2.0 THE PROPOSED ACTION AND ALTERNATIVES

Two alternatives are evaluated in this EA: 1) the Proposed Action (up to nine wells and associated facilities on approximately 2,640 federal acres and an interconnect pipeline along a corridor encompassing approximately 4,095 federal acres) (Section 2.1); and 2) the No Action Alternative (no further federal land development) (Section 2.2). Under the No Action Alternative, federal land would be used to access some CBM development on private land to the extent that a ROW has been issued to Williams to utilize the existing MetFuel road and a road south of the exploration area (Figure 1.1), both of which cross federal land. However, the No Action Alternative would preclude any further federal action, as presented in this document. If the No Action Alternative is selected, Williams may proceed with their project on private land but separate ROWs or sundry notices would be required for action on federal land and a separate NEPA analysis would be completed. The pipeline would not be authorized at this time. Additional alternatives were considered but rejected and these are discussed in Section 2.3.

2.1 THE PROPOSED ACTION

Williams proposes an exploration CBM project located in Townships 23 and 24 North, Ranges 80 and 81 West, Carbon County, Wyoming, approximately 10 mi northeast of Hanna (Figures 1.1 and 1.2). The Proposed Action would involve the development of up to nine wells and associated facilities on federal land and a ROW to construct and operate the interconnect pipeline on federal land. Access is from Hanna along Carbon County Road 291 (Hanna Draw Road). The HDEPA encompasses approximately 18,151 acres, 6,735 acres (37%) of which are federal surface and mineral estate. The exploration project would consist of drilling, casing, completing, and producing up to 16 CBM wells on private land and up to nine wells on federal land administered by the BLM. The 16 wells on private land have been approved and permitted by the Wyoming Oil and Gas Conservation Commission (WOGCC), and access has been authorized by the BLM. Development of the nine wells on federal land would begin in the fourth quarter of 2001. All wells would be located to minimize potentially adverse environmental impacts. Production wells would be spaced at 80 acres or eight wells per 640-acre section.

Ancillary facilities would include access roads, gas and water gathering lines, a power source, a central gathering/metering facility (CGF), a reservoir, and, if the field proves economically viable, a compressor station and the interconnect pipeline. No power lines are currently proposed.

All produced water would be contained in the existing reservoir, and no uncontained surface water discharge is proposed at this time (see Water Management Plan, Appendix B). The Wyoming State Engineer's Office (WSEO) has issued Reservoir Permit No. 11084R to appropriate surface water. In addition, Williams has applied for a National Pollutant Discharge Elimination System (NPDES) permit to discharge produced water from the Wyoming Department of Environmental Quality (WDEQ) (the draft NPDES permit is included in Appendix C). Produced water quality would be monitored in accordance with state and federal regulations.

Two existing improved roads provide the primary access to the field. Field development of 25 wells would require the construction/reconstruction of a maximum of 6.5 mi of access roads with adjacent gas and produced water gathering lines (facilities corridors). An estimated 2.75 mi of new road would be built on federal land and 3.75 mi of road/facilities corridors would be built on private land. Approximately 1.5 mi (not included in the total of 6.5 mi of road construction/reconstruction) of existing undeveloped road have already been upgraded.

Each well would require gas and water gathering lines (gas lines to collect CBM from wells and to transport it to a centralized pod to be located on private land and water lines to transport produced water to a reservoir for containment and evaporation) and a power source. Natural gas gathering lines (made of up to 3-inch diameter high-density polyethelene [HDPE]) from exploration wells would be tied into the CGF for gas metering and subsequent venting. A network of water lines exists on private lands in the project area. Short new lines (up to 6-inch diameter HDPE) would be required to collect produced water on the two federal sections; these would connect to the existing network. Water would be conveyed to a water containment reservoir (Figure 1.1). Each well would interconnect with the 12-inch trunkline via a 6-inch HDPE gathering line. Water lines would converge at the water-containment reservoir. Gas and

water lines would be installed adjacent to and overlapping with the access road ROWs. Power would be supplied by gas-driven engines, propane generators, or gas-powered generators fueled by produced gas.

Overall disturbance on federal land would be approximately 162.7 acres initially and 39.7 acres after preliminary reclamation (Table 2.1).

It is anticipated that it would take approximately 8 days to drill, log, and case each well utilizing a conventional rotary drilling rig and associated rig equipment. Two additional days would be required to run a bond log, perforate, and set a pump with a completion rig. As the project develops, road construction would occur concurrently with well drilling and testing (access roads to a given well would be constructed prior to drilling and testing), and although some level of activity would be continual, peak drilling and construction would be scheduled for the fourth quarter of 2001.

The anticipated life-of-project (LOP) would be from 5 to 30 years, depending upon the success of the exploration project, which is scheduled to occur for 18 months. Additional NEPA analyses would be conducted if additional facilities are required for project development.

2.1.1 Well Pad and Access Road Construction and Drilling Operations

All activities at each well on federal lands in the exploration area would follow procedures approved by the BLM in the well-specific APDs and their attached *Conditions of Approval*.

For all surface-disturbing activities requiring excavation, sufficient topsoil to facilitate revegetation would be segregated from subsoils, stockpiled, and replaced on the surface upon completion of operations as part of the reclamation and revegetation program. Topsoil stockpiles would be stabilized as necessary until used for reclamation. For development activities on private surface, topsoil salvage and replacement procedures would be implemented at the landowner's discretion.

Table 2.1 Types and Approximate Acreage of Disturbance on Federal Land of Proposed Action and No Action Surface Alternatives.

	Proposed Action					
	Initial Disturbance Area (acres)			Life-of-Project (LOP) Disturbance Area (acres)		
Type of Disturbance	Existing	Proposed	Total	Existing	Proposed	Total
Well pads[1]	0.0	10.8	10.8	0.0	2.7	2.7
Facilities corridors[2]	23.7	26.7	50.4	23.7	13.3	37.0
Interconnect pipeline[3,4]	0.0	101.5	101.5	0.0	0.0	0.0
Total	23.7	139.0	162.7	23.7	16.0	39.7

	No Action Alternative					
	Initial Disturbance Area (acres)			Life-of-Project (LOP) Disturbance Area (acres)		
Type of Disturbance	Existing	Proposed	Total	Existing	Proposed	Total
Well pads	0.0	0.0	0.0	0.0	0.0	0.0
Facilities corridors	23.7	0.0	23.7	23.7	0.0	23.7
Interconnect pipeline	0.0	0.0	0.0	0.0	0.0	0.0
Total	23.7	0.0	23.7	23.7	0.0	23.7

1 Assumes initial disturbance of 1.2 acres for each well pad and LOP disturbance of 0.3 acre per well pad.

2 Assumes 2.75 mi of new roads with parallel gas gathering and water discharge lines (80-ft average disturbance width). All disturbance except for the estimated 40-ft wide road travelway and adjacent ditches would be reclaimed for the LOP.

3 Assumes and average disturbance width of 90 ft along the entire 19.5-mi long corridor. An estimated 9.3 mi would cross federal land.

4 The compressor station (about 4.0 acres of disturbance) would be located on private land.

2.1.1.1 Well Pad and Road Construction

Well pads would be leveled and road ROWs constructed using standard cut-and-fill construction techniques and machinery.

Well Pad Construction. Major components of each well pad include a level area for placement/support of the drilling rig and other equipment and an earthen reserve pit to contain drilling fluids. The entire well pad would be cleared of vegetation, and up to 12 inches of topsoil would be removed from all areas of cut, fill, and/or subsoil storage. After topsoil has been removed, the pad would be graded using standard earth-moving equipment (e.g., dozers, scrapers) to prepare a level working surface. Each well location would be designed so that the amount of cut-and-fill material would roughly balance, where feasible, thereby minimizing the need to stockpile excess subsoil adjacent to the well location until site reclamation.

The reserve pit would be excavated using a dozer or other appropriate equipment. Materials excavated from the reserve pit would be stockpiled adjacent to the pit and used to backfill the pit during reclamation. Each reserve pit would be lined with reinforced synthetic liners. If necessary, the reserve pit would first receive a layer of bedding material (e.g., clay, sand) sufficient to prevent contact between the liner and any exposed rocks. The reserve pit would be fenced to protect livestock and wildlife until the pit is reclaimed.

The level area of the wellpad required for initial drilling and completion operations would be approximately 180 x 240 ft, including a reserve pit approximately 65 x 145 ft and 10 ft deep, so average surface disturbance would be about 1.2 acres/well.

Erosion control would be implemented, as necessary, at each well location through prompt revegetation of disturbed areas and by constructing surface water drainage controls such as berms, diversion ditches, and sediment ponds in accordance with the approved reclamation and

Storm Water Pollution Prevention Plans (SWPPPs). All diversion ditches and other surface water and erosion control structures at each location would be shown on maps provided with each APD. SWPPPs would be prepared for all well locations, access roads, and other disturbances of more than 5 acres, as required by the WDEQ.

Road Construction. Proper authorizations would be obtained for all roads, and all roads on federal lands required for the proposed project would be constructed following guidelines specified in the BLM *Manual 9113: Roads* (BLM 1985). Road authorization and use would be coordinated with other area users (e.g., appropriate easements/agreements would be established with private landowners). Roads to be used during construction would be marked with signs indicating which roads are the approved construction access roads. Figure 2.1 illustrates a typical road cross section with parallel natural gas and water gathering lines. Where feasible, gas and water gathering lines would be buried in a single trench under the access road travelway. The average travel surface width for gravel-surfaced local and resource roads would be 24 ft and 16 ft, respectively, with turnouts as necessary (100 ft long with 50-ft tapers spaced intervisibly at 1,000 ft), and all surface disturbance would be contained within authorized ROWs. Approximately 1.5 mi of existing developed road have already been upgraded, and approximately 6.5 mi of new road would be built. Figure 1.1 shows the proposed road locations. However, if existing developed roads cannot be adequately upgraded, new roads may be built at alternate locations to minimize potential adverse impacts, and existing developed roads may be closed and reclaimed. For the analysis of project impacts in this EA, all roads are considered local roads (Figure 2.1). Because roads and gathering lines primarily would be constructed within a single corridor, a corridor about 80 ft wide would be disturbed during construction. Where gas and water gathering lines would be buried under the access road travelway, disturbance width would be less than 80 ft.

Well pad and access road construction would require a maximum of four workers for a period of approximately 5 days per location. These workers would include both heavy equipment operators engaged in road and well pad construction and truck drivers hauling heavy equipment to and from locations. Construction workers would likely be hired locally and contracted by Williams or its agents.

Figure 2.1 Typical Access Road with Gas and Water Gathering Lines, Cross Section with Width Specifications for theProposed Road Type.

Local roads would provide the internal access network for the exploration area, whereas resource roads would be the spur roads that provide access to individual wells from local roads. Roads, including culvert design, improvements, erosion control, etc., would be constructed in conformance with BLM road standards. Design details would be provided with each APD and ROW application. Roads would be located to minimize disturbance and to avoid sensitive resources such as raptor nests and cultural resources. Primary access to the exploration area would be via the Hanna Draw Road (i.e., Carbon County Road 291), which traverses the exploration area. Topsoil on new road ROWs would be salvaged, stored in elongated piles within road ROWs, and seeded to prevent erosion as necessary. Available topsoil (up to 12 inches) would be stripped from all road corridors prior to commencement of construction activities, would be stockpiled, and would be redistributed and reseeded on backslope areas of the borrow ditch after completion of road construction activities. Borrow ditches would be reseeded in the first appropriated season after initial disturbance. If a well is determined to be unproductive, the entire road ROW would be recontoured and reclaimed as soon as practical using stockpiled topsoil and appropriate seeding techniques. Any large rocks that occurred on the ROW prior to construction would be scattered over the ROW after reseeding. Total surface disturbance from road ROWs (including disturbance for adjacent gas and water gathering lines) is estimated at 101.3 acres (50.4 acres on public land) initially and 62.5 acres (37.0 acres public land) for the LOP (Table 2.1).

All roads on federal land would be surfaced with appropriate locally available, weed-free materials according to BLM guidelines. Williams or its agents would acquire appropriate access permits from the Carbon County Road and Bridge Department.

2.1.1.2 Drilling, Casing, and Cementing

Drilling. Following construction of the well pad and access road for a given well, a rotary drilling rig would be transported via truck to the well pad and erected on-site. The level area of the well pad required for initial drilling and completion operations would be approximately 180 x 240 ft, including a reserve pit approximately 65 x 145 ft and 10 ft deep (Figure 2.2). Maximum disturbance at each location would be approximately 1.2 acres, including the area

Figure 2.2 Example Well Location Layout During Drilling.

required for cut/fill slopes and topsoil/subsoil stockpiles. Site-specific NEPA compliance would be completed for each well site on federal lands.

Approximately 8 days would be required to drill, log, and case each well using a conventional rotary drill rig and associated rig equipment. Wells would be drilled to coals in the Hanna Formation at depths of approximately 5,000 ft. The Hanna No. 2 coal is presently proposed for initial exploration (Figure 2.3), but other seams may be explored. Cuttings and all drilling fluids would be contained in the reserve pit, and drilling fluids would be recovered and re-used whenever practical. The reserve pit would be lined, as specified in APDs, to prevent loss of drilling fluids through seepage. If necessary, the reserve pit would first receive a layer of bedding material (e.g., clay, sand) sufficient to prevent contact between the liner and any exposed rocks. The reserve pit would be fenced to protect livestock and wildlife until the pit is reclaimed.

In the event that undesirable materials (e.g., hydrocarbon liquids) are inadvertently discharged to a reserve pit, they would be removed immediately and disposed of in accordance with WDEQ requirements. If any oil in the pit (as evidenced by a sheen on the water surface) is not immediately removed, the pit would be protected to prevent waterfowl use as directed by the BLM.

Approximately 6,000 42-gal barrels (bbl) of water would be required to drill each well (252,000 gal/well; 6,300,000 gal or 19.3 total acre-ft for all 25 wells), and this water would be obtained from the water produced during drilling. Water used to drill one well also may be re-used for drilling subsequent wells.

No abnormal temperatures or pressures or hydrogen sulfide are anticipated to be encountered during drilling. Any shallow water zones encountered would be reported and adequately protected.

Drilling rigs would be contracted by Williams from third parties and would typically employ four workers per 8-hour shift, with one crew on shift and two crews off. These crews would

Figure 2.3 Typical Wellbore Diagram.

reside at their own homes or other living quarters in nearby towns (e.g., Hanna, Rawlins, Sinclair). A number of additional personnel may be required to be on location during various stages of the drilling operation, including a geologist, a mud logger, and other service personnel. In some cases, these individuals would be required to remain on location 24 hours a day during drilling operations, and trailers would be provided on-site for their use.

If any spills of oil, gas, or other noxious fluids occur, Williams would immediately contact the BLM and any other regulatory agencies as necessary, and cleanup efforts would be initiated. These actions would occur at any stage of drilling, completion, operation, or abandonment of facilities.

During drilling and subsequent operations, all equipment and vehicles would be confined to access roads, well locations, and other areas specified in approved APDs, except in emergency situations.

Casing and Cementing. Fresh-water aquifers and potentially minable coal blocks would be protected by running casing--steel pipe--into the open borehole and cementing the casing into place (Figure 2.3). Cementing would also isolate all other formations in the hole and would effectively eliminate the possibility of contamination between hydrocarbon zones and/or water aquifers and other mineral resources. The quality of the primary cement job would be evaluated by running a wireline acoustical geophysical log (cement bond log or "CBL") through the production casing after the primary cement job has had sufficient time to set. When cement is adequately bonded to both the casing and the formation, a favorable acoustic coupling is developed. The degree of bonding within cemented intervals may be determined from the signature of the cased hole acoustic log (i.e., the cement bond log). Williams intends to use sufficient cement volumes to obtain full returns of cement to the surface and to run cement bond logs in all wells completed for production. Whenever partial or incomplete cement bonding is indicated within 100 ft above or below production zones, the casing would be perforated and additional amounts of cement would be pumped into the annulus to isolate the productive zones. A second cement bond log would then be run to determine the effectiveness of the additional cementing, and this procedure would be repeated as necessary to ensure adequate bonding.

2.1.2 Completion and Production Testing

In accordance with 43 C.F.R. 3164, a *Well Completion Report* would be filed with the BLM no later than 30 days after well completion. Following wellbore casing and cementing, potentially productive coal seams of the Hanna Formation would be perforated and tested to determine the ability of each to produce methane at commercially acceptable rates. In the Hanna Basin, Hanna Formation coal seams ("stringers") are typically 40-50 ft in individual thickness, and the total per well coal interval are typically 60-200 ft. During preparation for production testing, the rig used to drill the well would be replaced with a smaller service rig that would operate only during daylight hours. Smaller diameter (2 7/8-inch) tubing would be placed in the cased hole and pumping equipment set below the perforated intervals. Water would be pumped from the completed zone using sucker rod pumping units, progressive cavity pumps, or submersible pumps (Section 2.1.3) until methane flow is established. This procedure may require 560 days or more of pumping to initiate diagnostic gas flow rates. Pursuant to WOGCC regulations and/or BLM Notice to Lessee (NTL) 4A, gas flows would be measured at the surface, and noncommercial volumes of gas would be temporarily flared or vented under controlled conditions at the well site. Venting would be conducted in accordance with WOGCC regulations. Once the permitted venting limit is reached, wells would either be put into production or shut-in for later production. Produced water would flow through gathering lines buried below frostlines to the existing reservoir (see Section 2.1.7) where it would evaporate. Each well likely would be production tested for an estimated 6-18 months to evaluate the commercial feasibility of further development. Routine daily maintenance, including daily pump changes, would be required during the evaluation period.

Based on the results of this initial production test, the coals may be further studied by petroleum engineers to determine if gas flow rates may be augmented through fracture stimulation ("a frac"). A frac is designed to improve gas or fluid movement from the reservoir to the wellbore ("permeability"). In the course of a frac, fresh water or other water-based fluids are pumped down the wellbore and through the casing perforations under sufficiently high pressure to physically fracture the formation rock. Sand grains or other similar proppants are carried in suspension in fluids into the fractures. As the wellhead is opened at the surface, frac fluid flows

back into the wellbore and is discharged at the surface into the reserve pit. Successfully fractured formations will close on the proppants, leaving open channels for gas and liquid to be produced to the wellbore. Excess frac fluid would be evaporated or removed from the site for disposal at an authorized location outside the HDEPA or possibly re-used at another well. Wells may be fractured without proppant.

After reclamation of disturbed areas no longer needed for production, each producing location typically would occupy an area of approximately 0.3 acre.

Within 365 days after termination of drilling and completion activities, the liquid contents of the reserve pit, if any, would be removed and disposed of at an approved waste disposal facility. If adverse weather conditions prevent removal of the fluids from the reserve pit within 365 days, an extension may be granted by the BLM. If necessary, under special circumstances, reserve pit contents would be removed and disposed of at an appropriate facility and in a manner which satisfies all relevant state and federal regulations and stipulations. The reserve pit would be reclaimed by filling it with the spoil removed during initial pit construction, spreading previously stored topsoil, and reseeding according to BLM or surface owner specifications. Reserve pit back-filling and reseeding would not normally occur until after production testing, since the pit is generally used to hold liquids during such operations.

Production testing would, on average, require two workers for 90-540 days for every seven wells, for a total of seven workers (see Section 2.1.10).

2.1.3 Production

While natural gas production from wells may not occur for some time, to facilitate dewatering some well site production facilities would be installed once wells have been completed (see Section 2.1.8.2). A facilities/site security diagram (Figure 2.4) would be filed with the BLM within 30 days of installation. The operator would adhere to all site security regulations as specified in *Onshore Oil and Gas Order No. 3*.

Figure 2.4 Typical Producing Well Layout.

Rod-type pumping units or submersible pumps (powered by gas-driven engines, propane generators, or gas-powered generators fueled by produced gas) would be used to dewater the wells. In some wells, produced water and gas would be separated at the wellhead. Other wells would not require separators, as the water and gas would separate in the well casing. No uncontained surface discharge is proposed at this time. Water produced during initial production operations would be contained in reserve pits at each well location. All subsequent produced water would be contained in the reservoir. Williams has applied for an NPDES permit for the discharge of produced water into the containment reservoir (Appendix C). Water would be delivered from each well to the reservoir via water gathering lines (see Section 2.1.8 and Appendix B, Water Management Plan). Produced water quality would be monitored in accordance with state and federal regulations. Pumping units may be enclosed by a small shelter to avoid damage from wind, snow, and cold weather.

If the exploration field is economically productive, a small, centrally located, natural gas-fired compressor (e.g., 400 horsepower [hp]) would be installed on private land. Gas volumes would dictate the amount of compression required. Similarly, the 19.5-mi long pipeline would be constructed only if Williams deems it viable to transport gas from the field. Gas exiting the wellbore would be transported from each well through the natural gas gathering system to the CGF and compression station (see Section 2.1.4).

Williams anticipates production of up to 400 thousand cubic feet of gas per day (mcfgpd) from each well, which may require well site compressors. On-location compressors would be located and muffled to minimize noise and would comply with all applicable WDEQ, Air Quality Division (AQD) permitting requirements, as necessary. Williams would evaluate on-location compression needs as the project develops.

No electric-powered compression is proposed as part of the exploration project, and thus no electrical ROWs would be required.

All wells would be operated in a safe manner according to standard industry operating procedures. Routine maintenance of the producing wells would be necessary to maximize

performance and to detect operational difficulties. Each well site would be monitored daily to ensure operations are proceeding safely and efficiently. This visit would include, but would not be limited to, checking gauges, valves, fittings, and other on-site facilities. Routine on-site equipment maintenance would also be performed as necessary. All roads and well sites would be regularly inspected and maintained (e.g., regraded, resurfaced, watered) to minimize dust and erosion and to assure safe operations.

2.1.4 Compressor Station

If the pilot project proves successful, a methane compression facility may be constructed within the exploration area. Methane from the exploration area would be delivered to the compressor station via gas gathering lines. Once the methane reaches the compressor station, dehydration units would remove residual water from the gas, and this water would be evaporated from the dehydration unit. All of the applicant-committed practices applied to the proposed project would also be applied to the construction and operation of the compressor station and the pipeline (Section 2.1.13). Impacts of compressor station construction and operation are evaluated in this EA.

Williams would adhere to all applicable Wyoming Ambient Air Quality Standards (WAAQS), National Ambient Air Quality Standards (NAAQS), permit requirements (including preconstruction testing, and operating permits), and other regulations, as required by the WDEQ/AQD.

2.1.5 Workovers

Workovers are periodically necessary to correct downhole problems in a producing well to return the well to production. Workovers are implemented on an as-needed basis and are undertaken to increase or maintain production from the current downhole producing zone; to recomplete in a new zone; to lower operating costs by reducing water and/or sand production; or to return the well to its production objective by pulling and replacing leaking tubing or pulling

and repairing lift equipment. Workovers normally take 3 to 4 days and would be scheduled to minimize potential adverse effects to sensitive environmental resources.

2.1.6 Natural Gas Collection Lines

Gas collection lines for in-field gas collection (gathering system) would be installed to bring methane from individual well sites to the CGF and the interconnect pipeline. Gas collection lines would generally be located adjacent to roads or under the access road travelways, where feasible, and all necessary authorizing actions for the lines would be addressed prior to installation. A total of approximately 8.0 mi of gas and water collection lines would be installed within the 80-ft wide facilities corridor.

Sufficient topsoil to facilitate reclamation would be removed from collection line ROWs and stockpiled before construction; however, ROWs that do not require major excavation may be stripped of vegetation to ground level (scalped) by mechanical cutting, leaving topsoil intact and root masses relatively undisturbed. Scalping, coupled with ripping of compacted soils, would facilitate vegetation re-establishment.

A 3- to 5-ft deep trench would be excavated with a trencher or backhoe. Up to 3.0-inch diameter HDPE conduit would be buried at depths of 3.0-4.5 ft, except at major road and railroad crossings, where the depth would be at least 6 ft. Spoil and topsoil would be windrowed separately .

All of the project-wide environmental practices and protection measures identified in Section 2.1.13 would be applied to the construction and operation of gas collection lines.

2.1.7 Interconnect Pipeline

Depending upon the success of the pilot project, gas would be transported from the exploration area through a new interconnect pipeline connecting the field with an interstate gas pipeline along the Interstate 80 (I-80) corridor to the south. The interconnect pipeline generally would

be located along the same route as was proposed in the MetFuel EIS (Figure 1.2) but would extend about 12 mi further south. The pipeline would consist of 8- to 16-inch diameter steel pipe.

The construction corridor would be cleared of aboveground vegetation, obstacles, and up to 12 inches of topsoil, except in flagged areas of cultural significance where no topsoil would be removed. Typically, a 90-ft work space would be disturbed during pipeline construction. In areas of steep terrain, cuts, gullies, or stream crossings, some grading would be necessary to provide a safe and suitable working area; otherwise, no grading is proposed.

After the construction area is cleared and graded, a trench 3- to 5-ft deep would be excavated with a trencher or, in rocky areas or where the pipelines change direction, with a backhoe.

Pipe and other construction materials would be hauled to the pipeline corridor by semi-trucks and strung along the ROWs. One pipe yard occupying a maximum of approximately 2 acres would be located within the construction ROW.

A bending machine would be used to bend pipe to fit the trench. Sections of pipe would then be aligned and welded together, and joint coating would be applied. Cathodic protection to prevent corrosion would be installed according to industry standards within 1 year of pipeline installation. Side-boom caterpillars would be used to lower the pipe into the trench (Figure 2.5). The trench would be padded as necessary with sand or soil using ditch-padding techniques. After the pipeline is placed in the trench, the trench would be backfilled using an angle dozer or auger and the soil would be compacted to prevent subsidence. Any excavated material that cannot be placed in the trench would be disposed of in conformance with applicable landowner or agency requirements (e.g., spread/feathered over the disturbed area prior to topsoil replacement). No trench berms would remain on the surface unless approved by the BLM, and no rock foreign to the surface would remain exposed.

All paved roads and railroad crossings would be horizontally bored or directionally drilled to minimize disturbance to these areas. Boring and drilling sites would require some additional

Figure 2.5 Typical Pipeline Construction Layout (Cross Section).

disturbance outside the 90-ft construction ROW. Bore and drill sites would require up to 10,000 ft^2 (100 x 100 ft on each side of crossing), of which approximately 9,000 ft^2 would be within the construction corridor, for a total of 1,000 ft^2 additional disturbance per bore/drill. Assuming four potential bores/drills (the exact number to be determined when the pipeline alignment is finalized), an additional 4,000 ft^2 would be disturbed; however, no surface disturbance would occur on that portion of the ROW that was bored or drilled.

No new roads would be required for pipeline construction. Existing roads, fences, structures, or drainage facilities that are damaged during construction would be replaced or repaired to a condition equal to or better than that which existed before construction. Fences crossed during construction would remain down during daylight hours while construction is occurring; however, when daily construction activities are complete, fences would be reinstalled in a manner to minimize livestock passage. In the event that existing roads used to access the pipeline route require upgrades, appropriate on-site investigations (e.g., cultural resource inventories) would be conducted prior to road improvements, and if road repairs/upgrades are required, they would be done in accordance with BLM *Manual 9113: Roads* (BLM 1985).

After pipeline construction is complete, approximately 55 line markers would be installed above the pipe at line-of-site intervals and at road crossings to identify the approximate pipeline location within the ROW. Line markers would be equipped with anti-perching devices on areas within 2.0 mi of greater sage-grouse leks, would be colored to match the surrounding landscape, and would be strong enough to withstand livestock use for scratching. Approximately 528 cathodic protection test stations and five new block valves would also be installed, and all of these features would be located within the authorized ROW.

No new material or borrow sites or new rock disposal sites are anticipated to be necessary for pipeline construction. No construction would take place when the soil is too wet to adequately support construction equipment or when watershed damage is likely to occur. If equipment creates surface ruts more than 4 inches deep, Williams would suspend construction activities until the soil is sufficiently dry unless otherwise authorized by the BLM. No frozen soils or soil mixed with snow would be used in construction.

All equipment and vehicular access to the pipeline would be confined to existing BLM-approved roads and established ROWs. No new or rerouted roads would be required for pipeline construction or operation.

Equipment used to construct the proposed pipeline would include but is not limited to trenchers, tractor trailers, stringing trucks, 2-ton trucks, lowboy trucks, lube and fuel trucks, buses, pickup trucks, trenchers, ditch-padding machines, seed drillers, tractors, backhoes, trackhoes, side-boom tractors, dozers, welding trucks, and directional drilling or boring equipment.

2.1.8 Water Supply and Disposal

2.1.8.1 Water for Drilling

Water for drilling wells would come from produced water from existing wells. Water used to drill one well would be re-used to drill subsequent wells where practical.

2.1.8.2 Dewatering Operations

More than 90% of methane stored in coal is adsorbed onto coal surfaces or absorbed within the coal (Jones and DeBruin 1990). The Tertiary coals of the western Hanna Basin are water-bearing, and desorption of methane gas occurs when the formation hydrostatic pressure is reduced by pumping water out of the coalbed through a wellbore. As hydrostatic pressure drops, the physical bond between carbon (coal) and methane molecules is broken, and methane bubbles form and flow in a water solution towards the zone of lower pressure at the wellbore. Therefore, to create favorable conditions for the release of methane gas, water must be produced prior to and during methane extraction, especially during initial coalbed dewatering. Williams would file for the appropriation of the water rights for all produced waters, and dewatering permits would be obtained from the WSEO. If these waters are of sufficient quality and quantity, they may be made available to local users.

Based on limited data from the seven of the nine wells completed on private land, the maximum initial water discharge rate from each well would be about 550 barrels per day (bpd) (0.036 cubic feet per second [cfs]) (see Appendix B, Water Management Plan). The water discharge rate per well is expected to decrease to about 350 bpd (0.023 cfs) during the first 18 months of pumping. Actual discharge values may be greater or less depending on geologic conditions, pumping equipment limitations, interference of adjacent wells, and reservoir enhancement methods.

Pumping equipment used for the dewatering phase of the proposed project would be the same type generally used by the petroleum industry to lift oil and/or water (i.e., rod-type pumping units and/or electric submersible [downhole] pumps). Williams will likely use downhole progressive cavity (pc) pumps, which employ a mechanical drivehead, sucker rods inside a tubing string, and an engine powered by an electric generator, diesel, propane, or produced natural gas. These units would be selectively employed within the HDEPA and likely would be gasoline- or propane-powered during the early phases of development.

The pc-type pumping unit most likely to be used would be a BMW 175-6000, which employs a 30 hp motor and is capable of pumping a daily maximum rate of about 600 bpd (25,200 gal/day). These units are designed to be submerged in the wellbore below the standing fluid level at the bottom of the tubing string and below the intervals at which the coals are perforated. Electric power would be supplied at each well site by a propane-powered generator. Submersible pumps may be replaced by beam pumps at some well sites as water production rates decline--probably in the second year of production.

2.1.8.3 Disposal of Produced Water

Produced water would be disposed of in the existing reservoir constructed by Williams specifically for produced water disposal (Appendix B, Water Management Plan). Produced water would be transported from well locations to the reservoir via buried water pipelines (Figure 2.1) where it would evaporate. Produced water pipelines generally would be located between natural gas pipelines and roads within the 80-ft wide facilities corridor. The reservoir is unlined and impounded by an earthen dam. It is designed to contain all water produced by the

exploration project. The reservoir would have a maximum capacity of 500 acre-ft while maintaining a freeboard of 5 ft. The relationship between water elevation, reservoir area, and total storage is presented in Table 2.2.

The Water Management Plan (Appendix B) is designed to minimize peak water discharge volumes. Production wells would be scheduled to go online successively to flatten the peaks in the water production curve. During production activities, the maximum cumulative discharge rate for all wells in the exploration area would be about 13,750 bpd (0.89 cfs), whereas the steady state rate would be approximately 8,750 bpd (0.57 cfs). Water quality of the discharge water from wells on federal surface and mineral would be regulated pursuant to a WDEQ, Water Quality Division (WQD) NPDES permit, which has been applied for by Williams (Appendix C). Additionally, if approved by BLM and WDEQ/WQD, small quantities of suitable quality

Table 2.2 Reservoir Stage-Capacity-Area Relationship.

Elevation (ft)	Area (acres)	Total Storage (acre-ft)
6,896	0.27	0.00
6,898	4.40	4.40
6,900	14.02	22.55
6,902	20.14	56.71
6,904	25.42	102.27
6,906	30.05	157.74
6,908	33.98	221.77
6,910	37.69	293.44
6,912	41.35	372.48
6,914	44.77	458.62
6,915[1]	46.35	500.00
6,916	47.92	551.33
6,918	50.93	650.19
6,920	53.92	755.04[2]

[1] Reservoir designed for 500 acre-ft of storage with 5 ft of freeboard.
[2] Maximum reservoir capacity.

produced water may be used on project-required roads and during pipeline construction for dust suppression.

2.1.8.4 Hydrostatic Testing

The interconnect pipeline would be pressure-tested with water once it is in place. The pipeline would be filled with water and pressurized to 125% of its designated operating pressure for 8 hours to verify integrity, or other requirements identified in 49 C.F.R. 195.303 would be applied. Test water would be acquired from the Town of Hanna. A total of approximately 620,000 gal (1.9 acre-ft) of water would be required for pipeline testing.

All hydrostatic water testing and discharge would be approved by the WDEQ/WQD. A hydrostatic testing plan would be prepared. Test water would be discharged to the reservoir or to ephemeral drainages at a rate commensurate with the drainage capacity and, prior to release, hydrostatic test water would be tested and processed, if necessary, to ensure that it meets local, state, and federal water quality standards. Before discharging any hydrostatic test water from the pipeline, suitable energy dissipaters would be installed at pipeline outlets to prevent scouring or erosion. Materials such as sandbags, filters, straw bales (weed free), or rock would be placed in the receiving channel. The design and placement of any energy dissipating structures placed on federal land would be approved by BLM prior to installation. Upon completion of testing, all installed materials and objects would be removed from the site.

2.1.9 Hazardous Materials

Williams would maintain files containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances that would be used during the course of construction, drilling, completion, and production operations. Williams has reviewed the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act of 1986* (SARA), as amended, to identify any hazardous substances proposed for use in this project, as well as the U.S. Environmental Protection Agency's (EPA's)

List of Extremely Hazardous Substances as defined in 40 C.F.R. 355, as amended. Substances that may be used or produced by this project are listed in Appendix E.

Williams and its contractors would comply with all applicable hazardous material laws and regulations existing or hereafter enacted or promulgated. Williams and its contractors would locate, handle, and store hazardous substances in an appropriate manner that prevents contamination of soil and water resources or otherwise sensitive environments. Any release of hazardous substances (leaks, spills, etc.) in excess of the reportable quantity as established by 40 C.F.R. Part 117 would be reported as required by the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), as amended. If the release of a hazardous substance in a reportable quantity occurs, a copy of the report would be furnished to the BLM and all other appropriate federal and state agencies.

Williams would evaluate its overall field operations and prepare and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans, as necessary. The plans would include accidental discharge reporting, cleanup, and maintenance procedures. Copies of all plans would be available to all appropriate Williams personnel, contractors, and field workers. Copies would also be kept at Williams's Denver, Colorado, office, together with a Hazardous Communication Program. SARA Title III (community right-to-know) information would be submitted annually as required, with copies kept in Williams's office. A waste minimization plan would not be required since Williams does not generate hazardous waste; however, Williams would employ measures to minimize the amount of all wastes generated.

Hazardous chemicals contained in diesel fuel, gasoline, and coolant (ethylene glycol) would not be stored in floodplains or near live water, nor would any vehicle refueling occur in such areas. Fuels and coolants that may enter floodplains would be contained in the fuel tanks of vehicles or other equipment, and the chance of a spill would be negligible.

2.1.10 Workforce Requirements

A total of approximately 15.0 worker-years would be required for gas field development and operation over the LOP (Table 2.3). Pipeline construction would require about 40 workers for 3 months (40 workers x 90 days = 14 worker-years). Additional workers would be used for

Table 2.3 Estimated Workforce Requirements.[1]

Assignment	Worker-days Per Well[2]	Total Worker-years for Project[2]
Well Construction and Development		
Construction (3 days x 4 workers)	12	1.2
Drilling (8 days x 4 workers x 3 shifts)	96	9.2
Completion (4-day average x 3 workers)	12	1.2
Operations and Maintenance		
Production (18-month exploration period)[3]	154	14.8
Abandonment (Reclamation) (2 days x 2 workers)	4	0.4
Total	278	26.8

1 Assuming that all 25 wells are drilled and completed as producers.
2 1 worker-day = 8 hours; 260 worker-days = 1 worker-year.
3 Assumes two workers per seven wells for 18 months during production testing.

surveying, engineering, maintenance, inspection, and other specialty services. Construction workers would be hired from the local work force when available; otherwise, workers from outside the area would be hired.

2.1.11 Field Camps

No field camps are proposed for the project. Project personnel would commute to the work site daily, most likely from the Hanna, Rawlins, and Sinclair areas.

2.1.12 Abandonment and Reclamation

Reclamation would be conducted on all disturbed public lands in compliance with the BLM *Wyoming Policy on Reclamation* (BLM 1990b). The short-term goal of the reclamation program is to stabilize disturbed areas as soon as possible after disturbance to protect sites and adjacent undisturbed areas from degradation. The long-term goal is to return the land to conditions approximating those that existed prior to disturbance.

Reclamation would occur during two phases of the proposed project. Initially, well pads and facilities corridors would be partially reclaimed after well testing and production/ancillary facilities are installed. This initial reclamation would reduce the amount of disturbed area to only that necessary for production operations. Final reclamation at the end of the LOP would involve reclamation of all remaining disturbed areas. In addition, all unproductive well sites and the ROWs to these sites would be reclaimed as soon as practical during the LOP.

2.1.12.1 Initial Reclamation

After installation of production equipment, the well pad needed for a producing well would be reduced from approximately 1.2 acres to approximately 0.3 acre. Drilling and other fluids contained in reserve pits would be evaporated and covered in place as authorized by the BLM and/or WOGCC. If necessary, the material would be removed from pits and disposed of at an authorized location outside of the HDEPA (e.g., existing lined evaporation ponds or injector wells). The unused portion of the pad would be recontoured and reseeded within 1 year. Reclamation specifications, including methods and seed mixes, would be developed by Williams in consultation with the BLM or the private landowner. Reseeding would also be performed on all portions of roads, gathering line ROWs, the pipeline ROW, and well pads that do not need to remain disturbed during production. The entire pad and resource road for all unproductive locations would be reclaimed according to BLM or private landowner specifications as soon as possible after testing. Wells would be plugged and abandoned as authorized by BLM and/or WOGCC. Alternative WDEQ-, WOGCC-, BLM-, and Mine Safety and Health Administration-(MSHA-) approved plugging procedures may be employed at specific public land locations and within specific coal seams to ensure that minable coal seams are protected.

After the exploration phase of the project, water in the reservoir would be allowed to evaporate. The private landowner may wish to maintain a reservoir for stock watering, in which case Williams would lower the dam so that the reservoir's size is more appropriate for use as a stock pond. If the landowner does not wish to use the reservoir, the dam would be removed after all water has evaporated, and the area would be reclaimed.

2.1.12.2 Final Reclamation/Abandonment

At the end of the pilot project's life (from 5 to 30 years), additional NEPA analyses would be conducted for project continuance or Williams would obtain the necessary authorizations from the appropriate regulatory agencies or private landowners to abandon facilities. Wells would be permanently or temporarily plugged or shut-in until decisions are reached regarding future production options. Pipelines would be purged of all combustible products and retired in place or removed, based on authorizing agency or landowner specifications. All aboveground facilities would be removed, and all unsalvageable materials would be disposed of at authorized sites. Roads would be reclaimed or left in place based on authorizing agency or landowner preference. Reclamation procedures would be based on site-specific requirements and techniques commonly employed at the time the area is reclaimed. Regrading, topsoiling, and revegetation of disturbed lands would be completed. Abandoned ROWs would revert to the private landowner or appropriate agency control. Compacted areas would be thoroughly ripped to a depth of 12-18 inches before topsoil is replaced. A seed mix approved by the BLM or private landowner would be broadcast or drill seeded.

2.1.13 Project-Wide Environmental Practices and Protection Measures

The following section describes applicant-committed and agency-required measures and procedures that would be implemented to avoid or mitigate resource or other land use impacts within the HDEPA. The BLM may waive mitigation measures and design features if after a thorough analysis the BLM determines that the resource(s) for which the measure was developed would not be impacted and/or alternative BLM-approved measures or guidance for protecting the resource(s) are developed (e.g., alternate survey methodologies). Further site-specific mitigation measures may be identified during NEPA, APD, and ROW application processes.

With the exception of environmental practices and protection measures for cultural resources, paleontological resources, and greater sage-grouse, mitigation measures identified in this EA would be adhered to on federal and private land, subject to landowner preferences or agreements with Williams. Mitigation for cultural resources, paleontological resources, and greater sage-grouse would be applied on all federal land and on private land affected by any federal undertaking unless landowner denial for access is documented in writing.

2.1.13.1 Preconstruction Planning and Design Measures

Well pads and associated access roads and gathering lines and the interconnect pipeline would be designed and located to minimize disturbance to areas of high wildlife habitat and/or recreational value, including wetlands and riparian areas.

To allow project activities to proceed in restricted areas and/or during periods of restriction (e.g., mild winters, unused raptor nests or potential greater sage-grouse breeding/nesting sites, etc.), approval from the BLM in consultation with other agency personnel (e.g., Wyoming Game and Fish Department [WGFD], U.S. Fish and Wildlife Service [USFWS], the U.S. Army Corps of Engineers (COE), and State Historic Preservation Office [SHPO]) would be required. This approval would be acquired prior to the initiation of specific project activities (i.e., well pad construction, drilling, completion, and facility installation) on areas requiring federal authorization when sensitive resource constraints are involved.

2.1.13.2 Disposal of Sewage, Garbage, and Other Waste Material

Portable self-contained chemical toilets would be provided for human waste disposal. Upon completion of operations, or as required, toilet holding tanks would be pumped and their contents disposed of at an approved sewage facility in accordance with applicable rules and regulations regarding sewage treatment and disposal. Each well site would be provided with one or more such facilities during drilling and completion operations.

All garbage , trash, refuse, etc., would be collected in self-contained portable dumpsters or trash cages, and, upon completion of operations or as needed, the accumulated trash would be hauled off-site to an approved sanitary landfill. No trash would be placed in the reserve pit.

As soon as practical after removal of the drilling rig, all debris and other waste materials not contained in the trash cage would be cleaned up, removed from the well location, and disposed of at an approved landfill. No potentially harmful materials or substances would be left on location.

2.1.13.3 Cultural Resources

Impacts to cultural resources would be mitigated following procedures as specified in 36 C.F.R. 800 and/or the national programmatic agreement for cultural resources and statewide protocol. Class I and Class III inventories would be conducted prior to disturbance on all federal lands and on state and private lands affected by federal undertakings unless landowner denial for access is documented in writing. Where landowners deny access, alternative cultural resource mitigation resolution methodologies may be applied or the development may be denied. In selected areas identified by the BLM, cultural resource surveys may require testing and/or mitigation to determine significance. All resources identified during these inventories would be evaluated for eligibility for the NRHP by the BLM, and the SHPO would be consulted as necessary under the statewide protocol. In addition, all eligible or listed sites identified in Class I and Class III inventories would be avoided or mitigated, as would areas with high potential for significant cultural deposits--such as aeolian deposits, alluvial deposits along perennial waterways and other major drainages and terraces, and colluvial deposits at the base of low slopes and hills, where possible. If any NRHP (eligible or listed) sites found within proposed disturbance areas cannot be avoided, a data recovery program or other mitigation would be implemented as deemed appropriate by the BLM in consultation with the SHPO, the Advisory Council on Historic Preservation as necessary, and Williams. Cultural sites identified during inventories would be avoided, where possible.

If a large number of sites cannot be avoided or other adverse effects may occur, a programmatic agreement among the aforementioned parties may be developed. Programmatic agreements would usually be in place when properties are subjected to mitigation through data recovery. Additionally, programmatic agreements and/or discovery plans may be required to be in place prior to approval of APDs or ROW applications in areas with high densities of cultural resource sites, which may occur along culturally sensitive areas such as the ephemeral drainages that flow through the HDEPA.

In addition to Class I and Class III inventories, construction activities in areas where the BLM believes there is a high potential for buried cultural deposits may be monitored by a

BLM-permitted archaeologist. If historic or prehistoric materials are discovered on public land by Williams or its contractors during construction, further surface-disturbing activities at the site (in an area defined by the BLM) would cease immediately, and the BLM would be notified by Williams to assure proper handling of the discovery by qualified archaeologists. An evaluation would be made by the BLM to determine appropriate actions to prevent the loss of significant cultural resources. Williams may be responsible for the cost of site evaluation and mitigation; any decision as to proper mitigation (e.g., data recovery) would be made by the BLM after consulting the SHPO, the Advisory Council on Historic Preservation as appropriate, and Williams.

The BLM would require that all field personnel be informed by Williams of the importance of cultural resources and the regulatory obligations to protect such resources. Any cultural resource (historic or prehistoric site or object) discovered on public land by Williams or any person working on their behalf would be reported immediately to the BLM. The BLM would require Williams to instruct field personnel not to disturb cultural resource sites or collect artifacts and that disturbance and collection of cultural materials from public land is prohibited and against the law.

2.1.13.4 Paleontological Resources

If paleontological resources are uncovered during ground-disturbing activities, Williams would suspend all operations that may further disturb such materials and immediately contact the BLM, who would arrange for a determination of significance and, if necessary, would recommend a recovery or avoidance plan. Mitigation of paleontological resources would be on a case-by-case basis, and Williams would incur costs associated with BLM-required mitigations. Surface-disturbing activities would not resume until a Notice to Proceed is issued by the BLM.

2.1.13.5 Nonnative Invasive Species

Williams would control nonnative invasive species along ROWs and at wellpads, as well as on areas where the weeds originate on the ROW and invade adjacent areas. A list of nonnative

invasive species is provided in Section 3.2.1.3, which was obtained from the BLM and Carbon County Weed and Pest Office. On BLM lands, an approved Pesticide Use Proposal would be obtained before the application of herbicides or other pesticides for the control of nonnative invasive species.

Herbicide applications would be kept at least 500 ft from known special status plant populations.

Removal or disturbance of vegetation would be kept to a minimum through construction site management by utilizing previously disturbed areas, using existing ROWs, designating limited equipment/materials storage yards and staging areas, and other appropriate means.

Williams would seed and stabilize disturbed areas in accordance with BLM-approved reclamation guidelines and/or private landowner specifications.

2.1.13.6 Vegetation

Removal or disturbance of vegetation would be kept to a minimum through construction site management by utilizing previously disturbed areas, using existing ROWs, designating limited equipment/materials storage yards and staging areas, and other appropriate means.

Vegetation and soil removal would be accomplished in a manner that would minimize erosion and sedimentation.

Williams would seed and stabilize disturbed areas in accordance with BLM-approved reclamation guidelines and/or private landowner specifications.

2.1.13.7 Wetlands, Other Special Aquatic Sites, and Other Waters of the U.S.

Williams would evaluate all project facility sites for occurrence of wetlands, other special aquatic sites, and other waters of the U.S. according to COE's requirements. Efforts would be made to avoid these sensitive areas. If wetlands or other special aquatic sites, riparian areas, streams, and

and WDEQ Section 401 ephemeral/intermittent stream channels are likely to be disturbed, COE Section 404 permits/authorizations would be obtained as necessary, and appropriate mitigation would be implemented.

2.1.13.8 Road Construction/Transportation

Existing roads would be used to the maximum extent possible and upgraded as necessary. To decrease potential impacts, the number and mileage of roads would be limited by discouraging development of looped roads and by accessing wells from short resource roads off local roads. All roads would be constructed for the specific purpose of field development. Site-specific analysis under standard BLM procedures would be conducted for all roads during development.

All roads would be constructed with adequate drainage and erosion control structures (i.e., relief culverts, drainage culverts, wing ditches, etc.). Details would be provided in each APD and ROW application.

Roads would be built, surfaced, and maintained to provide safe operating conditions at all times as determined by the BLM, and all roads in areas of rough terrain or high erosion potential would be designed and monitored during construction by a professional engineer. The area disturbed would be minimized to reduce impacts and to reduce the area requiring reclamation.

All development activities along approved ROWs would be restricted to areas authorized in approved ROWs.

Available topsoil (up to 12 inches) would be stripped from all road corridors prior to commencement of construction activities, would be stockpiled, and would be redistributed and reseeded on backslope areas of the borrow ditch after completion of road construction activities. Borrow ditches would be reseeded in the first appropriate season after initial disturbance.

All project-related roads not required for routine operation and maintenance of producing wells or ancillary facilities would be closed and reclaimed as soon as possible as directed by the BLM

or private landowner. As necessary, these roads would be permanently blocked, recontoured, reclaimed, and revegetated by Williams, as would disturbed areas associated with permanently plugged and abandoned wells.

Williams would be responsible for maintenance of roads in the HDEPA and for closure of roads following production activities.

Williams would maintain roads in a safe usable condition. A regular maintenance program would include, but not be limited to, blading, ditching, culvert and cattleguard maintenance/ replacement, and surfacing, as needed. Design, construction, and maintenance of roads would be in compliance with the standards contained in BLM Manual 9113: Roads (BLM 1985), and in the "Gold Book," *Oil and Gas Surface Operating Standards for Oil and Gas Exploration and Development, Third Edition* (BLM and U.S. Forest Service 1989). No off-road travel would occur, except in emergency situations.

During drilling and production operations, traffic would be restricted to Carbon County Road 291, and roads developed for the project. Use of unimproved roads would be allowed only in emergency situations. Speed limits would be set commensurate with road type, traffic volume, vehicle types, and site-specific condition, as necessary, to assure safe and efficient traffic flows. Signs would be placed along roads, as necessary, to identify speed limits, travel restrictions, and other standard traffic control information. In addition, newly developed or improved roads through crucial wildlife areas would be gated and locked as directed by the BLM to prevent unnecessary wildlife disturbances.

Williams would comply with existing federal, state, and county requirements and restrictions to protect road networks and the traveling public.

Special arrangement would be made with the Wyoming Department of Transportation (WDOT) and Carbon County to transport oversize loads to the HDEPA. Otherwise, load limits would be observed at all times to prevent damage to existing road surfaces.

2.1.13.9 Hazardous Materials

Williams and its contractors would manage all hazardous materials in compliance with all federal, state, and local regulations. If necessary, a SPCC Plan would be in place and would be followed in the event of a spill. Williams would prepare a field-wide SPCC Plan and, after each well is drilled and determined to be suitable for production, would prepare a SPCC Plan specifically for that well. Copies of the SPCC Plans would be given to all appropriate Williams personnel, contractors, and field personnel and would also be available at Williams's Denver, Colorado, office.

2.1.13.10 Air Quality

Williams would adhere to all applicable WAAQS, NAAQS, and permit requirements, including preconstruction testing, operating permits, and other regulations, as required by the WDEQ/AQD.

Williams would initiate immediate abatement of fugitive dust by application of water, chemical dust suppressants, or other measures on federal lands and during times of high use (i.e., construction, drilling, and workover operations) 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 exceedences of applicable air quality standards. The BLM would approve dust control measures, locations, and application rates. If watering is the approved control measure, Williams would obtain water from BLM-approved sources, possibly including the water produced from existing CBM wells. Use of produced water for uses other than disposal in the reservoir would be approved by WDEQ prior to implementing the alternate use.

2.1.13.11 Topography and Physiography

The BLM may deny all proposed surface disturbances, except those associated with pipeline construction, within 500 ft of perennial surface water and/or wetland areas and/or within 100 ft of intermittent and ephemeral drainage channels. Additionally, the BLM may deny activities in

areas with high erosion potential and/or rugged topography. Any disturbance in the aforementioned areas would require site-specific mitigations. All roads would be crowned, ditched, and appropriately surfaced (e.g., graveled).

Areas with high erosion potential and/or rugged topography (i.e., steep slopes, stabilized sand dunes, floodplains, unstable soils) would be avoided where practical. Special mitigation measures to control erosion would be applied to such areas if they are disturbed.

Upon completion of construction and/or production activities, Williams would restore the topography to near pre-existing contours at well locations, facilities corridors, pipelines, and other facility sites.

2.1.13.12 Soils

The BLM may deny all proposed surface disturbances, except those associated with pipeline construction, within 500 ft of perennial surface water and/or wetland areas and/or within 100 ft of intermittent and ephemeral drainage channels.

All roads would be crowned, ditched, and appropriately surfaced (e.g., graveled). The BLM may require Williams to apply gravel or other appropriate road-surfacing materials to specific HDEPA roads. Five feet of fill may be required over reclaimed reserve pits. The BLM may also limit surface disturbance (e.g., limiting ROW surface grading) during gas and water line and interconnect pipeline construction.

Sufficient topsoil to facilitate revegetation would be segregated from subsoils during all construction operations and returned to the surface upon completion of operations. Topsoil stockpiles would be seeded or otherwise protected to prevent erosion and to maintain soil microflora and microfauna.

Williams would keep the area of disturbance to the minimum necessary for drilling activities and subsequent production activities while providing for safety.

No off-road travel would occur except in emergency situations.

Williams would minimize project-related travel during periods when soils are saturated and excessive road rutting (e.g., >4 inches) may occur.

Where practical, Williams would locate gas and water gathering lines immediately adjacent to roads or existing utility corridors to avoid creating additional disturbance.

Surface disturbance and/or occupancy would not occur on slopes in excess of 25%, nor would construction occur with frozen or saturated soil material or when watershed damage is likely, unless an adequate plan is submitted to the BLM that demonstrates potential impacts would be mitigated.

Temporary erosion control measures such as mulch, jute netting, or other appropriate methods would be used on unstable soils, steep slopes, and wetland areas to prevent erosion and sedimentation until vegetation becomes established.

Williams would minimize disturbance to vegetated cuts and fills on new and existing roads.

Williams would replace topsoil or suitable growth materials over all disturbed surfaces prior to revegetation.

Williams would revegetate all disturbed sites as soon as practical following disturbance.

2.1.13.13 Water Resources

Williams would adhere to the mitigation and monitoring measures identified in WDEQ/WQD water discharge permits. All project actions would be conducted in compliance with the *Clean Water Act*.

Williams would follow all practical alternatives and designs to limit disturbance within drainage channels, including ephemeral and intermittent draws.

The BLM may deny all proposed surface disturbances, except those associated with interconnect pipeline construction, within 500 ft of perennial surface water and/or wetland areas and/or within 100 ft of intermittent and ephemeral drainage channels.

All roads on federal lands would be crowned, ditched, and appropriately surfaced (e.g., graveled). The BLM may require Williams to apply gravel or other appropriate road-surfacing materials to specific HDEPA roads on federal land. Five feet of fill may be required over reclaimed reserve pits. The BLM may also limit surface disturbance (e.g., limiting ROW surface grading) during gas and water line and interconnect pipeline construction.

Williams would complete the necessary notifications, documentation, or permit acquisition to ensure project compliance with Sections 401 and 404 of the *Clean Water Act*.

No surface disturbance would occur within 100 ft of intermittent and ephemeral drainages, where practical.

Where wetlands, riparian areas, or stream, river, or ephemeral drainage channels must be disturbed, the following measures would be employed.

1) Wetland and flood-prone areas would be crossed during dry conditions (i.e., late summer, fall, or dry winters). Winter construction activities would only occur prior to soil freezing or after soils have thawed.
2) Streams, wetlands, and riparian areas disturbed during project construction would be restored as near as practicable to preproject conditions. If impermeable soils contributed to wetland formation, soils would be compacted to re-establish impermeability.
3) Perennial water crossings and facilities construction adjacent to such waters would not be constructed during important fish spawning periods in those waters.
4) Streams would be crossed perpendicular to flow, where practical.

5) Wetland topsoil would be selectively handled.
6) Recontouring and BLM-approved native species would be used to revegetate the banks to aid in soil stabilization.
7) Revegetation operations would begin on impacted areas in the first appropriate season after completion of project activities.

The discharge of all water (storm water, produced water) would occur in conformance with WDEQ/WQD, BLM, and WOGCC rules and regulations (WDEQ 1978; *BLM Onshore Oil and Gas Order No. 7*).

Mitigation to lessen any impacts from flooding or high flows during and after construction would include the re-establishment of existing contours, implementation of proper erosion and sediment control procedures (e.g., install interceptor ditches around well pads, sediment traps, waterbars, etc.), and prompt revegetation of all disturbed areas.

Current water uses on and adjacent to the HDEPA would be protected, and project activities would be conducted to prevent adverse effects on water quality and quantity as required by federal and state regulations.

BLM/WOGCC casing and cementing requirements would be implemented to protect all subsurface mineral- and water-bearing zones in accordance with standard oil-field practices.

2.1.13.14 Noise and Odor

Noise and odor on the HDEPA would be minimized by muffling and maintaining all internal combustion engines.

2.1.13.15 Wildlife and Fisheries

Removal or disturbance of vegetation would be minimized through construction site management (e.g., by utilizing previously disturbed areas, using existing ROWs, designating limited

equipment/materials storage yards and staging areas, scalping), and Williams would develop and implement detailed reclamation specifications including stabilizing and revegetating disturbed areas to minimize impacts from project-related activities.

To minimize wildlife mortality due to vehicle collisions, Williams would advise project personnel regarding appropriate speed limits on designated access roads. Potential increases in poaching would be minimized through employee and contractor education regarding wildlife laws. If violations are discovered, the offending employee or contractor would be disciplined and may be dismissed by Williams and/or prosecuted by the WGFD and/or USFWS.

Firearms and dogs would not be allowed on-site by project employees. Williams would enforce their company's existing drug, alcohol, and firearms policies.

To protect wildlife habitat, project-related travel would be restricted to designated access roads--no off-road travel would be allowed except in emergencies.

Potential impacts to fisheries would be minimized by using proper erosion control techniques (e.g., water bars, jute netting, rip-rap, mulch). Construction within 500 ft of open water and 100 ft of intermittent or ephemeral channels would be avoided unless otherwise authorized by BLM. Channel crossings requiring trenching would be constructed when flows are not expected (late summer or fall). All necessary crossings would be constructed nearly perpendicular (at right angles) to flow.

Reserve pits or other project-related impoundments potentially hazardous to wildlife would be adequately protected (e.g., fenced, netted) to prohibit wildlife access as directed by the BLM and to ensure protection of migratory birds and other wildlife.

Williams would implement policies designed to control poaching and littering and would notify all employees (contract and company) that conviction of a major game violation may result in disciplinary action. Contractors would be informed that any intentional poaching or littering within the HDEPA may result in dismissal.

Well construction and drilling activities and other facilities development on crucial big game winter range designated in this EA would be curtailed during critical winter periods (November 15 through April 30) unless exceptions are granted by the BLM pursuant to their rules, regulations, and policies.

ROW fence erection would be minimized and any necessary ROW fences would meet BLM and WGFD approval for facilitating wildlife movement. Wildlife-proof fencing would be constructed around areas potentially hazardous to wildlife (e.g., reserve pit, toxic materials storage location) as deemed necessary by the BLM and around reclaimed areas if it is determined that wildlife use is impeding successful re-establishment of vegetation.

Proposed disturbance within 0.5 to 1.0 mi of identified raptor nests would require survey by a qualified biologist to determine nest activity status prior to commencement of drilling and construction during the raptor nesting period. If an active raptor nest is identified within 0.5-1.0 mi (depending on species and line of sight) of a proposed site, Williams would restrict construction during the critical nesting season for that species.

Known active greater sage-grouse leks and adjacent public lands (2.0-mi radius from lek centers) would be avoided during the breeding and nesting season (March 1 through June 30), and no surface occupancy would be allowed on public lands within 0.25 mi of known active greater sage-grouse lek sites. Construction activities on public lands in greater sage-grouse nesting habitat within 2.0 mi of active greater sage-grouse leks would not occur without a BLM-approved biologist first surveying for greater sage-grouse nests, and if a nest is found, the area would be avoided until after nesting is complete.

2.1.13.16 Threatened, Endangered, Proposed, Candidate, and Sensitive Animal and Plant Species

All Species

1) BLM would consult with USFWS as required by Section 7 of the *Endangered Species Act* (ESA) to ensure the protection of threatened, endangered, proposed, and candidate (TEP&C) species.

2) To ensure construction activities are conducted in accordance with required mitigations, a BLM-approved biologist would be on-site during construction as deemed appropriate by the BLM and as identified during APD and ROW application processing.

3) Well pads, roads, gas and water gathering lines, the interconnect pipeline, and ancillary facilities would be located and designed to minimize disturbance in areas of high wildlife habitat value (e.g., prairie dog colonies, suitable mountain plover habitat, greater sage-grouse leks, cushion plant communities [i.e., mountain plover nesting habitat], playas, wetlands, and riparian areas).

4) Areas with high erosion potential and/or rugged topography (steep slopes, stabilized sand dunes, floodplains, unstable soil) would be avoided, where practical.

5) Areas potentially hazardous to threatened and endangered (T&E) or other sensitive species (e.g., reserve pits, evaporation pits, hazardous material storage areas) would be adequately protected (e.g., fenced, netted) to prevent access by wildlife and to ensure protection of migratory birds and other wildlife as deemed necessary by the BLM.

6) To protect plant populations and wildlife habitat, project-related travel would be restricted to designated access roads--no off-road travel would be allowed except in emergencies.

7) Wildlife-proof fencing would be utilized on reclaimed areas if it is determined that wildlife species and/or livestock are impeding successful vegetation establishment.

8) Williams would finance site-specific surveys for TEP&C and other sensitive plant species (e.g., blowout [Hayden's] penstemon) prior to any surface disturbance in areas determined by the BLM to contain potential habitat for such species (BLM

Directive USDI-BLM 6840). These surveys would be completed by a qualified botanist as authorized by the BLM, and this botanist would be subject to BLM's special status plant survey policy requirements. Data from these surveys would be provided to the BLM, and if any sensitive plant species are found they would be avoided or if their habitats are found BLM/USFWS recommendations for avoidance or mitigation would be implemented. Project facilities would be relocated, if deemed necessary by BLM, to avoid TEP&C and other sensitive plant species and/or their habitat.

9) Herbicide applications would be prohibited within 500 ft of known sensitive plant populations.

10) Site-specific surveys for TEP&C (e.g., black-footed ferret, mountain plover) and other sensitive animal species would be conducted prior to surface disturbance in areas determined by the BLM to contain potential habitat for such species pursuant to BLM Directive USDI-BLM 6840. These surveys would be completed by the BLM and/or a BLM-authorized Williams-financed biologist prior to disturbance. Surveys would focus on those TEP&C species known to occur on the HDEPA, as well as those potentially occurring in the area. If TEP&C or other sensitive animal species are found on the HDEPA, construction activities would be delayed, the BLM and USFWS would be notified, and appropriate avoidance and/or protection measures would be implemented as determined necessary during conferencing and consultation. Habitats where TEP&C and other sensitive animal species are found or are likely to occur would be avoided, if deemed necessary by BLM, through relocation of project facilities.

11) Pursuant to the ESA, Williams would adhere to all survey, mitigation, and monitoring requirements identified in the Biological Assessment (BA) (Appendix D) and USFWS Biological Opinion (BO) for this project.

Black-footed Ferret

1) Williams and its contractors would be shown how to identify black-footed ferret and their sign and would be provided with information about its habitat requirements, natural history, status, threats, possible impacts of gas development activities, and ways to minimize these impacts.

2) All active white-tailed prairie dog towns/complexes would be mapped within the HDEPA on federal land beginning in 2002 and every 3-5 years thereafter throughout the LOP. Burrow density determinations would not be necessary because any colonies within the HDEPA are part of the large complex supporting the reintroduced black-footed ferret population.

3) Attempts would be made to locate all project components at least 50 m (164 ft) from these towns/complexes on federal land to avoid direct town/complex disturbance.

4) Surface-disturbing activities would not occur in potential black-footed ferret habitat (i.e., active prairie dog colonies) on federal land, unless the area has been surveyed within the previous 12 months for black-footed ferret pursuant to USFWS (1989) guidelines or other BLM- and USFWS-approved methodology.

5) In the event a black-footed ferret or its sign is found, the BLM Authorized Officer would stop all action on the application in hand and/or action on any future application that may directly, indirectly, or cumulatively affect the colony/complex and would initiate Section 7(a)(4) conferencing with the USFWS. No project-related activities will be allowed to proceed until the USFWS issues its BO. The USFWS BO will specify when and under what conditions and/or prudent measures the action could proceed or whether the action will be allowed to proceed at all.

6) Williams and its contractors would prohibit project employees from having pet dogs on the HDEPA.

7) All suspected observations of black-footed ferrets, their sign, or carcasses on the HDEPA and the location of the suspected observation, however obtained, would be reported within 24 hours to:

Wildlife Biologist, BLM
(307) 328-4200
Rawlins Field Office
P.O. Box 2407
1300 North Third Street
Rawlins, WY 82301; and

Field Supervisor or Designee, USFWS
(307) 772-2374
Wyoming Field Office
4000 Airport Parkway
Cheyenne, WY 82001.

Observations would include a description including what was seen, time, date, exact location, and observer's name, address, and telephone number. Carcasses or other suspected ferret remains would be collected by the BLM or USFWS employees and deposited with the USFWS, Wyoming Field office.

Mountain Plover

1) Williams and its contractors would be shown how to identify mountain plover and would be provided information about its habitat requirements, natural history, status, threats, and possible impacts of gas development activities. Incidental observations of mountain plovers would be solicited from all field personnel.

2) During the period of May 1-June 15 throughout the LOP unless otherwise approved by the USFWS, mountain plover surveys would be conducted by the BLM or a Williams-financed BLM-approved biologist in accordance with existing or revised USFWS guidelines (USFWS 2001).

3) If an active nest and/or mountain plover are found within 0.25 mi of proposed facilities, informal conferencing would occur with the USFWS.

4) If an active nest is found in the survey area, planned activities would be delayed 37 days, or 1 week post-hatching, or if a brood of flightless chicks is observed, activities would be delayed at least 7 days.

5) Where access roads and/or well locations have been constructed prior to the mountain plover nesting season (April 10 - July 10) and use of these areas has not been initiated for development actions prior to April 10, a BLM-approved biologist would conduct surveys of these disturbed areas prior to use to determine whether mountain plover are present. In the event plover nesting is occurring, Williams would delay development activities until nesting is complete.

6) If nesting habitat is disturbed, these disturbed areas would be reclaimed to approximate original conditions (topography, vegetation, hydrology, etc.) after completion of activities in the area, in part to ensure suitable mountain plover breeding habitats are present on the reclaimed landscape. Seed mixes and application rates for reclamation in previously suitable mountain plover habitat would be designed to produce stands of sparse low-growing vegetation suitable for plover nesting, while meeting the BLM's requirements for stabilizing soil and controlling weeds. Reclamation would attempt to return the plant community to the pre-existing condition as soon as possible.

7) To minimize destruction of nests and disturbance to breeding plovers from construction and reclamation activities, grading, seeding, or other ground-disturbing activities would not occur from April 10 to July 10 unless surveys within 0.25 mi of project facilities (conducted using USFWS-approved methods) find that no plovers are nesting in the area.

8) All suspected observations of mountain plover adults, eggs, chicks, or carcasses on the HDEPA, however obtained, would be reported within 24 hours to:

Wildlife Biologist, BLM
(307) 328-4200
Rawlins Field Office
P.O. Box 2407
1300 North Third Street
Rawlins, WY 82301; and

Field Supervisor or Designee, USFWS
(307) 772-2374
Wyoming Field Office
4000 Airport Parkway
Cheyenne, WY 82001.

Observations would include a description including what was seen, time, date, exact location, and observer's name, address, and telephone number. Carcasses or other suspected plover remains would be collected by the BLM or USFWS employees and deposited with the USFWS, Wyoming Field Office.

2.1.13.17 Socioeconomics

Williams would implement hiring policies that encourage the use of local or regional workers.

2.1.13.18 Livestock/Grazing Management

Williams would coordinate project activities with ranching operations to minimize conflicts with livestock movement or other ranch operations and would maintain all fences, cattle guards, and other livestock-related structures required for their transportation network.

In areas of high livestock use, fencing of reclaimed areas would occur as necessary to ensure successful revegetation.

2.1.13.19 Land Status/Use

Roads, water and gas collection lines, and pipelines would be located adjacent to existing compatible linear facilities wherever practical.

All abandoned wells would be plugged utilizing BLM, WOGCC, and WDEQ procedures designed to protect subsurface aquifers; procedures may also include MSHA/WOGCC-approved techniques designed to facilitate future surface and subsurface coal mining operations at specific public land locations and in specific coal seams as deemed appropriate by the BLM.

Williams would secure an ROW on public lands from the BLM prior to facilities and pipeline construction or use of other areas and would notify authorized ROW users of any crossings or overlaps. Any associated river, creek, or utility crossing permits would be secured from the appropriate regulatory agency or private entity prior to facilities/pipeline construction.

Care would be used, including hand/shovel exposure where appropriate, for all facilities/pipeline construction work that parallels or crosses existing subsurface ROWs (e.g., pipelines, cables, power lines), and the minimum clearance between Williams's facilities/pipelines and existing features would be 12 inches unless a closer proximity is specifically authorized.

2.1.13.20 Recreation

BLM would encourage Williams to establish speed limits on project-related roads. Williams would inform their employees, contractors, and subcontractors that long-term camping (greater than 14 days) on federal lands or at federal recreation sites is prohibited.

2.1.13.21 Visual Resources

All surface facilities within the HDEPA would be designed to minimize disturbance and to conform to standards for the applicable Visual Resource Management (VRM) class (Class III

or IV). Facilities would be painted with standard environmental colors to blend with the surrounding landscape.

2.2 NO ACTION ALTERNATIVE

A No Action Alternative is considered in this NEPA document and provides a benchmark, enabling decision-makers to compare the magnitude of environmental effects of the alternatives. Under the No Action Alternative, the BLM would deny the proposal on federal lands in the HDEPA as currently proposed by Williams in the Proposed Action, while allowing existing land uses to continue. Denial of the current proposal is not, however, a denial of all natural gas development in the area. The decision of the BLM to deny an APD is not available without a No Surface Occupancy (NSO) stipulation in the lease; however, the BLM can impose "reasonable" mitigation measures on the lease if unnecessary or undue environmental degradation would occur. An oil and gas lease grants the lessee the "right to drill for . . . extract, remove, and dispose of all oil and gas deposits" from the leased lands, subject to the terms and conditions of the respective leases (BLM Form 3100-11). The denial of the right to develop a valid lease would violate the lessee's contractual rights, as well as result in the loss of federal royalties. 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. Although a given APD may be denied, the right to drill and develop somewhere on the leasehold may not be denied by the BLM. To deny all activity would constitute a breach of contract of an Operator's rights to conduct development activities on the leased lands. Authority for complete denial can be granted only by Congress (which can order the leases forfeited subject to compensation). The BLM, therefore, can only suspend the lease pursuant to Section 39 of the *Mineral Leasing Act* pending consultation with the Congress for a grant of authority to preclude drilling and provide compensation to the lessee.

For the purpose of this analysis, project development considered as components of the No Action Alternative are limited to the disturbances associated with the federal road ROW granted by BLM to Williams to in September 2001 to provide access to private land for the purposes of

developing private leases. On federal land, disturbance associated with these ROWs will be 23.7 acres initially and for the LOP (Table 2.1).

Under the No Action Alternative, development of the Proposed Action on federal lands would not be implemented (e.g., nine additional wells, the interconnect pipeline, and associated facilities would not be constructed), and other existing public and private land uses (e.g., CBM exploration, livestock grazing, wildlife habitat, and recreation) would continue in the HDEPA. No other development on federal lands is proposed, at this time, although, given the natural gas reserves potentially available within the Hanna Draw Federal Unit, projects to identify and potentially recover these resources are likely to be proposed in the future. If and when such projects are proposed, they would be analyzed in accordance with NEPA.

A No Action decision on the current proposal (i.e., a Finding of No Significant Impact [FONSI] is not made) would be considered if any of the following conditions are met:

1) there were no acceptable means of mitigating significant adverse impacts to stipulated surface resources values, which could trigger denial of leasing permits and ROW applications and would require consideration and analysis of other proposals/alternative(s); or
2) the USFWS concludes that the Proposed Action would likely jeopardize the continued existence of any TEP&C species, in which case the leasing permit and ROW application may be denied in whole or in part.

Under the No Action Alternative, site-specific NEPA analysis would be conducted for all development activities on federal land or mineral estate; however, the applicant-committed measures identified for the Proposed Action (Section 2.1.13) may not be implemented. Furthermore, additional developments on nonfederal land may occur. Existing disturbance from private land developments are summarized in Table 2.1.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Several other action alternatives were considered but were rejected for various reasons. One alternative would have re-injected the produced water. This alternative was rejected because the suitability of geological conditions for re-injection are presently unknown and because of the high costs associated with geologic evaluation and re-injection. In the event the pilot project proves to be successful, geological investigations to determine whether re-injection is feasible may be implemented.

A second alternative involved alternate numbers and locations of wells. This was rejected because the Proposed Action has the best well configuration for ensuring that a determination can be made from this exploration project regarding the commercial feasibility of coalbed methane development in the HDEPA.

A third alternative would have shortened the interconnect pipeline to about 8 mi in length, connecting it with the interstate pipeline immediately south of Hanna. This alternative was rejected due to the inadequate sales capacity of this particular pipeline.

An alternative interconnect pipeline route was considered as a fourth alternative. It was rejected because 1) the proposed 1-mi wide corridor includes enough routing alternatives to avoid most sensitive resources and 2) the proposed corridor is the shortest distance between the HDEPA and major interstate pipelines.

2.4 SUMMARY OF ENVIRONMENTAL IMPACTS

Table 2.4 presents a summary of the environmental impacts of the Proposed Action and the No Action Alternative. A detailed analysis of project impacts and mitigation measures is provided in Chapter 4.0.

Table 2.4 Summary of Environmental Consequences.

Resource	Proposed Action	No Action	Mitigation (Project-wide Environmental Practices and Protection Measures)
Climate	No impacts	No impacts	None
Air Quality	Temporary short-term construction-related increases in dust and exhaust emissions	Reduced to impacts caused by use of two existing roads	Dust suppression during construction; proper maintenance of construction equipment; prompt reclamation; WDEQ permit acquisition, as necessary
Topography and Physiography	Some LOP changes in topography due to cuts and fills	No impacts	Avoidance of steep slopes; proper reclamation
Geology and Geologic Hazards	No impacts	No impacts	Minimize disturbance or avoid sensitive areas; appropriate casing, plugging, and well abandonment procedures; prompt reclamation
Mineral Resources	Depletion of natural gas resources	Loss of federal mineral royalties	Efficient recovery of natural gas resources
Paleontology	Possible inadvertent destruction of fossils during construction	No impacts	Recovery during excavation of significant discoveries, as necessary
Soils	Disturbance of 162.7 acres of previously undisturbed soils	No impacts	Minimize disturbance; implement soil erosion practices until sites are permanently reclaimed; prompt stabilization and reclamation
Water Resources	No impacts to springs or seeps; pumping and disposal of ground water with increased metals and other constituents to the produced water containment reservoir; some increased runoff and sediment would likely reach local waterways	No impacts to springs or seeps; some increased runoff and sediment would likely reach local waterways	Avoid channel crossings; construction in channels during periods of no or low flow; prompt stabilization and reclamation; appropriate road and well location design and maintenance; proper disposal of produced water; adherence to Water Management Plan and NPDES permit requirements; WDEQ permit acquisition

Table 2.4 (Continued)

Resource	Proposed Action	No Action	Mitigation (Project-wide Environmental Practices and Protection Measures)
Noise and Odor	Temporary construction-related increases in noise; increased odors near wells and roads	Reduced to impacts caused by use of two existing roads	Properly muffle all construction equipment; avoid noise-sensitive areas at critical times
Vegetation, Wetlands, and Nonnative Invasive Species	Disturbance of 162.7 acres of previously undisturbed vegetation; potential for spread of nonnative invasive species on disturbed areas	No impacts to vegetation; potential for spread of nonnative invasive species from vehicular traffic on two existing roads	Minimize disturbance; noxious weed controls implemented; no disturbance to wetlands; prompt revegetation with native, adapted species
Wildlife and Fisheries	Direct effects from collision-related mortality; direct and indirect effects from 162.7 acres of temporary and 39.7 acres of LOP habitat loss; temporary displacement during construction; long-term displacement during operations	Direct effects of collision-related mortality	Comply with all seasonal stipulations and applicant-committed measures for wildlife protection unless otherwise authorized by the BLM; minimize disturbance; prompt reclamation
Threatened, Endangered, Proposed and Candidate, (TEP&C) Species, and Sensitive Animal and Plant Species	Not likely to adversely impact black-footed ferret; may cause loss of potential mountain plover breeding, nesting, and foraging habitat; no impacts to downstream species in the North Platte River	Same as Proposed Action, except no additional loss of mountain plover habitat	Complete surveys prior to construction; avoid species habitats where practical; adherence to BA requirements (Appendix D) and those specified in the USFWS Biological Opinion
Cultural Resources	Some unidentified sites and artifacts may be disturbed or destroyed	No impacts	Complete surveys of all areas to be disturbed; avoid NRHP-eligible sites where practical; mitigate possible impacts on a case-by-case basis through the NHPA Section 106 consultation process

Table 2.4 (Continued)

Resource	Proposed Action	No Action	Mitigation (Project-wide Environmental Practices and Protection Measures)
Socioeconomics/ Environmental Justice	Temporary beneficial economic impacts to local and state economies during construction; long-term benefits due to increased product availability; no impacts to environmental justice	Loss of positive economic benefits	Hire workers locally as available
Landownership and Use	No change in landownership; temporary loss of grazing land, wildlife habitat, and recreation	No impacts	Prompt stabilization after construction and reclamation of disturbed areas
Aesthetic and Visual Resources	Temporary visual impacts during construction; no long-term impacts requiring re-categorization of existing VRM classification	Impacts reduced to those related to use of two existing roads	Minimize disturbance; prompt stabilization and reclamation of disturbed areas; painting and locating aboveground features to blend with the surrounding landscape and taking other necessary measures to avoid visual impacts
Hazardous Materials	Possible spills	Same as Proposed Action but reduced to the use of two existing roads	Implementation of appropriate spill prevention and control measures