

Appendix C

Master Surface Use Program (MSUP) Red Rim Pod Right-Of-Way (ROW) Application For Facilities

Operators:
Warren E & P, Inc. and Anadarko E & P Company

LANDS INVOLVED:
Sections 20 & 28 in T20N R89W, 6th PM, Carbon County, Wyoming

BLM LEASES:
WYW149261, WYW150410

Surface Use Program and Plan of Development for the subject wells listed below:

Gas Wells in T20N R89W Section 20

AR Federal 2089 NE20 (WYW149261)
AR Federal 2089 SE20 (WYW149261)
AR Federal 2089 SW20 (WYW149261)

Gas Wells in T20N R89W Section 28

AR Federal 2089 NW28 (WYW150410)
AR Federal 2089 NE28 (WYW150410)

Plan of Development for the facilities listed below:

Proposed ROW (BLM surface ownership lands): Road Access to Fee and State Gas Wells in T20N R89W (AR Fee 2089 NE16, AR Fee 2089 SW16, AR State 2089 SE16, and AR Fee 2089 NE29):

Lands Involved: T20N R89W, Sections 16 and 28

Proposed ROW (BLM surface ownership lands): Road Access to Fee Injection Well in T20N R89W (AR Fee 2089 29I):

Lands Involved: T20N R89W, Section 28

Proposed ROW (BLM surface ownership lands): Gathering System for Water and Gas and Buried Electrical Utility Lines

Lands Involved: T20N R89W, Sections 20 and 28

Proposed ROW (BLM surface ownership lands): Delivery Pipeline for Gas

Lands Involved: T20N R88W, Section 8
T20N R89W, Sections 12, 14, and 22
T21N R87W, Section 30
T21N R88W, Sections 26 and 34

PROJECT DESCRIPTION

The MSUP for the Red Rim Pod is submitted by Warren E & P, Inc. (Warren), and Anadarko E & P Company (AEPC), collectively referred to as "the Companies." The proposed project would be located 8 miles southwest of Rawlins, Wyoming, along Carbon County Road 605 (Twentymile Road). 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 project is one of nine areas or well pods that make up the Atlantic Rim Interim Drilling Project. Of the nine proposed gas 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. Of the remaining proposed wells, three wells would develop fee minerals on fee surface, and one well would develop state minerals on federal surface. There are currently seven gas wells in the Red Rim Pod that are existing/authorized, which were previously permitted by AEPC on fee surface and minerals. A groundwater monitoring well also will be established in the project area, at a location specified by BLM.

Several additional facilities would be included as part of the Red Rim Pod. All of these facilities would be located on fee surface and would require no authorization from BLM prior to construction. Development of these wells and facilities is currently completed, underway, or planned for 2003:

- € Two produced water-conditioning facilities would be utilized to treat water produced by gas wells (one is existing/authorized and one is proposed, as needed),
- € Two deep injection wells would be utilized for disposal of hydrostatic test water and the waste stream from the water conditioning facilities (one is existing/authorized and one is proposed, as needed),
- € Three outfalls would be utilized for the discharge of produced water (two are existing/authorized and one is proposed, as needed), and
- € One compressor station (existing/authorized).

The MSUP contains surface operating procedures for the Companies' federal Applications for Permits to Drill (APDs), as required under Onshore Order No. 1. The enclosed **Project Map** shows all wells and facilities associated with the Red Rim Pod. Name, number, location, and lease information for the proposed wells and information on proposed facilities are listed in **Table B-1 – Red Rim Project**. Additional information on each federal well is contained in the **BLM APD Form 3160-3** and **Well Survey Plat** already on file with BLM.

Wells are currently planned on federal leases WYW149261 and WYW150410 in T20N R89W, Sections 20 and 28. Lease stipulations that affect these sections are described below.

TABLE B-1 – RED RIM PROJECT

Proposed Gas Wells			
Lease Number	Well Name	Well Number	Location
WYW-149261	AR Federal ¹	2089 NE20	T20N R89W Section 20 NENE
	AR Federal ¹	2089 SE20	T20N R89W Section 20 SESE
	AR Federal ¹	2089 SW20	T20N R89W Section 20 SWSW
WYW-150410	AR Federal ¹	2089 NW28	T20N R89W Section 28 SENW
	AR Federal ¹	2089 NE28	T20N R89W Section 28 NWNE
FEE/STATE LEASES	AR Fee	2089 NE16	T20N R89W Section 16 SWNE
	AR Fee	2089 SW16	T20N R89W Section 16 NESW
	AR State ¹	2089 SE16	T20N R89W Section 16 NWSE
	AR Fee	2089 NE29	T20N R89W Section 29 NENE

TABLE B-1 – RED RIM PROJECT

Existing or Authorized Gas Wells²			
Lease Information	Well Name	Well Number	Location
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
Proposed Injection Well			
FEE LEASE	AR Fee	29I	T20N R89W Section 29 NENE
Existing or Authorized Injection Well			
FEE LEASE	AR Fee	21I	T20N R89W Section 21 NENE
Proposed Facilities			
FEE LEASE	Conditioning Facility	Bountiful	T20N R89W Section 29 NENE
FEE LEASE	Outfall	Bountiful 001 (RR-D1)	T20N R89W Section 29 SWNE
Existing or Authorized Facilities²			
Lease Information	Site Type	Name	Location
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:¹ BLM surface ownership lands

² 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.

Lease WYW149261 contains a timing limitation stipulation in Section 20 to protect nesting habitat for raptors and greater sage-grouse, from February 1 through July 31 (raptors), and from March 1 through June 30 (greater sage-grouse and sharp tailed grouse). In addition, this lease contains a controlled surface use requirement for surface occupancy within ¼ mile of greater sage-grouse and sharp-tailed grouse strutting/dancing grounds, which requires a mitigation plan where impacts may occur. Potential mountain plover habitat has been identified in Section 20, which will require mitigation of impacts from April 10 through July 10. Finally, this lease contains a timing limitation for big game crucial winter range (November 15 through April 30), however, this stipulation is applied to Section 18, which is outside the pod. No project activities are proposed in Section 18, where crucial winter range for pronghorn antelope is delineated.

Lease WYW150410 contains a timing limitation stipulation in Section 28 to protect nesting habitat for raptors and greater sage-grouse, from February 1 through July 31 (raptors), and from March 1 through June 30 (greater sage-grouse and sharp tailed grouse). In addition, this lease contains a controlled surface use requirement for surface occupancy within ¼ mile of greater sage-grouse and sharp-tailed grouse strutting/dancing grounds, which requires a mitigation plan where impacts may occur. Potential mountain plover habitat has been identified in Section 28, which will require mitigation of impacts from April 10 through July 10.

Gas wells are also planned on BLM surface ownership lands in Section 16 that are not included in a federal lease because oil and gas rights for this section are not federally owned. No project activities are proposed near the very small area in the extreme northwestern portion of Section 16 that is delineated as crucial winter range for pronghorn antelope.

This MSUP is intended to serve as the ROW pre-application for the gas lines, water lines, access roads to well locations, and electric lines in the pod. A more detailed Plan of Development will be submitted with each application. Roads will require a 30-foot right-of-way. Gas-gathering lines will require a 30-foot right-of-way, water-gathering lines a 20-foot right-of-way, and electric lines a 10-foot right-of-way. The delivery pipeline will require a 50-foot right-of-way. All 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. All flowlines and roads have been collocated where possible. The enclosed **Project Map** shows the location of all access routes, gathering lines, and the delivery pipeline.

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.

An existing two-track runs north for about 0.8 mile from its intersection with County Road 605 in Section 21, T20N R89W to a point where new access road would be constructed across BLM lands in Section 16 to serve two fee wells and one state well proposed in Section 16. New access roads would be constructed from County Road 605 to proposed federal wells in Sections 20 and 28 and fee wells in Section 29. 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 will close and reclaim roads when they are no longer required for production operations, unless otherwise directed by the BLM or the affected surface owner.

The primary targeted reservoir in the Red Rim Pod is coal seams within recognized productive formations of the Mesaverde Group. All unproductive wells will be plugged and abandoned as soon as practical after the conclusion of production testing. Productive wells may be shut-in temporarily for gas pipeline connections and/or Sundry Notices under review by the BLM for production activities and facilities.

The Red Rim Pod contains approximately 3,200 acres. **Table B-2** summarizes the estimated disturbances that would result from implementing the project. The following schematics, which show typical facilities, operating standards, and methodologies, are attached to this MSUP: Drill Site Layout; Well Site; Water Disposal Facility; Water Transfer Facility; Water Conditioning Facility; and Compressor Station. A typical discharge structure is shown in the Water Management Plan (WMP). Additional schematics for this pod are attached to the Master Drilling Plan (MDP): B.O.P.; Bottom Flange; Configuration Options; Completed Well; and Injection Well.

TABLE B-2 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 ^a	32,300	40	N/A	29.7	29.7
Existing Road to be Upgraded ^b	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
Total New Disturbance				141.5	39.2
Total Disturbance				178.2	70.7

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

Natural gas is naturally adsorbed to the surfaces of the coal matrix and typically is not free to migrate in the subsurface until pressure is relieved. Hydrostatic head provides the pressure that keeps the majority of the gas adsorbed to the coal. Gas is liberated from the coal matrix by the withdrawal of water, which in turn reduces the hydrostatic head present in the coal formation. Once a “critical” subsurface coal formation pressure is reached as water is pumped from the coal formation, gas is free to migrate. Gas will then flow or can be pumped to the surface through the wellbore.

The Companies plan to spud the wells during fall 2003. The wells will be drilled through the coal seam formations. The natural gas will be produced from the coal seams through perforations in the casing. Drilling activities are expected to occur over several months.

The wells may be tested for a period of months. Well testing involves pumping and testing water from each well and determining its capacity to produce natural gas. It is anticipated that well testing will be completed within 6 to 12 months. If unproductive, the drill holes will be plugged and abandoned in accordance with Wyoming Oil and Gas Conservation Commission (WOGCC) rules and regulations and BLM guidance as soon as practicable after the conclusion of well testing.

During well testing associated with this project, natural gas, to the extent it is produced, will be vented or flared on-location in accordance with the applicable BLM Onshore Orders, Notices To Lessees, and WOGCC regulations, and authorized by the WOGCC and the BLM in Sundry Notices until wells are connected to the gathering system. Wet gas from the productive wells will be collected and transported via buried pipelines to the compressor station. During testing, produced water will be gathered from the well sites and piped to a water conditioning facility.

The water produced from the gas wells will 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 will 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 will 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 waste stream from the water conditioning facility will be injected.

An allocation meter will be used to measure raw produced gas volumes for each well in the pod. A sales meter will be located downstream of the final compressor and dehydration unit, at the compressor station, and will be used to measure dry salable-quality gas. A request for variance from Onshore Order No. 5, if needed, along with a description of the measurement equipment, will be submitted in a Sundry Notice if the wells are deemed producible.

Oil and gas activities in Wyoming are managed by the WOGCC. All of the Companies' operations, and those of its contractors, will be conducted in accordance with all BLM and WOGCC rules and regulations.

The 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.

1. EXISTING ROADS AND TRAVELWAYS

The project area is accessible from Rawlins, Wyoming, by traveling approximately 8 miles southwest on Carbon County Road 605. In Section 21, T20N, R89W, County Road 605 intersects an existing two-track that proceeds north toward various access roads that serve existing gas wells on fee lands. As stated previously, the Companies are applying for a ROW to construct new road access in the Red Rim project area. The remaining access roads are on private surface and will be maintained by access agreement with fee surface owners.

Local roads are shown on the enclosed map of the project area. Existing roads and gates will be used when practical. If necessary, existing roads will be improved. All existing roads will be brought up to minimum standards for a Resource Road as found in BLM Manual 9113.

The existing roads will be maintained in the same or better condition as existed prior to the start of operations. 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, and gravel surfacing where excessive rutting or erosion may occur. Limiting or temporarily suspending vehicle access during adverse conditions will reduce excessive rutting or other resource damage that may be caused by vehicle traffic on access roads that are wet, soft, or partially frozen. If vehicles create ruts in excess of 4 inches deep, the soil will be deemed too wet to adequately support vehicles, and routine activities shall be temporarily suspended.

Culverts will be placed in the existing BLM roads as the need arises or as directed by BLM's Authorized Officer. Gates and cattle guards will be installed where appropriate (refer to Project Map).

The Companies will share maintenance costs in dollars, equipment, materials, or labor proportionate to the Companies' use with other authorized users. Upon request, the BLM's Authorized Officer shall be provided with copies of any maintenance agreement entered into.

During periods of high potential for wildfire, extreme caution will be used in accessing the drill locations. To ensure that no ignitions occur, measures such as mowing the access rights-of-way or limiting vehicles may be undertaken as necessary. The Companies are sensitive to fire issues and risks in the western United States.

2. PROPOSED ACCESS ROUTES

1.1.2 Well Access

New access routes will be sited to avoid sensitive resource areas, such as leks, and areas susceptible to increased resource damage from the proposed project, such as areas of steep terrain or poor vegetative cover. Every effort will be made to minimize the amount of cut-and-fill construction needed to maintain safe, environmentally sound, year-round access to the well sites. The special conditions of approval specified for this pod by the BLM will be implemented.

Access to the individual well sites will be provided by crowned and ditched roads that are surfaced with an appropriate grade of gravel. To the extent possible, the access roads will follow existing terrain and two-tracks that would represent a sound alignment for a constructed road.

Where possible, existing two-tracks will be upgraded, as specified by BLM, to provide access to well sites. Newly constructed access routes will be crowned, ditched, and graveled, as specified by BLM. All equipment and vehicles will be confined to identified travel corridors and other areas specified in this MSUP. Gates and cattle guards will be installed where appropriate. The access roads will 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.

Unless otherwise exempted, free and unrestricted public access will be maintained on the access road. All construction work will be accomplished as specified by the landowner and the BLM. Access roads will be maintained in a safe and usable condition. A regular maintenance program will include, but is not limited to, blading, ditching, installing or cleaning culverts, and surfacing. Maintenance work will be accomplished as specified by the BLM.

The access roads will be constructed to minimum standards for a BLM Resource Road, as outlined in BLM Manual 9113. The minimum travelway width of the road will be 14 feet with turnouts. No structure will be allowed to narrow the road top. The inside slope will be 4:1. The bottom of the ditch will be a smooth V with no vertical cut in the bottom. The outside slope will be 2:1 or shallower. Turnouts will be intervisible and/or spaced at a minimum of 1000 feet.

Wing ditches will be constructed as deemed necessary to divert water from the road ditches. Wing ditches will be constructed at a slope of ½ percent to 1 percent.

Topsoil and vegetation will be windrowed to the side of the newly constructed access roads. After the roads are crowned and ditched with a 0.03 to 0.05 foot crown, the topsoil will be pulled back onto the cut slopes of the road right-of-way so no berm is left at the top of the cut slope.

Drainage crossings on the access routes will be low water crossings or crossings using “fish friendly” culverts. Crossings of Hadsell Draw and its tributaries will be accomplished according to BLM specifications. Low water crossings would be used in shallow channel crossings and at crossings of the main channel. Crossings of the main channel would 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 would be installed on smaller, steeper channel crossings. Rip-rap will be added at the outlet of each culvert to minimize erosion. Topsoil would be conserved before channel crossing construction occurs. Additional culverts would be placed as the need arises or as directed by the BLM's Authorized Officer. Also, the total area to be disturbed would be flagged on the ground for review during the onsite and before construction begins.

Where low water crossings are required, a 30-inch deep rock fill over geotextile through the drainage will be required. The rock fill will consist of 75 percent 3-inch to 10-inch diameter rough rock and 25 percent Wyoming Grading “W” Material to fill the voids. The geotextile will be overlapping at all joints and will extend beyond the rock fill. The top of the rock fill in the drainage bottom will match the elevation of the natural drainage to allow for smooth flow with no unnatural scouring or water backup. Four inches of course gravel over the rock will be used for the surface.

Culverts will 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 will be backfilled with unfrozen material and rocks no larger than 2 inches in diameter. Care will be exercised to thoroughly compact the backfill under the haunches of the conduit. The backfill will be brought up evenly in 6-inch layers on both sides of the conduit and thoroughly compacted. A permanent marker will be installed at both ends of the culvert to help keep traffic from running over the ends. Culverts will be installed in a manner that minimizes erosion or head-cutting and may include rip rapping or other measures as required. Additional culverts will be placed in the access road as the need arises or as directed by BLM's Authorized Officer.

If additional structures are warranted to maintain the access routes in acceptable condition during use, the affected road segments will be identified for BLM approval. In the event that specific BLM field survey requirements are not provided or do not exist, the field survey requirements described in BLM Manual 9113 will be followed.

The access roads will be winterized by providing a well-drained travelway to minimize erosion and other damage to the roadway or the surrounding public land. Construction activity or routine maintenance will not be conducted using frozen or saturated soil material or during periods when watershed damage is likely to occur.

No construction or routine maintenance activities will 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 will be deemed too wet to adequately support construction equipment, and construction and maintenance will be temporarily suspended.

The written approval of the Authorized Officer will be obtained before snow removal is undertaken outside the new and existing roadways. 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.

Design drawings and templates will be submitted only if specifically required by the BLM. A “plans-in-hand” review will be conducted with the drilling contractor prior to construction to review the access routes to the well sites. Directional markers will be set where needed and will be removed as soon as they are no longer needed.

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 ROW for the access road that are no longer needed also would be reclaimed. The outside ditch cuts also would be seeded and reclaimed.

3. LOCATION OF EXISTING WELLS

As mentioned previously, AEPC previously permitted seven gas wells that are currently existing or authorized for development on fee surface and minerals. These wells are identified in **Table B-1**. Apart from the existing or previously authorized wells that are part of the Red Rim Pod, a search of the WOGCC website identified one oil well drilled in 1974 by Davis Oil Company in Section 20 (API 720214), which was subsequently abandoned in 1975. The enclosed **Project Map** shows locations of disposal, drilling, producing, injection, and abandoned oil and gas wells within 1 mile of the Red Rim Pod wells.

According to the Wyoming State Engineer's Office (WSEO), there are no permitted water wells located within one mile of the project area.

Each Company would offer a water well agreement to the landowner for all wells within the circle of influence for that Company's producible gas wells. However, no permitted water wells are located within the circle of influence of any gas wells in the Red Rim Pod.

4. LOCATION OF EXISTING AND/OR PROPOSED FACILITIES, IF WELLS ARE PRODUCTIVE

On Well Pad

Wellhead facilities would be installed if the gas 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 this MSUP.

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.

The wellhead facilities would be contained within an area covering approximately 15 feet by 15 feet. The surface equipment at each well will consist of the wellhead, a pump panel, and an insulated wellhead cover. Additionally, a vertical separator at some well sites would separate gas from the water stream. Each productive well is expected to require installation of an electric submersible pump below ground level, which will be used to produce water necessary to lower pressure within the coal seams. A schematic of a **Typical Well Site** is enclosed with the MSUP.

The Companies will paint structures at wells and central facilities with flat colors that blend with the adjacent undisturbed terrain. The paint used will be a color which simulates “Carlsbad Canyon”, color 2.5Y 6/2 of the “Standard Environmental Colors,” unless otherwise specified by the BLM. This measure does not apply to structures that require safety coloration in accordance with the requirements of the Occupational Safety and Health administration (OSHA).

Electricity would be used to power pumps during well development and to initiate and maintain production. Engines fired by natural gas or propane would be used to run generators temporarily at individual wells until electric distribution lines are analyzed in the Atlantic Rim EIS and then constructed. If a well is productive, it will be shut-in until production facilities are constructed.

After construction of the production facilities, a temporary generator would be centrally located and used until permanent electrical services are installed. The Companies may choose to use centrally located generation equipment at the compressor station and an underground distribution system to supply power to well sites.

Where practical, utility lines on the well pad would be installed in the same trench as the gas-gathering and water-gathering lines in order to minimize surface disturbance. All utility lines would be buried in accordance with the Interim Drilling Policy.

Off Well Pad

Pipelines (Gathering Lines and Delivery Pipeline)/Compressor Station/ Water Handling and Disposal Facilities/Injection Wells/Tanks

The operator will submit a Sundry Notice for approval prior to construction of any new surface-disturbing activities on-lease that are not specifically addressed in the MSUP or individual APDs.

Pipelines

The ROWs for the gathering systems will typically follow access roads, except in a limited number of cases where topography dictates otherwise or as required by BLM. 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.

Trenches will be excavated to install the flowlines and electrical lines. Trenching will occur as close to the road prism as feasible. Gas-gathering and produced water-gathering pipelines (as well as utility lines) will 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 trenching and backfilling are completed. An additional area, estimated to be 10 feet wide will 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 9.3 miles long. About 3.9 miles of corridors for gathering lines would be located on BLM surface ownership lands.

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 barrels (bbls) or 21,000 gallons] would be injected. 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 12-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 a water conditioning facility. This network of water lines would use 4-inch through 12-inch diameter pipe made of HDPE.
3. Should encouraging quantities of natural gas be discovered, a gas delivery pipeline (high pressure) would be constructed. This pipeline would be constructed of 8-inch diameter steel pipe.

The alignment of the delivery line from the compressor station to the existing transmission pipeline is shown on the **Project Map**. The Companies are applying for a ROW for the delivery 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 an existing pipeline located 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 will be reclaimed as soon as practical after construction is completed. An 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 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. Surface soil material will be stockpiled to the side and segregated. Surface soil material will not be mixed or covered with subsurface material. Trenches will be compacted during backfilling. Pipeline routes will be graded to conform to the adjacent terrain. Cuts and fills will be made only where necessary. After construction, cut and fill slopes will be waterbarred or regraded to conform to the adjacent terrain, as specified by BLM. The constructed pipeline will not block, dam, or change the natural course of any drainage. Water body crossings will be completed as quickly as possible, with ditching, pipeline installation, and backfilling completed in less than 48 hours if possible. All minimum requirements contained in the pipeline safety regulations of the U.S. Department of Transportation will be met or exceeded.

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.

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 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.

Procedures will 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.

Compressor Station

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 million cubic feet per day (MMCFD) from 15 pounds per square inch (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). 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) dehydration system, which would dry the gas to meet pipeline-quality specifications of the market pipeline.

The compressor station facility is expected to be constructed within a site area covering approximately 300 feet by 300 feet (see enclosed **Typical Compressor Station**). In addition to the facilities on the pad, the Companies will construct drainage ditches to divert stormwater away from the compressor station pad. About one-half of the compressor station site area will be affected by construction, maintenance, and operation of the facility. The compressor station facility will be of all-weather construction, having a thick layer of gravel surfacing over the pad site. Topsoil will be removed and conserved for later reclamation activities. The compressor station will consist of an insulated header building containing a separator or a separator and allocation meters for each well. The compressor station will also have a dehydrator that will remove water from the wet gas stream. The water will be pumped from the header building to an approved injection well. If different production facilities are required, plans will be submitted in a Sundry Notice.

Water Handling and Disposal Facilities, Injection Wells, Monitoring Well (this section has been changed from what is in the RRPEA)

Within 90 days of initial production start-up, the operator will submit an analysis of the produced water to the BLM's Authorized Officer. The source of the water to be disposed is the coals in the Mesaverde Group. Coal bed formation water (produced water) will be collected in a buried polyethylene flowline (pipeline) for transport to the water injection facility. Any changes in the produced water disposal method or location must receive written approval from BLM's Authorized Officer before the changes take place.

A small portion of the water produced from gas wells, about 5 gallons per minute at each location identified on the **Project Map**, would be dispensed for use by livestock in five stock watering tanks at locations specified by BLM and the surface owners. These tanks would be equipped with float valves that would prevent overflow and discharge into drainages.

Injection will also be utilized for disposal of hydrostatic test water used to test the integrity of the gas delivery pipeline (500 bbls or 21,000 gallons).

A typical water disposal 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 (see attached schematic of **Typical Water Disposal Facility**). An approximate 3.5-foot berm would be constructed around the perimeter of the water tanks, excluding the pump shed, at each disposal 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 injection wells would be 5,000 barrels per day (bbls/day), and the maximum injection capacity would be 12,000 bbls/day. Both injection wells will be located on fee land. The injection zone, in the Hatfield, Cherokee, or Deep Creek sands, is isolated above and below by competent shale barriers. Maximum pressure requirements for the injection zone would be established through injectivity tests that would identify fracture pressure limits to prevent the overlying shale from being breached by the initiation and propagation of fractures through overlying strata to any zones of fresh water. 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. Injection horizons will not be exceeded based on injectivity tests and applicable permit limits, as regulated by the State of Wyoming and BLM. These deep sands are

limited reservoirs, and it may be necessary to find deeper reservoirs if they become filled to capacity. There are a number of deeper reservoirs that could be utilized.

Each injection well will be drilled, cased, and cemented from TD to surface. The injection wells would be drilled with the same equipment and personnel used for the gas wells. Depth of the injection wells 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.

BLM has requested that three to six groundwater monitoring wells be installed within the Atlantic Rim EIS study area during the interim drilling project. The locations of these monitoring wells have not yet been specified, however, one of them will be located in the Red Rim project area. The effects of interim drilling and development on the coal aquifer, including drawdown, will be monitored by these wells.

Transfer pumping stations, consisting of two 400-bbl water tanks with associated pump and piping, may be needed (see attached **Typical Water Transfer Facility**). 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. Each pumping station would contain up to two 400-bbl 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 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. These transfer stations will be located near proposed disturbance areas, outside cultural sites, and, where possible, away from any known sensitive wildlife or resource areas. Final location of the water transfer facilities will be submitted in a Sundry Notice.

Tanks

The water tanks at transfer and disposal facilities will be constructed, maintained, and operated to prevent unauthorized surface or subsurface discharges of water. The tanks will be located away from the established drainage patterns in the area and will be constructed to prevent the entrance of surface water.

The closed-top water tanks will be fenced or capped to prevent livestock or wildlife entry.

The water tanks will be kept reasonably free from surface accumulations of liquid hydrocarbons and are not to be used for disposal of water from other sources without the prior approval of the BLM. Any discharge from the tanks will be reported to the BLM as required by NTL-3A.

All storage tanks and compressor facilities designed to contain oil, glycol, produced water, or other fluid, which may constitute a hazard to public health or safety, will be surrounded by a secondary means of containment for the entire contents of the largest single tank in use, plus one foot of freeboard. The 3.5 foot berms planned for any closed produced water tanks used at well sites before flowlines are constructed, closed tanks used to hold fracturing fluids during well completion and testing, water disposal facilities, and water transfer facilities will contain the contents of the largest tank in use at that site, plus one foot of freeboard. The containment or diversionary structure will be impervious to any oil, glycol, produced water, or other toxic fluid for 72 hours and 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.

5. LOCATION AND TYPE OF WATER SUPPLY FOR DRILLING

Water to drill the first well will be trucked from the AR Fee 20 89 SE21 well located in T20N R89W, Section 21.

Water produced from project wells will be transported to nearby drilling locations and used to drill subsequent wells.

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 also 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.

Any changes in the water source or method of transportation must receive written approval from BLM's Authorized Officer before the changes take place.

6. CONSTRUCTION MATERIALS

Construction materials (mineral material aggregate suitable for surfacing material) will be purchased from a nearby private source or a local supplier having a permitted source of materials in the area. No construction materials will be removed from federal and/or Indian lands without prior approval from the BLM.

7. METHODS FOR HANDLING WASTE DISPOSAL

Drill cuttings (rock fragments generated during drilling) will be produced during drilling of the borehole. Cuttings will be buried in the reserve pit upon closure of the reserve pit.

No oil or other oil-based drilling additives, chromium/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, all liquid petroleum hydrocarbons will be contained in test tanks on the well site.

Dust abatement will comply with all applicable WOGCC, WDEQ, or BLM requirements. Only water suitable for livestock use would be used for dust abatement. Only disturbed areas will be sprayed. Spraying will be done in a way that will reduce runoff and channelized flow.

A portable, self-contained chemical toilet will be provided on location during drilling and completion operations. Upon completion of operations, or as required, the contents of toilet holding tanks will be disposed of at an authorized sewage treatment and disposal facility. Disposal will be in accordance with State of Wyoming, Carbon County, and BLM requirements regarding sewage treatment and disposal. The Companies will comply with all state and local laws and regulations pertaining to disposal of human and solid wastes.

No trash will be placed in the reserve pit. All refuse (trash and other solid waste including cans, paper, cable, etc.) generated during construction, drilling, and well testing activities will be contained in an enclosed receptacle, removed from the drill locations promptly, and hauled to an authorized disposal site.

Immediately after removal of the drilling rig, all debris and other waste materials not contained within trash barrels will be cleaned up and removed from the well location. No potentially adverse materials or substances will be left on the drill locations.

Hazardous Materials Management

All project-related activities involving hazardous materials will be conducted in a manner that minimizes potential environmental impacts. An on-site file will be maintained containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, or substances that are used in the course of construction, drilling, completion, production, and reclamation operations. Netting will be placed over any pits that may contain hazardous substances (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.

No hazardous substance, as defined by CERCLA, will be used in the construction or drilling operations associated with these wells. No Resource Conservation and Recovery Act (RCRA) hazardous wastes will be generated by well-drilling operations. The term "hazardous materials" as used here means: (1) any substance, pollutant, or containment (regardless of quantity) listed as hazardous under CERCLA of 1980, as amended 42 U.S.C. 9601 et seq., and the regulations issued under CERCLA; (2) any hazardous waste as defined in RCRA of 1976, as amended; and (3) any nuclear or nuclear byproduct as defined by the Atomic Energy Act of 1954, as amended, 42 U.D.C. 2001 et seq. The operator will be required to provide a referenced list of hazardous materials that could be used, produced, transported, disposed of, or stored on the well location including a discussion on the management of the hazardous materials.

Any spills of oil, gas, or any other potentially hazardous substance will be reported immediately to the BLM, landowner, local authorities, and other responsible parties and will be mitigated immediately, as appropriate, through cleanup or removal to an approved disposal site.

8. ANCILLARY FACILITIES

Several self-contained travel-type trailers may be used onsite during drilling operations. No facilities other than those described in this MSUP will be constructed to support the operations associated with the wells.

9. WELL SITE LAYOUT

A schematic drawing of the **Typical Drill Site Layout** used for each well is enclosed with this MSUP. Information on each federal well is contained in the **BLM APD Form 3160-3, Well Survey Plat**, and **Drill Pad Cross Section** already on file with BLM. The cross section shows the orientation of the drill pad with respect to the topographic features (cut and fill), facilities, and access to the pad.

At each drill location, surface disturbance will be kept to a minimum. The areal extent of each drill pad is approximately 200 feet by 200 feet. Each drill pad will be leveled using cut and fill construction techniques where needed. Prior to constructing the drill 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. All surface disturbance related to drilling will be confined to each drill site.

The Companies plan to use one reserve pit at each drilling location. A reserve pit is used during drilling to circulate the drilling mud (mostly bentonite clay and fresh water) and rock cuttings out of the borehole and for holding drilling fluids. This pit will be designed and constructed according to WOGCC and BLM requirements.

Each reserve pit will be approximately 20 feet deep (including 2 feet of freeboard), and will be 40 feet wide and 40 feet long (at the surface). Each pit will be excavated within the "cut area" of the drill site to minimize any potential for slope failure. Each pit will be designed to prevent collection of surface runoff

and will be closely monitored to ensure no pit overflows occur. 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.

Each reserve pit will be constructed in a manner that minimizes the accumulation of surface precipitation runoff into the pit. This will be accomplished by appropriate placement of subsoil/topsoil storage areas or construction of berms or ditches. Netting will be placed over any pits that have been identified as containing oil, as determined by visual observation or testing. The mesh diameter will be no larger than 1 inch. For the protection of livestock and wildlife, all pits and open cellars will be fenced. Fencing shall be in accordance with BLM specifications.

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. 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. Natural gas in the coal seam would be produced through perforations in the casing. The well control system will be designed to meet the conditions likely to be encountered in the hole and will conform to BLM and State of Wyoming requirements.

The drilling and completion operation for a gas well normally requires a maximum of 10 to 15 workers at a time, including personnel for logging and cementing. Each well would be drilled within 7 to 10 days. A well completion program may be initiated to stimulate production of gas and to evaluate the characteristics of gas and water production in preparation for production of gas from a drilled, cased, and cemented well. Wells determined to be productive would be shut in until pipelines and other production facilities are constructed.

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, methane 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.

10. PROGRAMS FOR RECLAMATION OF THE SURFACE

BLM surface ownership lands that contain disturbed areas or facilities that are no longer needed would be reclaimed at the earliest opportunity in accordance with applicable regulations and agency guidance. Non-federal lands would be reclaimed in accordance with the requirements of the surface owner.

Roads, culverts, cattle guards, pipelines, stock water 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 BLM. Water wells and produced water would be available to the surface owners and BLM, provided that appropriations, diversions, and storage rights are properly filed with the WSEO.

As soon as practical after the conclusion of drilling and testing operations, unproductive drill holes will be plugged and abandoned and site reclamation will commence. The BLM will be notified prior to commencement of reclamation operations. A Notice of Intent to Abandon will be filed for final recommendations regarding surface reclamation. Upon completion of drilling, the reserve pit will be dewatered and reclaimed in accordance with BLM guidance. Typically, this procedure involves allowing the contents to dry naturally, and then backfilling, re-contouring, and reclaiming the reserve pit area to approximate pre-drilling site conditions. The reserve pit will be backfilled with a minimum cover of 5 feet of soil or subsoil material.

After abandonment of productive wells, all wellhead equipment that is no longer needed will be removed, and the well sites will be restored.

Any areas, including the drilling locations, reserve pits, or access routes, that are disturbed by earthwork will be recontoured to a natural appearance as near to the original contour as possible as soon as practical after the conclusion of operations. Any flowline trenches that may be constructed will be backfilled completely.

Recontoured areas will be graded to be outsloped, and waterbreaks will be constructed where needed to avoid concentrating surface waters and producing gullies. The land surface will be left "rough" after recontouring to ensure that the maximum surface area will be available to support the reestablishment of vegetative cover.

All topsoil conserved during earthwork will be redistributed evenly and left "rough" over these recontoured areas. BLM goals for vegetative cover will guide revegetation efforts. Common goals are erosion control, weed control, palatable and nutritious forage for livestock and wildlife, and visual aesthetics.

Revegetation efforts will comply with BLM specifications on all BLM surface ownership lands. If no specifications are provided, the following specifications will be used. Seeding is expected to occur in the fall after September, prior to ground frost, or in the spring after frost has left the ground. The seed mixture, including fertilizer and mulching requirements, seeding depth, and seed drilling specifications, will be developed in consultation with the BLM. Seed will be drilled on the contour using a seed drill equipped with a depth regulator to ensure even depths of planting. Seed will be planted between one-quarter to one-half inch deep. The anticipated seed mix to be applied and rates of application are listed below in **Table B-3**. Soil material that will be stockpiled for 10 months or longer, will be seeded according to BLM specifications, to the extent practicable. Prior to seeding, the stockpile will be protected from wind and water erosion by roughening the soil surface, covering the stockpile with vegetation that has been removed, and mulching, if necessary.

TABLE B-3 SEED MIX FOR RECLAMATION

Species	Rate of Application*
Western Wheatgrass	4 lbs./Acre
Green Needlegrass	4 lbs./Acre
Indian Ricegrass	4 lbs./Acre
Sandberg Bluegrass	0.5 lbs./Acre
Gardner's Saltbush	1 lb./Acre
Winterfat	0.5 lbs./Acre

These rates of application apply to pure live seed (PLS) that is used for drill seeding. For broadcast seeding, the rates of application will be doubled.

11. SURFACE OWNERSHIP

U.S. Bureau of Land Management
Rawlins Field Office
1300 North Third
Rawlins, Wyoming 82301-2407
(307) 328-4200

Mr. John Espy / Red Rim Company (Sections 21 and 29)
206 West Maple Street
Rawlins, Wyoming 82301
(307) 324-4174

The Companies are the lessee or operator for the federal oil and gas leases associated with this MSUP and these APDs.

No slopes in excess of 25 percent would be affected by this proposal. No activities are planned near existing highways, railroads, pipelines, or powerlines. There are no occupied buildings or residences within one-quarter mile of the proposed drill sites.

Any road crossings of dry drainages, riparian, or other wetland areas will use appropriate Best Management Practices (BMP) to minimize impacts to these areas.

The presence, distribution, and density of noxious weeds in the project area will be monitored. The well access roads and well pads will be inspected regularly to ensure that noxious weeds do not become established in newly disturbed areas. Control methods will be based on available technology, taking into consideration the weed species present. Methods of noxious weed control may include revegetation of disturbed areas to reduce the potential for and success of weed establishment, mowing, hand-pulling, or application of appropriate herbicides. All BLM requirements associated with the control of noxious weeds will be met.

The project area encompasses public lands that contain sagebrush/grassland community types on gentle to steep upland ridges and undulating to rolling uplands, with some highly dissected areas. The existing stream channels are intermittent or ephemeral and are partially vegetated with grasses and shrubs.

Local flora consist primarily of needlegrass, western wheatgrass, prairie junegrass, blue grama grass, Indian rice grass, prickly pear cactus, and two varieties of big sagebrush intermixed with rabbitbrush and saltbush, horsebrush, and occasionally dense greasewood near drainages. Local fauna consist primarily of mule deer, antelope, greater sage-grouse, coyotes, rabbits, raptors, and various smaller vertebrate and invertebrate species. Livestock graze on some of these lands. Oil and gas activities have occurred in the general area.

Soils have a good reclamation potential provided the hazards of wind and water erosion are mitigated through the use of surface roughening, management of grubbed vegetation, surface mulch, adequate water breaks, and drainage structures in recontoured areas. With proper management, suitable soil material is available to reestablish vegetation at the conclusion of project activities.

A cultural/historical resource inventory has been conducted on the public lands by a qualified archaeologist permitted in Wyoming by the BLM. A block survey for cultural resources was required by the BLM for the Red Rim Pod. The findings have been submitted under separate cover. Any additional areas of potential effect identified subsequent to the completion of these reports will be inventoried as specified by the BLM, and a supplemental report will be prepared.

Landowner Notification

The Companies would obtain a surface use agreement with the landowner.

13. SITE-SPECIFIC CONDITIONS OF APPROVAL

Wildlife Stipulations

Facilities: All facilities on public surface.

Construction, drilling, and other activities potentially disruptive to strutting and nesting of greater sage-grouse or sharp tailed grouse are prohibited during the period of March 1 through June 30 for the protection of nesting areas.

Wells: AR State 20 89 SE16 (BLM Surface), AR Federal 20 89 NE20, and AR Federal 20 89 SW 20

Mitigation of impacts is required during April 10 through July 10 for the protection of potential mountain plover habitat.

Road and Well Pad Minimum Requirements

Culverts (minimum 18 inches in diameter) will be placed in drainages and draws that are shown on the enclosed **Project Map**.

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). 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 has been 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.

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 slope-stake 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.

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. The Companies 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 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.

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 construction 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. Inventories will be conducted annually by BLM.
8. Construction and surface occupancy cannot occur any time within 0.25 mile of existing leks for greater sage-grouse.
9. 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.
10. 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.
11. Surface occupancy or use 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.
12. 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 millkvetch, 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 manufacturer's specifications and 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.

14. LESSEE'S REPRESENTATIVE AND CERTIFICATIONS

Representative for Anadarko E & P Company

Name and Title: William M. Fowler, Environmental and Regulatory Affairs Manager
Address: 1201 Lake Robbins Drive
City/State/Zip: The Woodlands, Texas 77380
Phone: (832) 636-3167

Bonding

BLM Nationwide Bond, WY 1280, \$150,000

Certification

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill sites and access routes; that I am familiar with the conditions which currently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by AEPC and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C 1001 for the filing of a false statement.

I also certify that AEPC will comply with the provisions of the law or the regulations governing the Federal or Indian right of reentry to the surface under 43 CFR 3814.

I also certify that AEPC has reached or will reach an agreement with the surface owner(s) and surface lessee(s) regarding the requirements for the protection of surface resources and reclamation of disturbed areas and/or damages in lieu thereof, or if an agreement cannot be reached, will comply with the provisions of the law or the regulations governing Federal or Indian right of reentry to the surface under 43 CFR 3814.

I also certify that:

- A. All potentially affected landowners having properly permitted water wells with the WSEO within each producible well's Circle of Influence (one-half mile radius) will be offered a Water Well Agreement; and
- B. If a Water Well Agreement is not reached with the landowner, AEPC agrees to mitigate the impacts of its coal bed methane wells in accordance with State of Wyoming water laws; and
- C. Permits to Appropriate Groundwater have been applied for from the Wyoming State Engineer's Office, concurrently with these Applications for Permits to Drill.

I also certify that AEPC shall use its best efforts to conduct its approved operations in a manner that avoids adverse effects on any properties which are listed, or may be eligible for listing, in the National Register of Historic Places (NRHP). If historic or archaeological materials are uncovered during construction, the operator will immediately stop work that might further disturb such materials, and contact the authorized officer (or his/her representative) at the BLM Rawlins Field Office. Any paleontological resources or fossils discovered as a result of operations associated with these wells will be brought to the attention of the authorized officer or his/her representative immediately. All activities in the vicinity of such discoveries will be suspended until notified to proceed by the Authorized Officer.

I also certify that AEPC shall use its best efforts to conduct its approved operations in accordance with the Project-wide Mitigation Measures and procedures outlined in Chapter 2 of the Environmental Assessment (EA) for this project.

By: _____
William M. Fowler
Environmental and Regulatory Affairs Manager
Anadarko E & P Company

Date: _____

**MASTER DRILLING PLAN (MDP)
RED RIM PLAN OF DEVELOPMENT (POD)**

**OPERATORS (The Companies):
Warren E & P, Inc. (Warren)
Anadarko E & P Company (Anadarko)
Sections 20 & 28 in T20N R89W, 6th PM, Carbon County, Wyoming
BLM Leases: WYW149261, WYW150410**

Drilling Plan for the subject wells listed below:

Gas Wells in Section 20

AR Federal 2089 NE20 (WYW149261)
AR Federal 2089 SE20 (WYW149261)
AR Federal 2089 SW20 (WYW149261)

Gas Wells in Section 28

AR Federal 2089 NW28 (WYW150410)
AR Federal 2089 NE28 (WYW150410)

Monitoring Well

BLM has requested that three to six groundwater monitoring wells be installed within the Atlantic Rim EIS study area during the interim drilling project. The locations of these monitoring wells have not yet been specified, however, one of them will be located in the Red Rim project area. The effects of interim drilling and development on the coal aquifer, including drawdown, will be monitored by these wells.

1. ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS

Formation	Depth
Lance	Surface
Lewis Shale	630' – 2460'
Almond	2880' – 4710'
Pine Ridge SS	3420' – 5250'
Allen Ridge	3560' – 5390'
TD (Gas Wells)	4050' – 5850'
Hatfield/Cherokee/Deep Creek	5965' – 6335'

2. ESTIMATED DEPTH OF ANTICIPATED WATER, OIL, GAS OR MINERAL FORMATIONS

Almond	Natural gas
Pine Ridge	Natural gas
Allen Ridge	Natural gas

The Lance Formation and Lewis Shale are not anticipated to contain any zones capable of producing water. There are several zones within the Mesaverde Group capable of producing fresh water, including the coal seams. The Companies propose to test the productive formations between 2,880' and 5,390'. Several coal seams may be tested for gas production to total depth. All shallow water zones will be protected with casing and cement. Cement will be brought above the base of the Lewis Shale to isolate all formations in the Mesaverde Group.

Planned Objective for Gas Wells: Mesaverde

3. MINIMUM BLOW OUT PREVENTOR (BOP) REQUIREMENTS (refer to attached schematics)

1. The BOPE will conform to Onshore Shore Order #2. The blowout preventer equipment will consist of a 2000 psi W.P. Double Ram, Hydraulic Preventer (enclosed). All fill and kill lines will be 2000 psi W.P. From 0-160' there will be no pressure control. From 160'-1,600' the 2,000# system will provide control. Note: These wells are proposed as coal bed natural gas (CBNG) wells. Data from a number of CBNG wells drilled in the area indicate that the maximum anticipated surface pressure will not exceed 250 psi, thus the BOP will be tested to 1,000 psi (see attached schematic).
2. The BOP shall be pressure tested when initially installed, whenever any seal subject to pressure testing is broken, after repairs, or every 30 days.
3. The Companies shall notify the Rawlins BLM office 24 hours prior to the BOP test.

4. SUPPLEMENTAL INFORMATION

The primary objective of this project is to drill, stimulate, and produce natural gas from coal seams in recognized gas-producing formations of the Mesaverde Group. The coal seams are overpressured and are very unlikely to be in communication with overlying layers. Produced water will be conditioned and discharged as authorized by WDEQ in a NPDES permit or injected in one of two deep injection wells completed in the Cherokee/Deep Creek Sandstones. The coal seams will be perforated and stimulated by hydraulic enhancement or fracturing during testing. Fresh water, gelled water, and/or foam fracturing techniques will be used.

The following schematics that show typical facilities, operating standards, and methodologies, are attached to this MDP: B.O.P.; Bottom Flange; Configuration Options; Completed Well; and Injection Well. Additional schematics for this POD are attached to the Master Surface Use Program (MSUP): Drill Site Layout; Well Site; Water Disposal Facility; Water Transfer Facility; Water Conditioning Facility; and Compressor Station.

5. CASING PROGRAM

<u>Hole Size</u>	<u>Casing Size</u>	<u>Casing Wt.</u>	<u>Grade</u>	<u>Joint</u>	<u>Depth Set</u>	<u>New/Used</u>	<u>Rng</u>	
12 ¼"	9 ⅝"	32.3#	H-40	ST&C	10% of well depth	New	3	
9 ⅞"	7"	23#	MC-50	LT&C	0-TD	New	3	
Surface Casing:		9 ⅝"	32.3 ppf	H-40	STC Ratings:	Collapse 1370	Burst 2270	Tension 254M

A. $Burst = [0.052 * FG * TVD (shoe)] - [Gas Gradient * TVD]$
 $= [0.052 * 8.8ppg * 580'] - [0.1psi/ft * 580']$
 $= 207.4psi$

Safety Factor = Rating/Burst
 $= 2270/207.4$
 $= 10.94$

B. $Collapse = 0.052 * MW * TVD (shoe)$
 $= 0.052 * 8.8ppg * 580'$
 $= 265.4psi$

Safety Factor = Rating/Collapse
 $= 1370/265.4$
 $= 5.16$

$$\begin{aligned}
\text{C. Tension} &= \text{Weight} * \text{MD} * [1 - (\text{MW}/65.5\text{ppg})] \\
&= 32.3\text{ppf} * 580' * [1 - (8.8\text{ppg}/65.5\text{ppg})] \\
&= 16299 \text{ lbs.} \\
\text{Safety Factor} &= \text{Rating}/\text{Tension} \\
&= 254,000/16299 \\
&= 15.58
\end{aligned}$$

Surface casing shall have centralizers on the bottom 3 joints of the casing, starting with the shoe joint.

Production	7"	23 ppf	MC-50	STC	Collapse	Burst	Tension
Casing:				Ratings:	3110	3960	273M

$$\begin{aligned}
\text{A. Burst} &= [0.052 * 8.3\text{ppg} * 5800'] - [0.1\text{psi}/\text{ft} * 5800'] \\
&= 1923.3\text{psi} \\
\text{Safety Factor} &= \text{Rating}/\text{Burst} \\
&= 3960/1923.3 \\
&= 2.06
\end{aligned}$$

$$\begin{aligned}
\text{B. Collapse} &= 0.052 * 8.3\text{ppg} * 5800' \\
&= 2503.3\text{psi} \\
\text{Safety Factor} &= \text{Rating}/\text{Collapse} \\
&= 3110/2503.3 \\
&= 1.24
\end{aligned}$$

$$\begin{aligned}
\text{C. Tension} &= 23\text{ppf} * 5800' * [1 - (8.3\text{ppg}/65.5\text{ppg})] \\
&= 23\text{ppf} * 5800' * .87 \\
&= 116,058 \text{ lbs.} \\
\text{Safety Factor} &= \text{Rating}/\text{Tension} \\
&= 273,000/116,058 \\
&= 2.35
\end{aligned}$$

6. MUD PROGRAM

Drilling mud will be used as the circulation medium. A fresh water, polymer, gel drilling mud will be used and visual monitoring will be done from spud to total depth. The anticipated mud weight will be between 8.3–10 ppg. Sufficient quantities of lost circulation material and barite will be available at the well site at all times for the purpose of assuring well control.

7. CEMENTING PROGRAM

The following is the proposed procedure for cementing the 9 5/8" surface pipe and 7" long string:

Surface Casing:

Lead: Class "C" Type III, 14.4 ppg, yield 1.44ft³/sk @ 101% excess.
Compressive strength in 24 hours at 80°F 3100psi.

The surface casing shall be cemented back to surface. In the event cement does not circulate to surface or fall back of the cement column occurs, remedial cementing shall be done to cement the casing back to surface.

Long String:

Lead: Class "C" Type III, 14.4 ppg, yield 1.44ft³/sk @ 35% excess.
Compressive strength in 24 hours at 95°F 3200psi.

Estimated top of cement back to surface.

8. LOGGING PROGRAM

Cores: Rotary Cores will be taken as needed to evaluate the coal seams.

DSTs: None Planned

Logs: Induction, GR, SP, Density, Neutron and Caliper – From surface to TD
Cement Bond Log – From 9 5/8" casing shoe to TD
Mud Logger – As needed.

9. PRESSURE DATA AND POTENTIAL HAZARDS

Bottom hole pressures anticipated at much less than 1,000 – 1,100 psi.
There is no history of hydrogen sulfide gas in the area and none is anticipated.

10. ANTICIPATED STARTING DATES AND NOTIFICATION OF OPERATIONS

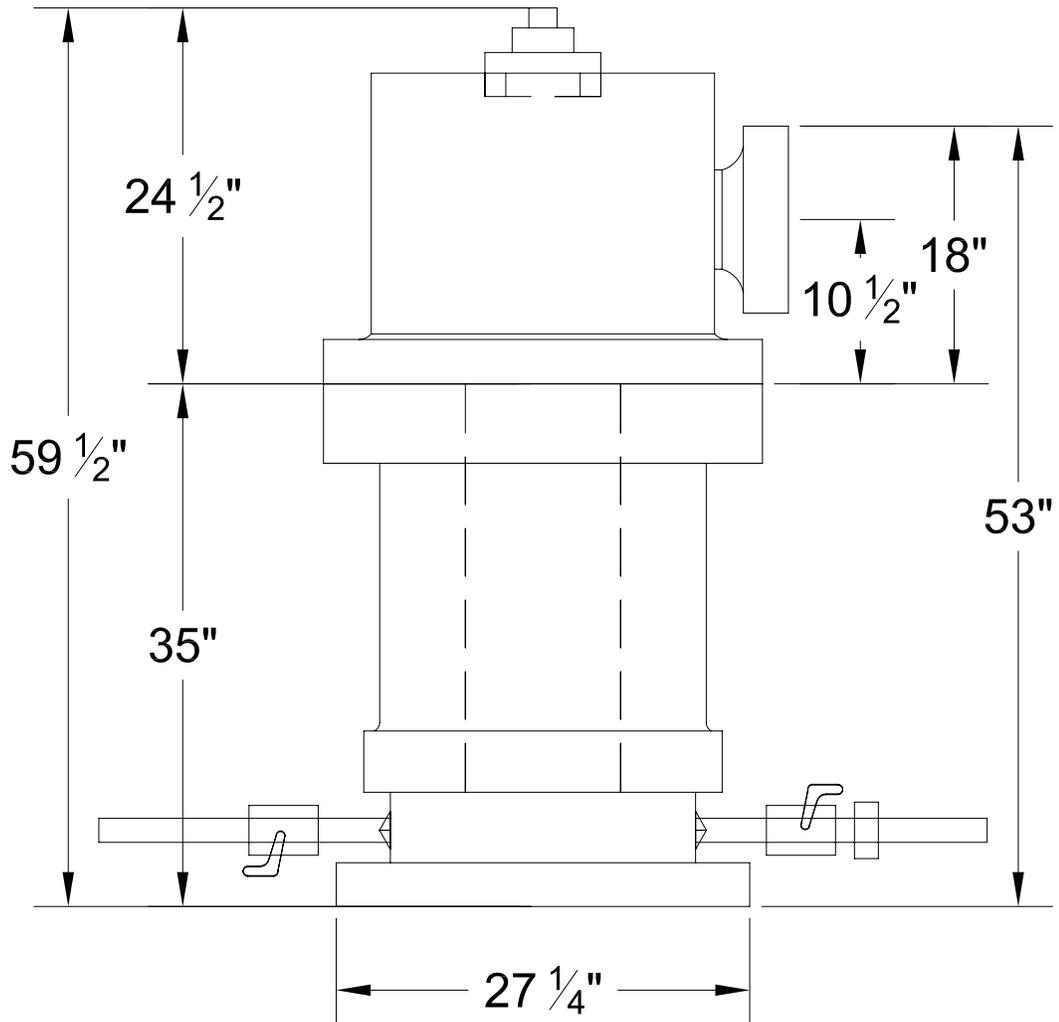
A. Anticipated Starting Dates:

Anticipated Commencement Date	- Fall 2003, or upon approval
Drilling	- Approximately 7 days per well
Completion	- Approximately 2 days per well
Initial Testing	- Approximately 7-14 days per well
Production Testing	- Approximately 6-12 months per well

Note: Drilling operations will commence as soon as practical after approval of all necessary permits including the Applications for Permits to Drill (APDs).

B. Notification of Operations:

Rawlins Field Office, BLM
1300 North Third St.
Rawlins, Wyoming 82301
(307) 328-4200

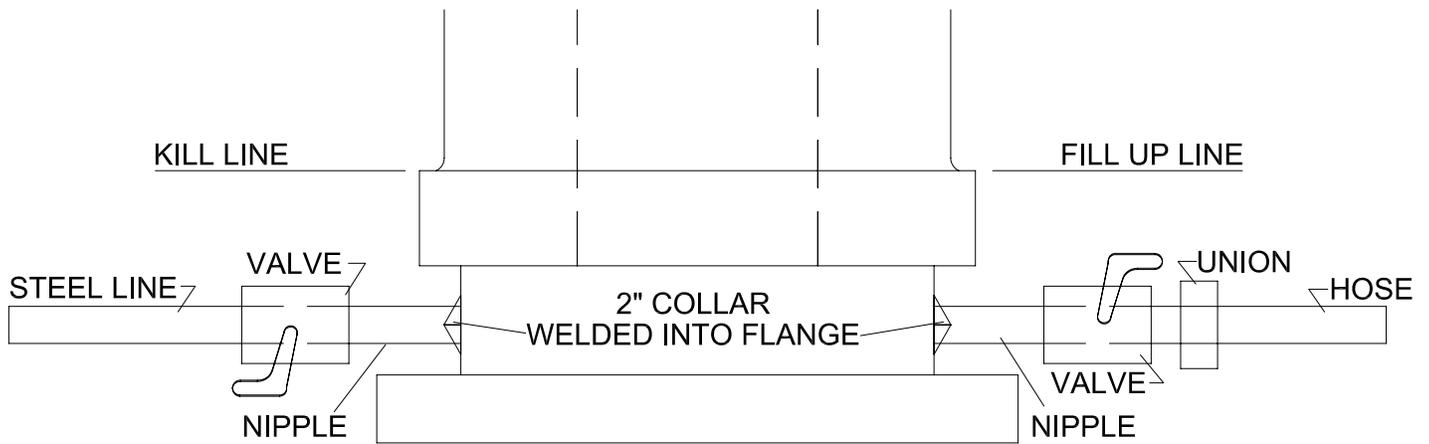


SPECIFICATIONS

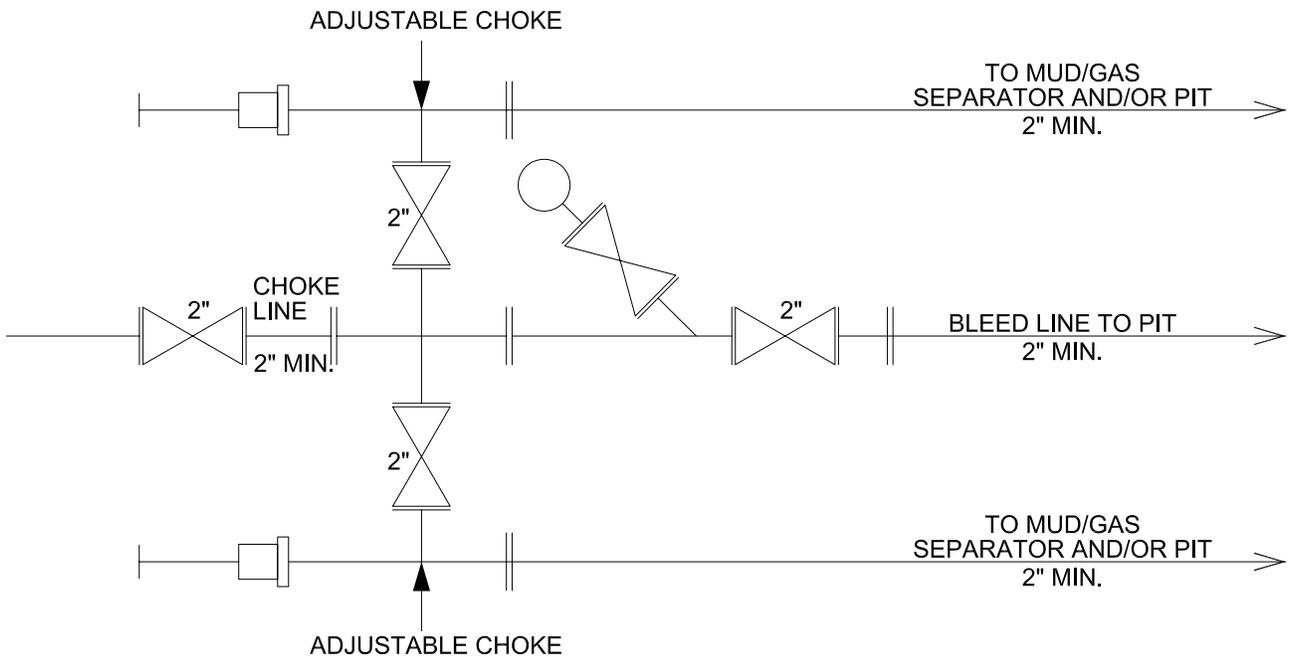
- 10" - 900 FLANGES ON B.O.P.
- 10" - 900 FLANGE ON ROTATING HEAD
- 6" - 600 FLANGE ON FLOWLINE
- 2" - COLLAR ON EACH SIDE OF B.O.P. AT BOTTOM

			
SCHEMATIC			
1500 P.S.I. REAGAN ANNULAR B.O.P			
SCALE: as noted	DATE: 05.04.01	DRAWN BY: MTM	FIGURE:

BOTTOM FLANGE ON ANNULAR B.O.P.



2M CHOKE MANIFOLD EQUIPMENT



SPECIFICATIONS

- 10" - 900 FLANGES ON B.O.P.
- 10" - 900 FLANGES ON ROTATING HEAD
- 6" - 600 FLANGES ON FLOWLINE
- 2" - COLLAR ON EACH SIDE OF B.O.P. AT BOTTOM

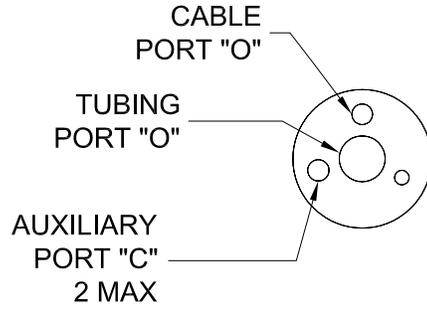


SCHEMATIC

BOTTOM FLANGE ON ANNULAR B.O.P. &
2M CHOKE MANIFOLD EQUIPMENT

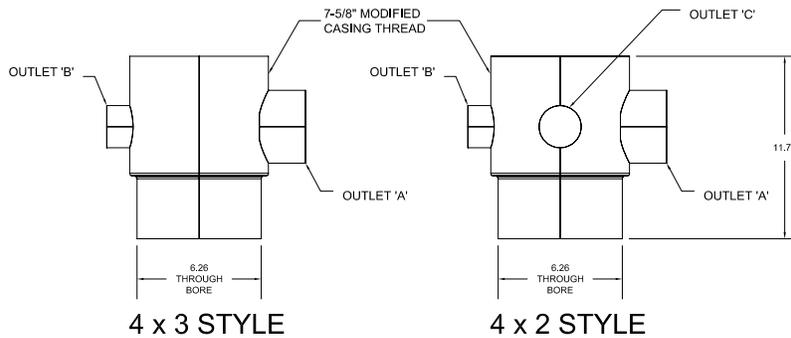
SCALE: as noted	DATE: 05.04.01	DRAWN BY: MTM	FIGURE:
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MANDREL STYLE



GS-3 / GS-4
CENTERED HANGER
WITH CABLE PORT &
UP TO 2 AUX PORTS

BODY STYLES



Standard Body Configurations

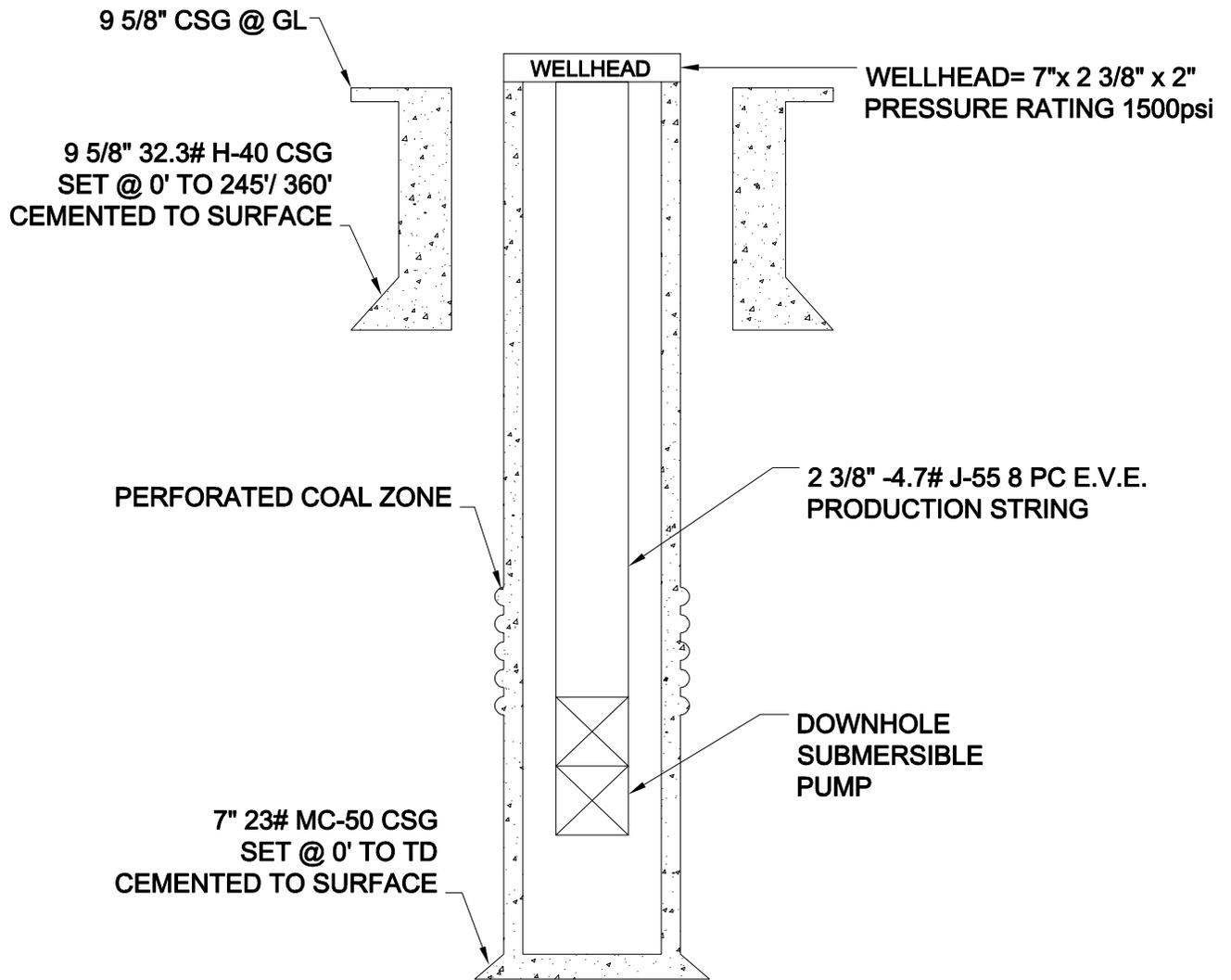
Body Style	Bottom Connection	Outlet "A"	Outlet "B"	Outlet "C"
4 x 2	7" Short Casing (Male or Female)	4" LP Female	2" LP Female	NA
4 x 3	7" Short Casing (Male or Female)	4" LP Female	3" LP Female	NA
4 x 2 x 2	7" Short Casing (Male or Female)	4" LP Female	2" LP Female	2" LP Female

Standard Mandrel Configurations

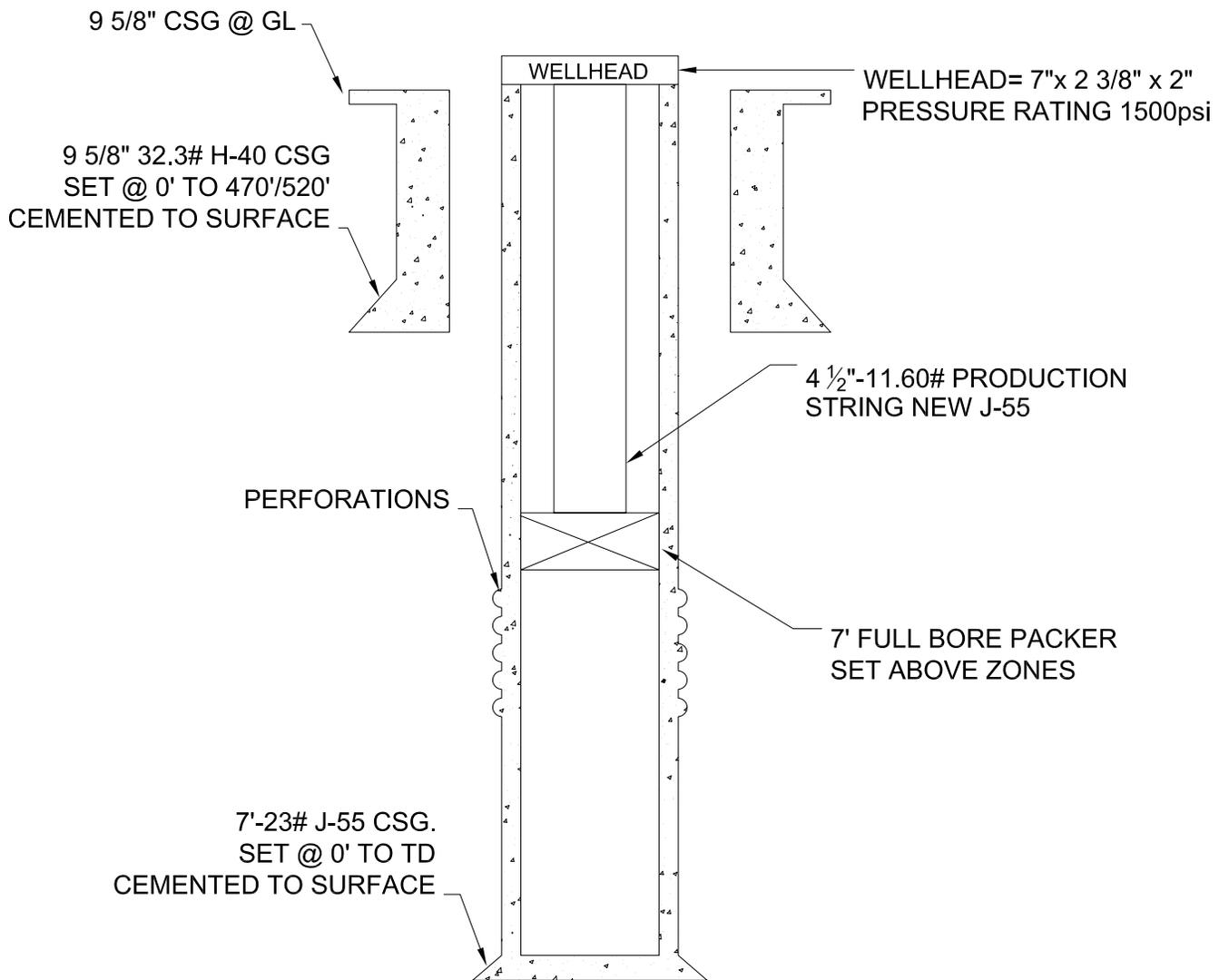
Mandrel Style	Port "C"	Port "D"	Port "E"	Approx Wt - LBS
GS-3	2-3/8" UPTBG Box Down X	1" LP	(1) 1/2" LP Box Up	26
GS-4	2-3/8" UPTBG Box Up	Box Up	(2) 1/2" LP Box Up	26



CONFIGURATION OPTIONS



TYPICAL COMPLETED WELL



TYPICAL INJECTION WELL

SCALE: NTS	DATE: 01.10.02	DRAWN BY: RLZ	FIGURE:
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