dust generated during vegetation-clearing activities and during wind events could reduce photosynthesis and productivity of the surrounding vegetation (Thompson, et al. 1984; Hirano, et al. 1995), increase water loss in plants near the proposed project area (Eveling and Bataille 1984), and result in injury to leaves of surrounding vegetation.

Cumulative Impacts

The spatial analysis area of the proposed project area is the Upper San Juan Watershed (HUC_10 # 1408010118) which is comprised of approximately 107,054 acres total. Existing surface disturbances within the spatial analysis area include an estimated 3,351 well pads for a total disturbance of 6,208.27 acres (2,513.25 acres long term disturbance and 3,695.02 acres reclaimed). Potential surface disturbances within the spatial analysis area, anticipated to occur in the reasonably foreseeable future, include an estimated 155 well pads for a total disturbance of 904.09 acres (232.5 acres long term disturbance and 671.59 acres reclaimed, Engler et al. 2014).

Additional surface disturbances that have occurred or are anticipated to occur in the reasonably foreseeable future include:

- U.S Highway 64 is directly north of the proposed project area.
- Trunk R pipeline is just south of the beginning of the proposed pipeline.
- Active wildlife and livestock grazing occurs in the area. The well pad is within the Blanco Community grazing allotment No. 05039 managed by the BLM-FFO.

Other reasonably foreseeable actions such as continued livestock grazing, vegetation treatments, and, indirectly, fugitive dust or deposition associated with existing roads, well pads, utility corridors, and public use in the immediate area could impact the vegetation within the analysis area and could continue to do so throughout the life of the proposed project. Additional potential surface disturbances within the spatial analysis area include BP's AL Elliott B 8 – 1H development outlined in Section 3.1.2. Aside from those discussed above, no additional impacts to vegetation are expected within the analysis area for the reasonably foreseeable future.

3.5. Noxious Weeds and Invasive Species

3.5.1. Affected Environment

Management of invasive and non-native plant species is mandated under several pieces of legislation, including the Lacey Act, as amended (16 USC 3371-3378); the Federal Noxious Weed Act of 1974, as amended (7 USC 2801 et seq.); the New Mexico Noxious Weed Management Act of 1998; and EO 13112 regarding Invasive Species. Under EO 13112, Federal agencies are ordered not to authorize or carry out actions that would cause or promote the introduction of invasive species.

In the San Juan Basin, invasive plants are frequently found in areas that have been disturbed by surface activities. A mission of the BLM-FFO is to detect new invasive plant species populations, prevent the spread of these new populations, manage existing populations, and eradicate invasive populations. This is to be accomplished in a timely manner, using the safest environmental methods available. For all actions on BLM-FFO lands that involve surface disturbance or reclamation, reasonable steps are required to prevent the introduction or spread of invasive plants (BLM 2003a, 3-34). A noxious weed plan for monitoring and treatment of any existing or new infestations will be established by BP for the length of this project. BMP's for the management of invasive and non-native plants associated with the proposed project are described in detail in Section 2.2.2 (Description of Proposed Project).

The U.S. Department of Agriculture (USDA) has designated certain plants as federally listed noxious weeds (NRCS 2010). The New Mexico Department of Agriculture (NMDA) has designated certain plants as state-listed noxious weeds (NMDA 2009). A total of 212 invasive and poisonous weed species have been identified on BLM-FFO lands. The PRMP/FEIS lists the invasive, non-native plant species of concern in the BLM-FFO area (BLM 2003a, 3-34 – 3-35).

During the onsite field inspections of the proposed project area no USDA-listed noxious weeds (NRCS 2010), NMDA-listed noxious weeds (NMDA 2009), or BLM-FFO invasive or poisonous weed species (BLM 2003a, 3-34 – 3-35) were identified within the proposed project area.

3.5.2. Impacts from the Proposed Action

Direct and Indirect Impacts

Noxious weeds and invasive species are generally tolerant of disturbed conditions, and disturbed soils at project sites could provide an opportunity for the introduction and establishment of noxious weeds and invasive species. Seeds or other propagules of noxious/invasive species could be transported to a project site from infested areas by heavy equipment or other vehicles that are used at the site. Noxious weeds and invasive species could also spread from established populations near a project site and colonize soils

disturbed by project activities. In arid regions, such as the area in which the proposed project area is located, longer time periods are required for the re-establishment of plant communities; this could create an increased potential for the establishment and spread of noxious/invasive species. Noxious weeds and invasive species typically develop high population densities and tend to exclude most other plant species, thereby reducing species diversity and potentially resulting in long-term effects. The establishment of noxious/invasive species could greatly reduce the success of native plant community restoration efforts in project areas and create a source of future colonization and degradation of adjacent undisturbed areas.

The establishment of invasive species, particularly annual grasses, such as cheatgrass, which produce large amounts of easily ignitable fuel over large contiguous areas, could also alter fire regimes. This situation could result in an increase in the frequency and intensity of wildfires, and in some areas, such as in some desert-scrub communities, a fire regime could be created where none was present before. In plant communities that are not adapted to frequent or intense fires, native species, particularly shrubs and trees, could be adversely affected, and their populations could be greatly reduced, creating opportunities for greater increases in noxious/invasive species populations (Brooks and Pyke 2001). Increases in fire frequency or severity could thus result in a reduction of biodiversity and could promote the conversion of some habitats (such as forest, shrubland, or shrub-steppe) to other types, prolonging or preventing the development of mature native habitats (BLM and U.S. Department of Energy 2010). BMP's for the management of invasive and non-native plants associated with the proposed project are described in detail in Section 2.2.2 (Description of Proposed Project).

Cumulative Impacts

The spatial analysis area of the proposed project area is the Upper San Juan Watershed. Within the spatial analysis area, ground-disturbing activities have or are anticipated to occur in the reasonably foreseeable future; these disturbances are described in Section 3.4 (Upland Vegetation). Additional potential surface disturbances within the spatial analysis area include BP's AL Elliott B 8 – 1H development outlined in Section 3.1.2. These ground disturbances could encourage the establishment of noxious weeds. In addition, ongoing activities, such as vehicles driving and livestock grazing, have contributed to the potential for weeds to be introduced to the spatial analysis area from other locations. These types of disturbances and activities have contributed to the establishment of cheatgrass (*Bromus tectorum*) and Russian thistle (*Salsola spp.*) in other areas and could contribute to the establishment and spread of other noxious weeds or invasive species within the proposed project area. The proposed project would contribute to surface disturbance and ongoing activity, and thus contribute to the potential for the establishment and spread of noxious weeds or invasive plant species within the spatial analysis area.

3.6. Migratory Birds

3.6.1. Affected Environment

Executive Order 13186 dated January 17, 2001 calls for increased efforts to more fully implement the Migratory Bird treaty Act of 1918. In keeping with this mandate, the BLM/FFO has issued an interim policy to minimize unintentional take as defined by the EO 13186 and to better optimize migratory bird efforts related to BLM/FFO activities (BLM 2010). In keeping with this policy, a list of priority birds of conservation concern which occur in similar eco-regions as the proposed action area was compiled through a review of existing bird conservation plans including:

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

These selected species have a known distribution in the BLM-FFO area and may be affected by various types of perturbations. Priority species that have the potential to occur within the proposed project area include: golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), and prairie falcon (*Falco mexicanus*), and to a lesser degree American peregrine falcon (*Falco peregrinus anatum*). According to the most recent BLM-FFO raptor nest geographic information system (GIS) data (BLM 2014b), no nest sites are located within 1/3-miles of the PPA. The closest nest site is 1.4 miles away to the south.

During the July 23rd, 2015 on-site meeting a Red-tailed hawk (*Buteo jamaicensis*) was seen flying over the project site, exhibiting a distress call and stayed within the area for approximately 10 minutes then flew off to the west. A potential nest was observed approximately 0.22 miles to the east of the PPA along a cliff wall, old nesting material was seen hanging from an outcrop in the cliff edge, a fair amount of whitewash was seen with the outcrop and around the area. It remains unknown as to whether the nest was active or not, or if it was associated with the observed Red-tailed hawk.

3.6.2. Impacts from the Proposed Action

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation within the proposed project area would be cleared. The proposed project would result in the removal of approximately 6.52 acres of Sagebrush / Shrubland vegetation community and approximately 40-50 trees. The well pad would be reclaimed to a BLM-approved working area. All new surface disturbances associated with the proposed pipeline corridor would be reclaimed during interim reclamation. The proposed project area would be converted to a reseed community following interim reclamation. If interim reclamation is successful, Sagebrush vegetation community would become re-established within the proposed project area. However, as discussed in Section 3.4 (Upland Vegetation), the re-establishment of a mature, native plant community could require decades, and it is possible that the plant community could never fully recover from disturbance (BLM 2003a, 4-18).

There is available, similar habitat in the surrounding area that migratory birds could utilize. However, the clearing of vegetation would remove potential habitat. The transformation of the proposed project area to a reseed community could remove potential habitat for numerous species, including the priority bird species listed above. The proposed activities would result in new surface disturbances; therefore, habitat fragmentation would increase as a result of the proposed project. Audial and visual disturbances associated with the proposed project could temporarily deter migratory birds from utilizing the proposed project area and immediately adjacent lands.

Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed project. As discussed in Section 2.2.2 (Description of Proposed Project - Protection of Flora and Fauna, Including SSS and Livestock), if the vegetation-clearing phase of construction is scheduled to occur during migratory bird breeding season (May 15 to July 31), a pre-construction migratory bird nest survey would be conducted within the proposed project area. Therefore, it is unlikely that nests, eggs, or young birds within the proposed project area would be directly harmed. If proposed project activities occur during migratory bird breeding season, birds nesting outside of but near the proposed project area could abandon existing nests as a result of visual and audial disturbances.

Cumulative Impacts

The spatial analysis area of the proposed project area is the Upper San Juan Watershed. Within the spatial analysis area, vegetation disturbing activities have or are anticipated to occur in the reasonably foreseeable future; these disturbances are described in Section 3.4 (Upland Vegetation). Additional potential surface disturbances within the spatial analysis area include BP's AL Elliott B 8 – 1H development outlined in Section 3.1.2. Other reasonably foreseeable actions such as continued livestock grazing, vegetation treatments, and community development would cumulatively impact migratory birds through direct and effective habitat loss. The proposed action would contribute to the direct loss of

approximately 6.52 acres of migratory bird habitat. The intensity of indirect effects would be dependent upon the species, its life history, time of year and/or day and the type and level of human and vehicular activity occurring.

3.7. Special Status Species

3.7.1. Affected Environment

The BLM manages certain species which are 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. BLM SSS include BLM Sensitive Species and BLM-FFO Special Management Species (SMS).

New Mexico BLM State Directors have developed a list of BLM Sensitive Species for the State of New Mexico (BLM 2011a, BLM 2011b, BLM 2011c, BLM 2012). In accordance with BLM Manual 6840, the BLM-FFO has prepared a list of BLM-FFO SMS to focus species management efforts toward maintaining habitats under a multiple-use mandate (BLM 2008b, BLM 2008c). BLM-FFO SMS include some BLM Sensitive Species and other species for which the BLM-FFO has determined special management is appropriate (BLM 2008b). The authority for this policy and guidance is established by the ESA; Title II of the Sikes Act, as amended (16 USC 670a-670o, 74 Stat. 1052); FLPMA; and Department of Interior Manual 235.1.1A.

Table 9 provides an evaluation of the potential for BLM Special Status Species to occur in the analysis areas. Potential presence determination is based on evaluation of the proposed action area habitat and the known habitat requirements of the species. Species are listed by the BLM New Mexico State Office as Sensitive (SEN) and/or as Special Management Species (SMS) by the BLM-FFO.

Table 9. BLM Special Status Species

Species Name	Conservation Status		Habitat Associations	Potential to Occur in Analysis Area
	BLM	State of NM		
Birds				
American peregrine falcon (*Falco peregrinus anatum*)	SMS	NM-T	Open country near lakes or rivers with rocky cliffs and canyons. Tall city bridges and buildings also inhabited.	Suitable foraging habitat within project area.
Bald eagle (*Haliaeetus leucocephalus*)	SEN SMS	NM-T	Near lakes, rivers and cottonwood galleries. Nests near surface water in large trees. May forage terrestrially in winter	Project area does not provide suitable habitat for species to occur.
Bendire's thrasher (*Toxostoma bendirei*)	SEN		Typically inhabits sparse desert shrubland & open woodland with scattered shrubs; breeds in scattered locations in central & western portions of NM; most common in southwest NM.	Marginal habitat within project area for species to occur.
Burrowing owl (*Athene cunicularia*)	SEN SMS		Associated with prairie dog towns. In dry, open, short-grass, treeless plains	Marginal habitat within project area for species to occur. Lack of large network of burrows a limiting factor.
Ferruginous hawk (*Buteo regalis*)	SMS		Grasslands and semi-desert shrub; occasionally piñon-juniper edge habitat. Nest on rock spires in NW New Mexico.	Suitable foraging habitat documented within project area.
Golden Eagle (*Aquila chrysaetos*)	SMS		In the West, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	Suitable foraging and nesting habitat documented within action area.
Mountain plover (*Charadrius montanus*)	SMS		Semi-desert, grasslands, open arid areas, bare fields, breeds in open plains or prairie.	Project area does not provide suitable habitat for species to occur.

Piñon jay (*Gymnorhinus cyanocephalus*)	SEN		Foothills throughout NM wherever large blocks of piñon-juniper woodland habitat occurs.	Project area does not provide suitable habitat for species to occur.
Prairie falcon (*Falco mexicanus*)	SMS		Arid, open country, grasslands or desert scrub, rangeland; nests on cliff ledges, trees, power structures.	Suitable foraging and nesting habitat documented within project area.
Yellow-billed cuckoo (*Coccyzus americanus*)	SMS		Low to mid-elevation riparian woodlands, deciduous woodlands, and abandoned farms and orchards. Rare in the San Juan River valley.	Project area does not provide suitable habitat for species to occur.
Flowering Plants				
Brack's hardwall cactus (*Sclerocactus cloveriae* ssp. *brackii*)	SEN SMS	NM-E	Sandy clay slopes of the Nacimiento Formation in sparse semi desert, piñon-juniper grasslands and open arid areas of badland habitat (5,000-6,400 ft).	Project area does not provide suitable habitat for species to occur.
Aztec gilia (*Aliciella formosa*)	SEN SMS	NM-E	Arid and sparsely vegetated Badland /Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,400 ft).	Project area does not provide suitable habitat for species to occur.

3.7.2. Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed project would result in the direct removal of approximately 6.52 acres of Sagebrush / Shrubland as well as approximately 40-50 trees. Audial and visual disturbances associated with the proposed project could temporarily deter SSS from utilizing the proposed project area and immediately adjacent lands.

There is available, similar habitat in the surrounding area that special status wildlife species could utilize. However, the clearing of vegetation and ground disturbing activities would remove potential habitat for American peregrine falcon, ferruginous hawk, golden eagle, prairie falcon and to a lesser degree Bendire's thrasher, and burrowing owls.

The proposed project area would be converted to a reseed community following interim reclamation. The impacts to the vegetation communities are described in detail in Section 3.4 (Upland Vegetation). If interim reclamation is successful, native vegetation communities would become re-established within the proposed project area. However, as discussed in Section 3.4 (Upland Vegetation), the re-establishment of a mature, native plant community could require decades, and it is possible that the plant community could never fully recover from disturbance (BLM 2003a, 4-18).

Discussed in Section 2.2.2 (Description of Proposed Project – Protection of Flora and Fauna, Including SSS and Livestock), under the Migratory Bird Treaty Act – BLM/FFO Interim Management Policy (IM No. NM-F00-2010-001), timing limitations on use authorizations will be enforced for projects during the nesting period of May 15 to July 31 to avoid or minimize the possibility of the unintentional take of migratory birds.

Cumulative Impacts

The spatial analysis area of the proposed project area is the Upper San Juan Watershed. Within the spatial analysis area, ground-disturbing activities have or are anticipated to occur in the reasonably foreseeable future; these disturbances are described in Section 3.4 (Upland Vegetation). Additional potential surface disturbances within the spatial analysis area include BP's AL Elliott B 8 – 1H development outlined in Section 3.1.2. 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 (BLM 2003a, 4-111). For reasonably foreseeable actions on federal lands, direct impacts to SSS would be avoided through the

BLM's siting criteria. 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 (BLM 2003a, page 4-125). Other reasonably foreseeable actions within the planning area that could impact SSS would include livestock grazing, agriculture, commercial and residential development, mining, wildfire, and vegetation management.

3.8. Transportation and Travel

3.8.1. Affected Environment

Within the BLM-FFO planning area, there are approximately 15,000 miles of roads. Most of the roads are unpaved and provide access to resources on Federal lands, predominantly oil and gas facilities. In areas with a high level of oil and gas development, there are approximately 4 miles of roads per square mile. In areas outside of oil and gas development areas, there are approximately 1 mile of roads per square mile. The major roads within the BLM-FFO planning area are U.S. Highways 550, 64, and 491 and State Highways 96, 170,173, 371, 511, 537, 544, 574, and 595 (BLM 2003a, 3-57 – 3-58).

The government entity that owns a road is responsible for maintenance (BLM 2003a, 3-58). The county roads within the BLM-FFO planning area have been categorized (BLM 2003a, 3-58):

- Full county-maintained: maintained at best level possible with resources available
- Lesser county-maintained: bladed twice a year
- Unmaintained roads

U.S. Highway 64 is directly north (351-feet) from the AL Elliott D 10 - 1H well pad.

3.8.2. Impacts from the Proposed Action

Direct and Indirect Impacts

During all proposed project phases, vehicles would use existing highways in the region. Traffic would include light vehicles (such as cars and pick-up trucks) and heavy vehicles (such as water trucks and large tractor-trailers hauling equipment), as described in Section 2.2.2 (Description of Proposed Project – Proposed Project Phases).

During all proposed project phases, the proposed project would result in increased traffic on area roads; therefore, there would be an increased potential for traffic accidents. Traffic estimates would likely increase during mobilization/demobilization phases, which would include the movement of equipment, pipes, and other materials in/out of a project area using heavy vehicles.

Roads would be maintained in the same or better condition as existed prior to the commencement of proposed operations. The maintenance activities would continue until final abandonment and reclamation of the proposed project area. The proposed access road would be maintained for the life of the proposed project in accordance with *The Gold Book* (BLM and USFS 2007).

BMPs to be utilized along the existing roads and proposed road closures and reclamation methods are described further in Section 2.2 (Proposed Action) and the Surface Reclamation Plan.

Access to the proposed project area would be gained by traveling on U.S. Highway 64.

Cumulative Impacts

The spatial analysis area of the proposed project area is the Upper San Juan Watershed. Within the spatial analysis area, ground-disturbing activities have or are anticipated to occur in the reasonably foreseeable future; these disturbances are described in Section 3.4 (Upland Vegetation). Additional

potential surface disturbances within the spatial analysis area include BP's AL Elliott B 8 – 1H development outlined in Section 3.1.2. This extensive development could contribute to public health and safety concerns in the general proposed project area. Transportation issues are a primary safety concern. Vehicles associated with oil and gas development utilize the developed highway and county road systems in the spatial analysis area. In addition, the oil and gas industry constructs and utilizes dirt access roads in the spatial analysis area. These roads, most of which are accessible by the public, are often hazardous, particularly during and following periods of inclement weather.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

Table 10 contains a list of tribes, individuals, organizations, and agencies invited to attend the on-site for the project.

Table 10. Tribes, Individuals, Organizations, and Agencies Invited to the On-Site

Name	Tribe, Organization, or Agency	Attended On-Site
--	San Juan Citizens Aliance	No
Thomas Singer	Western Environmental Law Center	No
Tim Ream	Wild Earth Guardians	No
Bruce Baizel	Earth Works Action	No
Gargy Graham	Western Resources	No

The BLM fulfills its responsibilities under the National Historic Preservation Act (NHPA) through a number of agreements. The National Programmatic Agreement (NPA 2012) between the BLM, Advisory Council on Historic Preservation (ACHP), and the National Council of State Historic Preservation Officers (NCSHPO) allows the agency to fulfill its NHPA responsibilities according to the provisions of the NPA in lieu of 36 CFR 800.3 through 800.7 regulations. The NPA, which applies to all BLM activities below specified thresholds, provides among other things, regulatory relief in many instances from the requirement for case-by-case review by State Historic Preservation Officers (SHPOs) and the ACHP, in exchange for managers' maintenance of appropriate staff capability and observance of internal BLM standards as set out in the 8100 Manual series.

The New Mexico BLM has a two-party protocol with the New Mexico SHPO (BLM-SHPO 2014) specifically encouraged by the NPA. This protocol details how the New Mexico BLM and SHPO will regulate their relationship and consult. Specifically, this document outlines among other things, how and when consultation will be conducted between the BLM, SHPO, Tribes, and the public. The protocol also outlines when case-by-case SHPO consultation is or is not required for specific undertakings and the procedures for evaluating the effects of common types of undertakings and resolving adverse effects to historic properties. These common types of undertakings regularly include the common actions undertaken in the BLM FFO.

4.2. List of Preparers

- Jim Copeland, Archaeologist – BLM-FFO
- John Kendall, Wildlife Management Biologist – BLM-FFO
- Marcella Martinez, Planning and Environmental Specialist – BLM-FFO
- Sarah McCloskey, Environmental Specialist – Adkins Consulting, Inc.
- Jason Meininger, Division of Conservation Archaeology of the San Juan County Museum Association

- Heather Perry, Noxious Weed Coordinator – BLM-FFO
- Michael Porter, Natural Resource Specialist – BLM-FFO
- Jeff Tafoya, Supervisor, Multiple Resources – BLM-FFO
- Craig Willems, Environmental Protection Specialist – BLM-FFO
- Doug McKim, Recreation Planner – BLM-FFO
- Katie White-Bull, Reality Specialist – BLM-FFO

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