BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE

EN RONMENTALASSESSMENT

FOR

Application for Permit to Drill the
Dugan Production Corporation's
Olympic No.90 & No.91
Well Pads, Access Roads and Well-tie Pipelines

Lease # NMNM 023744
NM- F010- 2011- 265

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1.0 Introduction

A representative of Dugan Production Corporation (Dugan) filed an Application for a Permit to Drill (APD) with the BLM for the Olympic No. 90 and the Olympic No. 91 well pads, access roads, and well-tie pipelines. The proposed Olympic No. 90 is located in the SESW/4 of Section 3, Township 23N, Range 10 W, and the proposed Olympic No. 91 is located in the SWSE/4 of Section 3, Township 23N, Range 10W, in San Juan County, New Mexico.

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

1.1 Purpose and Need

The purpose for the proposal is to define and produce natural gas on one or more valid federal oil and gas mineral leases issued to the applicant by the BLM. It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. The Mineral Leasing Act of 1920 (MLA), as amended [30 USC 181 et seq.], authorizes the BLM to issue oil and gas leases for the exploration of oil and gas and permit the development of those leases. The existing lease is a binding legalcontract that allows development of the mineralby the holder. An approved Application for Permit to Drill (APD) and/or approved ROW Grant, issued by the BLM and/or BIA, authorizes the applicant to construct and drill the proposed well and associated structures.

Dugan proposes to construct an off-lease pipeline ROW which crosses Navajo Allotted Lands. The table below will describe agency responsibility in this mixed estate proposed project. The table below will also define the purpose and need for the other parties involved in this project.

Federal Agency/Other Involved Participants	Purpose and Need
Farmington Field Office Bureau of Land Management (FFO/BLM)	The BLM is responsible for enforcing environmental compliance, for identifying drainage and due diligence issues, and for notifying BIA of these issues and making recommendations for remedy. The BLM approves the APD in accordance with the National Environmental Policy Act (NEPA) of 1969.
Eastern Agency of the Bureau of Indian Affairs (BIA)	The BIA holds primary responsibility for the stewardship of Indian Trust Lands and Indian Allotted Lands. These responsibilities include: the conservation and protection of the land resources in the best interest of the Indian mineral owner, determining if an action constitutes a significant environmental impact, and determining surface and NEPA compliance. BIA responsibility includes promoting economic development of the area and determining ROW grants on Navajo Allotted Lands.
Dugan Production Corporation	An approved APD would allow Dugan to develop their existing natural gas lease rights and generate revenue.
Allotment No. 258804 Allottees	Dugan proposes to construct an off-lease pipeline ROW which crosses Navajo Allotted Lands.

Substances Control Act (TSCA) of 1976, as amended (15 U.S.C. 2601, et seq.). Additionally, Spill Prevention Control and Countermeasures (SPCC) may be required and enforced by the Environmental Protection Agency (EPA) for sites that could impact navigable waters of the United States.

As required in the FFO!BLM and/or BIA permits, Dugan would comply with all applicable federal and Navajo Nation laws and regulations existing, enacted, or promulgated concerning waste disposal and hazardous materials. Dugan would agree to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as defined in CERCLA or RCRA). Additionally, the proponents would comply with TSCA with regard to any toxic substances that were used, generated by, or stored on the project, especially provisions on polychlorinated biphenyls (40 CFR 761.1-761.193). Any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 would be reported as required by the CERCLA, Section 102b.

1.2 Conformance with Applicable Land Use Plan and Other Environmental Assessments

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan/Final Environmental Impact Statement [(PRMP/FEIS) BLM 2003a], which was approved as the Final Resource Management Plan for the Farmington Field Office (FFO) of the BLM by the Record of Decision (ROD) signed September 29, 2003 (BLM 2003b). The PRMP/FEIS, Final Plan, and Record of Decision are available for review at the BLM Farmington Field Office, 1235 La Plata Hwy., Farmington, NM or electronically at:

http://www.blm.gov/nm/sUen/fo/Farmington_Field_Office/farmington_rmp.html

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

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

Under Section 402 of the Clean Water Act (as amended}, the U.S. Environmental Protection Agency (EPA), was directed to develop a phased approach to regulate storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. Industrial activities disturbing land may require permit coverage through a NPDES storm water discharge. Depending on the acreage disturbed, either a Phase I industrial activity (five or more acres disturbance) or a Phase II small construction activities (between one and five acres disturbance) permit may be required. However, gas and *oil* activities were recently exempted from NPDES permitting. Additionally, an U.S. Army Corps of Engineers Section 404 permit for the discharge of dredge and fill materials may also be required. Operators are required to obtain all necessary permits and approvals prior to any disturbance activities.

Farmington Field Office staff reviewed the proposed action and determined it would be in compliance with threatened and endangered species management guidelines outlined in the September 2002 Biological Assessment (Cons. #2-22-01-1-389). No further consultation with the U.S. Fish and Wildlife Service is required.

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

Additionally, the Operator is required to:

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

Pertinent Navajo Nation Statutes and Regulations required for the construction, operation, maintenance and final abandonment of the proposed action. The proposed action, any feasible alternatives, and the no action alternative would be carried out in full compliance with all federal regulations. This EA is prepared under the authority of the National Environmental Policy Act (NEPA) of 1969, {42 United States Code (D.S.C.)§ 4321-4347] and the associated federal implementing regulations in 40 Code of Federal Regulations (CFR) § 1500-1508. A permitted pipeline ROW would be required by the BIA under 25 CFR, Part 169.

The use and disposal of hazardous materials is regulated primarily under the Resource Conservation and Recovery Act (RCRA) of 1976 (42 U.S.C. 6901, et seq.), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as *amended (42 U.S.C. 9601, et seq.), and the Toxic*

2.0 Alternatives Including the Proposed Action

2.1 Alternative A - No Action

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

2.2 Alternative B – Proposed Action

Dugan proposes to construct two well pads, access roads, and well-tie pipelines in order to drill and develop federal minerals in the Basin Fruitland Coal formation. Access to the proposed projects would be gained by traveling south on US Highway 550 from Bloomfield, NM for 28.3 miles. Turn right on State Route 57 and travel southwest for approximately 9.5 miles to the proposed staked well locations. The proposed Olympic No. 90 project is on federal and Navajo Allotted Tribal land with federal minerals. The proposed Olympic No. 91 project is on federal land with federalminerals.

Olympic No. 90

The proposed Olympic No. 90 well pad would be 105 feet x 150 feet with an additional 50-foot construction buffer zone on all four sides of the well pad area. The proposed project would be a stand-alone well pad and would not utilize any existing disturbance. The well pad would require between 1.0 and 2.0 feet of fill on the west side of the location, and 1.0 foot of cut on the east side of the location. The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Production pits would be lined with a synthetic material no less than 20 mils thick. Cut and fill slopes would be returned to the original contour upon reclamation. New surface disturbance from the proposed Olympic No. 90 well location would be approximately 1.18 acres, and would total approximately 0.18 acres following interim reclamation.

Runoff would be diverted around the well site by a diversion ditch above the east side of the well pad, draining south and west.

A new access road approximately 265 feet in length with an average clearing width of 30 feet would be developed to BLM "Gold Book" standards to provide access to the proposed well pad. The surfacing and repair of deteriorated sections of the existing access roads may be required. Culverts 24-inch minimum in diameter may be placed at the entrance of the well location, at the proposed access road take-off and in low areas where necessary and according to "Gold Book" standards. The new access road would result in approximately 0.18 acres of new surface disturbance.

Once the proposed Olympic No. 90 gas well is completed, an associated 2,431-foot long pipeline ROW would be constructed, connecting the proposed Olympic No. 90 to the Dugan Squaw Valley Com No. 91 pipeline. An 827-foot portion of the proposed pipeline would be constructed on Navajo Allotted Tribal Land, while the remaining 1,605 feet of the pipeline would be constructed on BLM land. The proposed pipeline would be constructed paralleling the proposed access road for approximately 390 feet, with the remaining 2,041 feet being constructed cross-country. The cross country pipeline would also create habitat fragmentation for nesting migratory birds by disrupting continuous habitat importing for nesting birds. The habitat fragmentation by the cross country pipeline would create an additional 14.2 acres of long term disturbance. Potential new disturbance for the proposed pipeline would be approximately 15.61 acres.

Olympic No. 91

The proposed Olympic No. 91 well pad would be 105 feet x 150 feet with an additional 50-foot construction buffer zone on all four sides of the well pad area. The proposed project would be a stand-

alone well pad and would not utilize any existing disturbance. The well pad would require 2.0 feet of fill on the south side of the location, and 1.0 foot of cut on the northeast corner of the location. The construction buffer zones may be used to stockpile topsoil or vegetative material that would be utilized later during reclamation. Production pits would be lined with a synthetic material no less than 20 mils thick. Cut and fill slopes would be returned to the original contour upon reclamation. New surface disturbance from the proposed Olympic No. 91 well location would be approximately 1.18 acres, and would total approximately 0.18 acres following interim reclamation.

Runoff would be diverted around the well site. The natural landscape is very slightly sloped and there are no major drainage issues within the proposed project area.

A new access road approximately 65 feet in length with an average clearing width of 30 feet would be developed to BLM "Gold Book" standards to provide access to the proposed well pad. The surfacing and repair of deteriorated sections of the existing access roads may be required. Culverts 24-inch minimum in diameter may be placed at the entrance of the well location, at the proposed access road take-off and in low areas where necessary and according to "Gold Book" standards. The new access road would result in approximately 0.05 acres of new surface disturbance.

Once the proposed Olympic No. 91 gas well is completed, an associated 2,805-foot long pipeline ROW would be constructed, connecting the proposed Olympic No. 91 to the proposed Olympic No. 90 pipeline. The proposed pipeline would be constructed cross-country for approximately 2,008 feet, and would parallel existing access roadway for the remaining 797 feet. The cross country pipeline would also create habitat fragmentation for nesting migratory birds by disrupting continuous habitat importing for nesting birds. The habitat fragmentation by the cross country pipeline would create an additional 21.1 acres of long term disturbance. Potential new disturbance for the proposed pipeline would be approximately 22.85 acres.

Construction of both well-tie pipelines would consist of clearing surface vegetation within the pipeline corridors to a width of 30 feet using a brush-hog. Trenches would be dug with a rubber-tired backhoe to prevent extensive surface disturbance. Pipe would be welded at staging point on the well pad and pulled through the length of the ditch. The gas pipeline would be buried at least five feet deep and a 4-inch poly pipeline would be used. The gas pipe wall strength would be 160 pounds per square inch (PSI). This project would also include laying a 2-inch poly water pipeline within the same ROW, parallel to the gas pipeline. The trench would be backfilled with a rubber tired backhoe, re-contoured to original contours, and re-seeded as specified by the BLM and/or BIA or as written in the surface owner agreement.

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

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

For a detailed description of design features and construction practices associated with the proposed action (Alternative B), refer to the APD (attached as Appendix 7.1). Also see the subject APD for additional maps showing the proposed well location and associated facilities described above. Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) are also listed in Appendix 7.1 and incorporated and analyzed in this alternative. Site specific stipulations and mitigation measures determined at the onsite include:

- All pits would meet State of New Mexico, Oil Conservation Division (NMOCD) pit guidelines and requirements, NMAC 19.15.17. Pits would be lined.
- A tight sheep fence would be constructed around three sides of the pit during drilling and completion, and around the fourth side after the completion rig leaves the wellhead. The fences would remain until the pits are dried and backfilled.
- Excavated materials from the cuts would be used on the fill portions of the location.
- Reclaimed slopes would be re-contoured to pre-construction topographical contours.
- Sub-surface soil remaining after leveling of pad and construction of pit would be stockpiled separately from surface soil and be re-used during reserve pit abandonment and well pad re-contouring.
- All disturbed areas not needed for production would be seeded with the FFO specified standard seed mixture.
- Above ground structures would be painted to blend with the natural color of the landscape. Paint color would be Carlsbad Brown.
- The existing access road will be upgraded to Gold Book standards from the Olympic #91 back to the main road.
- Additional 24" culverts and silt traps for the access road and other necessary hydrologic BMPs would be installed as necessary for proper drainage and sediment management.
- All cultural resource stipulations would be followed.
- Stipulations attached by the BIA pertaining to surface use would be followed for portions of the pipeline ROW crossing Navajo Allotted Tribal Land.
- Under the Migratory Bird Treaty Act, any proposed action 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 developed by the BLM/FFO. If any active nests are located within the proposed action area, project activities will not be permitted until written approval by a BLM/FFO biologist. The BLM/FFO may monitor any active nests located from a nest survey. This proposed action will have a combined vegetative disturbance of over 4.0 acres; therefore, no construction activities will be permitted to take place between May 15 and July 31 without a migratory bird nest survey.

Table 2.2-Proposed Well Information (Alternate B)

Well Name	Well Number	Township	Range	Section(a)	Footagea	Lease#	Leeaelasue Date
Olympic	90	23N	10W	3&4	905' FSL 1400' FWL	NMNM 023744	2/1/1975
Olympic	91	23N	10W	3	1300' FSL 1550' FEL	NMNM 023744	2/1/1975

County: San Juan

Applicant: Dugan Production Corporation

Surface Owner: Bureau of Land Management and Navajo Allotted Tribal

2.3 Alternative C – Full Alternative Analysis

An alternative to the proposed action would be to construct the well pads and access roads as described in Alternate 8, but the well-tie pipelines for both the Olympic No. 90 and Olympic No. 91 would be constructed parallel to existing access roads. The Alternative C well-tie pipelines would be constructed as follows:

Olympic No. 90

Once the proposed Olympic No. 90 gas well is completed, an associated 3,000-foot long pipeline ROW would be constructed, connecting the proposed Olympic No. 90 to the Dugan Squaw Valley Com No. 91 pipeline. An 827-foot portion of the proposed pipeline would be constructed on Navajo Allotted Tribal Land, while the remaining 2,410 feet of the pipeline would be constructed on BLM land. The proposed pipeline would be constructed paralleling the proposed and existing access roads for approximately 2,435 feet, with the remaining 565 feet being constructed cross-country; potential new disturbance for the proposed pipeline would be approximately 1.51 acres.

Olympic No. 91

Once the proposed Olympic No. 91 gas well is completed, an associated 3,400-foot long pipeline ROW would be constructed, connecting the proposed Olympic No. 91 to the proposed Olympic No. 90 pipeline. The proposed pipeline would be constructed parallel to the existing access roadway for 2,880-foot length and cross country for 520-foot. Potential new disturbance for the proposed pipeline would be approximately 1.68 acres.

Construction of the Alternate C well-tie pipelines would consist of clearing surface vegetation within the pipeline corridors to a width of 20 feet using a brush-hog. Trenches would be dug with a rubber-tired backhoe to prevent extensive surface disturbance. Pipe would be welded at staging point on the well-pad and pulled through the length of the ditch. The gas pipeline would be buried at least five feet deep and a 4-inch poly pipeline would be used. The gas pipe wall strength would be 160 pounds per square inch (PSI). This project would also include laying a 2-inch poly water pipeline within the same ROW, parallel to the gas pipeline. The trench would be backfilled with a rubber tired backhoe, re-contoured to original contours, and re-seeded as specified by the BLM and/or BIA or as written in the surface owner agreement.

Other than those specifics mentioned above, Alternative C mitigation measures and construction and production specifics would be similar to those described for Alternative 8 in section 2.2.

Site specific stipulations and mitigation measures determined at the onsite include:

- Stipulations attached by the BIA pertaining to surface use would be followed for portions of the pipeline ROW crossing Navajo Allotted Tribal Land.
- Under the Migratory Bird Treaty Act, any proposed action 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 developed by the BLM/FFO. If any active nests are located within the proposed action area, project activities will not be permitted until written approval by a BLM/FFO biologist. The BLM/FFO may monitor any active nests located from a nest survey. The Alternative C action will have a combined vegetative disturbance of over 4.0 acres; therefore, no construction activities will be permitted to take place between May 15 and July 31 without a migratory bird nest survey.

Table 2.3 – Alternative C Well Information (Well location would be the same for the Alternative Band Alternative C actions}

Well Name	Well Number	Township	Range	Sectlon(s)	Footages	Leese#	Lease Issue Date
Olympic	90	23N	10W	3&4	905' FSL 1400' FWL	NMNM 023744	2/1/1975
Olympic	91	23N	10W	3	1300' FSL 1550' FEL	NMNM 023744	2/1/1975

County: San Juan

Applicant: Dugan Production Corporation

Surface Owner: Bureau of Land Management and Navajo Allotted Tribal

3.0 Description of Affected Environment

This section describes the environment that would be affected by implementation of the action alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. These items are included below in Table 3.0. Following the table, only the aspects of the affected environment that are potentially impacted are described.

Table 3.0 – Affected Environment and Basis for Determination of No Further Analysis

Resource	Located In Project Area	Not In Project Area	Further Analysis Presented In Text	Basis for Determination
CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Air Resources	X		X	
Areas of Critical Environmental Concern		X	X	
Cultural Resources		X	X	
Native American Religious Concerns		X	X	A review of existing information indicates the project is not associated with any known Traditional Cultural Property.
Environmental Justice		X	X	
Farmlands, Prime or Unique		X	X	
Floodplains		X	X	
Invasive, Non-native Species		X	X	
Threatened or Endangered Species		X		BLM/FFO review determined compliance with threatened and endangered species management guidelines outlined in the Sept. 2002 Biological Assessment. No further Section 7 ESA consultation with the USFWS is required NNDFW review determined compliance with Navajo Nation biological resources management guidelines (NNDFW Biological Resources Compliance Form (11ADKI02)).
Wastes, Hazardous or Solid		X	X	
Water Quality - Surface/Ground	X		X	
Wetlands/Riparian Zones		X	X	

Wild and Scenic Rivers		X		There are no Wild and Scenic Rivers in Farmington Field Office area, no indirect effects are projected outside the FFO area.
Wilderness		X		Actions are approx. 4 miles north Ah-shi-sle-pah Wilderness Study Area. No indirect effects are projected outside the action alternative areas.
NON-CRITICAL ELEMENTS				
General Topography/Surface Geology	X		X	
Mineral Resources	X		X	
Paleontology		X	X	Action alternatives are approx. 1.5 miles from Betonnie Tsosie Fossil Area. No indirect effects are projected outside the action alternative areas.
Soils	X		X	
Watershed/Hydrology	X		X	
Vegetation, Forestry	X		X	
Livestock Grazing	X		X	
Special Management Species		X	X	
Wildlife	X		X	
Wild Horse and Burros		X	X	
Recreation		X	X	
Visual Resources	X		X	
Public Health and Safety		X	X	

3.1 Air Resources

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

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

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

In addition, the Environmental Protection Agency (EPA), on October 17, 2006, issued a final ruling on the lowering of the National Ambient Air Quality Standard (NMOS) for particulate matter ranging from 2.5 micron or smaller particle size. This ruling became effective on December 18, 2006, stating that the 24-hour standard for PM2.5, was lowered to 35 ug/m^3 from the previous standard of 65 ug/m^3. This revised PM2.5 daily NMOS was promulgated to better protect the public from short-term particle exposure.

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

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

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

3.11 Air Quality

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

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

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

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

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

3.12 Climate

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

In 2007, the Intergovernmental Panel on Climate Change (IPCC) predicted a warming of about 0.2°C per decade for the next two decades, and then a further warming of about 0.10C per decade. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures.

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

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

3.2 Areas of Critical Environmental Concern (ACECs)

Areas of Critical Environmental Concern (ACEC) were designated in the FFO/BLM 2003 FRMP, under authority of the FLPMA of 1976 allowing for multiple use of lands administered by the BLM. The ACEC designation pertains to "...areas within public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards." (FLPMA 1976 Sec. 103, 43 U.S.C. 1702 et seq.).

The proposed action alternatives would not be located in any BLM/FFO designated ACEC.

3.3 Cultural Resources

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

The BLM FFO has categorized variability in archeological sites by major time period, cultural affiliations/components, average size, and occurrence of features in each of the 20 watersheds within the BLM FFO's jurisdiction (BLM 2003b:3-88). The action alternatives are located within the Chaco Wash watershed. A total of 14,408 sites representing 22,899 temporaVcultural components have been documented within the watershed. Of the 19 categories of sites defined based on temporal/cultural affiliation, all are represented. The most frequently occurring cultural affiliations recorded are the Anasazi Pueblo 1-111 Periods (ca. A.D. 700 -1300), Unknown Navajo, and Navajo Reservation Period (1868 to present). Features common to these sites include room blocks, hearths, hogans, isolated rooms, mounds, corrals, kivas, and petroglyphs.

The entire area of potential affect for the proposed action (Alternative B) was surveyed by Complete Archaeological Service Associates (CASA) at a BLM Class III level (100%) and inventory reports were prepared and submitted to the BLM (CASA 09-47; BLM 201O{IV}022F) in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (BLM 2005).

One previously recorded site (NM-G-48-82) was found on Trust Lands during the cultural resources survey of the Olympic No. 90 Alternative B action area. Site NM-G-48-82 has been determined significant or eligible for inclusion on the National Register of Historic Places by the Navajo Nation HPD (HPD-10-720)..

No archaeological sites were found during the survey of the proposed Olympic No. 91 Alternative B action area.

3.4 American Indian Religious Concerns

Traditional Cultural Properties (TCPs) is a term that has emerged in historic preservation management and the consideration of Native American religious concerns. TCPs are places that have cultural values that transcend, for instance, the values of scientific importance that are normally ascribed to cultural resources such as archaeological sites. The National Park Service (Parker and King 1998:1) has defined TCPs as follows:

> A traditional cultural property can be defined generally as one (a property) that is eligible for the National Register because of its association with cultural practices or beliefs of a living community that, (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. (National Register Bulletin 38)

Native American cultural associations are the "communities" most likely to identify TCPs, although TCPs are not restricted to this group. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known.

There are several pieces of legislation or Executive Orders that should be considered when evaluating Native American religious concerns. These govern access and use of scared sites, possession of sacred

items, protection and treatment of human remains, and the protection of archaeological resources ascribed with religious or historic importance. These include the following:

- The American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996, P.L. 95-431 Stat. 469).
  - ./ Possession of sacred items, performance of ceremonies, access to sites
- Executive Order 13007 (24 May 1996).
  - ./ Access and use of sacred sites, integrity of sacred sites
- The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001, P.L. 101-601).
  - ./ Protection, ownership, and disposition of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony
- The Archaeological Resources Protection Act of 1979 (ARPA; 16 USC 470, Public Law 96-95).
  - ./ Protection or archaeological resources on Federal and Indian lands

For the proposed action alternatives, identification of TCPs were limited to reviewing existing published and unpublished literature (e.g. Valkenburgh 1941, 1974 , Brugge 1993, Kelly et al2006), and the site-specific cultural resources survey report conducted for the Proposed Action. In addition, the BLM's cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts.

A review of existing information compiled during previous land use planning efforts, existing studies, or via direct consultation indicates the proposed action alternatives are not within a known Traditional Cultural Property.

3.5 Environmental Justice

Executive Order 12898 requires federal agencies to assess projects to ensure there is no disproportionately high or adverse environmental, health, or safety effects on minority and low-income populations. Minorities comprise a large proportion of the population residing inside the boundaries of the Farmington Field Office (see pages 3-106 to 3-107 of the PRMP/FEIS for more details on ethnicity and poverty rates).

3.6 Farmlands, Prime or Unique

Several of the watersheds within the Farmington Field Office boundaries have some soils meeting the definition of prime farmland, all of which must be irrigated to produce high quality crops (BLM 2003a, pg
3-19).

The proposed action alternatives would be located within the Chaco Wash watershed. Less than one percent of the watershed has prime farmland soils. The proposed action alternatives would not be located within any soil units known to contain prime or unique farmlands (BLM 2003a, pg 3-20).

3.7 Floodplains

A review of the GIS data on active and 100-year floodplains {derived from Federal Emergency Management Agency floodplain maps) indicate the proposed action alternatives are not located within any designated floodplains.

3.8 Invasive, Non-Native Species

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

No invasive or noxious weeds were encountered during the onsite inspections of the proposed action alternatives. BLM GIS data of known invasive or noxious weed populations indicate no known weed populations to be in or nearby the area of the proposed action alternatives.

3.9 Wastes, Hazardous or Solid

The Resource Conservation and Recovery Act (RCRA) passed in 1976, establishes a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The U.S. Environmental Protection Agency (EPA) regulations define solid wastes as any "discarded materials" subject to a number of exclusions. A "hazardous waste" is a solid waste that is (1) listed by the EPA as a hazardous waste, (2) exhibits any of the characteristics of hazardous wastes (ignitability, corrosivity, reactivity, or toxicity) or (3) is a mixture of solid and hazardous waste. A 1980, amendment to RCRA conditionally exempted from regulation as hazardous wastes, "drilling fluids, production waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas. On July 6, 1988, EPA determined that oil and gas exploration, development and production (ED&P) wastes would not be regulated as hazardous wastes under RCRA. A simple rule of thumb was developed for determining if an ED&P waste is likely to be considered exempt or non-exempt from RCRA regulations: If (1) the waste came from down-hole, or (2) the waste was generated by contact with the oil and gas production stream during removal of produced water or other contaminants, the waste is most likely to be considered exempt by EPA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA}, passed in 1980, deals with the release (spillage, leaking, dumping, accumulation, etc.) or threat of a release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as hazardous substances under CERCLA. The New Mexico Oil Conservation Division (OCD) administers hazardous waste regulations for oil and gas activities in New Mexico.

No hazardous or solid waste materials are present at the proposed action alternatives. The notification of releases such as natural gas, natural gas liquids, and petroleum, outside a facility site is required under CERCLA and under BLM NTL-3A.

3.10 Water Quality- Surface/Ground

Availability of water quality data, like stream-flow data, is largely limited to the perennial streams in the northern part of the San Juan Basin. The water quality of the perennial streams varies from upstream to downstream and is strongly influenced by the type of rock and soils with which the water has been in contact. In the upper reaches, the perennial streams have relatively low concentrations of dissolved solids. In the middle and lower reaches, the streams contain progressively more magnesium, calcium, sodium and sulfate concentrations and vary according to flow conditions.

Quality data for the ephemeral runoff south of the San Juan River are limited to only a few observations at sampling stations associated with the USGS coal hydrology program. Ephemeral flows are generally very poor quality water due to the highly erosive and saline nature of the soils. Sparse vegetative cover and rapid runoff conditions are characteristic of the area.

There are no perennial water resources within the immediate vicinity of the proposed action alternatives. The area within the Chaco Wash watershed is characterized by gently rolling sagebrush plain interspersed with sparse pinon and juniper woodland areas. Numerous ephemeral washes, including Ah shi-sle-pah, Kimbeto, Betonnie Tsosie, and Escavada, drain the general area south of the proposed action area into Chaco Wash. The area in close proximity to the proposed action alternatives drains into the Coal Creek drainage approximately 7.0 miles west. Coal Creek drains into De-Na-Zin Wash approximately 16.0 miles west. De-Na-Zin Wash carries a seasonally flow water into Chaco Wash 10.5 miles southwest of its confluence with Coal Creek. Chaco Wash turns into the Chaco River and seasonally flows into the perennial San Juan River over 65 miles northwest.

The San Juan Basin is underlain by sandstone aquifers and unconsolidated sand and gravel aquifers. The Colorado Plateau's Aquifers are sandstone while the Rio Grande Aquifer system is unconsolidated

sand and gravel. The primary Colorado Plateau's Aquifers underlying the vast majority of the San Juan Basin are the Uinta-Animas Aquifer and the Mesa Verde Aquifer.

The quality of groundwater in the San Juan Basin generally ranges from fair to poor. The Uinta-Animas contains fresh to moderate saline water and the quality of the Mesa Verde is extremely variable. In general, areas of the aquifer that are recharged by infiltration from precipitation or surface water sources contain relatively fresh water.

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

3.11 Wetlands/Riparian Zones

Field inspection of the proposed action alternatives and a review of BLM and USFWS GIS data indicate the proposed action alternatives are not located within any riparian or wetlands habitat.

3.12 General Topography/Surface Geology

The proposed action alternatives would be located approximately 2,400 feet from one another on a gently sloping sagebrush plain area between Split Lip Flats to the west and US Highway 550 to the east. Several broad, sandy washes dissect Great Basin Desert scrub terrain interspersed with sparse pinon and juniper woodland areas. Various sandstone outcrop areas typical of the Bisti-De-Na-Zin Wilderness Area and the Ah-Shi-Sie-Pah Wilderness Study Area are found within 8.0 miles to the south and west of the proposed action alternatives. Huerfano Mountain, reaching 7,474 feet in elevation, is located approximately 12.0 miles to the north of the proposed action alternatives. Elevation in the immediate proposed action area ranges from 6,665-6,675 feet.

3.13 Mineral Resources

Federal lands in the San Juan Basin are important sources of mineral materials for construction projects in the region, including sand and gravel, rock and stone, and other fill materials. The proposed action alternatives are not located on any permitted surface mineral mining operation or free use area.

3.14 Paleontology

The proposed action alternatives are located within the paleontologically rich area of the San Juan Basin of northern New Mexico. The BLM uses the Potential Fossil Yield Classification (PFYC) system to identify areas with a high potential to produce significant fossil resources (BLM 2008b). This system has ranked all lands within the FFO management area as a Class 5 PFYC designation. Class 5 designations are described as being Very High Potential paleontological resources areas, thus potentially requiring an assessment at the project level (IM 2008-009).

The BLM's PFYC system is a predictive modeling tool that was developed to provide a baseline guidance for assessing and mitigating paleontological resources. It is intended to be used at an intermediate point in analyses and should be used to assist in determining the need for further mitigation assessment or actions. Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils, or scientifically significant invertebrate or plant fossils, and their sensitivity to adverse impacts. The Farmington Field Office Resource Management Plan identified specific areas within the region as Specially Designated Areas (SDA) for the protection of paleontological resources within the Nacimiento Formation.

The BLM/FFO also recognizes nine Special Designated Areas (SDA) totaling more than 135,000 acres in order to preserve important paleontological resources for scientific study and other public benefits (BLM 2003b:4-117). The proposed action alternatives are not within any paleontological SDA, however they are located approximately 1.5 miles northwest of the BLM/FFO designated Betonnie Tsosie Fossil Area.

The action alternatives would be assessed individually based on the BLM's PFYC system, known paleontological locality information, existing reports, and data for the area. If preliminary analysis indicates that the action alternatives fall within a Paleontology SDA or have a high probability of impacting paleontological resources, additional surveys, reporting, and stipulations would be required.

3.15 Soils

The San Juan Basin is bordered by the Defiance Uplift and Chuska Mountains to the west, San Juan Dome to the north, Chaco Slope and Zuni Uplift to the south and the Nacimiento Uplift to the east. In total, the San Juan Basin covers a surface of approximately 4,600 square miles. The soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. The material has been mixed and sorted in transport and has a wide range of mineralogy and particle size. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

Soils in the immediate area of the proposed action alternatives are comprised of the Doak-Sheppard-Shiprock association, rolling. Elevation is 6,665-6,675 feet.

The Doak-Sheppard-Shiprock (OS) association comprises the entire proposed action area. The OS soil map unit is composed of approximately 40 percent Doak and similar soils, 30 percent Sheppard and similar soils, and 20 percent Shiprock and similar soils. The Doak series consists of very deep, well drained, moderately slowly permeable soils that formed in eolian and fan alluvium from sandstone and shale. Doak soils are typically found on cuesta dipslopes, mesas, plateaus, and fan remnants on valley sides. The surface layer is a yellowish brown fine sandy loam, 0 to 2 inches thick. Sheppard soils are very deep, somewhat excessively drained soils that formed in eolian material derived from sandstone. Sheppard soils are found on structural benches, alluvial fans, dunes on structural benches, and terraces, with a typical reddish yellow fine sand surface layer. The third component of the OS soil unit is Shiprock soils. The soil consists of very deep, well drained and somewhat excessively drained, moderately rapidly permeable soils that formed in eolian material and alluvium, fan alluvium, and slope alluvium derived from sandstone and shale and found on summits of mesas, and plateaus, cuestas, fan remnants and fan terraces on valley sides and sideslopes of hills. A light yellowish brown fine sandy loam surface layer is typically seen in combination with the above two soil types. The OS soil unit is used mainly for rangeland and livestock grazing. Typical native vegetation supported on the OS soil association is a shrub/grass component of big sagebrush, ephedra, blue grama, western wheatgrass, Indian ricegrass, galleta grass, winterfat, sand dropseed, alkali sacaton, and four-wing saltbush. The different characteristics of these soil types are listed below in Table 3.15.1.

Table 3.15.1

Characteristic	Doak	Sheppard	Shiprock
Type	Yellowish brown fine sandy loam	Reddish yellow fine sand	Light yellowish brown fine sandy loam
Slope	0-5%	0-15%	0-5%
Depth	More than 80 inches	More than 80 inches	More than 80 inches
Surface Runoff	Slow to medium	Negligible to low	Very low to low
Typical Use	Rangeland	Livestock grazing	Livestock grazing and irrigated farmland
Moisture Regime	Typic aridic	Typic aridic	Typic aridic

Drainage Class	Well drained	Somewhat excessively drained	Well drained
Available Water Cap.	High	Low	Moderate
Permeability	Moderately slow	Rapid	Moderately rapid
Parent Material	Alluvium	Eolian	Eolian

3.16 Watershed-Hydrology

The San Juan Basin consists of broad mesas interspersed with many deep canyons with steep canyon walls, dry washes, entrenched narrow valleys, and alluvial fans and floodplains. Elevations range from approximately 4,800 feet, where the San Juan River flows into Utah, to approximately 8,800 feet near the Jicarilla Apache land, and near 7,300 feet near Lindrith, New Mexico. The planning area is divided into watersheds based on the Hydrologic Units (4th level) delineated by the USGS. Principally, the administrative area under the jurisdiction of the Farmington Field Office consists of five of these 4th level hydrologic watershed units. These watershed units are: (1) Middle San Juan, (2) Animas, (3) Upper San Juan, (4) Blanco Canyon, and (5) Chaco Wash. The proposed action alternatives are within the Chaco Wash watershed. The Chaco Wash watershed covers a 4,510 square mile area and contains 5,567 miles of perennial waterways, and 199 miles of ephemeral waterways.

3.17 Vegetation, Forestry

The proposed action alternatives would be located within a Great Basin Desert scrub vegetation community interspersed with sparse pinon and juniper woodland areas. The dominant vegetation is big sagebrush, with minor understory composed of broom snakeweed, blue grama and prickly pear cactus. The proposed action alternatives would not remove any trees.

3.18 Livestock Grazing

There are 167 grazing allotments managed by the Farmington Field Office with 351 grazing authorizations that permit cattle, sheep, and horse grazing within the resource area. Of the 351 grazing authorizations, 317 are permitted under section 3 of the Taylor Grazing Act. Of the 167 grazing allotments, there are four authorizations issued under section 15 of the Taylor Grazing Act to the Navajo Tribe that authorizes grazing on 35 allotments. There are an additional 30 section 15 authorizations that permit grazing on 30 allotments in the Lindrith, NM area.

The proposed action alternatives are located within the Navajo Land Department Allotment No. 6011. The grazing allotment is operated from March 1 through February 28 annually with a maximum of 1,178 head of cattle. *The project area is within the Navajo Nation Grazing Management Area #19.*

3.19 Wild Horse and Burros

There are no areas managed for wild horse or burros within the proposed action area. The proposed action alternatives lie over 45 miles southwest of the Jicarilla Wild Horse Territory. No wild horses or burros, or sign of wild horses or burros, exist nor are suspected to exist in the action alternatives area.

3.20 Wildlife

Mule deer and coyote are common in the proposed action alternatives area, as are other common mammalian species such as the deer mouse and the black-tailed jackrabbit. Game birds found in the area may include mourning dove. Migratory birds that may be present can include the Western bluebird, scrub jay, sage sparrow, and common raven. Principal raptors that may be seen are Red-tailed hawk and American kestrel. Nesting nee-tropical migratory birds could include the western bluebird, gray vireo, violet-green swallow, and ash-throated flycatcher. No evidence of nesting birds was observed in the proposed action alternative areas at the time of field inspections. The most notable reptiles are the Eastern fence lizard, Western whiptail, and short-horned lizard.

The proposed action alternatives would not be located within any BLM/FFO designated Wildlife Areas. *The proposed action is within Navajo Nation Eastern Hunting Unit #14.*

3.21 Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC§§ 701-715s, as amended), established protections for migratory birds and their parts (i.e. eggs, nests, and feathers) from taking, hunting, capture, transport, sale, or purchase. Executive Order 13186, 66 Fed. Req. 3853, (January 17, 2001), entitled "Responsibilities of Federal agencies to Protect Migratory Birds," directed agencies to take certain actions to further implement the migratory bird conventions, the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA) and other pertinent statutes. A Memorandum of Understanding (MOU) between the US Department of the Interior Bureau of Land Management (BLM) and the US Fish and Wildlife Service (FWS) was signed on April12, 2010, and outlines a collaborative approach to promote the conservation of migratory bird populations. The purpose of the MOU is to strengthen migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through collaboration between the BLM and FWS, in coordination with state, tribal, and local governments. Information from the New Mexico PIF website (http://www.hawksaloft.org/pif.shtml), the New Mexico PIF highest priority list of species of concern by vegetation type, and the 2008 Birds of Conservation Concern Report for the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR) No. 16, have been used to develop a list of high priority migratory bird species with potential to occur in the proposed action area (Tables 3.21.1 and 3.21.2).

For proposed projects 4.0 acres or more of vegetative disturbance, no construction activities from May 15 through 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 developed by the BLM/FFO. If any active nests are located within the proposed action area, the project's activities will not be permitted until written approval by a BLM/FFO biologist. The BLM/FFO may monitor any active nests located from a nest survey.

No Migratory Bird timing stipulations are required by the Navajo Nation Department of Fish and Wildlife (NNDFW Biological Resources Compliance Form (11ADKI02)).

Table 3.21.1 USFWS Birds of Conservation Concern with potential to occur in Action Area

Common Name (Scientific name)	Habitat Associations
Mountain plover *(Charadrius montanus))*	Relatively xeric habitats dominated by shrubs and grasses; shrub component within a grassland complex critical.
Sage thrasher *(Oreoscoptes montanus)*	Uses sage-dominated grasslands and shrubby arid lands; considered a sagebrush obligate and prefers dense sagebrush.
Brewer's Sparrow *(Amphispiza breweri)*	Closely associated with big sagebrush, either pure stands or interspersed with bitterbrush, saltbush, shadscale, rabbitbrush or greasewood; occasionally in sagebrush-juniper.
Burrowing Owl *(Athene cunicularia)*	Open grasslands or desert scrub. Presence of suitable nest burrow is critical prerequisite (often prairie dog burrows).
Bendire's Thrasher *(Toxostoma bendirei)*	Relatively open grass-shrubland with scattered shrubs or trees. May use fringes of dense

	vegetation, such as riparian woodland or desert washes.

3.22 Special Management Species

In accordance with BLM Manual6840, BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. Included in this category are state listed endangered species and federal candidate species which receive no special protections under the Endangered Species Act. Special Management Species with potential to occur in the action alternative areas are listed in Table 3.22.

Table 3.22- Special Management Species of the BLM/FFO and their potential to occur in the action alternative areas.

Common Name *(Scientific name)*	Status*	Habitat Associations	Presence**
BIRDS			
American peregrine falcon *(Falco peregrinus anatum)*	SMS NM-T	Nest in ledges or potholes on cliffs in wooded/forested habitats; Forage over riparian woodlands, coniferous & deciduous forests, shrublands, prairies.	NS
Ferruginous hawk *(Buteo rega/is)*	SMS	Breed in open country, usually prairies, plains and badlands; semidesert grass-shrub, sagebrush-grass & pinon-juniper plant associations.	NS
Golden eagle *(Aquila chrysaetos)*	SMS	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	NS
Bald eagle *(Haliaeetus leucocephalus)*	SMS NM-T	Nests in forested areas adjacent to large bodies of water.	NP
Burrowing Owl *(Athene cunicularia)*	SMS	Open grasslands or desert scrub. Presence of suitable nest burrow is critical prerequisite (often prairie dog burrows).	NP
Prairie falcon *(Falco mexicanus)*	SMS	Forages in open grassland, desert scrub, rangeland, agricultural; nests in cavities, ledges, on cliffs, trees, and power structures.	NS
Mountain plover *(Charadrius montanus)*	SMS	Lowland grasslands, sites with grassland characteristics (alkali flats, agricultural lands).	NP
Yellow-billed cuckoo *(Coccyzus americanus)*	SMS C	Breeds in riparian woodlands with dense, understory vegetation.	NP
PLANTS			
Brack's hardwall cactus *(Sclerocactus cloveriae ssp brackii)*	SMS NM-E	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft.)	NP
Aztec gilia *(Aiiciella formosa)*	SMS NM-E	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	NP

Sources: BLM 2005, New Mexico Natural Heritage Program 2005, NM Rare Plant 1999, USFWS 2007.	
Status* SMS = BLM Special Management Species C = Federal Candidate NM-E = State of NM Endangered NM-T =State of NM Threatened	Presence** K = Known, documented observation within project area. S = Habitat suitable and species suspected to occur within the project area. NS = Habitat suitable but species is not suspected to occur within the project area. NP = Habitat not present and species unlikely to occur within the project area.

The action alternative areas provide potential foraging habitat for the American peregrine falcon, Prairie falcon, Golden eagle, and Ferruginous hawk. The action alternative areas do not provide nesting habitat for the four raptors. No birds of prey or signs of their presence were observed during onsite inspection of the action alternative areas. The nearest recorded SMS raptor nest, a Golden Eagle nest, lies approximately 2.7 miles southwest of the Olympic 90 action alternative areas, and approximately 3.2 miles southwest of the Olympic 91 action alternative areas.

3.23 Threatened and Endangered Species

The Navajo Nation Department of Fish and Wildlife (NNDFW) has *identified any federal and/or Tribal TES flora species known to occur within three miles of the Olympic 90 action alternative areas or vicinity, and any federal and/or Tribal TES flora species with potential to occur within three miles of the action alternative* areas *or vicinity. Adkins Consulting, Inc., permitted by NFWD, conducted a survey for the presence of TES species. No evidence of any federally listed TES flora species or critical habitats were found within the action alternative areas during the biological evaluation. The Navajo Nation Department of Fish and Wildlife Biological Resources Compliance Forms (11ADKI02), Consultation Letter, and the Biological Survey Report are included in this EA under Appendix A.*

3.24 Visual Resources

The BLM has developed a Visual Resource Management (VRM) classification system designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape. There are four VRM classes (Classes I through IV) which identify suggested degrees of allowed human modification in a landscape. Class I allows the least modification and Class IV allows the most (RMP 2003).

The 2003 RMP based interim VRM classes on a 1978-80 Visual Resource Inventory (VRI) of the BLM-FFO area (BLM-FFO Interim VRM Office Policy 2011). A VRI is a scenic quality evaluation, a visual sensitivity level analysis, and a delineation of distance zones. The 2003 VRM classifications pended the completion of a new VRI that would meet current BLM guidance (RMP 2003).

In 2009, a new VRI was completed for the BLM-FFO area. This VRI indicated that the landscape has changed substantially since the 1978-80 VRI, warranting the need for an amendment to the RMP to address visual resources. Therefore, on June 13, 2011, the BLM-FFO filed a Notice of Intent (FR Doc. 2011-14491) to prepare an RMP amendment and EA for visual resources. The BLM-FFO will continue to honor all valid, existing rights and resource allocations discussed in the RMP (BLM-FFO Interim VRM Office Policy 2011). In the interim, until the amendment has been signed, 2003 VRM and 2009 VRI classifications will both be discussed during the EA process.

The proposed action alternatives are located in a VRM Class III. Management objectives for Class III designation recommend partially retaining the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Any changes should repeat the basic elements found in the predominant natural features of the characteristic landscape (BLM 2003a: 2-10).
The proposed action area is in 2009 VRI Class III, as well.

There are existing access roads, pipeline ROWs, powerlines, and well pads in the immediate vicinity of the proposed action area. The proposed action area is not visible from any houses, commercial areas, highways, or designated recreation areas.

3.25 Recreation

The Farmington Field Office has set aside several areas for special use and manages them as Specially Designated Areas (SDA). Recreation SDA's are managed to accommodate a large variety of recreational uses and outdoor recreational experiences. Areas located outside of recreation SDAs are managed as Extensive Recreation Management Areas (ERMAs). Few recreation facilities or supervisory efforts exist on these lands and they are managed to maintain a freedom of recreation choice with limited regulatory constraints. The proposed action alternatives would not be located within a recreation SDA.

3.26 Public Health and Safety

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

Most substances and wastes generated at oil and gas facilities are exempt from regulation under the Resource Conservation and Recovery Act (1976). The Environmental Protection Agency (EPA) and DOT regulate materials associated with well construction and production activities that are classified as hazardous. When significant amounts of chemicals are stored on-site, governmental agencies will be notified as required under the Emergency Planning and Community Right to Know Act (1986). The notification *of* releases such as natural gas, natural gas liquids, and petroleum, outside the facility site is required under the Comprehensive Environmental Response Compensation and Liability Act, 1980 (CERCLA) and under BLM NTL-3A. The well locations must have an informational sign, as directed under 43 CFR 3160.

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

3.27 Socio-economic Conditions

Historically, the Huerfano Chapter economy has been largely subsistence farming, ranching, and trading. Currently, the Chapter economy centers on employment and community farming opportunities with the Navajo Agricultural Products Industry (NAP/).

3.27.1 Employment and Income

Major employers in the Huertano Chapter include NAP/, employing approximately 340 people; the Dzlith-na-o-dith-hle Health Center, employing approximately 50 people; and the Dzlith-na-o-dith-hle Community School, employing approximately 90 people. Other sources of employment include Giant Industries, the Navajo Nation and the Huerfano Dormitory.

The Huerfano Chapter area attracts tourists as well as scientists who are visiting or working within the Angel Peak Recreation Area, Fossil Forest, and Bisti!De-na-zin Wildemess Area, or en route to Chaco Culture National Historical Park.

3.27.2 Demographics and Trends

Huertano Chapter has the largest land base within the Eastern Navajo Agency and the second largest chapter within the Navajo Nation. The Huerfano Chapter has a population of approximately 2,313 people

of Native American descent as of 2000 (U.S. Census Bureau, Census 2000). The Huerfano Chapter is a certified chapter of the Navajo Nation.

The nearest population center is Nageezi, NM, which is located 8.4 miles to the east of the proposed action alternative areas. Nageezi had a population of 296 with 115 housing units; a land area of 14.31 sq. miles; and a population density of 20.69 people per sq. mile according to the U. S. Census Bureau, Census 2000.

3.27.3 Lifestyles, Cultural Values, Attitudes, Expectations

Historically, the Huerfano Chapter economy has been largely subsistence farming, ranching, and trading. Many members of the younger generation attend school and seek employment in nearby towns and cities.

The Huerfano Chapter is one of presently 110 Chapters within the Navajo Nation. Chapters have a representative who acts on behalf of the People within the Chapter. Any new Chapter must be approved by the Navajo Tribal Council. The Huerfano Chapter House provides a meeting place and some recreational facilities. Good roads allow most shopping to be done in larger cities nearby.

3.27.4 Community Infrastructure

The Huerfano Chapter is served by three major highways: U.S. Highway 64, U.S. Highway 550, and N.M. Highway 371. U.S. Highway 64 runs east to west near the northern boundary of the Chapter. New Mexico Highway 371 borders the western edge of the Chapter, while U.S. Highway 550 runs north to south through the eastern portion of the Chapter. A number of well-maintained, San Juan County paved and dirt roads branch from all three highways and serve the interior of the Chapter.

Huerfano Chapter educational institutions include the Dzlith-na-o-dith-hle Community School, the Huerfano Dormitory, and Carson Pre-School. Students are also bussed into the Bloomfield public schools. San Juan Community College in Farmington, New Mexico provides close access to higher education opportunities.

The Huerfano Chapter has limited commercial establishments and includes 1 trading post, 2 gasoline stations, 2 convenience stores and 1 video shop. The nearest commercial airport is located in Farmington, approximately 30.0 miles northwest of Huerfano Chapter House.

Medical services are provided by San Juan Regional Medical Center and Presbyterian Medical Services in Farmington, Shiprock Indian Hospital in Shiprock, and the Dzlith-na-o-dith-hle Health Center near Blanco Trading Post.

4.0 Environmental Consequences and Proposed Mitigation Measures

No Action (Alternative A)

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

Proposed Action Alternatives

A summary of potential surface disturbances is presented in Tables 4.0 and 4.1. A summary of new surface disturbance by land ownership type is presented in Table 4.2. Descriptions of potential effects on individual resources for the proposed action alternatives are presented in the following text. Also described are potential mitigation measures that could be incorporated by the BLM where appropriate as Conditions of Approval attached to the permit.

Table 4.0 – Summary of Disturbance (Olympic No. 90 Project)

Fadllty		Alternative B		Altem atlve C		Duration
		Feet	Aeres	Feet	Ac,..	
Well Pad	New Disturbance	105 x 150	*0.36	105 x 150	*0.36	*ShorULong Term
	Existing Disturbance	-	-	-	-	*ShorULong Term
Construction Zone	New Disturbance	710 x 50	0.82	710 x 50	0.82	Short Term
	Existing Disturbance	-	-	-	-	Short Term
**Pipeline	New Disturbance	2041 x 30 390 x 20	1.41 0.18	565 x 30 2435 x 20	0.39 1.12	Short Term
	Existing Disturbance	-	-	-	-	
[11]Fragmentation	Area fragmented	-	14.2	-	-	Long Term
***Access Road	New Disturbance	265 x 30	0.18	265 x 30	0.18	Long Term
	Existing Disturbance	1100 x 10	0.25	1100 x 10	0.25	Long Term
Total New Disturbance			17.40		312	Short Term
			14.81		0.61	Long Term

[11] Fragmentation is the breaking up of a intact area of a habitat vegetation type into smaller intact units. To see impacts of habitat fragmentation, see section 4.21.

*Approximately 0.18 acres of long-term disturbance following interim site reclamation (See Plat 1 of APD).

** A typical Cross Country Pipeline ROW is 40-foot wide to allow for equipment during construction. The Operator has stated that they can complete the cross country pipelines with 30-feet of disturbance. A typical Pipeline ROW fallowing a road is 20-foot wide, with the remaining disturbance within the roadway. Assuming a 30-foot width disturbance for cross-country construction and a 20-foot width disturbance for paralleling existing and/or proposed disturbance construction.

*** The existing access will be upgraded to Gold Book standards to allow for year round travel and prevent further erosion. The existing road was permitted with the maximum driving surface of 20-foot. Currently the existing road is less than 14-foot wide and flat bladed (without a crown or ditches to ensure water drainage.

Table 4.1-Summary of Disturbance (Olympic No. 91 Project)

Facility		Alternative B		Alternative C		Duration
		Feet	Acres	Feet	Acres	
Well Pad	New Disturbance	105 x 150	*0.36	105 x 150	*0.36	*Short/Long Term
	Existing Disturbance	-	-	-	-	*Short/Long Term
Construction Zone	New Disturbance	710 x 50	0.82	710 x 50	0.82	Short Term
	Existing Disturbance	-	-	-	-	Short Term
**Pipeline	New Disturbance	2008 x 30 797 x 20	1.38 0.37	520 x 30 2880 x 20	0.36 1.32	Short Term
	Existing Disturbance	-	-	-	-	
''Fragmentation	Area fragmented	-	21.1	-	-	Long Term
Access Road	New Disturbance	65 x 30	0.05	65 x 30	0.05	Long Term
	Existing Disturbance	4600 x 10	1.06	4600 x 10	1.06	Long Term
Total New Disturbance			25.05		3.61	Short Term
			22.30		1.29	Long Term

'' Fragmentation is the breaking up of a intact area of a habitat vegetation type into smaller intact units. To see impacts of habitat fragmentation, see section 4.21

*Approximately 0.18 acres of long-term disturbance following interim site reclamation (See Plat 1 of APD).

** A typical Cross Country Pipeline ROW is 40-foot wide to allow for equipment during construction. The Operator has stated that they can complete the cross country pipelines with 30-feet of disturbance. A typical Pipeline ROW fallowing a road is 20-foot wide, with the remaining disturbance within the roadway. Assuming a 30-foot width disturbance for cross-country construction and a 20-foot width disturbance for paralleling existing and/or proposed disturbance construction.

*** The existing access will be upgraded to Gold Book standards to allow for year round travel and prevent further erosion. The existing road was permitted with the maximum driving surface of 20-foot. Currently the existing road is less than 14-foot wide and flat bladed (without a crown or ditches to ensure water drainage.

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

For the purpose of this EA, potential impacts have been divided into three categories:

High:- as defined in CEQ guidelines (40 CFR 1500-1508}, impacts which are substantial in severity and therefore should receive the greatest attention in decision-making.
Moderate: - impacts that cause a degree of change that is easy to detect, but do not meet the criteria for significant impacts.
Low:- impacts which cannot be easily detected, and cause little change in the existing environment.

Table 4.2- Summary of Proposed Disturbances by Surface Land Ownership (Acres)

Alternative B		Surface Ownership	
		BLM	Navajo Allotted
Olympic No. 90	Well Pad	1.18	
	Access Road	0.43	
	Pipeline (incl. habitat fragmentation)	15.03	0.57
Olympic No. 91	Well Pad	1.18	
	Access Road	1.11	
	Pipeline(incl. habitat fragmentation)	22.85	
Total		**41.78**	**0.57**

Alternative C		Surface Ownership	
		BLM	Navajo Allotted
Olympic No. 90	Well Pad	1.18	
	Access Road	0.43	
	Pipeline	0.94	0.57
Olympic No. 91	Well Pad	1.18	
	Access Road	1.11	
	Pipeline	1.68	
Total		**6.52**	**0.57**

4.1 Air Resources

4.1.1 Direct and Indirect Effects

4.1.1.1 Air Quality

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

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

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

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

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

The NAAQS are set for the most common and widespread pollutants. The standards are concentrations of air pollution above which the EPA has determined that serious health and welfare consequences could

occur. If the concentrations are below the NAAQS, there are no expected adverse effects to humans and the environment.

4.1.1.2 Climate

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

4.12 Potential Mitigation

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

Additional air quality modeling conducted since completion of the 2003 FEIS/RMP and provisions in the ROD for the FEIS/RMP provide for applications of additional emission controls if requested by the NMAQB. Based on this modeling, the NMAQB issued an interim directive that all newly issued APDs limit compressor emissions to no more than 2 grams per horsepower hour of N20 for engines of 300 horsepower or less. The FFO has complied with this directive through a condition of approval (COA) which has been in effect since August 1, 2005. To date, NMAQB has made no other such requests.

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

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

The BLM's regulatory jurisdiction over field production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality by reducing all emissions

from field production and operations. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; placement of compressors engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour; re-vegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads; and water dirt roads during periods of high use in order to reduce fugitive dust emission. The significant threshold for particulate matter of 35 ug/m^3 daily PM2.5 NAAQS is not expected to be exceeded under the action alternatives.

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

4.2 Areas of Critical Environmental Concern

No effect.

4.3 Cultural Resources

4.3.1 Direct and Indirect Effects

Direct effects normally include alterations to the physical integrity of a cultural resource. If a cultural resource is significant for other than its scientific information, direct effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. A potential indirect effect from the action alternatives is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural resources in the area.

One previously recorded site (NM-G-48-82) was found during the cultural resources survey of the Action Alternative B area..

Based on a review of the archaeological reports and the assessment of the undertaking in this area, the BLM cultural resources staff has determined that the Action alternative B will have no effect on cultural resources (BLM No. 201O(IV)022F). This determination will be included with the FFO/BLM cultural resources stipulations, if any, attached to the APD/R-0-W, as the case may be.

No cultural resources inventory has been conducted for Alternative C. If Alternative C was developed, a level III inventory would need to be conducted prior to any construction activities. If as a result of the inventory it was determined that cultural or historic sites would be damaged or disturbed, then Alternative C, in its present form, would cease to be a viable alternative.

4.3.2 Potential Mitigation

All FFO/BLM and NNHPD cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review (BLM) and the Cultural Resources Compliance Form (NNHPD) attached to the R-0-W/APD, as the case may be. These stipulations may include, but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education.

All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment, and that

it is illegal to collect, damage, or disturb cultural resources, and that such activities are punishable by criminal and or administrative penalties under the provisions of the Archaeological Resources Protection Act (16 U.S.C. 470aa-mm).

One previously recorded site was found within the originally staked Olympic No. 90 Alternative B pipeline ROW, but will be completely avoided following the Alternative B pipeline ROW re-route. No cultural resources were found in the survey of the proposed Olympic No. 91 action area.

If selected, Alternative C would be surveyed for cultural resources prior to any construction. Mitigation strategies may be required to protect sites adjacent to the action area. If mitigation strategies are not sufficient to protect cultural resources discovered, then Alternative C would be abandoned as a viable alternative.

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

In the event of a discovery of any cultural resources during construction on Navajo Nation Allotted Lands, all operations in the immediate vicinity of the discovery would cease, and the NNHPD would be notified.

4.4 American Indian Religious Concerns

4.4.1 Direct and Indirect Effects

The proposed action alternatives are not known to physically threaten the integrity of any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies and rituals pursuant to AIRFA or EO 13007. There are currently no known threats to remains that fall within the purview of NAGPRA or ARPA.

4.4.2 PotentialMitigation

No mitigation measures have been recommended for the proposed action alternatives.

4.5 EnvironmentalJustice

4.5.1 Direct and Indirect Effects

No minority or low income populations would be directly affected in the vicinity of the proposed action alternatives. Indirect effects could include effects due to overall employment opportunities related to the oil and gas and service support industry in the region as well as the economic benefits to state and county governments related to royalty payments and severance taxes. Other effects could include a small increase in activity and noise disturbance in areas used for grazing, wood gathering, or hunting. However, these effects would apply to all public land users in the project area. A more detailed description of potential impacts is contained in the PRMP/FEIS p.4-120 and 4-129.

4.6 Farmlands, Prime or Unique

No effect.

4.7 Floodplains

No effect.

4.8 Invasive,Non-native Species

4.8.1 Direct and Indirect Effects

Weeds (invasive/nonnative vegetation) can be introduced in many ways, including wind, vehicles, heavy equipment, livestock, and wildlife. The potential for weeds to invade or spread within an area is increased when native vegetation is removed and physical disturbance to the soil occurs. Establishment of weeds usually occurs in disturbed sites such as oil/gas pads, pipelines, stock water ponds, and edges of roads. Alternative 8 may have a higher potential for

The Farmington Field Office and the operator would follow BLM policy to control and manage invasive nonnative vegetation species. There were no invasive weeds encountered during the onsite inspections of the proposed action alternatives.

4.8.2 Potential Mitigation

It would be the responsibility of the operator to control and eradicate all noxious/invasive weeds within the area of the selected action alternative during the life of the projects.

4.9 Wastes, Hazardous or Solid

Typical wastes associated with the action alternatives would include trash, sewage, produced water, and produced hydrocarbons. During drilling and completion, a trash receptacle and a chemically treated portable toilet would be on location for trash and sewer disposal. All produced hydrocarbons would be put in tanks on location during completion work. Produced water would be put in onsite tanks or within lined reserve pit during completion work. All wastes would be disposed of in a proper manner as required by federal and state law and as described in the COAs.

When significant amounts of chemicals are stored on-site, governmental agencies would be notified as required under the Emergency Planning and Community Right to Know Act (1986). The notification of releases such as natural gas, natural gas liquids, and petroleum, outside the facility site is required under the Comprehensive Environmental Response Compensation and Liability Act, 1980 (CERCLA) and under BLM NTL-3A. The well locations must have an informational sign, as directed under 43 CFR 3160.

4.10 Water Quality: Surface and Groundwater

4.10.1 Direct and Indirect Effects

There are no perennial water sources, springs, seeps, wetlands or well defined ephemeral drainages within the action alternative areas. Effects to ground water resources would be low due to mitigation measures such as casing. Below casing depth, losses of produced water or mud may occur to differing degrees in various formations, but the losses are considered to be low and contained to within a few feet of the well bore. These losses are not considered to be substantial because of the very small amount of groundwater that could be affected (BLM 2003a, p. 4-14).

4.10.2 Potential Mitigation

Culverts, diversions, and silt traps, where indicated in the attached GOA's, would be used to stabilize and reduce sediment flow. The Operator would be responsible to ensure an adequate casing program is designed to protect ground water from contamination. Onshore Order #2 requires that all useable aquifers be protected by casing or cementing. All pits would meet State of New Mexico, Oil Conservation Division

(NMOCD) pit guidelines and requirements, NMAC 19.15.17. All pits would be lined to prohibit drilling and production fluids from infiltrating into groundwater resources or flowing into surface water resources.

4.11 Wetlands/Riparian Zones

No effect.

4.12 General Topography/Surface Geology

Although there will be surface disturbance for all projects, interim reclamation and reseeding is incorporated into the project for site mitigation. No prominent topographical features would be removed or disturbed by the proposed action alternatives.

4.13 Mineral Resources

No effect.

4.14 Paleontology

The San Jose Formation found within the action alternative areas is not known to contain any paleontological resources. No fossils are known to occur within or proximate to the proposed action alternatives.

4.14.1 Direct and Indirect Effects

Although no paleontological resources are known to occur within the action alternative areas, impacts to paleontological resources from the implementation of the action alternatives could possibly occur. Direct impacts of the action alternatives to fossil localities could result from the ground disturbing activities or the disturbance of the stratigraphic context in which they are located. The proposed action alternatives could also create indirect impacts to areas by changing erosion patterns. Additionally there could be an increase in off-road vehicular access from the action alternative project areas for recreational activities. An increase in human activity in the area could increase the possibility of unauthorized removal or other alterations to paleontological resources in the area. Potential impacts to paleontological resources as a result of the proposed action alternatives would be low and long-term.

4.14.2 Potential Mitigation

All BLM/FFO paleontological resources stipulations will be followed as indicated in the COAs, attached to the APD. These stipulations may include. but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. Upon review, a determination for final project clearance and stipulations shall be issued by the BLM/FFO.

If previously undocumented paleontological sites are encountered during construction, all activities shall stop in the vicinity of the discovery and the BLM and/or BIA will be immediately notified. The site will then be evaluated. Mitigation measures such as data recovery may be required by the BLM and/or BIA to prevent impacts to newly identified paleontological resources.

4.15 Soils

4.15.1 Direct and Indirect Effects

Due to the nature of drilling for oil and gas there would be soil disturbance within the action alternative areas. All areas to be disturbed would be bladed as needed to create flat surfaces for operating equipment and vehicles. Depth of soil disturbance would increase with rougher topography. Available topsoil would be stockpiled for reclamation. The cut and fill slopes on the action alternative areas would be especially susceptible to wind and water erosion until vegetation has been reestablished (one to two growing seasons). The potential impacts would be dependent, in part, on seasonal variation in rainfall and snowmelt run-off, terrain, soil type, prevailing winds, and vegetative cover. The heaviest amounts of erosion will be short-term (one to two growing seasons) until the vegetation has established. Effects to soils would likely be low to moderate for the action alternatives.

4.15.2 Potential Mitigation

Re-vegetation will reduce or minimize impacts created by water and/or wind erosion. Approximately half of the well locations and the entire well-tie pipelines disturbances would be reclaimed, resulting in approximately 0.18 acres of long-term disturbance per well location. The remaining surface disturbances would remain disturbed for the life of the well for production equipment and vehicle travel surfaces. Following final down-hole plugging and abandonment of the well, the entire well pad and access road would be reclaimed.

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

4.16 Watershed – Hydrology

4.16.1 Direct and Indirect Effects

The action alternatives would comply with water quality, quantity, and ground water protection standards under the Clean Water Act of 1977, and the Safe Drinking Water Act of 1974 as amended. The action alternatives would disturb more than five (5) acres; currently, a Storm Water Pollution Prevention Plan for the Environmental Protection Agency (EPA) under the Clean Water Act would not be required.

The Operator would be required to comply with any future changes to the National Pollutant Discharge Elimination System permitting process for storm water discharge from construction activities enacted by the EPA prior to the completion of well construction and site stabilization. The action alternatives would not cross any ephemeral washes or impact any other waters of the United States; therefore, a Nationwide 404 Permit from the U.S. Army Corps of Engineers, Albuquerque District Office would not be required.

4.16.2 Potential Mitigation

Diversions would be constructed above the east side of the Olympic No. 90 well pad. The proposed Olympic No. 91 well pad area is on very slightly sloped terrain and no diversions would need to be constructed. The Olympic No. 90 diversion would be directed such that water would drain away and/or around the pad. Culverts would be installed where needed to maintain drainages along access roads (see attached COA's). This mitigation would apply to both action alternatives.

4.17 Vegetation, Forestry

4.17.1 Direct and Indirect Effects

Direct impacts would be the removal of shrubs and grasses to construct the well pads and pipelines for the proposed action alternatives. The Alternative B action would remove approximately 6.67 BLM acres and 0.57 Navajo Allotted acres of established vegetation and would not remove any trees. The cross

country pipeline would create a fragmentation of the vegetation, thus, creating a larger disturbance of 41.78 acres The Alternative C action would remove approximately 6.52 BLM acres and 0.57 Navajo Allotted acres of established vegetation with no fragmentation of the land and would not remove any trees. Indirect impacts would be the remaining long-term (20-30 years) disturbance of the well locations used for production equipment and vehicle driving surfaces.

4.17.2 Potential Mitigation

Under both the Alternative B and Alternative C action alternatives, upon the completion of the construction, drilling, and the wells being placed into service, the rehabilitation and reseeding of the unused portion of the well pads and pipelines would occur. Those surfaces used for production equipment and vehicle travel would be reclaimed as directed by the conditions of approval (COA's) after final abandonment of the wells.

4.18 Livestock Grazing

4.18.1 Direct and Indirect Effects

There would be a temporary loss of approximately 6.67 BLM acres and 0.57 Navajo Allotted acres of forage under the Alternative B action; and a temporary loss of 6.52 BLM acres and 0.57 Navajo Allotted acres of forage under the Alternative C action prior to rehabilitation and reseeding. Long-term disturbance (all of which would be on BLM surface) is anticipated to be 1.9 acres for the Alternative B action and 1.9 acres for the Alternative C action, resulting in a negligible reduction in AUMs for the action alternatives.

4.18.2 Potential Mitigation

Mitigation measures associated with soils, water, riparian and wildlife serve to lessen impacts to the rangeland components essential for rangeland health.

4.19 Wild Horse and Burros

No effect.

4.20 Wildlife

4.20.1 Direct and Indirect Effects

Some temporary displacement of wildlife could occur during the construction, drilling and completion phase of the proposed action alternatives. Potentially affected species include cottontail rabbit, black-tailed jackrabbit, mule deer, coyote, and other species that typically utilize such habitat.

The proposed Alternative B action would remove approximately 6.67 BLM acres and 0.57 Navajo Allotted acres of potential habitat for such species. The proposed Alternative C action would remove approximately 6.52 BLM acres and 0.57 Navajo Allotted acres of potential habitat for such species. There are approximately 435,500 acres of sagebrush or desert scrub habitat, and 633,400 acres of pinon-juniper woodland in the BLM/FFO planning area (BLM 2003a, pg 3-31). Habitat in the proposed action alternative areas is not unique to the planning area and is common throughout the northern half of the planning area. Effects to wildlife would be low for oil and gas development that adheres to proper conditions of approval.

4.20.2 Potential Mitigation

Standard mitigation measures to protect or restore wildlife habitat can be found in the RMP (December 2003) pages 2-25 and 2-26. All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover reestablishment would minimize impacts to wildlife. Long-term disturbance (all of which would be on BLM surface) is anticipated to be 1.9acres for the Alternative B action and 1.9 acres for the Alternative C action. All hazards associated with construction and operation of the proposed action alternatives would be fenced or contained in storage tanks.

4.21 Migratory Birds

4.21.1 Direct and Indirect Effects

Migratory birds would not be directly harmed by the proposed action alternatives because of their mobility and ability to avoid areas of human activity and proper mitigation measures. The increased human presence during construction, drilling, and reclamation activities may indirectly disturb or displace adults from nests and foraging habitats for a short period of time. Long term production operations would result in only a slight increase in human activity in the immediate proposed project area.

Alternative B for both proposed projects would have a higher impact on migratory bird habitat due to the large amount of habitat fragmentation. Over 40 acres of habitat fragmentation would occur under Alternative B within the action area, including the long term disturbance of the proposed project area (well pad, access road, pipeline). Alternative C would create approximately 6.5 acres of habitat disturbance with no habitat fragmentation. Habitat fragmentation is the breaking up of an intact area of a particular vegetation or habitat type. Habitat fragmentation is often a cause of species becoming threatened or endangered by creating edge effects. While creating edge effects can lead to the increase in the biodiversity in species (generalist species), it also can be detrimental to specialist species who rely on a particular habitat type. The existence of viable habitat is critical to the survival of any many species, including migratory birds.

Potentially affected migratory bird species listed by the FWS species of concern including Bendire's thrasher, Brewer's sparrow, sage sparrow, burrowing owl, and mountain plover for Great Basin shrub habitat. The 2010 MOU between the BLM and USFWS and the BLM/FFO Migratory Bird Policy instructs the BLM/FFO to assess the adverse impacts (if any) on migratory bird, including short-term and long-term effects of the project on migratory bird populations and their habitat. There is no available data to analyze potential impacts to individual species within the action area of the proposed project due to the relatively small disturbance compared to the overall habitat area. However, looking at the impacts on migratory bird habitat using habitat acres disturbed for both alternatives, Alternative C would have a much less impact(-85% less) on migratory bird habitat than Alternative B in the long term.

4.21.2 Mitigation Measures

For both alternatives, project mitigation measures are designed to minimize effects on migratory birds and other wildlife. These measures include netting of any permanently open pits and vent caps on all open pipes to prevent bird entry and nesting. All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover reestablishment would minimize impacts to migratory birds. All hazards associated with construction and operation of the proposed action alternatives would be fenced or contained in storage tanks.

For both alternatives, Best Management Practices (BMPs) would be used to avoid or minimize the possibility of the unintentional take of migratory birds and their habitat, as instructed in the MOU and BLM/FFO Interim Management Policy (MOU No. NM-F00-2010-001).

- Combined ground disturbance for the complete action is over 4.0 acres of vegetative disturbance. No construction activities from May 15 to July 31 will be permitted without a BLM/FFO approved migratory bird nest survey or written approval by a BLM/FFO Biologist. If any active nests are

located within the proposed action area, project activities will not be permitted without written approval and/or monitoring by a BLM/FFO approved biologist.

No timing stipulations are required by the Navajo Nation Department of Fish and Wildlife (NNDFW Biological Resources Compliance Form (11ADKI02)).

4.22 Special Management Species

4.22.1 Direct and Indirect Effects

The proposed action alternatives would not result in any direct *effect* on any Special Management Species or their nests or roosts. Increases in noise and activity would be minimal and consistent with current activities in the area. The proposed action alternatives are not within a 1/3 mile buffer zone to any raptor nests. Under Alternative B, there would be a temporary loss of approximately 6.67 BLM acres and 0.57 Navajo Allotted acres of potential foraging habitat for the Golden eagle, Ferruginous Hawk, American peregrine falcon, and Prairie falcon prior to rehabilitation and reseeding. The Alternative C action would result in a temporary loss of approximately 6.52 BLM acres and 0.57 Navajo Allotted acres of potential foraging habitat for the four raptor species prior to rehabilitation and reseeding.

4.22.2 Potential Mitigation

Standard conditions of approval designed to protect wildlife and migratory birds would serve to protect Special Management Species (see Appendix 7.1). All construction activities would be confined to permitted areas only. Rapid and permanent vegetation and cover reestablishment would minimize impacts to wildlife. All hazards associated with construction and operation of the proposed action alternatives would be fenced or contained in storage tanks.

4.23 Threatened and Endangered Species

4.23.1 Direct and Indirect Effects

BLM/FFO review determined compliance with threatened and endangered species management guidelines outlined in the Sept. 2002 Biological Assessment. No further Section 7 ESA consultation with the USFWS is required. Refer to Appendix A, the Biological Survey Report.

4.24 Visual Resources

4.24.1 Direct and Indirect Effects

The proposed action alternatives would be located in an area designated a Class III VRM. Visual resource impacts would be low to moderate in the short-term during construction and drilling. Operation of the proposed action alternatives would result in low long-term visual impacts which are minimized by interim reclamation of areas on the pad that are not used. In addition, low-profile equipment painted an area appropriate color would further reduce visibility. Long-term effects would be low as the surrounding area is developed with additional oil and natural gas facilities, and pipeline and power line ROWs. The proposed action alternative areas would not be visible from any residential areas, commercial areas, highways, or recreation areas. Changes to the existing character of the landscape would be moderate and would repeat the basic elements found in the predominant natural features of the characteristic landscape.

4.24.2 Potential Mitigation

During the construction phase of the proposed action alternatives, activities would be confined to the allowed disturbance area and not migrate outside of the construction zone. Vehicles and equipment would utilize the access roads and disturbed areas. A rapid construction schedule would minimize impacts to visual resources that result from construction activities and would reduce the period of greatest visual impact. Although minimal vegetation removal is expected as a result of the proposed action alternatives, mitigations that can potentially minimize the visual impact of the project include revegetation requirements and above-ground facility paint color (Carlsbad brown) requirements that are established by the BLM.

4.25 Recreation

4.25.1 Direct and Indirect Effects

The proposed action alternatives are located in a somewhat remote area not often frequented by individuals not involved in the gas and oil industry. The well sites of the action alternatives may affect recreation activities and the general recreational experience of the public through increased noise, dust, visual changes to the landscape (see Section 4.17 above), and a general increase in human activity in the area. The proposed activity would decrease the solitude of the immediate area. The general public may encounter heavy construction and drilling vehicles within the immediate areas of the well sites, as well as along the access roads to the well sites.

The recreational user may observe new surface disturbances, drilling activities, and additional energy production equipment. However, the proposed action alternatives would be less noticeable as there are numerous existing wells, ROWs, and other infrastructure in the area. The proposed action alternatives would be consistent with the existing environment.

4.25.2 Potential Mitigation

Equipment on the proposed action alternatives would be painted Carlsbad brown to help blend in with the surrounding scenery. Disturbed areas would be quickly re-contoured, reclaimed, and seeded. These measures will decrease the visual effects to the recreating public. Standard conditions of approval designed to protect wildlife and migratory birds would serve to limit effects to the activities of recreationally important animal species (see Appendix 7.1).

4.26 Public Health and Safety

4.26.1 Direct and Indirect Effects

The proposed action alternatives are located in a somewhat remote area rarely frequented by individuals not involved in the gas and oil industry. No residences are located within one mile of the proposed action alternatives. Effects to public safety would be low for the short and long-term and would include increased traffic risks, chemical spills, pipeline failures, and equipment accidents.

4.26.2 Potential Mitigation

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

4.27 Socio-economic Conditions

4.27.1 Direct and Indirect Effects

The proposed action alternatives are located in a somewhat remote area rarely frequented by individuals not involved in the gas and oil industry. No residences or businesses are located within one mile of the proposed action alternatives. Effects to socio-economic conditions would be low for the short and long-term and may include the following: an increase in temporary jobs generated during the construction phase of the proposed action alternative; and service businesses may also benefit in the short term from the presence of work-crews.

Construction; and increased natural gas production may result in increased employment opportunities and royalty income to Native Americans and other minority and traditionally low income groups. The proposed action alternatives would not impact traditional lifestyles. Low short term and long term impacts to current socioeconomic conditions are anticipated.

4.27.2 Potential Mitigation

The proposed action is not anticipated to have any adverse impacts to socioeconomic conditions in the Huerfano Chapter or the general area.

5.0 Cumulative Impacts

The leased area of the proposed action alternatives has been industrialized with oil and gas well development. The surface disturbance for each project that has been permitted has created a spreading out of land use fragmentation. The cumulative impacts fluctuate with the gradual reclamation of well abandonments and the creation of new additional surface disturbances in the construction of new access roads and well pads. The on-going process of restoration of abandonments and creating new disturbances for drilling new wells gradually accumulates as the minerals are extracted from the land. Preserving as much land as possible and applying appropriate mitigation measures will alleviate the cumulative impacts.

Due to the absence of regulatory requirements to measure GHG emissions and the variability of oil and gas activities on federal minerals, it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of approving this application for permit to drill. A general assumption, however, can be made: drilling these wells may contribute to GHG emissions.

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to natural resources and plant and animal species due to climate change are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated.

Due to loss of habitat or competition from other species whose ranges may shift northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependent on historic water conditions. Forests at higher elevations in New Mexico, for example, have been exposed to warmer and drier conditions over a ten year period. Should the trend continue the habitats and identified drought sensitive species in these forested areas and higher elevations may also be more affected by climate change.

6.0 Consultation/Coordination

This section includes individuals or organizations from the public, public land users, the interdisciplinary team, and permittees that were contacted during the development of this document.

Table 6.0- Summary of Public Contacts Made During Preparation of Document and Interdisciplinary Team

Public Contact	Title	Organization	Present at Onslte?
-	-	-	-
10 Team Member	**Title**	**Organization**	**PrMent at Onslte?**
Craig Willems	Environmental Protection Specialist	BLM	YES
Kurt Fagrelius	Geologist	Dugan Production	YES
Maria Adkins	Third Party Contractor	Adkins Consulting	YES
Matt Zabka	Third Party Contractor	Adkins Consulting	YES
Lori Gregory	Third Party Contractor	Adkins Consulting	NO
Consultation	**Title**	**Organization**	**Present at Onslte?**
Jim Copeland	Archaeologist	BLM	NO
John Hanson	Wildlife Biologist	BLM	NO
John Kendall	T&E Specialist	BLM	NO
Sarah Scott	Natural Resource Specialist/ Riparian Coordinator	BLM	NO
Jeff Tafoya	Rangeland Management Specialist	BLM	NO
Barney Wegener	Air Quality Specialist	BLM	NO
Dale Wirth	Branch Chief, Range & Multiple Resources	BLM	NO

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7.0 Appendices

7.1 APD/COA

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

7.2 Authorities

Code of Federal Regulations (CFR)
40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of July 1, 2001.
43 CFR, All Parts and Sections inclusive - Public Lands: Interior. Revised as of October 1, 2000.

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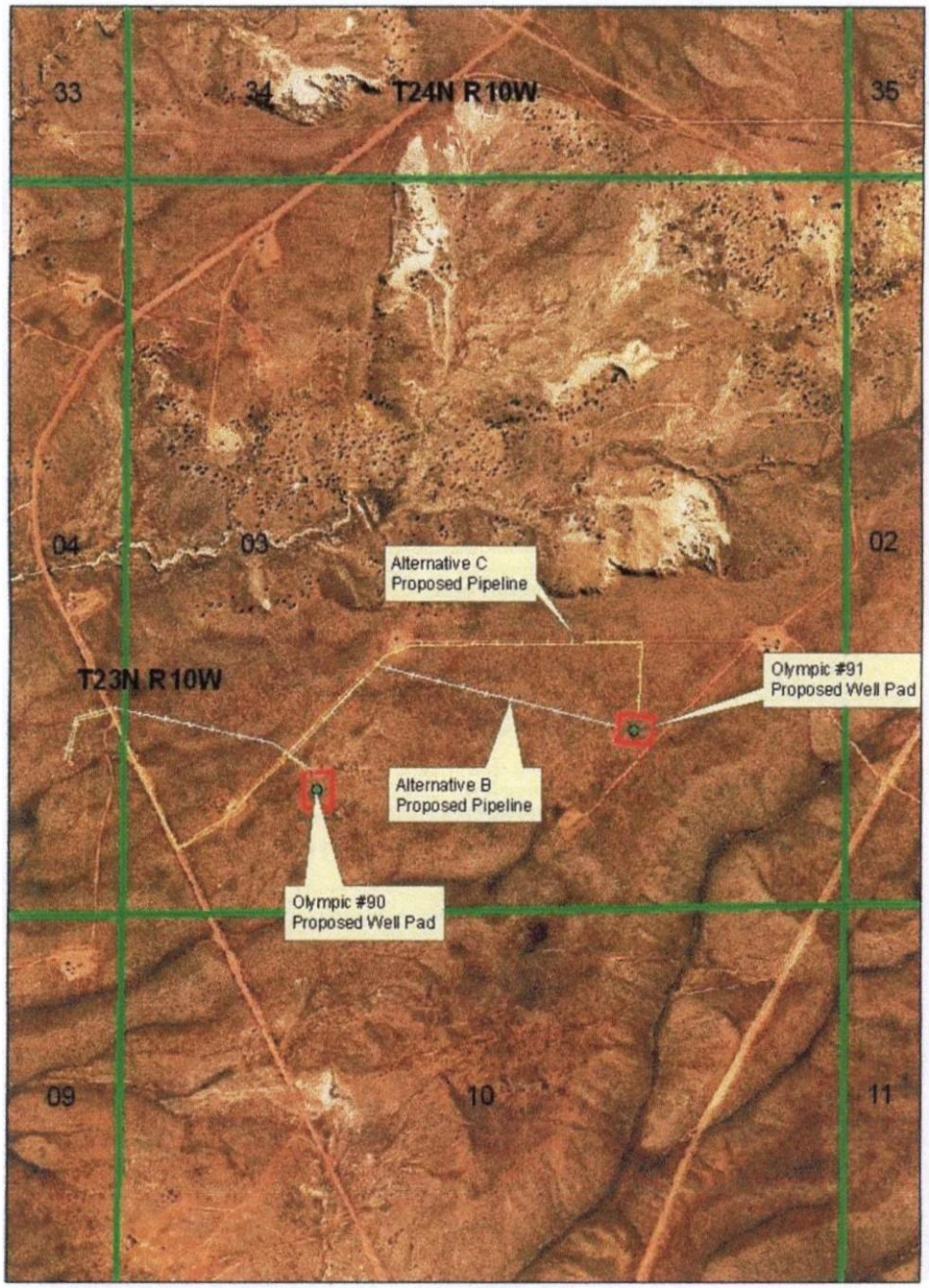
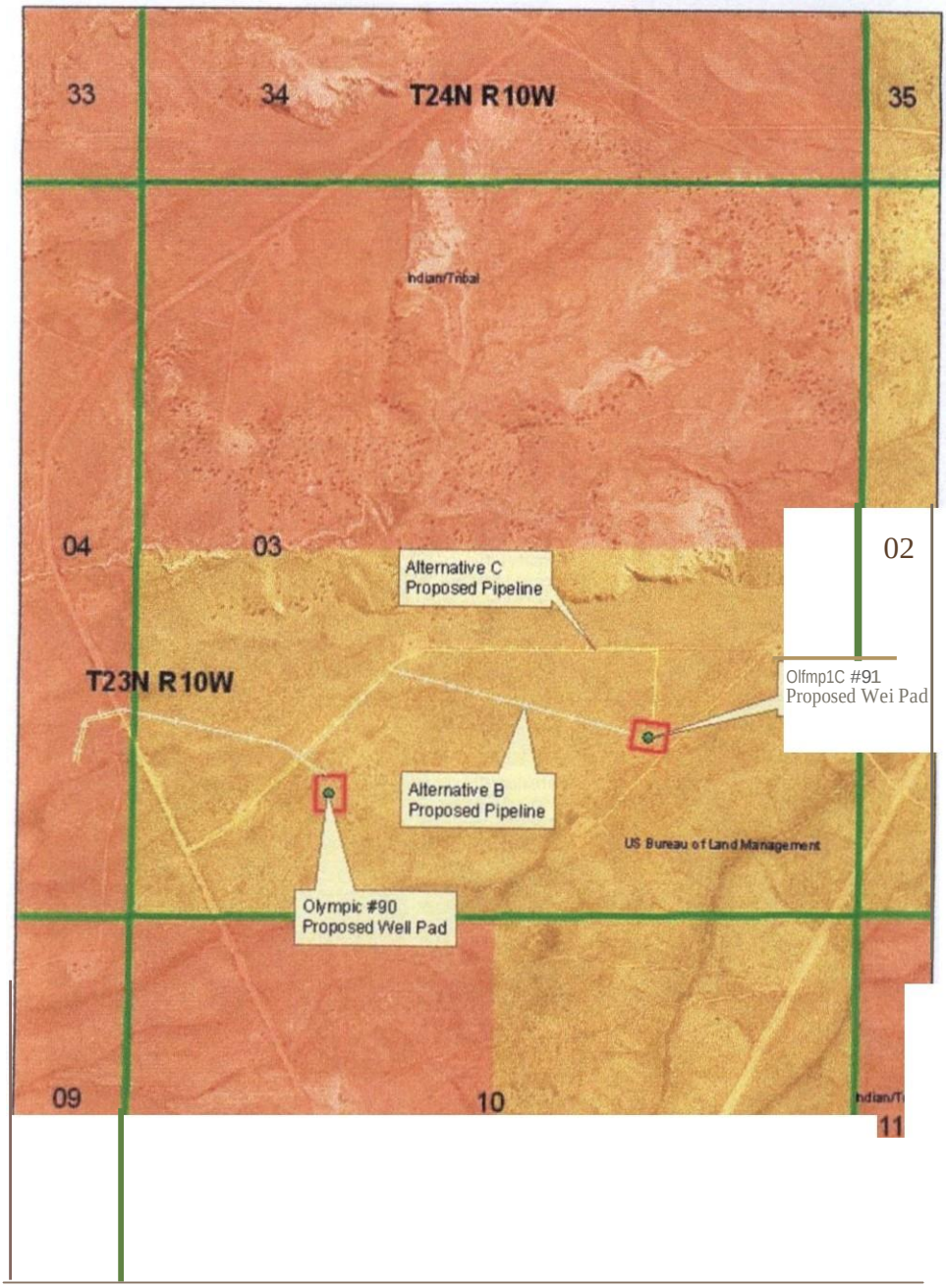
7.3 Proposed Action Alternatives Map



7.4 Surface Ownership Map