

## 2.0 PROPOSED ACTION AND ALTERNATIVES

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### 2.1 ALTERNATIVE 1 – PROPOSED ACTION

The proposed project (Alternative 1 – Proposed Action) submitted jointly by Anadarko E&P Company (AEPC) and Warren E & P, Inc. (Warren), collectively referred to as “the Companies,” consists of exploration and interim development of coal bed natural gas (CBNG) resources on existing federal, state, and fee leases in the Red Rim area (Project Area). The proposed project location is shown in [Figure 2-1](#). The proposed project will provide geologic and resource information needed by BLM for use in the Atlantic Rim Natural Gas Project EIS (Atlantic Rim EIS). Also, it will provide information to the Companies for use in evaluating the feasibility of economically developing CBNG resources in the Atlantic Rim area.

The Project Area lies within the Great Divide Basin, a sub-basin of the Greater Green River Basin. The Continental Divide splits around the Great Divide Basin, and isolates it as a closed, interior drainage basin. Therefore, any water entering the basin is contained within it.

The Proposed Action consists of constructing, drilling, completing, testing, and operating nine exploratory gas wells and up to two water injection wells; testing and operating seven existing exploratory wells; and constructing and operating two water conditioning facilities, three surface discharge outfalls, and a compressor station. The Proposed Action also would include related access roads, gathering lines for water and gas, buried electrical utilities, a market access line for gas, production facilities, and self-contained tanks that allow beneficial use of small quantities of produced water by livestock and wildlife without discharging to surface drainages. **Table 2-1** summarizes the wells and facilities that would be included in the project. A groundwater monitoring well also would be established in the Project Area, at a location specified by BLM.

The water produced from the exploratory wells would be conditioned using a proprietary, natural-mineral based process that will result in reduced levels of specific conductance and sodium adsorption ratio (SAR). The conditioned water would be discharged into ephemeral tributaries of Hadsell Draw on fee lands, provided it meets the applicable water quality standards for irrigation. Surface discharge of produced water would comply with all terms, conditions, and monitoring requirements of a National Pollutant Discharge Elimination System (NPDES) permit issued by the Wyoming Department of Environmental Quality (WDEQ).

The proposed project would be located 8 miles southwest of Rawlins, Wyoming, along Carbon County Road 605 (Twentymile Road), which intersects Interstate 80 (I-80) near Rawlins. The project is one of nine areas or well pods that make up the Atlantic Rim Interim Drilling Project. Of the nine proposed well locations, five wells would be located on surface ownership lands administered by the Bureau of Land Management (BLM) Rawlins Field Office (RFO) and would develop federal minerals. One proposed well would be located on surface ownership lands administered by

**Figure 2-1 Project Map**

**TABLE 2-1 RED RIM PROJECT**

<b>Proposed Gas Wells</b>			
<b>Lease Number</b>	<b>Well Name</b>	<b>Well Number</b>	<b>Location</b>
WYW-149261	AR Federal <sup>1</sup>	2089 NE20	T20N R89W Section 20 NENE
	AR Federal <sup>1</sup>	2089 SE20	T20N R89W Section 20 SESE
	AR Federal <sup>1</sup>	2089 SW20	T20N R89W Section 20 SWSW
WYW-150410	AR Federal <sup>1</sup>	2089 NW28	T20N R89W Section 28 SENW
	AR Federal <sup>1</sup>	2089 NE28	T20N R89W Section 28 NENE
FEE/STATE LEASES	AR Fee	2089 NE16	T20N R89W Section 16 SWNE
	AR Fee	2089 SW16	T20N R89W Section 16 NESW
	AR State <sup>1</sup>	2089 SE16	T20N R89W Section 16 NWSE
<b>Existing or Authorized Gas Wells<sup>2</sup></b>			
<b>Lease Information</b>	<b>Well Name</b>	<b>Well Number</b>	<b>Location</b>
FEE LEASES	AR Fee	2089 NE21	T20N R89W Section 21 NENE
	AR Fee	2089 NW 21	T20N R89W Section 21 NENW
	AR Fee	2089 SW21	T20N R89W Section 21 NESW
	AR Fee	2089 SE21	T20N R89W Section 21 NESE
	AR Fee	2089 NW29	T20N R89W Section 29 SENW
	AR Fee	2089 SW29	T20N R89W Section 29 SWSW
	AR Fee	2089 SE29	T20N R89W Section 29 SESE
	AR Fee	2089 NE29	T20N R89W Section 29 NENE
<b>Existing or Authorized Injection Well</b>			
FEE LEASE	AR Fee	21I	T20N R89W Section 21 NENE
FEE LEASE	AR Fee	29I	T20N R89W Section 29 NENE
<b>Proposed Facilities</b>			
FEE LEASE	Conditioning Facility	Bountiful	T20N R89W Section 29 NENE
FEE LEASE	Outfall	Bountiful 001 (RR-D1)	T20N R89W Section 29 SWNE
<b>Existing or Authorized Facilities<sup>2</sup></b>			
<b>Lease Information</b>	<b>Site Type</b>	<b>Name</b>	<b>Location</b>
FEE LEASE	Conditioning Facility	Abundance	T20N R89W Section 21 NENE
FEE LEASE	Outfall	Abundance 002 (RR-D2)	T20N R89W Section 21 NENE
FEE LEASE	Outfall	Abundance 003 (RR-D3)	T20N R89W Section 21 NENE
FEE LEASE	Compressor Station	Red Rim	T20N R89W Section 21 SESE

Note: <sup>1</sup> BLM surface ownership lands

<sup>2</sup> Wells and facilities requiring no authorization from BLM prior to construction; development of these wells and facilities in accordance with the Red Rim POD is currently completed, underway, or planned for 2003.

the RFO and would develop minerals owned by the State of Wyoming. The remaining proposed wells (three) would be located on fee lands and would develop fee minerals. The proposed water injection wells, zeolite water conditioning facilities, surface discharge outfalls, and compressor station all would be located on fee lands.

The Proposed Action is a part of the interim drilling associated with the Atlantic Rim EIS in Carbon County, Wyoming. The Proposed Action complies with the cooperative plan established by BLM in the Interim Drilling Policy – “Development Authorized Concurrent with EIS Preparation for the Atlantic Rim Coalbed Methane Project” ([Appendix A](#)). The primary objective of interim drilling is to evaluate the following aspects of development in the Atlantic Rim area:

- Ø Productivity of and reserves within the coals;
- Ø Economics of drilling and completion techniques;
- Ø Feasibility of dewatering the coals; and
- Ø Depths or pressure windows that may be preferred as the target for economic gas production.

The BLM is preparing an EIS for the Atlantic Rim area. The RFO will allow up to 200 exploratory wells to be drilled during preparation of the EIS, provided that this activity complies with criteria described in the Interim Drilling Policy ([Appendix A](#)). In addition, the RFO must determine through a NEPA analysis that no significant or adverse impacts would occur. The RFO would monitor drilling on public lands to ensure that it does not significantly affect the environment or prejudice the decisions to be made as a result of the analysis conducted in the Atlantic Rim EIS.

The Wyoming Oil and Gas Conservation Commission (WOGCC) has established a 160-acre well spacing pattern for the wells included in the Proposed Action under Chapter 3, Section 2 of WOGCC rules that establish a 160-acre spacing for gas wells located in certain townships, including T20N R89W. This order applies to all of Sections 16, 20, 21, and 29, and all except the southeast quarter of Section 28. An 80-acre spacing pattern for wells completed in the Mesaverde Group has been established for the southeast quarter of Section 28 under Cause No. 1, Order No. 1, Docket No. 154-2001.

Interim drilling within the Red Rim area would develop over a 6- to 12-month period. Wells would be tested when completed; however, an estimated 6 to 12 months of continuous producing status in the Red Rim area would be needed to fully evaluate the economics of any additional development. The life of the project is estimated at between 10 and 20 years. The productive life of a shallow gas well completed in coals in the Mesaverde Group is estimated to be 15 years.

Specific components of the project are shown in the Red Rim Plan of Development (POD), which consists of a Master Surface Use Program (MSUP) ([Appendix B](#)), Master Drilling Plan (MDP) ([Appendix C](#)), Water Management Plan (WMP) ([Appendix D](#)), and the project map ([Figure 2-1](#)). Project plans are summarized below in the section titled “Plan of Development.” Although the entire project is described in the POD, the proposed federal action is limited to the anticipated activities that would require a decision or authorization from BLM to proceed.

### **2.1.1. Plan of Development**

The Companies would follow the procedures outlined below to gain approval for the activities proposed on BLM-administered lands or minerals within the Project Area. Development also would be approved, as required, by other agencies.

### **2.1.2. Preconstruction Planning and Site Layout**

Before construction begins, the Companies would submit federal Application for Permit to Drill (APD) and Right-of-way (ROW) applications along with a preliminary MSUP, MDP, WMP, and a project map to the RFO that shows the specific location of the proposed activity (such as individual drill sites, pipeline corridors, access roads, or other facilities). The application would include site-specific plans that describe the proposed development (drilling plans with casing/cementing program; surface use plans with construction details for roads and drill pads; a water management plan; and site-specific reclamation plans). Approval of all planned operations would be obtained in accordance with the applicable regulations and Onshore Oil and Gas Order No. 1 (Approval of Operations on Onshore Federal and Indian Oil and Gas Leases). Stormwater discharges during construction would be managed in accordance with a stormwater permit issued by WDEQ.

The proposed facilities would be staked by the Companies and inspected by an interdisciplinary team or an official from the BLM to verify consistency with the RMP, the Interim Drilling Policy ([Appendix A](#)), and stipulations contained in the oil and gas leases.

The Companies would submit detailed descriptions of the proposed activity or construction plans to the BLM, when required, for the proposed development. The plans would address concerns related to construction standards, required mitigation, and other issues. Negotiation of these plans between the Companies and the BLM, if necessary to resolve differences, would be based on findings of the field inspection and would take place either during or after the BLM onsite inspection.

The Companies or their contractors would revise the MSUP, MDP, or WMP, as necessary, based on changes agreed to with BLM. The BLM would complete a project-specific environmental analysis that incorporates standards for construction and mitigation. The BLM would then approve the specific proposal and attach the Conditions of Approval to the permit. The Companies must then commence the approved activity within 1 year.

A general discussion of proposed construction techniques to be used by the Companies follows. More detailed plans can be reviewed in [Appendix B](#). These construction techniques would apply to drill sites, pipelines, and access roads within the Project Area, and may vary among well sites.

## **2.1.3. Construction Phase**

### **2.1.3.1.1. Construction of Access Roads**

The primary access road to the Project Area would be Carbon County Road 605. Access is provided by the feeder road of I-80, which intersects Carbon County Road 605 just south and west of Rawlins. Carbon County Road 605 is an existing one-lane road that is graded and partially graveled. Access to drill locations from the existing network of roads would be provided by new and upgraded crowned, ditched, and surfaced roads. The access road would be upgraded from the point where it crosses into Section 22 of T20N R89W to the southern edge of the Project Area in Section 29 of T20N R89W.

The Companies propose to construct new access roads across public lands in accordance with the standards in BLM Manual 9113 and applicable regulations. Roads would be located to minimize disturbances and maximize transportation efficiency. The Companies would close and reclaim roads when they are no longer required for production operations, unless otherwise directed by the BLM or the affected surface owner.

Drainage crossings on the access routes within the Project Area would either be low-water crossings or crossings that use “fish-friendly” culverts where applicable. Low-water crossings would be used in shallow channel crossings. Crossings of larger channels within the Project Area would be accomplished by excavating an area approximately 4 feet deep under the travelway and filling it with rock and gravel to the level of the drainage bottom. Channel banks on either side of these deeper crossings would be cut down to reduce grade where necessary. Culverts would be installed on smaller, steeper channel crossings. Topsoil would be conserved before construction of the channel crossing occurs. In addition, the total area to be disturbed would be flagged on the ground before construction begins.

### **2.1.3.1.2. Well Pad Design and Construction**

Six of the proposed wells would be drilled on surface lands administered by the BLM. A graded well pad would be constructed at each drill location using cut and fill construction techniques. [Appendix B](#) contains a schematic drawing of the layout for a typical drill site. The dimensions of each well pad would be about 200 feet by 200 feet. Each well site would disturb an estimated 1.0 acres, including cut and fill slopes.

A temporary reserve pit about 40 feet wide by 40 feet long by 20 feet deep would be excavated at each drill location and would be reclaimed after well completion operations end. Topsoil would be removed and stockpiled as required by the BLM before the pit is excavated. The Companies estimate that the reserve pit would be open for 2 to 8 weeks to allow fluids to evaporate. During this time, the pit would be fenced on all sides to prevent wildlife or livestock from falling in.

In the event that drilling is non-productive at any site, all associated disturbed areas would be reclaimed to the approximate landform that existed before construction.

Reclamation would encompass the drill location and new access road. Reclamation and site stabilization techniques would be applied as specified in the MSUP.

If drilling is productive, all access roads to the well site would remain in place for well servicing (such as maintenance and improvements). Portions of the drill location outside the well pad that are no longer needed would be reclaimed. Any portions of the access road ROW that are no longer needed also would be reclaimed. The outside ditch cuts also would be seeded and reclaimed.

#### **2.1.4. Drilling and Completion Operations**

A conventional drilling rig would be used to drill the gas wells and injection wells. Additional equipment and materials needed for drilling operations would be trucked to the drill location. The well control system would be designed to meet the conditions likely to be encountered in the hole and would conform to BLM and State of Wyoming requirements. Drilling plans and a completed well bore are included in [Appendix C](#).

Water for use in drilling the wells would be obtained from existing gas wells completed in the coal seams of the Mesaverde Group. Approximately 700 barrels (almost 30,000 gallons) of water would be needed to drill each well. The actual volume of water used in drilling operations would depend on the depth of the well and any losses that might occur during drilling. The proposed project also would require almost 70,000 gallons of water per well for preparation of cement or stimulation of the well (55,440 gallons), and control of dust (14,000 gallons). In all, nearly 100,000 gallons (about 0.3 acre-feet) of water per well would be used. Dust abatement would comply with all applicable WOGCC requirements. Only water suitable for livestock use would be used for dust abatement.

No oil or other oil-based drilling additives, chromium- or metals-based muds, or saline muds will be used during drilling of these wells. Only fresh water, biodegradable polymer soap, bentonite clay, and non-toxic additives will be used in the mud system.

Depending on the location of the coal seam, each producing well would be drilled to a depth of 4,050 feet to 5,850 feet or deeper. The drilling and completion operation for a shallow gas well normally requires approximately 10 to 15 workers at a time, including personnel for logging and cementing. Each well would be drilled within a period of 7 to 10 days.

A mobile completion rig similar to the drill rig may be transported to the well site and used to complete each well. Completion operations are expected to average 2 to 5 days per well. When the applicable permits are received, natural gas may be vented or flared. Formation water may be temporarily contained in the reserve pit during drilling and well completion activities. All fracturing fluids will be contained in closed tanks on location. During the testing period, produced water from the Mesaverde aquifer will be contained in closed tanks on location or trucked to an authorized disposal well, pending the completion of flowlines for produced water. All closed tanks on location will be encompassed by a 3.5 foot berm that will contain the entire contents of the largest tank in use, plus 10 percent, with one foot of freeboard, as authorized by BLM.

The injection wells would be drilled with the same equipment and personnel used for the gas wells. Depth of the injection wells, which would be completed in the Cherokee or Deep Creek sands, is expected to be between 5,965 and 6,335 feet. Drilling and completing each injection well would require approximately 7 to 14 days; installing surface equipment, holding tanks, and pumping equipment may require an additional 14 days. A schematic of a typical injection well is shown in [Appendix B](#).

## **2.1.5. Production Operations**

Roads, culverts, cattle guards, pipelines, stock watering facilities, or other structures could be left in place at the end of the project for any beneficial use, as designated by the affected surface owners and the BLM. Water wells and produced water would be available to the surface owners and BLM, provided appropriations, diversion, and storage rights are properly filed with the Wyoming State Engineer's Office (WSEO). BLM surface ownership lands that contain disturbed areas or facilities that are no longer needed would be reclaimed in accordance with applicable regulations. Non-federal lands would be reclaimed in accordance with the requirements of the surface owner.

### **2.1.5.1.1. Well Production Facilities**

Wells determined to be productive would be shut in until pipelines and other production facilities are constructed. Natural gas in the coal seam would then be produced through perforations in the casing.

Wellhead facilities would be installed if the wells are productive. A weatherproof covering would be installed over the wellhead facilities. A downhole pump would be used to produce water from the cased and perforated pay intervals. If productive, natural gas and produced water would be collected and transported from the wellhead via buried pipelines. Gas and water would be measured as specified in the MSUP. Additionally, a vertical separator at some well sites would separate gas from the water stream.

The long-term surface disturbance at the location of each productive well would encompass approximately 0.25 acre, including cut and fill slopes. Typically, only the production facilities at the well site would be fenced or otherwise removed from existing uses. A loop road or a small, graveled pad area would provide a safe turnaround area for vehicles. The perimeter of the pad area would be fenced if adjacent cut and fill slopes represent a safety hazard for vehicles. A typical gas production well site is shown in [Appendix B](#).

### **2.1.5.1.2. Power Generation**

Electricity would be used to power pumps to initiate and maintain production. Engines fired either by natural gas or propane would be used to run generators temporarily at individual wells until electric distribution lines can be analyzed in the Atlantic Rim EIS and then constructed. The Companies may choose to use centrally located generation equipment at the Red Rim compressor station and an underground distribution system to provide power to well sites. Utility lines would be installed in the same trench as the gas gathering and water gathering lines to minimize surface disturbance. Electrical motors or

natural gas-fired reciprocating or microturbine engines would power booster or blower units if they are required on the gas wells. Future compressors are anticipated to be powered by natural gas engines or electric motors. All utility lines would be buried in accordance with the Interim Drilling Policy.

#### **2.1.5.1.3. Summary of Pipelines and Related Facilities**

Construction and installation of gathering lines for gas and water would occur at the same time as access roads are constructed or immediately after drilling has been completed. Construction and installation of the gas delivery pipeline would occur after the producibility of the wells has been confirmed. All produced water used to test the integrity of the gas delivery pipeline (500 bbls or 21,000 gallons) would be injected. ROWs located in the same corridor will overlap each other to the maximum extent possible, while maintaining sound construction and installation practices. Where ROW corridors are located along a road, working space for installation of facilities will be along the road. Pipeline corridors would be reclaimed as soon as practical after construction of the pipeline is complete. Three types of pipelines would be constructed as part of the proposed project:

1. A gas-gathering pipeline system (low pressure) would be constructed from the wellheads to the central compressor station. This system would use high-density polyethylene (HDPE) pipe, starting with 4-inch diameter pipe at the wellhead, and graduating up to 12-inch diameter pipe at the inlet to the compressor.
2. Produced water-gathering pipeline systems (low pressure) would be constructed from the wellheads to the centralized conditioning facilities and from the centralized conditioning facilities to the surface discharge outfalls and tire tanks used for stock watering. Water lines also would be constructed from the centralized conditioning facilities to the injection facilities for wastewater. This network of water lines would use 4-inch through 12-inch diameter pipe made of HDPE.
3. A gas-delivery pipeline (high pressure) would be constructed from the compressor station to an existing transmission pipeline. This pipeline would be constructed of 8-inch diameter steel pipe.

Related facilities would include the Red Rim compressor station and water management facilities. Water management would include two water conditioning sites that are collocated with injection wells, three surface discharge outfalls, and stock tanks.

#### **Gathering Systems, Utilities, and Facilities for Conditioning and Injection**

The ROWs for the gathering systems would typically follow access roads, except in a limited number of cases where topography dictates otherwise or as required by the BLM. Trenches would be excavated to install the flowlines and electrical lines, and then backfilled. Gas-gathering and produced water-gathering pipelines would be laid together in the same trench when practical. Trenches excavated for well gathering lines and electrical lines are expected to temporarily disturb 30-foot wide corridors, which would

be reclaimed as soon as practical after construction is completed. An additional area, estimated to be 10 feet wide, would be used to transport machinery, personnel, and equipment along the corridor to install flowlines and electrical lines, wherever the gathering system would not follow an access road. This corridor is used to allow working room for the machinery, personnel, and equipment during the installation process. Corridors for the system of gathering lines in the Project Area would be about 9.3 miles long. About 3.9 miles of corridors for gathering lines would be located on BLM surface ownership lands.

Separate gathering lines that are buried would transport natural gas from the wellheads to the compressor station and produced water to the water conditioning facilities. Produced water would be routed to one of two centralized water conditioning sites. A typical facility for water conditioning is shown in [Appendix B](#).

After it has been conditioned, produced water would be piped from the centralized conditioning facilities to the surface discharge outfalls and tire tanks used for stock watering. A small portion of the water produced from gas wells (about 5 gallons per minute at each location identified on Figure 2-1) would be dispensed for use by livestock. Water would be piped into self-contained tire tanks that would not discharge produced water into drainages. A separate gathering line would be used to transport wastewater between the conditioning facilities in the event that only one injection well would be used. Corridors from the conditioning facilities to the outfalls and stock tanks would not contain gas-gathering lines. All other corridors would contain both gas-gathering and produced water-gathering lines. The alignments of the gathering lines are shown on [Figure 2-1](#).

The central water conditioning sites also would serve as locations for central injection facilities and disposal wells ([Figure 2-1](#)). The centralized water conditioning facilities would be located in Sections 21 and 29 of T20N R89W. The centralized conditioning facilities would be approved, as required, and each would be collocated with an injection well. A typical water disposal facility is shown in [Appendix B](#). The injection wells also would be approved, as required.

A typical injection facility would consist of a pad of approximately 200 feet by 200 feet that would disturb an estimated 1.0 acre, including cut and fill slopes. Each facility would contain four 400-bbl water tanks, pump house, piping, and well house. An approximate 3.5-foot berm would be constructed around the perimeter of the water tanks, excluding the pump shed, at each injection facility to contain any potential spills on the pad. The pump shed would be excluded from the berm area to minimize the potential for electrical or safety hazards that could occur if water entered the pump shed and caused electrical shorts. The berm would be constructed to contain the water from the largest tank, plus 10 percent, and maintain a freeboard (extra capacity) of 1 foot.

The approximate minimum injection capacity of the AR Fee 2089 21I injection well would be 5,000 barrels per day (bbls/day), and the maximum injection capacity would be 12,000 bbls/day. The approximate minimum injection capacity of the AR Fee 2089 29I injection well would be 5,000 bbls/day, and the maximum injection capacity will be 12,000 bbls/day. The injection capacity would be determined by the permeability of the

receiving reservoirs and limits on the injection pressure to preclude fracturing the formation, and would be established in the permit for each well.

Water transfer pumping stations may be used during production operations to transfer produced water from the gas wells to the water handling facilities. The transfer pumping stations are needed in areas where differences in elevation require supplemental pumping to transfer the produced water. If transfer pumping stations are required, they will be identified in the MSUP. Each pumping station would contain up to two 400-barrel water tanks, an inlet separation vessel, and a small centrifugal water pump. A small pump shed would be constructed to enclose the pump. Each pumping station would consist of a pad of approximately 125 feet by 125 feet that would disturb an estimated 0.4 acre, including cut and fill slopes. An approximate 3.5-foot berm would be constructed around the perimeter of the water tanks, excluding the pump shed, at each pumping station to contain any potential spills on the pad. The pump shed would be excluded from the berm area in order to minimize the potential for electrical or safety hazards that could occur if water entered the pump shed and caused electrical shorts. The berm would be constructed to contain the water from the largest tank, plus 10 percent, and maintain a freeboard (extra capacity) of one foot. A berm that is about 40 feet by 25 feet, with a water height of 2.5 feet could contain 2,500 cubic feet of water, equivalent to the 2,250 cubic feet of water contained in a 400 bbl tank, with additional capacity (10 percent). A typical water transfer facility is shown in [Appendix B](#).

#### **Gas-Delivery Pipelines and Compression**

Produced natural gas under wellhead pressure would move through the low-pressure gas-gathering system to the compressor station. Typical pressure in the lines for a gathering system of the type proposed for this project is less than 100 pounds per square inch (psi). Gas arriving at the compressor station would be compressed from the pressure in the gathering line to facilitate delivery and introduction of the gas into an existing transmission pipeline located in Section 30, T21N R87W. Compression of the gas at a field compressor station would increase the pressure to an estimated 700 to 1,450 psi.

The compressor station will be sited to allow for the installation of one compressor initially, with the addition of up to two more compressors later in the life of the field. Each compressor would be sized to handle 5 MMCFD from 15 psi suction pressure to 1,200 psi discharge pressure. Each compressor would be driven by a natural gas engine that would be designed to meet all specifications established by the Wyoming Department of Environmental Quality, Air Quality Division (WDEQ-AQD). Generally, all engines used to drive compressors would have emissions of less than 1.5 g/bhp-hr, or less than 16.7 tons per year of nitrogen oxides (NO<sub>x</sub>), and 0.5 hg/bhp-hr, or less than 5.6 tons per year of carbon monoxide (CO). Additional equipment at each compressor station would include a tri-ethylene glycol (TEG) dehydration system, which would dry the gas to meet all pipeline-quality specifications of the market pipeline.

The pad at the compressor station would be 300 feet by 300 feet and would result in approximately 2.2 acres of disturbance, including cut and fill slopes. All compressor engines would be housed within structures designed in accordance with applicable regulations. A typical compressor station is shown in [Appendix B](#).

Should encouraging quantities of natural gas be discovered, a delivery pipeline would be required to move the gas to an existing system located in Section 30 of T21N R87W. The alignment of the delivery line from the compressor station to the existing transmission pipeline is shown on [Figure 2-1](#). The Companies are applying for a ROW for the 8-inch diameter steel pipeline that would be buried 6 feet deep on a 50-foot wide ROW. This pipeline would be anchored at the compressor station and would proceed northeast to the existing pipeline in Section 30 of T21N R87W. This gas delivery pipeline would be 10.2 miles long, of which about 4.6 miles would be located on BLM surface ownership lands.

Construction and installation of this delivery pipeline would temporarily disturb a 50-foot wide corridor, which would be reclaimed as soon as practical after construction is completed. An additional area, estimated to be 25 feet wide, would be used to transport machinery, personnel, and equipment along the corridor to install the pipeline, wherever the delivery pipeline would not follow an access road. This corridor would allow working room for the machinery, personnel, and equipment during the installation process.

The delivery pipeline will be constructed using open cut construction methods for upland areas, and dry ditch construction methods for water body crossings. The disturbed area will be kept to a minimum. In order to minimize surface disturbance, the operator will use wheel trenchers (ditchers) or ditch witches, where possible, to construct all pipeline trenches associated with this project. Trenches that are open for the installation of pipelines will have plugs placed no more than 1,000 feet apart to allow livestock and wildlife to cross the trench or walk out of it, if needed. Placement of plugs will be determined in consultation with BLM and any affected landowner.

The Companies would complete the pipeline during periods when key habitats are not occupied to limit human presence in and disturbance of key wildlife habitats during critical periods of use. The availability of adequate working space would accelerate construction. Surface disturbance would be reclaimed when the pipeline is complete.

### **2.1.6. Ancillary Facilities**

The Companies would operate all wells, pipelines, and associated ancillary production facilities in a safe manner, as set forth in standard industry operating guidelines and procedures. Routine maintenance of producing wells would be necessary to maximize performance and detect potential difficulties with production operations. Each well location would be visited approximately every other day to ensure that operations are proceeding in an efficient and safe manner. The visits would include checking separators, gauges, valves, fittings, tanks, generators, and pumps. The equipment onsite also would be routinely maintained, as necessary. Additionally, all roads and well locations would be regularly inspected and maintained to minimize erosion and assure safe operating conditions.

## 2.1.7. Estimates of Traffic and Work Force

Estimated traffic requirements for drilling, completion, and field development are shown on **Table 2-2**. The “Trip Type” column lists the various service and supply vehicles that would travel to and from the well sites and production facilities. The “Round-Trip Frequency” column lists the number of trips, both external (to and from the Red Rim Project Area) and internal (within the Red Rim Project Area). The figures provided on **Table 2-2** should be considered general estimates, based on an active drilling program. The level of drilling and production activity may vary over time in response to weather and other factors.

**TABLE 2-2 TRAFFIC ESTIMATES**

Trip Type	Round-Trip Frequency	
	External (to/from Project Area)	Internal (within Project Area)
<b>Drilling (2 rigs, 2 crews/rig)</b>		
Rig supervisor	4/day	Same
Rig crews	4/day	Same
Engineers <sup>a</sup>	2/week	1/day/rig
Mechanics	4/week	Same
Supply delivery <sup>b</sup>	1/week	2-4/day
Water truck <sup>c</sup>	1/month	2 round trips/day
Fuel trucks	2 round trips/well	Same
Mud trucks <sup>d</sup>	1/week	2/day
Rig move <sup>e</sup>	8 trucks/well	8 trucks/well
Drill bit/tool delivery	1 every 2 weeks	Same
<b>Completion and Operations (2 rigs, 2 crews/rig)</b>	<b>External (to/from Project Area)</b>	<b>Internal (within Project Area)</b>
Small rig/crew	1/day	Same
Cement crew	2 trips/well	Same
Consultant	1/day	Same
Well loggers	3 trips/well	Same
Gathering systems	2/day	Same
Power systems	2/day	Same
Compressor station	2/day	Same
Other field development	2/day	Same
Testing and operations	2/day	Same

Notes:

- <sup>a</sup> Engineers travel to Project Area weekly and stay in a mobile home at the Project Area during the week.
- <sup>b</sup> Current plans are to establish a central supply area within the Project Area and deliver supplies weekly.
- <sup>c</sup> Water trucks would deliver water to rigs from a location within the Project Area and provide dust abatement for roads in the Project Area.
- <sup>d</sup> Current plans are to establish a central mud location within the Project Area and deliver mud weekly.
- <sup>e</sup> Four trucks would be required to move each rig to the Project Area. When drilling is complete in a Project Area, each rig would move to the next Project Area.

## 2.1.8. Site Restoration and Abandonment

The Companies would completely reclaim all disturbed areas that are not needed for production. Reclamation would generally include: (1) complete cleanup of the disturbed areas (drill sites and access roads, for example), (2) restoring the disturbed areas to the approximate ground contour that existed before construction, (3) replacing topsoil over all disturbed areas, (4) ripping disturbed areas to a depth of 12 to 18 inches, and (5) seeding recontoured areas with a BLM-approved, certified weed-free seed mixture.

## 2.1.9. Summary of Estimated Disturbances

Table 2-3 summarizes the estimated disturbances that would result from implementation of the project.

**TABLE 2-3 ESTIMATES OF DISTURBED AREA – RED RIM PROJECT AREA**

Facility	Construction Phase				Operations
	Length (feet)	Width (feet)	Area, ea. (acres)	Temporary Acres	Life of Project Acres
New Roads	12,300	40	N/A	11.3	11.3
Existing Well Access Road <sup>a</sup>	32,300	40	N/A	29.7	29.7
Existing Road to be Upgraded <sup>b</sup>	17,400	40	N/A	16.0	16.0
Corridors for New Gathering Lines and Utilities	49,600	30	N/A	34.2	0
Corridor for New Market Access Line	52,800	50	N/A	60.6	0
New Drill Locations (9)	N/A	N/A	1.0	9.0	2.3
Injection Well (2)	N/A	N/A	1.0	2.0	2.0
Existing Well Location (7)	N/A	N/A	1.0	7.0	1.8
Compressor Station (1)	N/A	N/A	2.2	2.2	2.2
Water Conditioning Facility (2)	N/A	N/A	2.6	5.2	5.2
Monitoring Well (1)	N/A	N/A	1.0	1.0	0.2
<b>Total New Disturbance</b>				<b>141.5</b>	<b>39.2</b>
<b>Total Disturbance</b>				<b>178.2</b>	<b>70.7</b>

Notes:

a Carbon County Road 605 not included in existing well access road

b Existing two-track that would be upgraded, and the portion of Carbon County Road 605 within the Project Area that would be used during the project

## 2.1.10. Project-Wide Mitigation Measures and Procedures

For this project, the Companies have voluntarily agreed to use and comply with the following measures and procedures to avoid or mitigate potential impacts to resources or other land uses, after consultation with BLM regarding agency requirements. These

measures and procedures will be referred to as Best Management Practices (BMPs) throughout this document. These mitigation measures and procedures would be applied on privately owned surface unless the private surface owners involved specifically require alternative actions. An exception to a mitigation measure or design feature may be approved on public land on a case-by-case basis when deemed appropriate by the BLM. An exception would be approved only after a thorough, site-specific analysis had concluded that the resource or land use that the measure was intended to mitigate is not present or would not be significantly affected in the absence of the mitigating measures.

#### **2.1.10.1.1. Preconstruction Planning, Design, and Compliance Measures**

1. The Companies would designate a qualified representative to serve as compliance coordinator. This person will be responsible for ensuring that all requirements of the APD and Plan of Development (MSUP, MDP, WMP, and Conditions of Approval) are followed.
2. The Companies and the BLM would make onsite inspections of each proposed and staked facility site (such as drill locations and other facilities), new access road, access road upgrades, and pipeline alignment projects to develop site-specific recommendations and mitigation measures.
3. New roads would be constructed and existing roads maintained in the Project Area in accordance with standards in BLM Manual 9113 and applicable regulations for resource roads and construction details outlined in the MSUP and Conditions of Approval. These standards would be followed on BLM surface ownership lands.
4. Prior to construction, the Companies would submit an APD package to BLM. This package would contain individual APDs for each drill site, as well as the MDP, MSUP, WMP, schematics of facilities, and ROW applications for pipelines, utilities, and access roads. APDs submitted by the Companies would show the layout of the drill pad over the existing topography, the dimensions of the pad, cross sections of the cuts and fills (when required), the location and dimensions of reserve pits, and locations of access roads.
5. The Companies would design and engineer construction when required by the BLM (for example, in steep or unstable slopes) and receive approval from the BLM before construction begins.
6. BLM would require roads to be crowned with a 0.3- to 0.5-foot crown, and ditched. The topsoil would be graded over the cut slope so no berm is left at the top of the cut slope.
7. BLM would require that culverts be covered with a minimum of 12 inches of fill or one-half the diameter of the pipe, whichever is greater. The inlet and outlet will be set flush with existing ground and lined up in the center of the draw. Before the area is backfilled, the bottom of the pipe will be bedded on stable ground that does not contain expansive or clay soils, protruding rocks that would damage the pipe, or unevenly sized material that would not form a good seat for the pipe. The site

would be backfilled with unfrozen material and rocks no larger than 2 inches in diameter. Care would be exercised to thoroughly compact the backfill under the haunches of the conduit. The backfill would be brought up evenly in 6-inch layers on both sides of the conduit.

8. Additional culverts would be installed in the existing access road as needed or as directed by BLM.
9. The access roads would be surfaced with an appropriate grade of aggregate or gravel to a depth of 4 inches before the drilling equipment or rig is moved onto the pad.
10. BLM would require that access roads be maintained in a safe and usable condition. A regular maintenance program would include, but is not limited to, blading, ditching, installing or cleaning culverts, and surfacing.
11. The written approval of the authorized officer will be obtained before snow removal outside the new and existing roadways is undertaken. If approval is given, equipment used for snow removal operations outside the road ditches will be equipped with shoes to keep the blade off the ground surface. Special precautions will be taken where the surface of the ground is uneven to ensure that equipment blades do not destroy the vegetation.
12. BLM would require that wing ditches be constructed, as necessary, to divert water from road ditches.
13. Trenches that are open for the installation of pipelines should have plugs placed no more than 1,000 feet apart to allow livestock and wildlife to cross the trench or walk out of it, if needed. Placement of plugs would be determined in consultation with BLM and any affected landowner.
14. Procedures would be implemented to prevent livestock or wildlife from falling into open excavations. Procedures could include temporary covers, fencing, or other means acceptable to BLM and any affected landowner.

#### **2.1.10.1.2. Resource-Specific Requirements**

The Companies propose to implement the following resource-specific mitigation measures, procedures, and BLM management requirements on public lands.

#### **Geology, Minerals, and Paleontology**

Mitigation measures presented in the sections of this EA on Soils and Water Resources would avoid or minimize many of the potential impacts to surface mineral resources. BLM and WOGCC policies on casing and cementing would protect subsurface mineral resources from adverse impacts.

Scientifically significant paleontological resources that may occur within the Lance Formation, the only geologic formation of concern exposed at the surface in the Project Area, would be protected through the following mitigation measures:

1. If recommended by BLM, each proposed facility located in areas of known and potential vertebrate paleontological resources would be surveyed by a BLM-approved paleontologist before any surface disturbance is allowed (BLM 1987 and 1990).
2. Discovery. Project personnel would make contingency plans for the accidental discovery of significant fossils. If construction personnel discover fossils during implementation of the project, the BLM would be notified immediately. If the fossils could be adversely affected, construction would be redirected or halted until a qualified paleontologist had assessed the importance of the uncovered fossils, the extent of the fossiliferous deposits, and had made or implemented recommendations for further mitigation.
3. Field Survey. No specific data currently exist on deposits of high or undetermined paleontologic potential in Project Area. For that reason, field survey for paleontologic resources would be conducted on a case-by-case basis, as directed by the BLM. These resources would be surveyed in areas where surface exposures of the Browns Park, Green River, or Wasatch Formations occur. A field survey may result in the identification of additional mitigation measures needed to reduce adverse impacts to fossil resources. This mitigation may include collection of additional data or representative samples of fossil material, monitoring excavation, or avoidance. In some cases, no action beyond the measures taken during the field survey may be necessary.

A report would be submitted to the BLM after each field survey is complete. The report will describe in detail the results of the survey, with a list of fossils collected, if any, and may recommend additional mitigation measures. If scientifically significant fossils are collected, the report must document the curation of specimens into the collection of an acceptable museum repository and must contain appropriate geologic records for the specimens.

### **Air Quality**

1. All activities conducted or authorized by BLM must comply with local, state, tribal, and federal air quality regulations and standards. The Companies would adhere to all applicable ambient air quality standards, permit requirements (including preconstruction, testing and operating permits), standards for motorized equipment, and other regulations, as required by the WDEQ-AQD.
2. Before any wells are vented or flared, WDEQ-AQD would be notified as required by Wyoming Air Quality Standards and Regulations, Chapter 1, Section 5 *Reporting Guidelines for Well Flaring and Venting*. Test periods longer than 15 days would require authorization by WOGCC, in accordance with Chapter 3, Section 40 *Authorization for Flaring and Venting of Gas*.

3. On federal land, the Companies would immediately abate fugitive dust (by application of water, chemical dust suppressants, or other measures) when air quality is impaired, soil is lost, or safety concerns are noticed by the Companies or identified by the BLM or the WDEQ-AQD. These concerns include, but are not limited to, actions that exceed applicable air quality standards. BLM would approve the control measure, location, and application rates. If watering is the approved control measure, the operator must obtain the water from state-approved sources in accordance with any applicable regulations.
4. The Companies would not allow garbage or refuse to be burned at well locations or other facilities.

### **Soils**

1. The Companies would reduce the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of the operation.
2. Where feasible, the Companies would locate pipelines immediately adjacent to roads to avoid creating separate areas of disturbance and to reduce the total area of disturbance.
3. The Companies would avoid using frozen or saturated soils as construction material.
4. The Companies would minimize construction in areas of steep slopes.
5. Cut slopes would be designed in a manner that would retain topsoil, and facilitate use of surface treatment such as mulch and subsequent revegetation.
6. The Companies would selectively strip and salvage topsoil or the best suitable medium for plant growth from all disturbed areas. Topsoil would be removed and conserved to a minimum depth of 6 inches and a maximum of 12 inches from all drill locations, unless otherwise agreed by the BLM and the operator.
7. Where possible, disturbance to vegetated cuts and fills would be minimized on existing improved roads.
8. The Companies would install runoff and erosion control measures such as water bars, berms, and interceptor ditches if needed.
9. The Companies would install culverts for ephemeral and intermittent drainage crossings. In addition, drainage crossing structures would be designed to carry the 25-year discharge event, or as otherwise directed by the BLM.
10. Layout of the access roads may require minor variations in routing to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Where possible, the

Companies would maintain a 100-foot wide buffer of natural vegetation (not including wetland vegetation) between construction and ephemeral and intermittent channels.

11. The Companies would include adequate drainage control devices and measures in the design of roads (for example, berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipaters). These devices and measures would be located at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road to avoid erosive, concentrated flows. In conjunction with surface runoff or drainage control measures, the Companies would use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. In addition, the Companies would implement a revegetation program as soon as possible to reestablish the soil protection afforded by vegetation.
12. When the use of an area that is not specifically required for production operations is complete, the Companies would restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites. The Companies also would replace up to 6 inches of topsoil or suitable plant growth material over all disturbed surfaces; apply fertilizer as required; seed; and mulch.

### **Water Resources**

Other mitigation measures listed in the sections of this EA on Soils, and Vegetation and Wetlands would apply to Water Resources.

1. Applications would be submitted for all necessary NPDES permits as required by the Water Quality Division (WQD) of WDEQ for discharge of produced water into ephemeral drainages. Plans for surface discharge are described in the WMP (**Appendix D**).
2. The Companies would limit construction of all drainage crossings to no-flow or low-flow periods.
3. The area of disturbance would be minimized within perennial, ephemeral, and intermittent drainage channels.
4. BLM would prohibit construction of well sites and other non-linear features within 500 feet of surface water and riparian areas. BLM would grant possible exceptions for linear features based on a site-specific environmental analysis and site-specific mitigation plans.
5. The Companies would design channel crossings to minimize changes in channel geometry and subsequent alterations in flow hydraulics.
6. Layouts of the access roads may require minor variations in routing to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Where possible, a

100-foot wide buffer of natural vegetation (not including wetland vegetation) would be maintained between construction and ephemeral and intermittent channels.

7. Interceptor ditches, sediment traps, water bars, silt fences, and other revegetation and soil stabilization measures would be designed and constructed, as needed.
8. The Companies would construct channel crossings by pipelines such that the pipe is buried a minimum of 4 to 6 feet below the channel bottom, as specified by BLM.
9. Disturbed channel beds would be regraded to the original geometric configuration and would contain the same or similar bed material.
10. Wells must be cased during drilling, and all wells cased and cemented in accordance with Onshore Order No. 2 to protect all high-quality aquifers. High-quality aquifers exhibit known water quality of 10,000 milligrams per liter total dissolved solids (TDS) or less. Well casing and welding must be of adequate integrity to contain all fluids under high pressure during drilling and well completion. Furthermore, wells would adhere to the appropriate BLM cementing policy.
11. The reserve pits would be constructed in cut rather than fill materials. Fill material must be compacted and stabilized, as needed. The subsoil material of the pit to be constructed should be inspected to assess stability and permeability and to evaluate whether reinforcement or lining is required. If lining is required, the reserve pit must be lined with a reinforced synthetic liner at least 12 mils thick and with a bursting strength of 175 by 175 pounds per inch (American Society for Testing and Materials [ASTM] Standard D 75179). Use of closed or semi-closed drilling systems should be considered in situations where a liner may be required.
12. Two feet of freeboard must be maintained on all reserve pits to ensure they are not in danger of overflowing. Drilling operations must be shut down if leakage is found outside the pit until the problem is corrected.
13. Hydrostatic test water used in conjunction with pipeline testing, and all water used during construction or dust abatement must be extracted from sources that contain sufficient quantities and with appropriation permits approved by the State of Wyoming.
14. Hydrostatic test water would be injected into an authorized deep injection well, in compliance with all applicable requirements.
15. All concentrated water flows must be discharged within the ROW for an access road onto or through an energy dissipater structure (such as riprapped aprons and discharge points) and into undisturbed vegetation.
16. If required by the applicable regulations, the Companies would develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as

required per WDEQ permit requirements under NPDES. All required WDEQ permits will be in place before water is discharged.

17. The Companies would exercise stringent precautions against pipeline breaks and other potential accidental discharges of oil or hazardous chemicals into adjacent streams. If liquid petroleum products are stored on site in sufficient quantities (per the criteria contained in Title 40 CFR Part 112), a Spill Prevention Control and Countermeasures (SPCC) plan would be developed in accordance with 40 CFR Part 112.
18. The Companies would coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (COE).
19. BLM must approve in writing any changes in the method or location for disposal of produced water.

#### **Vegetation, Wetlands, and Noxious Weeds**

Other mitigation measures under the section on Soils and Water Resources of this EA would also apply to vegetation and wetlands.

1. Noxious weed monitoring forms must be filed with the BLM, and the Companies must implement, if necessary, a weed control and eradication program.
2. The Companies would evaluate all project facility sites for occurrence and distribution of waters of the U.S., special aquatic sites, and jurisdictional wetlands. All project facilities would be located out of these sensitive areas. If complete avoidance is not possible, the Companies would minimize impacts through modification and minor relocations. The Companies will comply with applicable regulations for any activities that involve dredge or fill of wetlands.
3. An approved Pesticide Use Proposal would be obtained before herbicides or other pesticides are applied on BLM surface ownership lands to control noxious weeds.
4. Disturbed areas would be seeded and stabilized in accordance with BLM-approved reclamation guidelines.

#### **Range Resources and Other Land Uses**

Mitigation requirements listed under sections of this analysis on Soils, Vegetation, Wetlands, Noxious Weeds, and Wildlife also apply to Range Resources and Other Land Uses.

1. The Companies would coordinate with the affected livestock operators to ensure that livestock control structures remain functional (as directed by the livestock operator) during drilling and production operations, and to coordinate timing of activities planned.

2. When necessary, traffic control and speed limits would be used to limit potential conflicts.

### **Wildlife**

1. During reclamation, the Companies would establish a variety of forage species that would return the land to a condition that approximates or is equal to its state before disturbance.
2. The Companies would prohibit unnecessary off-site activities of operational personnel near the drill sites. The Companies also would inform all project employees of applicable wildlife laws and the potential penalties associated with unlawful take and harassment.
3. The Companies would limit construction within crucial winter range for big game from November 15 to April 30, unless authorized by BLM.
4. A raptor survey would be completed before construction begins to ensure that well sites are located away from potential conflict areas.
5. The Companies would survey and clear well sites within 1 mile of raptor nests identified in the raptor survey before construction or drilling can begin during the raptor nesting period (February 1 through July 31).
6. When an “active” raptor nest is located 0.75 to 1 mile from a proposed well site (depending on species and line of sight), the Companies must restrict construction during the critical nesting season for the species. The distance would be increased to within 1 mile of a proposed well site for listed and BLM sensitive species (Chapter 3).
7. Raptor nests must be inventoried annually to evaluate potential nesting activity in areas where work may be occurring during the raptor nesting period from February 1 to July 31. BLM conducts inventories annually.
8. The Companies must protect leks for greater sage-grouse during the breeding, egg-laying, and incubation period (March 1 through June 30) by restricting construction within a 2-mile radius of active leks for greater sage-grouse. Exceptions may be granted if the activity would occur in unsuitable nesting habitat.
9. Construction, drilling, or other activities that could disrupt nesting areas are prohibited during the period from February 1 to July 31 (raptors) and from March 1 to June 30 (greater sage-grouse and sharp tailed grouse) for the protection of nesting areas for these species. An exception would be approved only after a thorough, site-specific analysis concluded that a negative impact would not occur.
10. Surface occupancy, Construction, or use of Public land within 0.25 mile of a greater sage-grouse strutting or dancing ground will be restricted or prohibited unless the

operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts.

11. All pits and open cellars must be fenced for the protection of wildlife and livestock. Fencing must be in accordance with BLM specifications. Netting must be placed over all production pits to eliminate any hazard to migratory birds or other wildlife. Netting is also required over reserve pits that have been identified as containing oil or hazardous substances as these terms are defined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 101 (14), as determined by visual observation or testing. The mesh diameter shall be no larger than 1 inch.

### **Fisheries**

1. No mitigation for fisheries is needed beyond the measures indicated under Water Resources and Special Status Species.

### **Special Status Species**

#### **Special Status Plants**

1. The Companies would employ site-specific recommendations developed by the BLM interdisciplinary team (IDT) for staked facilities.
2. The occurrence and distribution of two T&E plants (Ute ladies'-tresses orchid and western prairie fringed orchid) and seven BLM sensitive plants (Laramie columbine, Nelson's milkvetch, Cedar Rim thistle, Weber's scarlet gilia, Gibben's beardtongue, persistent sepal yellowcress, and Laramie false sagebrush) will require specific consideration during the APD process.
3. Impacts caused by clearing and soil handling must be minimized.
4. Clearance surveys must be performed for plant species of concern.

### **Recreation**

Measures under the section of the EA on Wildlife, Transportation, Soils, Health and Safety, and Water Resources apply to Recreation.

1. The Companies must minimize conflicts between project vehicles and equipment and recreation traffic by posting warning signs, implementing operator safety training, and requiring project vehicles to adhere to low speed limits.

### **Visual Resources**

1. Roads, pipeline corridors, drill rigs, wellheads, and production facilities must be screened from view to the extent possible, when specified by BLM.

2. The Companies must paint structures at wells and central facilities with flat colors (such as Carlsbad Canyon) that blend with the adjacent undisturbed terrain. This measure does not apply to structures that require safety coloration in accordance with the requirements of the Occupational Safety and Health Administration (OSHA).

### **Cultural Resources**

1. A Class III inventory for cultural resources has been done, but if the area of potential effect were to change, additional inventory would be required.
2. Avoidance is the preferred method for mitigating adverse effects to a property that is considered eligible for, or is already on, the NRHP.
3. Adverse effects to cultural or historical properties that cannot be avoided would be mitigated by preparing and implementing a cultural resources mitigation plan. Mitigation plans would be developed as needed for eligible sites that would be impacted.
4. If cultural resources are discovered at any time during construction, all construction would halt and BLM would be immediately notified. Work would not resume until BLM issues a Notice to Proceed.

### **Socioeconomics**

1. Project activities must be coordinated with ranching operations to minimize conflicts that involve movement of livestock or other ranch operations. Coordination would include scheduling project activities to minimize potential disturbance of large-scale livestock movements. The Companies would establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.

### **Transportation**

1. Existing roads would be used as collectors and local roads whenever possible. Standards for road design would be consistent with BLM Road Standards Manual Section 9113. The proposed access road would be constructed to the BLM standard for a local road.
2. Roads that are not required for routine operation and maintenance of producing wells and ancillary facilities or field production would be permanently blocked, reclaimed, and revegetated.
3. Areas with important resource values, steep slopes, and fragile soils would be avoided where possible in planning for new roads.
4. Permits are required from Carbon County for any access to or across a county road or for any pipeline that crosses a county road. These permits would be acquired

before additional roads are built. All roads on public lands that are not required for operation and maintenance of field production would be permanently blocked, re-contoured, and seeded. Roads on private lands would be treated in a like manner, depending on the desires of the landowner.

5. The Companies would be responsible for preventive and corrective maintenance of roads in the Project Area throughout the duration of the project. Maintenance may include blading, surfacing, cleaning ditches and drainage facilities, abating dust, controlling noxious weeds, or other requirements as directed by the BLM or the Carbon County Road and Bridge Department.
6. Except in emergencies, access would be limited to drier conditions to prevent severe rutting of the road surface. No construction or routine maintenance activities would be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of 4 inches deep, the soil would be considered too wet to adequately support construction equipment. Culverts would be installed where needed to allow drainage in all draws and areas of natural drainage. Low water crossings would be used where applicable. Onsite reviews would be conducted with BLM personnel for approval of proposed access before any construction begins.

#### **Health and Safety**

Measures listed under the section of the EA on Air Quality and Water Quality also apply to Health and Safety.

1. Sanitation facilities installed on the drill sites and any resident camps would be approved by the WDEQ.
2. To minimize undue exposure to hazardous situations, the Companies would comply with all applicable rules and regulations (such as Onshore Orders and OSHA requirements) that would prevent the public from entering hazardous areas and would post warning signs to alert the public of truck traffic.
3. The Companies would haul all garbage from the drill site to a state-approved sanitary landfill for disposal. In addition, the Companies would collect and store any garbage or refuse on location in containers approved by the BLM until it can be transported.
4. During construction and when production operations begin, the Companies would maintain an inventory of chemicals or hazardous substances for all items that may be at the site. The Companies would institute a Hazard Communication Program for employees and would require subcontractors to establish programs in accordance with OSHA regulations at 29 CFR 1910.1200. These programs are designed to educate and protect employees and subcontractors with respect to any chemicals or hazardous substances that may be present in the work place. In addition, Material Safety Data Sheets (MSDS) would accompany every chemical or hazardous material that is brought on location and would become part of the file

maintained at the Red Rim field office, as required by 29 CFR 1910.1200. All employees would receive proper training in storage, handling, and disposal of hazardous substances.

5. SPCC Plans would be written and implemented as necessary, in accordance with 40 CFR Part 112, to prevent discharge into navigable waters of the United States.
6. If quantities that exceed 10,000 pounds or the threshold planning quantity (TPQ) as designated by the RFO are to be produced or stored in association with the project, chemical and hazardous materials would be inventoried and reported in accordance with the toxic release inventory (TRI) requirements set forth in Title III of the Superfund Amendments and Reauthorization Act (SARA) and codified at 40 CFR Part 335. The required Section 311 and 312 forms would be submitted at the specified times to the state and county emergency management coordinators and the local fire departments.
7. Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), would be transported and disposed of in accordance with all applicable federal, state, and local regulations.
8. All storage tanks and compressor facilities that are designed to contain oil, glycol, produced water, or other fluid that may constitute a hazard to public health or safety, must be surrounded by a secondary means of containment for the entire contents of the largest single tank in use, plus 1 foot of freeboard. The Companies would use 3.5-foot berms around affected storage tanks and facilities. The containment or diversionary structure must be impervious to any oil, glycol, produced water, or other hazardous fluid for 72 hours. In addition, it would be constructed so that any discharge from a primary containment system would not drain, infiltrate, or otherwise escape to groundwater, surface water, or navigable waters before cleanup is completed.

### **Noise**

1. The Companies would muffle and maintain all motorized equipment according to Best Management Practices.
2. In any area of operations (such as a drill site or compressor station) where noise levels may exceed safe limits specified by OSHA, the Companies would provide and require that employees use proper personal protective equipment.
3. In addition to other restrictions on activities near leks, the BLM will require that noise levels be limited to no more than 10 decibels on the A-weighted scale (dBA) above background levels at leks for greater sage-grouse that are located on public lands. This scale simulates human hearing by placing less emphasis on lower frequency noise. The BLM will require that compressor engines located on public lands be enclosed in a building and located at least 600 feet away from sensitive receptors or sensitive resource areas to comply with these limits on noise levels.

## 2.2 ALTERNATIVE 2 – INJECTION OF PRODUCED WATER FROM FEDERAL WELLS WITH LIMITED BENEFICIAL USE

Alternative 2 was developed specifically to respond to issues that address the effects of the surface discharge of produced water on surface resources and uses. BLM altered the Proposed Action for federal wells under the agency's authority by providing for the disposal of produced water by injection instead of surface discharge. Other than the differences described below, Alternative 2 is the same as the Proposed Action. Under Alternative 2, almost all the produced water from the proposed federal wells in Sections 20 and 28 within the Project Area would be injected. Gathering lines would carry produced water from federal wells to the nearest injection well. A small portion of the water produced from gas wells (about 5 gallons per minute at each location identified on **Figure 2-1**) would be dispensed for use by livestock. Water would be piped into self-contained tire tanks that would not discharge produced water into drainages. A water management plan that would apply to Alternative 2 is included as [Appendix D](#).

Produced water from non-federal gas wells in Sections 16, 21, and 29 would be discharged to ephemeral draws on fee lands in compliance with an NPDES permit approved by WDEQ. Gathering lines would carry produced water from non-federal wells to a water conditioning facility and two outfalls located on fee lands in the NE1/4 of Section 21. Two outfalls would be used in order to dissipate the energy of flows and reduce potential erosion of the channel by spreading out the volume of water entering the drainage over two locations.

An outfall on fee lands in the NE1/4 of Section 29 is included in the Companies' NPDES permit. However, this outfall likely would not be needed under Alternative 2, considering the reduced volumes of produced water that would be conditioned and discharged, compared with Alternative 1. Injection of produced water from federal wells under Alternative 2 also would make it unlikely that a second conditioning facility, in Section 29, would be needed. Therefore, under Alternative 2, the conditioning facility and outfall that would have been located on fee lands in Section 29 under the Proposed Action, would not be constructed unless unforeseen circumstances develop that cannot be addressed without constructing these facilities. Examples of circumstances that could affect requirements for facilities would include a much greater volume of produced water than anticipated that cannot be handled by one conditioning facility, or injection formations not accepting the anticipated volumes of water.

Injection wells would be located in Sections 21 and 29 (AR Fee 21I in the NE1/4 of Section 21, and AR Fee 29I in the NE1/4 of Section 29) to dispose of the waste stream from the conditioning facility and to inject produced water from the federal wells. The injection wells also would be available to dispose of produced water from non-federal wells when the water conditioning facility is being maintained.

## 2.3 ALTERNATIVE 3 – NO ACTION ALTERNATIVE

Section 1502.14(d) of NEPA requires that the alternative analysis include the alternative of no action. Under the No Action alternative, ongoing natural gas production activities would be allowed to continue but the coordinated exploration and interim development described in the Red Rim Plan of Development (proposed project) would not be authorized by BLM. Section 1502.14(d) of NEPA requires that the alternative analysis include the alternative of no action. Under the No Action alternative, ongoing natural gas production activities, if any exist, would be allowed to continue but the coordinated exploration and interim development described in the Red Rim Plan of Development (proposed project) would not be authorized by BLM. The Project Area has been disturbed by existing CBNG exploration (**Table 2-1** and **Table 2-3**). BLM would consider additional APDs and ROW actions for federal lands on a piecemeal or case-by-case basis outside the scope of this EA, consistent with the scope of existing environmental analysis. Transport of natural gas products would be allowed from existing wells within the Project Area. Additional gas development could occur on state and private lands within the Project Area under APDs approved by the WOGCC.

Exploration in Sections 21 and 29, as described below, is included in the No Action alternative because these activities would not require approval from BLM. The Companies would gain access to the fee leases in Sections 21 and 29 from Carbon County Road 605. If gas cannot be transported across federal surface ownership lands because BLM would not approve a ROW until the Atlantic Rim EIS is complete, then gas would be vented during testing in accordance with State of Wyoming requirements.

The produced water from fee wells located in Sections 21 and 29 would be discharged to ephemeral draws in compliance with an NPDES permit approved by WDEQ. Gathering lines would carry produced water from the fee wells in Sections 21 and 29 to a water conditioning facility located in Section 21 near the Abundance outfalls in the E1/2NE1/4, where it would be conditioned and discharged. Produced water from four fee wells located in Section 29 also would be transported to the same water conditioning facility, where it would be conditioned and discharged. A water management plan that would apply to Alternative 3 – No Action is included as **Appendix D**.

An injection well, AR Fee 21I in the NE1/4 of Section 21, would inject the waste stream from the conditioning facility and provide an alternative method for handling water. Injection would be available to dispose of produced water when the water conditioning facility is being maintained.

A small portion of the water produced from fee wells in Sections 21 and 29 (about 5 gallons per minute at each location identified on **Figure 2-1**) would be dispensed for use by livestock. Water would be piped into self-contained tire tanks that would not discharge water into drainages.

## 2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The proposed project has a limited scope and purpose, to obtain resource information in support of the Atlantic Rim EIS that is currently being prepared. A reasonable range of alternatives under NEPA would include actions under BLM's authority that could be implemented before the Atlantic Rim EIS is completed. Under the Interim Drilling Policy, the proposed project must not significantly affect the environment or prejudice the decisions that would be made as a result of the analysis conducted for the Atlantic Rim EIS. Therefore, construction of new linear features such as access roads or pipelines should occur parallel to existing roads to minimize disturbance. In addition, the integrity of important wildlife habitats and sensitive areas, such as areas of critical environmental concern (ACECs), should not be compromised.

The Proposed Action, Alternative 2, and No Action alternative are consistent with the guidance found in the Interim Drilling Policy – “Development Authorized Concurrent with EIS Preparation for the Atlantic Rim Coalbed Methane Project” ([Appendix A](#)). They address a reasonable range of alternatives for the limited scope and purpose of the proposed project.

Only one route for the market access pipeline (Proposed Action) could be implemented, based on the considerations described below, and was analyzed in detail. Alternatives for federal actions also must be based on the activities under the control of the BLM. For example, BLM would have no authority over activities that would occur on a fee lease. As a result, only one alternative to the project for water management (Alternative 2), other than the No Action alternative, was considered.

The Companies have entered into a sales agreement with a pipeline company that will purchase gas from the Project Area. Alternative routes for the market access pipeline that would transport gas to this pipeline company were considered in this analysis. Furthermore, the Companies' market access pipeline must enter the interstate pipeline at a block valve. Only two block valves exist near the Project Area (Section 34 in T21N R90W and Section 30 in T21N R87W). These two locations were the only end points for the market access line that were considered. The end point in Section 30 was considered in the Proposed Action.

A pipeline route that would move gas from the compressor station to an existing system located in Section 34 of T21N R90W also was considered. This pipeline route would have been 1.4 miles shorter and would have resulted in about 9 acres less disturbance during construction of the pipeline. This northwestern pipeline route would have cost almost \$250,000 less to construct than the northeastern route the Companies included in the Proposed Action. The northwestern route was not analyzed in detail based, in part, on concerns that included crossing undisturbed lands, natural features such as Red Rim and Separation Creek, and crucial winter range for pronghorn antelope. The northwestern route also would have crossed the Red Rim-Daley Wildlife Habitat Management Area. Under the Interim Drilling Policy, pipelines would follow the ROW for the road where possible. BLM and the Companies determined that it was possible to follow the ROW

for the road with the northeastern pipeline route included in the Proposed Action. Therefore, the northwestern pipeline route was dropped from further consideration, in accordance with the Interim Drilling Policy.

Alternate pipeline routes that would have ended at pipelines where the Companies have no sales agreement were not considered alternatives that could be implemented for an interim, exploratory project. An alternative that consists of a market access pipeline to a different interstate pipeline than the one already contracted by the Companies also would represent uneconomic conditions.

Uneconomic routes would not be implemented, and were not analyzed in detail. A person or company of ordinary prudence would consider as uneconomic any pipeline that would cost more to construct, operate, and maintain than the value of the gas, or that would not provide a reasonable rate of return on the Companies' investments in the infrastructure.