

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 ALTERNATIVE 1- PROPOSED ACTION

The proposed project (Alternative 1- Proposed Action) submitted jointly by Warren E & P, Inc. and APC, consists of exploration and interim development of natural gas resources on federal and fee leases in the JRPA. The proposed project location is shown in **Figure 2-1**. This Proposed Action will provide geologic and resource information to the BLM for use in the Atlantic Rim EIS. Interim drilling in the JRPA would also determine the feasibility of developing CBNG resources in the Atlantic Rim EIS study area.

The Proposed Action consists of constructing, drilling, completing, testing, operating and reclaiming 16 new exploratory wells, 8 existing wells, two proposed deep injection wells, and one existing deep injection well to dispose of produced water located on both private and federal leases. Related access roads, utilities, flowlines, pipeline, and production facilities are also planned for the Proposed Action. The location, lease number, well name, and well number of each well planned for the JRPA are shown in **Table 2-1**.

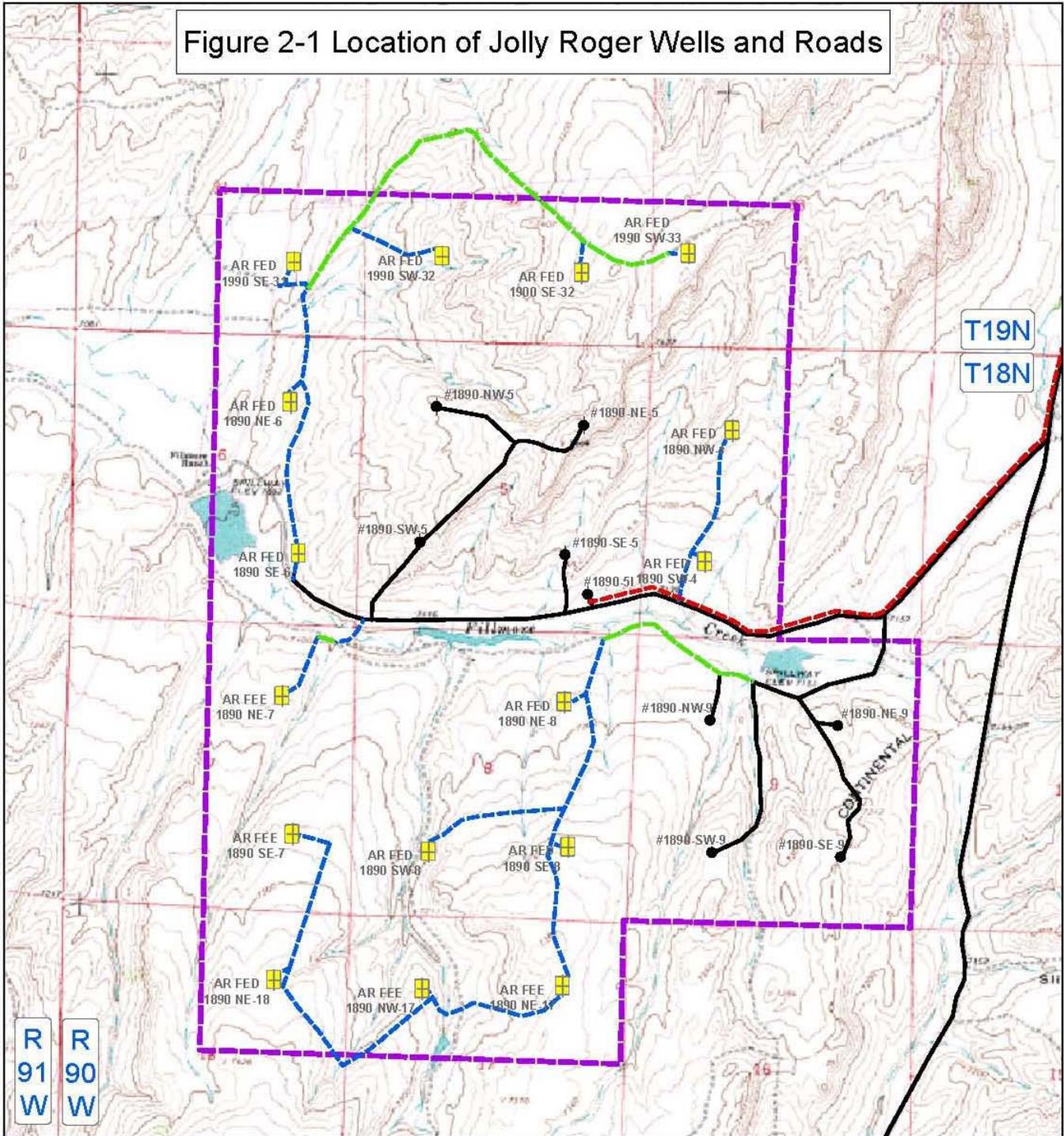
The proposed project would be located approximately 18 miles southwest of Rawlins, Wyoming, along Carbon County Road 605 (Twentymile Road), which intersects Interstate 80 (I-80) near Rawlins. The project is one of nine possible exploration areas that make up the Atlantic Rim Interim Drilling Project. Of the 24 proposed well locations, ten wells would be located on surface ownership lands administered by the BLM RFO and would develop federal minerals. The remaining 14 wells would develop fee minerals on fee surface. The compressor station and the existing injection well are located on fee lands. The other injection wells would also be located with other natural gas facilities on fee lands.

The Proposed Action is a part of the interim drilling plan associated with the Atlantic Rim EIS in Carbon County, Wyoming. The Proposed Action complies with the Interim Drilling Policy-“Development Authorized Concurrent with EIS Preparation for the Atlantic Rim Coalbed Natural Gas Project”. The primary objective of interim drilling is to evaluate the following aspects of gas development in the Atlantic Rim area:

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

In addition, the RFO must determine through a NEPA analysis that no significant or adverse impacts would occur with this development. The RFO would monitor drilling to ensure 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.

Figure 2-1 Location of Jolly Roger Wells and Roads



LEGEND

- PROPOSED WELL
- EXISTING WELL
- SHUT IN WELL
- EXISTING PIPELINE
- PROPOSED PIPELINE
- EXISTING ROAD NEEDS UPGRADE
- PROPOSED ACCESS
- EXISTING ROAD
- POD #4 BOUNDARY



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POD #4 FIELD MAP
 SECTIONS 4, 5, 6, 7, 8, 9, 17 & 18, T18N, R90W, 6th P.M.
 SECTIONS 31, 32 & 33, T19N, R90W, 6th P.M.

Scale 1" = 2500' (1:30,000)

**Table 2-1
Jolly Roger Project**

| Proposed Wells | | | |
|--------------------------------------|------------------|----------------------|----------------------|
| Lease Number | Well Name | Well Number | Location |
| WYW-148977 | AR Federal | 1990-SE 32 | T19N R90W Sec. 32 SE |
| | AR Federal | 1990-SW 32 | T19N R90W Sec. 32 SW |
| WYW-148973 | AR Federal | 1890-NE 6 | T18N R90W Sec. 6 NE |
| | AR Federal | 1890-SE 6 | T18N R90W Sec. 6 SE |
| | AR Federal | 1890-NW 4 | T18N R90W Sec. 4 NW |
| | AR Federal | 1890- SW 4 | T18N R90W Sec. 4 SW |
| WYW-129066 | AR Federal | 1890-NE 8 | T18N R90W Sec. 8 NE |
| | AR Federal | 1890-SW 8 | T18N R90W Sec. 8 SW |
| | AR Federal | 1890-SE 8 | T18N R90W Sec. 8 SE |
| | AR Federal | 1890-NE 18 | T18N R90W Sec. 18 NE |
| Fee Wells | AR Fee | 1990- SE 31 | T19N R90W Sec. 31 SE |
| | AR Fee | 1990-SW 33 | T19N R90W Sec. 33 SW |
| | AR Fee | 1890-NE 7 | T18N R90W Sec. 7 NE |
| | AR Fee | 1890-SE 7 | T18N R90W Sec. 7 SE |
| | AR Fee | 1890-NW 17 | T18N R90W Sec. 17 NW |
| AR Fee | 1890-NE 17 | T18N R90W Sec. 17 NE | |
| Proposed Deep Injection Wells | | | |
| Lease Number | Well Name | Well Number | Location |
| Fee Lease | AR Fee | 1890-7I | T18N R90W Sec.7 SE |
| | AR Fee | 1990-31I | T19N R90W Sec. 31 SE |
| Existing Deep Injection Well | | | |
| Lease Number | Well Name | Well Number | Location |
| Fee Lease | AR Fee | 1890- 5I | T18N R90W Sec. 5 SE |
| Existing Wells | | | |
| Lease Number | Well Name | Well Number | Location |
| Fee Lease | AR Fee | 1890-NW 5 | T18N R90W Sec. 5 NW |
| | AR Fee | 1890-NE 5 | T18N R90W Sec. 5 NE |
| | AR Fee | 1890-SW 5 | T18N R90W Sec. 5 SW |
| | AR Fee | 1890-SE 5 | T18N R90W Sec. 5 SE |
| | AR Fee | 1890-NW 9 | T18N R90W Sec. 9 NW |
| | AR Fee | 1890-NE 9 | T18N R90W Sec. 9 NE |
| | AR Fee | 1890-SW 9 | T18N R90W Sec. 9 SW |
| | AR Fee | 1890-SE 9 | T18N R90W Sec. 9 SE |

The Wyoming Oil and Gas Conservation Commission (WOGCC) established an 80-acre well spacing pattern for wells completed in the Mesaverde Group in the JRPA. Spacing for this area was established under Cause No.1, Order No. 1, Docket Nos. 157-2001 and 113-2002.

Interim drilling within the JRPA 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 JRPA 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 gas well completed in Mesaverde Group coals is estimated to be 15 years.

Specific components of the project are shown in the Master Surface Use Plan (MSUP) (Appendix A), Master Drilling Plan (MDP) (Appendix B), 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 Plan of Development, 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 proponents would follow the procedures outlined below to gain approval for the activities proposed on BLM-administered lands within the JRPA. Development also would be approved, as required, by other agencies.

2.1.2 Preconstruction Planning and Site Layout

The Proponents have submitted a federal APD and a Right-of-way (ROW) application, along with a MSUP, MDP, 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 includes site-specific plans that describe the proposed development (drilling plans with casing/cementing program; surface use programs with construction details for roads and drill pads; and site-specific reclamation plans). Approval of all planned operations has been 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 Wyoming Department of Environmental Quality (WDEQ).

The proposed facilities have been staked by the Proponents and inspected by an interdisciplinary team or an official from the BLM to verify consistency with the approved RMP, the Interim Drilling Policy, and stipulations contained in the oil and gas leases.

The Proponents have submitted detailed descriptions of the proposed activity and construction plans to the BLM for the proposed development. The plans address concerns related to construction standards, required mitigation, and other issues. These plans are negotiated between the Proponents and the BLM, if necessary to resolve differences, based on findings of the field inspection and take place either during or after the BLM onsite inspection.

The Proponents or their contractors revise the MSUP and MDP, as needed, based on changes agreed to with the BLM. The BLM in turn adds conditions of approval (COAs), then completes a project-specific environmental analysis that incorporates standards for construction, mitigation and COAs. If the proposal meets BLM requirements and poses no significant impacts, BLM approves the specific proposal. The Proponents must then commence the approved activity within 1 year.

A general discussion of proposed construction techniques to be used for the project is described in the following sections. These construction techniques apply to drill sites, pipelines, and access roads within the JRPA, and may vary among well sites.

2.1.3 Construction Phase

2.1.3.1 Construction of Access Roads

The JRPA is accessible from Rawlins, Wyoming, by traveling south on Carbon County 605 (Twentymile Road). In Section 3, T18N R90W, County Road 605 is intersected by the Fillmore Ranch Road, which runs southwest for approximately .75 miles and then west for approximately 1 mile. This road provides access into the JRPA. Local roads are shown on the enclosed map of the JRPA.

All existing and proposed access roads would be constructed to minimum standards for a BLM Resource Road, as outlined in BLM Manual 9113. The operator proposes to upgrade and construct 40,180 feet of new road to access all the pad facilities. The travel-way would have a running surface of approximately 14 feet wide except for turnouts, and disturbed width would be between 40-50 feet. This construction would result in approximately 46 acres of surface disturbance.

Maintenance of the roads used to access the well locations will continue until final abandonment and reclamation of the well locations occur. A regular maintenance program will include, but is not limited to, blading, ditching, culvert installation and cleanout, invasive weed control, and gravel surfacing where excessive rutting or erosion may occur.

Drainage crossings on the access routes will be low water crossings or culverts. The Fillmore Creek crossing will be designed as a low water crossing. Low water crossings are used in shallow channels. Main channel crossings consist of excavating an area approximately 4 feet deep, or deeper if specified by BLM, under the travelway and filling it with rock and gravel to the level of the drainage bottom. Channel banks on either side of these crossings would be cut down to reduce grade where necessary. Culverts (a minimum of 18 inches in diameter) would be installed on smaller, steeper channel crossings. Rip-rap will be added at the outlet of each culvert to minimize erosion. Additional culverts would be added as the need arises or as directed by the BLM's Authorized Officer.

2.1.3.2 Well Pad Design and Construction

Information on each federal well is contained in the BLM APD Form 3160-3, Well Survey Plat, and Well Pad Cross Section on file with the BLM. At each well location, surface disturbance will be kept to a minimum. The areal extent of each well pad is approximately 220 feet by 320 feet. This pad will include the reserve pit, area for temporarily storing top soil, and the cut and fill slopes. Each well pad will be leveled using cut and fill construction techniques where needed. Prior to constructing the well pad the top 6 to 8 inches of soil (more if available) and associated vegetative material will be removed and stockpiled. Drainage ditches will be constructed to divert stormwater away from each pad. Total well pad (24 wells) disturbance for the life of the project is approximately six acres, with the ten wells proposed on federal land disturbing approximately 2 acres.

The Proponents plan to use one reserve pit at each drilling location (30 feet wide and 75 feet long). This pit will be designed and constructed according to WOGCC and BLM requirements. The reserve pit will be open for an estimated 2 to 8 weeks to allow for evaporation of pit fluids. During this time the pit will be closed off from wildlife and livestock by two strands of barbed wire above a woven wire fence.

2.1.4 Drilling and Completion Operations

A conventional drilling rig would be used to drill the gas wells. Additional equipment and materials needed for drilling operations would be trucked to the drill location.

Water for use in drilling the wells would be obtained from existing wells completed in the coal seams of the Mesaverde Group. Approximately 700 barrels of water (almost 30,000 gallons) 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 would require almost 70,000 gallons of water per well for preparation of cement and stimulation of the well (14,000 gallons) and control of dust (55,440 gallons). In all, nearly 100,000 gallons (about 0.3 acre-feet) of water per well would be used. Dust abatement using produced water would comply with all applicable WOGCC, WDEQ, and BLM requirements. Only water suitable for livestock use would be used for dust abatement. Only disturbed areas will be sprayed.

No oil or other oil-based drilling additives, chromim/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. Details regarding the mud program are incorporated within the MDP. These wells will not produce oil or salt water typical of oil production. Furthermore, other liquid hydrocarbons are not anticipated. Should unexpected liquid petroleum hydrocarbons (crude oil or condensate) be encountered during drilling or well testing, it will be contained in test tanks on the well site.

Depending on the location of the coal seam, each producing well would be drilled to an approximate depth of 1,952 feet to 5,900 feet. Natural gas in the coal seam would be produced through perforations in the casing. 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.

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, and water may be temporarily contained in the reserve pit or trucked to an alternative disposal site during the testing period. Wells determined to be productive would be shut in until pipelines and other production facilities are constructed.

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 for the Cherokee or Deep Creek Sands, is expected to be between 3,800 and 4,600 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. The injection wells will be constructed on fee land and constructed on pads designed for CBNG wells (located adjacent to wells). This would result in 2 acres of disturbance for the life of the project.

2.1.5 Production Operations

In the ARPA, the wells are expected to produce 800,000 cubic feet of gas per day (MCFD) and between 200 to 500 barrels of water per well each day. The gas will be transported from the well by a pipeline to the compressor station. The water would be piped to a storage tank near the injection well. It would be stored in the tank and disposed via injection in the well. All produced water would be managed per onshore Order #7.

2.1.5.1 Well Production Facilities

Wellhead facilities would be installed if the wells are 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 elsewhere 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 acres, 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. **Figure 2-2** shows a typical CBNG well and pad before reclamation is complete.

Figure 2-2
CBNG Well and Pad



2.1.5.2 Power Generation

Electricity would be used to power pumps during well development and to initiate and maintain production. A centrally located electrical generator located at the compressor station will be

utilized to provide electricity to the wells. The distribution system will consist of utility lines buried in the road ROW. These lines would be installed in trenches approximately 3 feet deep.

2.1.5.3 Summary of Pipelines and Related Facilities

Construction and installation of the gas delivery pipeline occurs after the productivity of the wells has been confirmed. 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 compressor station. This system would use high-density polyethylene (HDPE) pipe, starting with 4-inch diameter pipe at the wellhead and graduating up to 20-inch diameter pipe at the inlet to the compressor.
2. A produced water-gathering pipeline system (low pressure) would be constructed from the wellheads to the centralized facilities for injection. This network of water lines would use 4-inch lines from the well and graduating up to 20-inch diameter pipe at the injection well.
3. Should market quantities of natural gas be discovered, a gas delivery pipeline (high pressure) would be constructed (**Figure 2-3**). This pipeline would be constructed of 8-inch diameter steel pipe.

Gathering Systems and Utilities

The gathering systems and utility lines will parallel access roads. They will be located in separate trenches and run parallel to each other close to the road ROW. A working space for installation of these facilities will also be designated within the road.

Trenches will be excavated to install the pipelines and electrical lines. Trenching will occur as close to the road prism as feasible. Trenches excavated for well gathering lines and electrical lines (which would require a disturbed width of 20 feet for gas lines and water lines on one side of the road, and 10 feet in width for electrical lines, which are located on the other side of the road) would be reclaimed as soon as practical after trenching and backfilling are complete.

Facilities for Injection

Produced water from individual wells would be gathered and routed to central storage facilities located next to the injection wells. Produced water-gathering pipelines would be constructed along the well access road, from the wellhead to the injection facilities.

The deep injection wells would be approved by the BLM, WOGCC, and WDEQ and would be located in Sections 5 and 7 of T18N R90W and Section 31 of T19N R90W.

The approximate maximum injection capacity of the three injection wells would be 45,000 barrels per day (bbls/day).

Gas-Delivery Pipeline and Compression

The compressor station facility is expected to be located with the AR Fee 1890-5I injection well within a site area covering approximately 400 feet by 400 feet. This facility will disturb 3.7 acres for the life of the project. The compressor would be sized to handle 5 million cubic feet per day (MMCFD) from 15 pounds per square inch (psi) suction pressure to 1,200 psi discharge pressure. The compressor would be driven by a natural gas powered engine and would be designed to meet all specifications established by the WDEQ, Air Quality Division. Engines used to drive compressors would have emissions of less than 1.5 grams per brake horsepower per hour (g/bhp-hr), or less than 16.7 tons per year of nitrogen oxides (NO_x) and 0.5 g/bhp-hr, or less than 5.6 tons per year of carbon monoxide (CO). Additional equipment at the compressor station would include a tri-ethylene glycol (TEG)

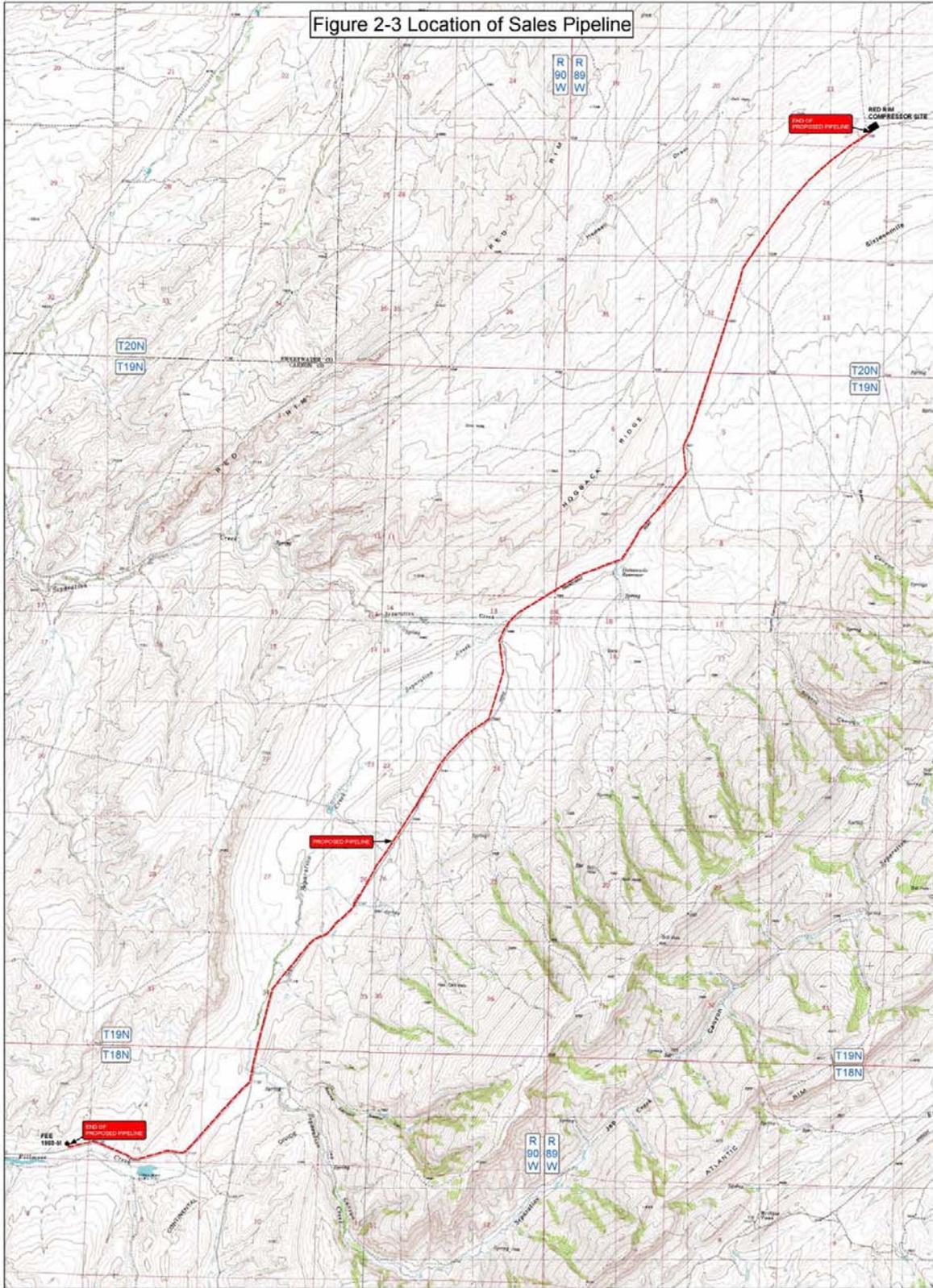


Figure 2-3 Location of Sales Pipeline

APPROXIMATE PIPELINE DISTANCE : 65,200' +/-

Scale 1" = 2000' (1:24,000)

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**PROPOSED PIPELINE TO
RED RIM COMPRESSOR**



LEGEND

- COMPRESSOR SITE
- SHUT IN WELL
- PROPOSED PIPELINE

T18N, T19N, R90W, 6th P.M.
T19N, T20N, R89W, 6th P.M.

dehydration system, which would dry the gas to meet pipeline-quality specifications of the market pipeline. **Figure 2-4** shows a typical CBNG compressor station.

Figure 2-4
CBNG Compressor Station



Should market quantities of natural gas be discovered, a gas delivery pipeline would be required to move the gas to an existing system. The alignment of the delivery line from the compressor station to the existing transmission pipeline is shown on Figure 2-3. The pipeline ROW will be 50 feet wide. This pipeline would begin at the compressor station in Section 5 of T18N R90W and would proceed northeast to the existing pipeline in Section 21 of T20N R89W. The ROW would parallel County Road 605.

Construction and installation of this delivery pipeline would temporarily disturb a 50-foot wide corridor, which will be reclaimed as soon as practical after construction is completed. All construction activities would take place within the 50-foot corridor. This area would be used to transport machinery, personnel, and equipment along the corridor to install the pipeline.

Excavated top soil material will be stockpiled to the side and segregated. Top soil material will not be mixed or covered with subsurface material. After construction, cut and fill slopes would be waterbarred or regraded to conform to the topography, and reclaimed to pre-disturbance appearance.

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. Track hoes or other equipment will be used where topographic or other factors require their use. Trenches of 5,000 feet or more in length that are open for the installation of pipelines will have plugs placed to allow livestock and wildlife to cross the trench. Placement of plugs will be determined in consultation with the BLM and the affected landowner. The new gathering lines would temporarily disturb 30.95 acres and the new market pipeline would temporarily disturb 74.8 acres. These disturbances would be reclaimed to BLM specifications.

2.1.6 Maintenance

The Proponents would operate all wells, pipelines, and ancillary production facilities in a safe manner, as set forth by standard industry operating guidelines and procedures. Routine maintenance of producing wells would be necessary to maximize performance, and detect potential difficulties with gas production operations. Each well location would be visited several times per week to ensure that operations are proceeding in an efficient and safe manner. The visits would include checking separators, water meters, valves, fittings, and onsite storage of produced water and condensates. 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 operations 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 JRPA) and internal (within the JRPA). The figures provided on Table 2-2 should be considered general estimates. The level of drilling and production activity may vary over time in response to weather and other factors.

2.1.8 Site Restoration and Abandonment

The Proponents would completely reclaim all disturbed areas that are not needed for production through utilizing the following procedures:

Short-Term (Temporary) Reclamation

- Immediately stabilize the disturbed area by mulching, providing run-off and erosion control, and through establishment of new vegetation.
- Control and minimize surface runoff, erosion, and sedimentation through use of diversion and treatment structures.

Long-Term Reclamation

- Restore primary productivity of site and establish vegetation that provides for natural plant and community succession.
- Establish a vigorous stand of desirable native plant species resistant to the invasion of noxious or undesirable species.
- In the long-term, reclaimed landscapes should have characteristics that approximate the original visual qualities of the area.

**Table 2-2
Traffic Estimates**

| Trip Type | Round-Trip Frequency | |
|--------------------------------|-------------------------|------------------------|
| | External (to/from JRPA) | Internal (within JRPA) |
| Drilling (2 rigs, 2 crews/rig) | External (to/from JRPA) | Internal (within JRPA) |
| Rig crews | 4/day | Same |
| Engineers ^a | 2/week | 1/day/rig |
| Mechanics | 4/week | Same |
| Supply delivery ^b | 1/week | 2-4/day |
| Water truck ^c | 1/month | 2 round trips/day |
| Fuel trucks | 2 round trips/well | Same |
| Mud trucks ^d | 1/week | 2/day |
| Rig move ^e | 8 trucks/well | 8 trucks/well |
| Drill bit/tool delivery | 1 every 2 weeks | Same |
| Completion | | |
| 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 stations | 2/day | Same |
| Other field development | 2/day | Same |
| Testing and operations | 2/day | Same |

Notes:

- a) *Engineers travel to JRPA weekly and stay in a mobile home at the JRPA during the week.*
- b) *Current plans are to establish a central supply area within the JRPA and deliver supplies weekly.*
- c) *Water trucks would deliver water to rigs from a location within the JRPA.*
- d) *Current plans are to establish a central mud location within the JRPA and deliver mud weekly.*
- e) *Four trucks would be required to move each rig to the JRPA. When drilling is complete in a JRPA, each rig would move to the next JRPA.*

Performance Standards

The following performance standards should be used to determine the attainment of successful revegetation and reclamation:

- All disturbed areas should have at least 50 percent cover of protective material within six months after reclamation.
- By the second year, at least 50 percent vegetative cover should have been established.
- By the fifth year at least 80 percent of the site should be vegetated.
- Ninety percent of the revegetation consists of species included in the seed mix and/or occurs in the surrounding natural vegetation.

- Erosion condition of the reclaimed areas is equal to or in better condition than the adjacent undisturbed area.

2.1.9 Summary of Estimated Disturbances

Table 2-3 summarizes the estimated disturbances from implementing the project.

**Table 2-3
Estimates of Disturbed Areas - Jolly Roger Project Area**

| Facility | Evaluation Phase | | | | Operations |
|--|------------------|--------------|-------------------|-----------------|-----------------------|
| | Length (feet) | Width (feet) | Area, ea. (acres) | Temporary Acres | Life of Project Acres |
| New Roads | 40,180 | 50 | 46 | N/A | 46 |
| New Gathering Lines | 44,950 | 30 | N/A | 30.95 | 0 |
| New Market Access Line | 65,200 | 50 | N/A | 74.8 | 0 |
| New Drill Pads (16) | N/A | N/A | 1.4 | 22.4 | 4.0 |
| New Injection Wells(2) | N/A | N/A | 1.0 | 2.0 | 2.0 |
| Existing Drill Pad (8) | N/A | N/A | 1.4 | 11.2 | 2.0 |
| Compressor Station and Existing Injection Well | N/A | N/A | 3.7 | 3.7 | 3.7 |
| Total Disturbance | | | | 145.05 | 57.7 |

2.1.10 Project-Wide Mitigation Measures and Procedures

For this project, the Proponents have voluntarily agreed to use and comply with measures and procedures to avoid or mitigate impacts to resources or other land uses. These measures and procedures will be referred to as Best Management Practices (BMPs) throughout this document. These mitigation measures and procedures will also be applied on privately owned surface.

2.1.10.1 Preconstruction Planning, Design, and Compliance Measures

1. The Proponents 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, and Conditions of Approval) are followed.
2. New roads would be constructed and existing roads maintained in the JRPA in accordance with standards in BLM Manual 9113 for resource roads and construction details outlined in the MSUP and Conditions of Approval.
3. Roads would 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.
4. Culverts would 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.

5. Additional culverts would be installed in the existing access road as needed or as directed by BLM.
6. The access road 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.
7. The access roads would 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.
8. If snow must be removed outside new and existing roadways, snow removal equipment would be equipped with shoes to raise the blade off the ground surface. If the surface of the ground were uneven, special precautions would be undertaken to prevent the equipment from destroying vegetation.
9. Wing ditches would be constructed, as necessary, to divert water from road ditches.

2.1.10.2 Resource-Specific Requirements

The Proponents 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 in the JRPA have been protected through the following mitigation measures:

1. 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 until a qualified paleontologist had assessed the importance of the uncovered fossils, the extent of the fossiliferous deposits, and had implemented recommendations for further mitigation.
2. No specific data currently exists on deposits of high or undetermined paleontologic potential in JRPA. For that reason, field survey for paleontologic resources would be conducted on a case-by-case basis. These resources would be surveyed in areas where surface exposures of the Browns Park, Green River, or Wasatch Formations occur. Field surveys may result in identification of additional mitigation measures 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 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 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 proponents 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 State of Wyoming, WDEQ, Air Quality Division (AQD).
2. The proponents would not allow garbage or refuse to be burned at well locations or other facilities. 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 proponents 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 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.

Soils

1. The Proponents have reduced the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of the operation.
2. The Proponents have located pipelines immediately adjacent to roads to avoid creating separate areas of disturbance and to reduce the total area of disturbance.
3. The Proponents will avoid using frozen or saturated soils as construction material.
4. The Proponents will 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 Proponents will 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 Proponents would install runoff and erosion control measures such as water bars, berms, and interceptor ditches.

9. The Proponents 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. The Proponents would maintain a 100-foot wide buffer of natural vegetation (not including wetland vegetation) between construction and ephemeral and intermittent channels.
11. The Proponents 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 Proponents would use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. In addition, the Proponents would implement a revegetation program as soon as possible to reestablish the soil protection afforded by vegetation.

When construction that is not specifically required for production operations is complete, the Proponents would restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites. The Proponents also would replace up to 6 inches of topsoil or suitable plant growth material over all disturbed surfaces.

Water Resources

1. The Proponents would limit construction of all drainage crossings to no-flow or low-flow periods.
2. The area of disturbance would be minimized within perennial, ephemeral, and intermittent drainage channels.
3. The 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 an environmental analysis and site-specific mitigation plans.
4. The Proponents would design channel crossings to minimize changes in channel geometry and subsequent alterations in flow hydraulics.
5. 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.
6. Interceptor ditches, sediment traps, water bars, silt fences, and other revegetation and soil stabilization measures would be designed and constructed, as needed.
7. The Proponents would construct channel crossings by pipelines such that the pipe is buried a minimum of 4 feet below the channel bottom.
8. Disturbed channel beds would be regraded to the original geometric configuration and would contain the same or similar bed material.

9. 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 cementing 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.
10. 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.
11. 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.
12. Hydrostatic test water used in conjunction with pipeline testing, and all water used during construction must be extracted from sources that contain sufficient water quantities and with appropriation permits approved by the State of Wyoming.
13. The Proponents would develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as required per WDEQ permit requirements.
14. The Proponents 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 Code of Federal Regulations [CFR] Part 112), a Spill Prevention Control and Countermeasures (SPCC) plan would be developed in accordance with 40 CFR Part 112, dated December 1973 and updated in July 2002.
15. The Proponents would coordinate all crossings or encroachments of Waters of the U.S. with the U.S. Army Corps of Engineers (COE).
16. BLM must approve in writing any changes in the method or location for disposal of produced water.

Vegetation, Wetlands, and Noxious/Invasive Weeds

1. An approved Pesticide Use Proposal would be obtained before pesticides are applied on BLM surface ownership lands to control weeds.
2. Disturbed areas would be seeded and stabilized in accordance with BLM-approved reclamation guidelines.

Range Resources and Other Land Uses

1. The Proponents 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.
2. Traffic control and speed limits would be used to limit potential conflicts between operators and livestock.

Wildlife and Fisheries

1. During reclamation, the Companies would establish a variety of forage species that would return the land to a condition that approximates its state before disturbance. In the short term, grasses and forbs would be established and in the long term, shrub species would establish themselves naturally when seeding conditions.
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 penalties associated with unlawful take and harassment.
3. Construction would not be allowed during critical nesting season (February 1-July 31) near active raptor nests. Seasonal timing restrictions within a “buffer zone” around nests to avoid disturbance to nesting raptors would reduce impact from construction activities. Exception requests may be granted if nests are found to be inactive or modified if there is visual screening of the nest that is determined by the BLM to be sufficient to minimize impacts.
4. Surface disturbing activities would not be allowed within ¼ mile of identified greater sage grouse leks.
5. The Companies would protect greater sage grouse nesting habitat during the breeding, egg-laying, incubation and early brood-rearing 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 not interfere with greater sage grouse nesting activity.
6. Construction activities in potential mountain plover nesting habitat during the nesting period (April 10 -July 10) would not be allowed unless an exception is granted. An exception may be granted if a survey for mountain plovers is conducted, within areas of potential habitat, prior to any surface disturbance in those areas, according to current mountain plover survey protocol and no plovers are found (USDI-FWS 2002).
7. 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 (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Section 101 (14)), as determined by visual observation or testing. The mesh diameter will be no larger than 1 inch.
8. No known fish species are located within the JRPA.
9. Clearance surveys would be performed for threatened, endangered, proposed, candidate, and sensitive species of concern.

Recreation

1. The Proponents must minimize conflicts between project vehicles/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. The Proponents must use existing topography to screen from view roads, pipeline corridors, drill rigs, wellheads, and production facilities.
2. The Proponents must paint structures, wells, and facilities with flat colors (such as Carlsbad Canyon or Slate Green) 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. Avoidance is the preferred method for mitigating adverse effects to a property that is considered eligible for, or is already on, the National Register of Historic Places (NRHP).
2. Adverse effects to cultural or historical properties that cannot be avoided would be mitigated by implementing a cultural resources mitigation plan (including data recovery plan).
3. 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. The Proponents would implement hiring policies that encourage use of local or regional workers who would not have to relocate to the area.
2. 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 Proponents would establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.
3. The Proponents and their subcontractors would obtain Carbon County sales and use tax licenses for purchases made in conjunction with the project so that project-related sales and use tax revenues would be distributed to Carbon County.

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.
2. Roads that are not required for routine operation and maintenance of producing wells and ancillary facilities 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 Proponents would be responsible for preventive and corrective maintenance of roads in the JRPA throughout the duration of the project. Maintenance may include blading, cleaning ditches and drainage facilities, abating dust, controlling 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. 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. On-site reviews would be conducted with BLM personnel for approval of proposed access before any construction begins.

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 Proponents 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 Proponents would haul all garbage from the drill site to a state-approved sanitary landfill for disposal. In addition, the Proponents would collect and store any garbage or refuse on location until it can be transported in containers approved by the BLM.

Hazardous Materials

1. 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.
2. 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.
3. 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.
4. 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 Proponents would use 2-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 Proponents would muffle and maintain all motorized equipment according to manufacturer's specifications.
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 Proponents would provide and require that employees use proper personal protective equipment.
3. The BLM will require that noise levels will 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. 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 – NO ACTION ALTERNATIVE

Section 1502.14(d) of NEPA requires that the alternatives analysis “include the alternative of no action.” “No Action” implies that ongoing natural gas production activities, if any exist, would be allowed to continue by the BLM in the JRPA, but the proposed project would not be allowed. The JRPA has been disturbed by existing CBNG drilling. BLM would consider additional APDs and ROW actions for federal land on a case-by-case basis consistent with the scope of existing environmental analysis. Additional gas development could occur on state and private lands within the JRPA under APDs approved by the WOGCC.

The U.S. Department of the Interior's (USDI) authority to implement a “No Action” Alternative is limited because the public lands have already been leased. An explanation of this limitation and the USDI's discretion in this regard follows.

- An oil and gas lease grants the lessee the “right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits” in the leased lands, subject to the terms and conditions incorporated in the lease (Form 3110-2). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, restrictions are imposed on the lease terms.
- Leases within the JRPA contain various stipulations concerning surface disturbance, surface occupancy and limited surface use. In addition, the lease stipulations provide that the USDI may impose “such reasonable conditions, not inconsistent with the purposes for which [the] lease is issued, as the [BLM] may require protecting the surface of the leased lands and the environment.” None of the stipulations, however, would empower the Secretary of the Interior to deny all drilling activity because of environmental concerns.

- Provisions in leases that expressly provide authority to deny or restrict APD development in whole or in part would depend on an opinion provided by the U.S. Fish and Wildlife Service (FWS) regarding impacts to endangered or threatened species or habitats of plants or animals that are listed or proposed for listing (such as the bald eagle). If the FWS concludes that the Proposed Action and Alternatives would likely jeopardize the continued existence of any endangered or threatened plant or animal species, then the APDs and Atlantic Rim development may be denied in whole or in part.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

The project was developed around measures provided in the ARPA Interim Drilling Policy - Development Authorized Concurrent with EIS Preparation for the Atlantic Rim Coalbed Natural Gas Project (Appendix A). Only alternatives that addressed allowable actions specified in the Interim Drilling Policy are considered in this analysis. All other alternatives would be considered only in the Atlantic Rim EIS.

During the alternative analysis, wells and ancillary facilities were analyzed to determine potential impacts to resources. A total of five wells were dropped during the alternative analysis because they resulted in impacts to wildlife, topography (steep slope), or excessive disturbance to soils and vegetation. These wells were replaced with new pad sites that would result in less impact to these resources.

The following wells were eliminated from consideration based on impacts to resources:

1. Well NW6 (T18N R90W Sec 6NW) – Located within ¼ mile of sage grouse lek.
2. Well SW31 (T19N R90W Sec.31 SW) – Removed due to disturbance to resources.
3. Well NW7 (T18N R90W Sec. 7 NW) – Removed due to disturbance to resources.
4. Well SW7 (T18N R90W Sec. 7 SW) - Removed due to access and road issues.
5. Well NW18 (T18N R90W Sec18 NW) – Removed due to topography and slope issues.

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