

## TABLE OF CONTENTS

<b>CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES</b> .....	2-1
PROPOSED ACTION .....	2-1
Plan of Development .....	2-3
Preconstruction Planning and Site Layout .....	2-3
Construction and Drilling Phase .....	2-4
Access Road Construction .....	2-4
Well Pad Design and Construction .....	2-4
Drilling and Completion Operations .....	2-5
Production Operations .....	2-6
Well Production Facilities .....	2-6
Power Generation .....	2-6
Pipelines .....	2-6
Gas-Gathering Pipeline Systems .....	2-7
Produced Water-Gathering System and Injection Facilities .....	2-7
Gas-Delivery Pipelines and Compression .....	2-8
Ancillary Facilities .....	2-8
Traffic and Work Force Estimates .....	2-8
Site Restoration and Abandonment .....	2-9
Summary of Estimated Disturbances .....	2-10
Project-Wide Mitigation Measures and Procedures .....	2-10
Preconstruction Planning, Design, and Compliance Measures .....	2-11
Resource-Specific Requirements .....	2-12
Geology/Minerals/Paleontology .....	2-12
Air Quality .....	2-13
Soils .....	2-13
Water Resources .....	2-14
Vegetation/Wetlands/Noxious Weeds .....	2-16
Range Resources and Other Land Uses .....	2-16
Wildlife .....	2-17
Fisheries .....	2-17
Special Status Species .....	2-18
Recreation .....	2-18
Visual Resources .....	2-18
Cultural Resources .....	2-19
Socioeconomics .....	2-19
Transportation .....	2-19
Health and Safety .....	2-20
Noise .....	2-21
NO ACTION ALTERNATIVE .....	2-21
ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL .....	2-22

## TABLE OF CONTENTS (continued)

---

### Tables

---

Table 2-1	New Well Information .....	2-1
Table 2-2	Traffic Estimates .....	2-9
Table 2-3	Disturbed Area Estimates - Blue Sky POD .....	2-10

## CHAPTER 2

# PROPOSED ACTION AND ALTERNATIVES

### PROPOSED ACTION

The Proposed Action submitted by Petroleum Development Corporation (Pedco) consists of constructing, drilling, completing, testing, and operating 23 new CBM exploratory wells and two injection wells located on existing leases. Related access roads, utilities, flowlines, production facilities, a compressor station, and water disposal facilities also are included in the Proposed Action. **Table 2-1** summarizes proposed CBM well information by lease number. **Figure 1** shows the proposed Blue Sky Project (Project).

<b>Table 2-1 New Well Information</b>			
Lease Number	Well Name	Well Number	Location
<b>CBM Wells</b>			
WYW-141276	ARFederal	1591-1-5	T15N, R91W, Sec. 5, NENE
	ARFederal	1591-7-5	T15N, R91W, Sec. 5, SWNE
	ARFederal	1591-9-5	T15N, R91W, Sec. 5, NESE
	ARFederal	1591-11-5	T15N, R91W, Sec. 5, NESW
	ARFederal	1591-13-5	T15N, R91W, Sec. 5, SWSW
	ARFederal	1591-15-5	T15N, R91W, Sec. 5, SWSE
	ARFederal	1591-3-8	T15N, R91W, Sec. 8, NENW
	ARFederal	1591-5-8	T15N, R91W, Sec. 8, SWNW
	ARFederal	1591-9-8	T15N, R91W, Sec. 8, NESE
	ARFederal	1591-15-8	T15N, R91W, Sec. 8, SWSE
WYW-141277	ARFederal	1591-3-5	T15N, R91W, Sec. 5, NENW
	ARFederal	1591-5-5	T15N, R91W, Sec. 5, SWNW
	ARFederal	1591-1-8	T15N, R91W, Sec. 8, NENE
	ARFederal	1591-7-8	T15N, R91W, Sec. 8, SWNE
	ARFederal	1591-11-9	T15N, R91W, Sec. 9, NESW
	ARFederal	1591-15-9	T15N, R91W, Sec. 9, SWSE
WYW-146499	ARFederal	1591-3-9	T15N, R91W, Sec. 9, NENW
	ARFederal	1591-5-9	T15N, R91W, Sec. 9, SWNW
	ARFederal	1591-13-9	T15N, R91W, Sec. 9, SWSW
94-00401*	ARState	1591-3-16	T15N, R91W, Sec. 16, NENW
	ARState	1591-5-16	T15N, R91W, Sec. 16, SWNW
	ARState	1591-7-16	T15N, R91W, Sec. 16, SWNE
	ARState	1591-11-16	T15N, R91W, Sec. 16, NESW
<b>Injection Wells</b>			
WYW-141277	ARFederal	1591-8I	T15N, R91W, Sec. 8, SENW

<b>Table 2-1 New Well Information</b>			
<b>Lease Number</b>	<b>Well Name</b>	<b>Well Number</b>	<b>Location</b>
WYW-146499	ARFederal	1591-9I	T15N, R91W, Sec. 9, SWSW

Note:

\* BLM surface ownership lands only

The Project is located approximately 18 miles north-northeast of Baggs, Wyoming near the intersection of SH 789 and Carbon County Road 608 (Dad Road). The Project is one of nine areas or well pods that comprise the Atlantic Rim Interim Drilling CBM Project. All 23 of the proposed CBM well sites, the two injection well sites and the one existing well site in the Project are located on surface ownership lands administered by the Bureau of Land Management (BLM) Rawlins Field Office (RFO). A total of 19 of the proposed CBM wells would develop federal minerals. The remaining four proposed CBM wells would develop state minerals. The one existing Project CBM well, S&W State 1-16, is located on State of Wyoming mineral ownership lands.

The Project is a part of the Interim Drilling Plan associated with the Atlantic Rim environmental impact analysis in Carbon County, Wyoming. The Atlantic Rim CBM Environmental Impact Statement (EIS) is scheduled to begin in 2002, and is expected to take about 24 months to complete. During the interim period before the EIS is completed, the RFO will allow up to 200 exploratory wells to be drilled, provided this activity is in compliance with criteria described in the Interim Drilling Policy (**Appendix A**), and the RFO determines through a NEPA analysis that no significant impacts would occur.

Proposed CBM development in the Atlantic Rim area is based on a Wyoming Oil and Gas Conservation Commission (WOGCC) approved 80-acre well spacing pattern. In addition to well sites, other facilities, such as access roads, gas gathering and water disposal pipelines, buried electrical utilities, injection wells, water transfer facilities, and a compressor station, would be developed to support CBM production in the well fields. The interim drilling activities would develop over a 6 to 12 month period. The life of the Project is estimated to be between 10 and 20 years. The productive life of a CBM well is estimated to be 15 years.

Specific components of the Project are shown in the Master Surface Use Program (MSUP) (**Appendix B**), Master Drilling Plan (MDP) (**Appendix C**), Water Management Plan (WMP) (**Appendix D**), and the Project Map (**Figure 1**). Project plans are summarized below in the Plan of Development.

## Plan of Development

### Preconstruction Planning and Site Layout

Pedco would follow the procedures outlined below to gain approval for proposed activities on BLM-administered lands or minerals within the Project Area. Development activities also would be approved by the WOGCC. The WOGCC permitting procedures require filing a state Application for Permit to Drill (APD) with the WOGCC and obtaining a ROW from the surface owner.

- Prior to the start of construction activities, Pedco would submit a federal APD, and a ROW application, along with a preliminary MSUP, MDP, WMP and a Project Map to the RFO, showing the specific location of the proposed activity (e.g., individual drill sites, pipeline corridors, access roads, or other facilities). The application would include site-specific plans that describe the proposed development (i.e., drilling plans with casing/cementing program; surface use plans with road and drill pad construction details; and site-specific reclamation plans, etc.). Approval of all planned operations would be obtained in accordance with authority prescribed in Onshore Oil and Gas Order No. 1 (Approval of Operations on Onshore Federal and Indian Oil and Gas Leases).
- The proposed facilities would be staked by Pedco and inspected by an interdisciplinary team and/or an official from the BLM to ensure consistency with the approved RMP, the Interim Drilling Policy (**Appendix A**), and oil and gas lease stipulations.
- More detailed descriptions of the proposed activity or construction plans would be submitted to the BLM by Pedco, when required for the proposed development. The plans would address concerns that may exist concerning construction standards, required mitigation, etc. Negotiation of these plans between Pedco and the BLM, if necessary to resolve differences, would be based on field inspection findings and would take place either during or after the BLM onsite inspection.
- Pedco and/or its contractors would revise the MSUP, MDP, or WMP, as necessary, per negotiations with the BLM. The BLM would complete a project-specific environmental analysis that incorporates agreed upon construction and mitigation standards. The BLM would then approve the specific proposal and attach the Conditions of Approval to the permit. Pedco must then commence the proposed activity within one year.

Following is a general discussion of proposed construction techniques to be used by Pedco. More detailed plans can be reviewed in **Appendix B**. These construction techniques would be applicable to drill sites, pipelines, and access roads within the Project Area, and may vary between the well sites.

## Construction and Drilling Phase

### *Access Road Construction*

The primary road access utilized by Pedco to reach the Project Area is Wyoming State Highway 789. Access is provided by Carbon County 608 (Dad Road), an existing one-lane road that is graveled and partially graveled. Access to drill locations from the existing road network already in place would be provided by new and upgraded crowned, ditched, and surfaced roads.

Pedco proposes to construct required new access roads across public lands in accordance with BLM Manual 9113 standards. Roads would be located to minimize disturbances and maximize transportation efficiency. Roads would be closed and reclaimed by Pedco when they are no longer required for production operations, unless otherwise directed by the BLM.

Drainage crossings on the access routes within the Project Area would either be low water crossings or crossings using 'fish-friendly' culverts where applicable. Low water crossings would be utilized in shallow channel crossings. Crossings of larger channels within the Project Area would consist of excavating an area approximately four feet deep under the travelway and filling it with rock and gravel to the level of the drainage bottom. Channel banks on either side of such crossings would be cut down to reduce grade where necessary. Culverts would be installed on smaller, steeper channel crossings. Topsoil would be conserved before channel crossing construction occurs. Also, the total area to be disturbed would be flagged on the ground before construction begins.

### *Well Pad Design and Construction*

All of the proposed CBM wells would be drilled on surface lands administered by the BLM. A graded well pad would be constructed at each well site using cut and fill construction techniques. **Appendix B** contains a schematic drawing of a typical CBM drill site layout. The dimensions of each well pad would be approximately 200 feet by 200 feet. Each well site would disturb an estimated 1.25 acres.

A temporary mud pit would be constructed within the well pad location. A small trench would be excavated at each well and reclaimed after completion operations. Topsoil would be removed and stockpiled as required by the BLM, prior to excavating the pit. Pedco estimates the reserve pit would be open for two to eight weeks to allow for evaporation of pit fluids. During this time, the pit would be fenced on all sides to prohibit wildlife or livestock from falling into the pit.

In the event drilling is non-productive at any given site, all disturbed areas associated with that site, including the well site and new access road, would be reclaimed to the approximate landform existing prior to construction. Reclamation and site stabilization techniques would be applied as specified in the MSUP.

If drilling is productive, all access roads to the well site would remain in place for well-servicing activities (i.e., maintenance, improvements, etc.). Partial reclamation would be completed on segments of the well pad and access road ROW that are no longer needed.

### *Drilling and Completion Operations*

Drilling of the CBM wells and injection wells would utilize either a conventional or truck-mounted drilling rig. Additional equipment and materials needed for drilling operations would be trucked to the well site. Water for use in drilling the initial well would be obtained from a local source near the Project Area. Water for drilling the remaining wells would be obtained from water produced by the initial well. Approximately 600 barrels of water would be needed for drilling each well. The actual water volume used in drilling operations would be dependent upon the depth of the well and any losses that might occur during drilling. The proposed Project would require approximately 84,000 gallons (or 0.26 acre-feet) of water per well for cement preparation, well stimulation, and dust control. Water used for drilling will come from existing Pedco CBM wells completed in coals of the Mesaverde Group. Based on existing hydrogeologic information, groundwater in the coal seams at the completions depths in the existing CBM wells is hydraulically isolated from shallow groundwater and surface water resources. The likelihood that removal of this groundwater could deplete the supply of water to Colorado River watershed is exceedingly remote.

Drilling mud would consist of native mud and bentonite. As hole conditions dictate, small amounts of polymer additives and/or potassium chloride salts may be added for hole cleaning and clay stabilization.

Depending on the depth of the coal seam, each producing well would be drilled to a depth of 1,800 feet to 2,700 feet or deeper, and would be exposed to the coal seam through perforations. The well control system would be designed to meet the conditions likely to be encountered in the hole and would be in conformance with BLM and State of Wyoming requirements. A completed CBM well bore is shown in **Appendix C**.

The drilling and completion operation for a CBM well normally requires approximately ten to fifteen people at a time, including personnel for logging and cementing activities. Each well would be drilled within a period of seven to ten days. A well completion program may be initiated to stimulate production of gas and to determine gas and water production characteristics in preparation for production of gas from a drilled, cased, and cemented well. 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 two to five days per well. Upon receiving applicable permits, methane gas may be flared or vented and water temporarily discharged and contained in the reserve pit for a short period of time during testing. If determined to be productive, wells would be shut-in until pipelines and other production facilities are constructed.

Drilling of the injection wells would be accomplished with the equipment and personnel used to drill the CBM wells. Depth of the injection wells is expected to range from 4,170 to 4,450 feet. Drilling and completion of each injection well is expected to take approximately seven to fourteen days and

installation of surface equipment, holding tanks and pumping equipment, an additional fourteen days. A schematic of a typical injection well is shown in **Appendix B**. See **Appendix C** for drilling plans.

## **Production Operations**

### *Well Production Facilities*

Wellhead facilities would be installed if the CBM wells are productive. A weatherproof covering would be placed over the wellhead facilities. A downhole pump would be utilized to produce water from the uncased open hole or perforated interval. The long-term surface disturbance at each productive well location where cut and fill construction techniques are utilized would encompass approximately 0.25 acres. Well site production facilities typically would be fenced or otherwise removed from existing uses. A typical CBM production well site is shown in **Appendix B**.

Pipeline trenches for well gathering lines are expected to disturb 15-foot wide corridors within the 30-foot wide ROW temporarily, and to be reclaimed as soon as practical after construction is completed. Trenches would be constructed along the access roads wherever possible. Separate gathering lines would be buried in the trenches and would transport methane gas to the metering facility and compressor station and produced water to the injection wells.

At the conclusion of the Project, roads, culverts, cattleguards, pipelines, stock watering facilities, or other structures could be left in place for any beneficial use, as designated by the BLM. Water wells and produced water would be available to the BLM, with appropriations, diversion, and storage rights already properly filed with the Wyoming State Engineer's Office (WSEO). All federally-owned lands containing disturbed areas or facilities that are no longer needed would be reclaimed.

### *Power Generation*

Electricity would be used to power pumps during well development and to initiate and maintain production. Both natural gas-fired and diesel engine-powered generators would be used on a temporary basis at individual wells until electric distribution lines are analyzed in the Atlantic Rim Coalbed Methane Project EIS. Electrical motors or natural gas-fired reciprocating or microturbine engines would power booster and blower units. Future compressors are anticipated to be natural gas-fired or electrical units. All power lines into the Project Area would be buried per the Interim Drilling Policy.

### *Pipelines*

Three types of pipelines would be constructed as part of the proposed Project:

1. Gas-gathering pipeline systems (low pressure, from wellhead to building or metering facility, and from building through trunkline to the compressor station).
2. Produced water-gathering pipeline systems.



3. Gas-delivery pipelines (high pressure, from compressor station to existing transmission pipelines).

Reclamation of pipeline corridors would occur as soon as practical after pipeline construction is complete.

### Gas-Gathering Pipeline Systems

Gas-gathering and produced water-gathering pipelines would be placed together in the same trench/ditch when practical. Construction and installation of pipelines would occur immediately upon determination of producibility of the wells. The pipeline right-of-way would typically follow access roads, except in a limited number of cases where topography dictates or as required by the BLM. Separate gathering lines would transport methane gas to production facilities and produced water away from CBM wells to injection wells.

Gathering lines, averaging 9.4 miles long in length, are expected to disturb fifteen foot wide corridors within 30-foot wide ROWs, and would gather gas from the CBM wells and transport it to the compressor station. The alignments of the gathering lines to the compressor station are shown in **Figure 1**

Development would be constrained by the gas production from the coal seam(s) and by the pipeline capacity available to transport compressed gas to markets. Currently, the pipeline capacity within the Project Area is 12-60 million cubic feet per day (MMCFD), depending on the pipeline connecting locations.

### Produced Water-Gathering System and Injection Facilities

Produced water from individual wells would be collected and injected at two disposal wells (**Figure 1**). These wells would be approved by the BLM, WOGCC, and WDEQ.

The produced water from 14 CBM wells would be injected into the ARFederal 1591-9I well, an approximate minimum of 7,200 bbls/day and maximum of 19,200 bbls/day. The remaining ten wells would be injected at the ARFederal 1591-8I well, an approximate minimum of 5,142 bbls/day and maximum of 23,500 bbls/day.

Produced water-gathering pipelines would be constructed along the well access road wherever feasible, from the wellhead to the injection well locations. The water lines would be placed together in the same trench/ditch as gas gathering lines wherever practical, and buried. A typical water disposal facility is shown in **Appendix B**.

Transfer pumping stations would be utilized during production operations to transfer produced water from the CBM well(s) to the disposal well(s). The transfer pumping stations are needed in those areas where elevation differences require supplemental pumping to transfer the produced water. If transfer pumping stations are required, they would be identified in the MSUP. Each pumping station would contain a 400-barrel water tank and a small centrifugal water pump. Each pumping station would consist of a pad area having approximate dimensions of 120 feet by 120 feet, and disturbing

an estimated 1.0 acre. An approximate two-foot berm would be constructed around the perimeter of each pumping station area to contain any potential spills. A small pump house would be constructed immediately outside the bermed area to house the centrifugal pump. A typical water transfer facility is shown in **Appendix B**.

### Gas-Delivery Pipelines and Compression

Produced natural gas (methane) under wellhead pressure would move through the low pressure gas gathering system to a compressor station. Typical gathering system line pressure is less than 100 pounds per square inch (psi). Gas arriving at the compressor station would be compressed from line pressure to facilitate transport and introduction of the gas into an existing transmission pipeline.

Compression of the gas at a field compressor station would increase the pressure to an estimated 700 to 1,450 psi. The compressor station would have a pad size of 200 feet by 200 feet and would result in approximately 1.5 acres of site disturbance. All compressors are expected to be housed within structures. A typical compressor station and meter facility is shown in **Appendix B**.

Should commercial quantities of CBM be discovered, a transportation pipeline would be required to move the gas to an existing pipeline system located in the NE $\frac{1}{4}$  of Section 4, T.15N. R.91W. The alignment of the sales line from the compressor station to the existing sales pipeline is shown in **Figure 1**. Pedco is applying for a right-of-way (ROW) for the eight-inch diameter steel pipeline to be buried six feet deep on a 50-foot wide ROW, that would connect from the compressor station, northeast to the existing pipeline in Section 4. This sales pipeline would be approximately 1.7 miles long.

### **Ancillary Facilities**

All wells, pipelines, and associated ancillary production facilities would be operated in a safe manner by Pedco, as set forth by standard industry operating procedures. Routine maintenance of producing wells would be necessary to maximize performance and detect potential difficulties with gas production operations. Each well location would be visited about every other day to ensure operations are proceeding in an efficient and safe manner. The visits would include checking separators, gauges, valves, fittings, and onsite storage of produced water and condensates. Routine onsite equipment maintenance would also be performed as necessary. Additionally, all roads and well locations would be regularly inspected and maintained to minimize erosion and assure safe operating conditions.

### **Traffic and Work Force Estimates**

Estimated traffic requirements for drilling, completion, and field development operations are shown in **Table 2-2**. The 'Trip Type' column lists the various service and supply vehicles that would travel to and from the well sites and production facilities. The 'Round-Trip Frequency' column lists the number of trips, both external (i.e., to/from the Blue Sky Project Area) and internal (within the Blue Sky Project Area). The figures provided in **Table 2-2** should be considered general estimates. Drilling and production activity levels may vary over time in response to weather and other factors.

**Table 2-2  
Traffic Estimates**

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

## Notes:

- <sup>a</sup> Engineers travel to Project Area weekly and stay in a trailer at the Project Area during the week.
- <sup>b</sup> Current plans are to establish a central supply area within a Project Area and deliver supplies on a weekly basis.
- <sup>c</sup> Water trucks would deliver water to rigs from a location within the Project Area.
- <sup>d</sup> Current plans are to establish a central mud location within a Project Area and deliver mud on a weekly basis.
- <sup>e</sup> It would require four trucks to move each rig to a Project Area. Upon completion of drilling in a Project Area, each rig would move to the next Project Area.

## Site Restoration and Abandonment

Pedco proposes to completely reclaim all disturbed areas not needed for production activities. Reclamation would generally include: 1) complete cleanup of the disturbed areas (drill sites, access roads, etc.); 2) restoration of the disturbed areas to the approximate ground contour that existed prior to construction; 3) replacement of topsoil over all disturbed areas; 4) ripping of disturbed areas to a depth of 12 to 18 inches; and 5) seeding of recontoured areas with a BLM approved, certified weed-free, seed mixture.

## Summary of Estimated Disturbances

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

<b>Table 2-3 Disturbed Area Estimates - Blue Sky Project Area</b>					
<b>Facility</b>	<b>Development Phase</b>				<b>Operations</b>
	<b>Length (feet)</b>	<b>Width (feet)</b>	<b>Area, ea. (acres)</b>	<b>Acres</b>	<b>Acres</b>
New Roads	38,800	20	N/A	17.8	17.8
Existing Well Access Road*	1,300	20	N/A	0.6	0.6
Existing Road to be Upgraded	6,100	20	N/A	2.8	2.8
New Gathering Lines	49,600	15	N/A	17.1	0
New Sales Line	9,100	15	N/A	3.1	0
New CBM Drill Pads (23)	N/A	N/A	1.25	28.8	5.8
New Injection Wells <sup>@</sup> (2)	N/A	N/A	1.0	2.0	2.0
Existing Drill Pad (1)	N/A	N/A	0.75	0.75	0.3
Compressor Station (1)	N/A	N/A	1.5	1.5	1.5
Pumping Stations (4)	N/A	N/A	1.0	4	4
<b>Total Disturbance</b>				<b>78.5</b>	<b>34.8</b>

\* Carbon County Road 608 not included in Existing Road measurements.

@ Injection Wells will be co-located with other facilities (Figure 1).

## Project-Wide Mitigation Measures and Procedures

The following describes applicant-committed and agency-required measures and procedures to avoid or mitigate resource or other land use impacts. These measures and procedures will be referred to as Best Management Practices (BMPs) throughout this document. These mitigation measures and procedures would be applied on privately-owned surface unless alternate actions are specifically required by the involved private surface owners. An exception to a mitigation measure and/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 determined that the resource or land use for which the measure was put in place is not present or would not be significantly impacted.

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

1. Pedco would designate a qualified individual to serve as compliance coordinator. This individual 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. Pedco and the BLM would make onsite inspections of each proposed and staked facility site (e.g., well sites and other facilities), new access road, access road reconstruction, and pipeline alignment projects to develop site-specific recommendations and mitigation measures.
3. New road construction and maintenance of existing roads in the Project Area would be accomplished in accordance with BLM Manual 9113 standards for Resource Roads and construction details outlined in the MSUP and Conditions of Approval, unless private landowners, Carbon County, or the State of Wyoming specify otherwise.
4. Prior to construction, Pedco would submit an APD package. This package would contain individual APDs for each drill site, MDP, MSUP, WMP, schematics of facilities, and ROW applications for pipelines, utilities, and access roads. APDs submitted by Pedco would show the layout of the drill pad over the existing topography, dimensions of the pad, cross sections of the cut and fill (when required), location and dimensions of reserve pit(s), and access road locations.
5. Pedco would slope-stake construction activities when required by the BLM (e.g., steep and/or unstable slopes) and receive approval from the BLM prior to the start of construction.
6. BLM would require the road to be crowned and ditched with a .03 to .05 ft crown, and the topsoil would be pulled back down on the cut slope so there is no berm 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 pipe diameter, whichever is greater. The inlet and outlet will be set flush with existing ground and lined up in the center of the draw. Before backfilling, the bottom of the pipe will be bedded on stable ground not containing 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 two 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" layers on both sides of the conduit.
8. Additional culverts would be placed in the existing access road as needed or directed by BLM.
9. BLM would require surfacing of the access road with an appropriate grade of aggregate or gravel to a depth of four inches, prior to moving the drilling equipment/rig 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, culvert installation, and surfacing.

11. If snow removal is required outside new and existing roadways, BLM would require that snow removal equipment be equipped with shoes to keep the blade off the ground surface. If the surface of the ground is uneven, the BLM would require that special precautions be undertaken to ensure that equipment blades do not destroy vegetation.
12. BLM would require wing ditches be constructed, as necessary, to divert water from road ditches.

### *Resource-Specific Requirements*

Pedco proposes to implement the following resource-specific mitigation measures, procedures, and BLM management requirements on public lands.

#### Geology/Minerals/Paleontology

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

Scientifically significant paleontological resources potentially occurring within the Lewis Shale, the only geologic formation of concern which underlies the Project Area, would be protected through the following mitigation measures:

1. If recommended by the BLM, each proposed facility located in areas having known and potential vertebrate paleontological resources would be surveyed by a BLM-approved paleontologist prior to surface disturbance (BLM 1987 and 1990).
2. Discovery. Contingency would be made for the accidental discovery of significant fossils by Project personnel. If fossils are discovered by construction personnel during implementation of the Project, the BLM would be notified immediately. If the fossils could be adversely affected by construction, construction activities would be redirected until a qualified paleontologist has determined the importance of the uncovered fossils, the extent of the fossiliferous deposits, and has made or implemented recommendations regarding further mitigation.
3. Field Survey. No specific data currently exists 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, in areas where surface exposures of the Browns Park, Green River, or Wasatch Formations occur. Field survey may result in the identification of additional mitigation measures to lessen 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 that conducted during the field survey may be necessary.

A report would be submitted to the BLM following the completion of each field survey. That report will detail the results of the survey, including a list of fossils collected, if any, and may

include recommendations for additional mitigation. If significant fossils are collected, the report must document the curation of specimens into the collections of an acceptable museum repository, and contain appropriate geologic records for the specimens.

### Air Quality

1. All BLM conducted or authorized activities must comply with applicable local, state, tribal and federal air quality regulations and standards. Pedco would adhere to all applicable ambient air quality standards, permit requirements (including preconstruction, testing, and operating permits), motorized equipment and other regulations, as required by the State of Wyoming, Department of Environmental Quality, Air Quality Division (WDEQ-AQD).
2. Pedco would not allow burning garbage or refuse at well locations or other facilities. Any flaring would be conducted under the permitting provisions of Section 13 of the Wyoming Air Quality Standards and Regulations.
3. On federal land, Pedco would initiate immediate abatement of fugitive dust (by application of water, chemical dust suppressants, or other measures) when air quality, soil loss, or safety concerns are identified by the BLM or the WDEQ-AQD. These concerns include, but are not limited to, potential exceedances of applicable air quality standards. The 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 source(s).

### Soils

1. 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, locate pipelines immediately adjacent to roads to avoid creating separate areas of disturbance and in order to reduce the total area of disturbance.
3. Avoid using frozen or saturated soils as construction material.
4. Minimize construction activities in areas of steep slopes.
5. Design cut slopes in a manner that would allow retention of topsoil, use of surface treatment such as mulch, and subsequent revegetation.
6. Selectively strip and salvage topsoil or the best suitable medium for plant growth, from all disturbed areas. Remove and conserve to a minimum depth of six inches and a maximum of twelve inches from all well pads, unless otherwise agreed to by the BLM and the operator.
7. Where possible, minimize disturbance to vegetated cuts and fills on existing improved roads.

8. Install runoff and erosion control measures such as water bars, berms, and interceptor ditches if needed.
9. Install culverts for ephemeral and intermittent drainage crossings. Design all drainage crossing structures to carry the 25-year discharge event, or as otherwise directed by the BLM.
10. Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Where possible, maintain a 100-foot wide buffer strip of natural vegetation (not including wetland vegetation) between construction activities and ephemeral and intermittent channels.
11. Include adequate drainage control devices and measures in the road design (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipators) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. Implement a revegetation program as soon as possible to re-establish the soil protection afforded by vegetation.
12. Upon completion of construction activities not specifically required for production operations, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites; replace up to six 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 Soils, and Vegetation and Wetlands sections of this EA would also apply to Water Resources.

1. Limit construction of all drainage crossings to no-flow periods or low-flow periods.
2. Minimize the area of disturbance within perennial, ephemeral and intermittent drainage channel environments.
3. Prohibit construction of well sites and other non-linear features within 500 feet of surface water and/or riparian areas. Possible exceptions to this would be granted by the BLM for linear features based on an environmental analysis and site-specific mitigation plans.
4. Design channel crossings to minimize changes in channel geometry and subsequent changes in flow hydraulics.
5. Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Where possible, maintain a 100-foot wide buffer



strip of natural vegetation(not including wetland vegetation) between construction activities and ephemeral and intermittent channels.

6. Design and construct interceptor ditches, sediment traps, water bars, silt fences and other revegetation and soil stabilization measures, as needed.
7. Construct channel crossings by pipelines such that the pipe is buried a minimum of four feet below the channel bottom.
8. Regrade disturbed channel beds to the original geometric configuration containing the same or very similar bed material.
9. Case wells during drilling, and case and cement all wells in accordance with Onshore Order No. 2 to protect all high quality water aquifers. High quality water aquifers are aquifers with known water quality of 10,000 TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Further, wells would adhere to the appropriate BLM cementing policy.
10. Construct the reserve pits in cut rather than fill materials. Compact and stabilize fill material, as needed. Inspect the subsoil material of the pit to be constructed in order to assess soil stability and permeability and determine whether reinforcement and/or lining are required. If lining is required, line the reserve pit with a reinforced synthetic liner at least 12 mils in thickness and a bursting strength of 175 x 175 pounds per inch (ASTMD 75179). Consideration should be given to use of closed or semi-closed drilling systems in situations where a liner may be required.
11. Maintain two feet of freeboard on all reserve pits to ensure the reserve pits are not in danger of overflowing. Shut down drilling operations until the problem is corrected if leakage is found outside the pit.
12. Extract hydrostatic test water used in conjunction with pipeline testing and all water used during construction activities from sources having sufficient quantities and appropriation permits approved by the State of Wyoming.
13. Discharge hydrostatic test water in a controlled manner onto an energy dissipator. The water is to be discharged onto undisturbed land that has vegetative cover, if possible, or into an established drainage channel. Prior to discharge, treat or filter the water to reduce pollutant levels or to settle out suspended particles if necessary. If discharged into an established drainage channel, the rate of discharge would not exceed the capacity of the channel to safely convey the increased flow. Coordinate all discharge of hydrostatic test water with the WDEQ/WQD and the BLM.
14. Discharge all concentrated water flows within access road ROWs onto or through an energy dissipator structure (e.g., riprapped aprons and discharge points) and discharge into undisturbed vegetation.

15. Develop and implement a pollution prevention plan (PPP) for storm water runoff at drill sites as required per WDEQ storm water permit requirements under the National Pollution Discharge Elimination System (NPDES). All required WDEQ permits will be in place prior to discharge.
16. Exercise stringent precautions against pipeline breaks and other potential accidental discharges of toxic chemicals into adjacent streams. If liquid petroleum products are stored onsite in sufficient quantities (per criteria contained in 40 CFR Part 112), a Spill Prevention Control and Countermeasures (SPCC) plan would be developed in accordance with 40 CFR Part 112, dated December 1973.
17. Coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (COE).
18. Any changes in the produced water disposal method or location must have written approval from the BLM before the changes take place.

#### Vegetation/Wetlands/Noxious Weeds

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

1. File noxious weed monitoring forms with the BLM and implement, if necessary, a weed control and eradication program.
2. 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, minimize impacts through modification and minor relocations. Coordinate activities that involve dredge or fill into wetlands with the COE.
3. On BLM lands, an approved Pesticide Use Proposal would be obtained before the application of herbicides or other pesticides for the control of 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 Soils, Vegetation/Wetlands/Noxious Weeds, and Wildlife in this analysis also apply to Range Resources and Other Land Uses.

1. Pedco 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 planned activities.

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

### Wildlife

1. During reclamation, establish a variety of forage species that will return the land to a condition approximate or equal to that which existed prior to disturbance .
2. Prohibit unnecessary off-site activities of operational personnel in the vicinity of the drill sites. Inform all Project employees of applicable wildlife laws and penalties associated with unlawful take and harassment.
3. Limit construction activities within big game crucial winter range from November 15 to April 30, per BLM authorizations.
4. Complete a raptor survey prior to construction to ensure that well sites are located away from potential conflict areas.
5. Survey and clear well sites within one mile of raptor nests identified in the raptor survey prior to the commencement of drilling and construction during the raptor nesting period (February 1 through July 31).
6. When an “active” raptor nest is within 0.75 to one mile (depending on species and line of sight) of a proposed well site, restrict construction during the critical nesting season for that species. For listed and BLM sensitive species (see Chapter 3) the distance should be increased to within one mile of a proposed well site.
7. To determine potential nesting activity, raptor nests must be inventoried annually in areas where work may be occurring during the raptor nesting period from February 1 to July 31.
8. Do not perform construction activities anytime within 0.25 mile of existing greater sage grouse leks.
9. Provide protection for greater sage grouse leks during the breeding, egg-laying and incubation period (March 1 through June 30) by restricting construction activities within a two-mile radius of active greater sage grouse leks. Exceptions may be granted if the activity would occur in unsuitable nesting habitat.
10. To eliminate any hazard to migratory birds or other wildlife, BLM would require netting (maximum two-inch mesh) be installed over any pits identified as containing oil or toxic substances.

### Fisheries

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

## Special Status Species

### Special Status Plants

1. Employ site-specific recommendations developed by the BLM IDT for staked facilities.
2. Minimize impacts due to clearing and soil handling.
3. Monitor and control noxious weeds.
4. Comply with Section 404(b)(1) guidelines of the federal Clean Water Act (CWA).
5. Perform clearance surveys for plant species of concern.

### Special Status Animals

1. If the Project will lead to a water depletion (consumption) in the Colorado River system, impacts to the Bonytail chub, Colorado pikeminnow, Humpback chub, and Razorback sucker will need to be evaluated. Any actions that may result in a water depletion to the Colorado River System will need to be described. Water data has been collected and tests are underway to determine if water from the Mesaverde Group is connected to surface waters associated with the Colorado River System. Results of the testing will be submitted to the BLM. BLM staff will review the data submitted, and if necessary, will submit the data to the USFWS for a final determination. If data indicate there is a connectivity between the waters produced concurrent with CBM production and the Colorado River system, and that the Project will result in depletion of waters, formal consultation with the USFWS will be initiated. The Project will be approved pending consultation as long as no discharge occurs.

## Recreation

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

1. Minimize conflicts between Project vehicles and equipment and recreation traffic by posting appropriate warning signs, implementing operator safety training, and requiring Project vehicles to adhere to low speed limits.

## Visual Resources

1. Utilize existing topography to screen roads, pipeline corridors, drill rigs, wellheads, and production facilities from view.
2. Paint well and central facilities site structures with flat colors (e.g., Carlsbad Canyon or Desert Brown) that blend with the adjacent surrounding undisturbed terrain, except for structures that

require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements.

### Cultural Resources

1. If a site is considered eligible for, or is already on the National Register of Historic Places (NRHP), avoidance is the preferred method for mitigating adverse effects to that property.
2. Mitigation of adverse effects to cultural/historical properties that cannot be avoided would be accomplished by the preparation of a cultural resources mitigation plan.
3. If cultural resources are discovered at any time during construction, all construction activities would halt and the BLM would be immediately notified. Work would not resume until a Notice to Proceed is issued by the BLM.

### Socioeconomics

1. Implement hiring policies that would encourage the use of local or regional workers who would not have to relocate to the area.
2. Coordinate Project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This would include scheduling of Project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.
3. Pedco and its subcontractors would obtain Carbon County sales and use tax licenses for purchases made in conjunction with the Project so that Project-related sales and use tax revenues would be distributed to Carbon County.

### Transportation

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

production should be permanently blocked, re-contoured and seeded. Roads on private lands should be treated similarly, depending on the desires of the landowner.

5. Pedco would be responsible for preventive and corrective maintenance of roads in the Project Area throughout the duration of the Project. This may include blading, cleaning ditches and drainage facilities, dust abatement, noxious weed control, or other requirements as directed by the BLM or the Carbon County Road and Bridge Department.
6. Except in emergency situations, access would be limited to drier conditions to prevent severe rutting of the road surface. Culverts would be installed where needed to allow drainage in all draws and natural drainage areas. Low water crossings would be utilized where applicable. Onsite reviews would be conducted with BLM personnel for approval of proposed access prior to any construction.

### Health and Safety

Measures listed under Air Quality and Water Quality also apply to Health and Safety.

1. Sanitation facilities installed on the drill sites and any resident camp site locations would be approved by the WDEQ.
2. To minimize undue exposure to hazardous situations, the operator would comply with all existing applicable rules and regulations (i.e., Onshore Orders, OSHA requirements, etc.) that would preclude the public from entering hazardous areas and place warning signs alerting the public of truck traffic.
3. Haul all garbage and rubbish from the drill site to a state-approved sanitary landfill for disposal. Collect and store any garbage or refuse materials on location prior to transport in containers approved by the BLM.
4. During construction and upon commencement of production operations, Pedco would have a chemical or hazardous substance inventory for all such items that may be at the site. Pedco would institute a Hazard Communication Program for its employees and would require subcontractor programs in accordance with OSHA 29 CFR 1910.1200. These programs are designed to educate and protect the employees and subcontractors with respect to any chemicals or hazardous substances that may be present in the work place. It would be required that as every chemical or hazardous material is brought on location, a Material Safety Data Sheet (MSDS) would accompany that material and would become part of the file kept at the Blue Sky Pod field office as required by 29 CFR 1910.1200. All employees would receive the proper training in storage, handling, and disposal of hazardous substances.
5. Spill Prevention Control and Countermeasure 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 exceeding 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 Superfund Amendments and Reauthorization Act (SARA) Title III. 40 CFR Part 335. The appropriate Section 311 and 312 forms would be submitted at the required 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/or disposed of in accordance with all applicable federal, state, and local regulations.
8. 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, shall be surrounded by a secondary means of containment for the entire contents of the largest single tank in use, plus one foot of freeboard. Pedco would utilize two-foot berms around affected storage tanks and facilities. The containment or diversionary structure shall 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.

### Noise

1. Muffle and maintain all motorized equipment according to manufacturers' specifications.
2. In any area of operations (drill site, compressor station, etc.) where noise levels may exceed federal OSHA safe limits, Pedco would provide and require the use of proper personnel protective equipment by employees.

## **NO ACTION ALTERNATIVE**

Section 1502.14(d) of the NEPA requires that the alternatives analysis "include the alternative of no action." "No Action" implies that ongoing natural gas production activities would be allowed to continue by the BLM in the Project Area, but the proposed Project would be disallowed. An estimated 1.25 acres in the Project Area have been disturbed by existing CBM drilling activities (**Table 2-3**). Additional APDs and ROW actions would be considered by the BLM for federal land on a case-by-case basis consistent with the scope of existing environmental analysis. Transport of natural gas products would be allowed from those wells within the Project Area that are currently productive. Additional gas development could occur on state and private lands within the Project Area under APDs approved by the WOGCC.

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

- An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease (Form 3110-2). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, restrictions are imposed on the lease terms.
- Leases within the Project Area contain various stipulations concerning surface disturbance, surface occupancy and limited surface use. In addition, the lease stipulations provide that the USDI may impose "such reasonable conditions, not inconsistent with the purposes for which [the] lease is issued, as the [BLM] may require to protect the surface of the leased lands and the environment." None of the stipulations, however, would empower the Secretary of the Interior to deny all drilling activity because of environmental concerns.
- Provisions in leases that expressly provide Secretarial authority to deny or restrict APD development in whole or in part would depend on an opinion provided by the U.S. Fish and Wildlife Service (FWS) regarding impacts to endangered or threatened species or habitats of plants or animals that are listed or proposed for listing (e.g., bald eagle). If the FWS concludes that the Proposed Action and Alternatives would likely jeopardize the continued existence of any endangered or threatened plant or animal species, then the APD(s) and Atlantic Rim development may be denied in whole or in part.

## **ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL**

The Project was developed around measures provided in the Interim Drilling Policy - Conditions and Criteria Under Which Development Activities May Occur Concurrent with EIS Preparation for the Atlantic Rim Coalbed Methane Project (**Appendix A**). Only alternatives addressing allowable actions specified in the Interim Drilling Policy are considered in this analysis, outside the Atlantic Rim EIS analysis. All other alternatives would only be considered in the Atlantic RIM EIS analysis. As a result, no alternatives to the Project, other than the No Action Alternative, were considered in this analysis.