

Montana Board of Oil and Gas Conservation

Environmental Assessment

For

Pinnacle Gas Resources Inc

Coal Creek Field Plan of Development (2005)

This site-specific analysis tiers into and incorporates by reference the information and analyses contained in the Final Statewide Oil and Gas Environmental Impact Statement -January 2003 (Final CBNG EIS) jointly prepared by the Bureau of Land Management (BLM), Montana Department of Environmental Quality (MDEQ), and the Montana Board of Oil and Gas Conservation (MBOGC) and adopted by the MBOGC on March 26, 2003, and the Programmatic EIS on Oil and Gas Drilling In Montana (Programmatic EIS), prepared under the supervision of the Office of the Governor and adopted by the MBOGC on December 28, 1989.

Proposed Action – Title: Pinnacle Gas Resources Inc. (Pinnacle) Coal Creek Field Plan of Development.

Location of Proposed Action

The proposed Plan of Development (POD) includes Coal Bed Natural Gas (CBNG) development drilling in Sections 5, 6, 7, 8, 19, 20, 21, 22 and 30, Township 8 South, Range 41 East, MPM¹, Big Horn County Montana. Six (6) existing wells are located on federal minerals, ten existing wells are located on fee minerals, and 48 proposed wells will also be located on fee minerals. The entire surface of the proposed expansion project is under private ownership. The proposed action is the drilling and production of 48 CBNG wells and the continued production of the existing 10 fee wells.

Purpose and Need

The proposed action involves the development of CBNG resources believed to exist within the project. The lands involved are fee lands, all under oil and gas lease. Recovery of natural gas resources is a direct benefit to the mineral owners, both public and private, to state and local governments, and public schools as recipients of tax receipts. Natural gas has become a fuel of choice for environmental reasons and national demand as well as the price received for this commodity has increased substantially during recent years. This Environmental Assessment (EA) will determine the applicability and sufficiency of the overarching Environmental Impact Statements (EIS), the extent to which the EIS's adequately describe and mitigate impacts, and the need for appropriate site-specific mitigation. This EA applies only to the development on fee surface and minerals, not to the existing wells on federal minerals.

¹ MPM = Montana Principal Meridian

Description of the Proposed Action

The Coal Creek project was initiated with the Coal Creek Coal Bed Methane Pilot Project Finding of No Significant Impact (FONSI) and Notice of Decision (NOD) issued by the MBOGC on November 24, 2004. The Pilot Project was brought by Powder River Gas, LLC; it consisted of 16 CBNG wells. Pinnacle is the successor of Powder River Gas, LLC and comes now to propose an expansion of their Coal Creek Pilot Project by proposing the drilling and production of 48 new wells to augment the 16 existing wells. Of the proposed new drilling, all 48 wells are under the regulatory jurisdiction of the MBOGC.

The Proposed Action includes the use of existing infrastructure as well as proposed new installations. Construction of about 6.3 miles of two-track access road, about 11.52 miles of new corridor with co-located water, gas, and power lines are voluntarily proposed to minimize surface disturbances, and 2.29 acres of proposed crown and ditch road.. A central gathering and compressor station are also proposed to be constructed. The existing outfall will be used for water discharge while approximately eight evaporation and four containment/storage ponds have been proposed (as needed) to support management of water produced in association with natural gas produced from various underground coal seams. Wells will be drilled, one per coal bed, on shared sites with two wells located on a common well site (or “pad”) to develop the Wall and Flowers-Goodale coal seams.

Wells are expected to be drilled with truck-mounted water well type rigs; because this type of rig can be set up on uneven terrain, the surface is generally not bladed nor will a pad site be constructed unless topography requires it. A 100-foot square area is typically mowed to accommodate the rig, and small reserve pits, approximately 4 feet x 25 feet x 40 feet are constructed to serve the drilling wells on that site. A total of about one acre is required for the approximately two wells drilled on a site (the actual number of wells per site depends upon the number of coal seams to be developed at that site). After setting surface casing, the wells are completed using 7” steel well casing set and cemented to surface from the top of the target coal bed. Small diameter tubing and an electric submersible pump are installed in the well. Topsoil is stripped and saved during any surface disturbing operations and used for reclamation of the disturbed area. Pinnacle intends to equip producing wells with telemetry systems to reduce traffic at individual sites by Pumpers. In addition, travel to well sites during wet or soft ground conditions will be restricted to emergencies.

Well heads will be equipped with appropriate frost boxes painted an unobtrusive color and fenced to protect the facility from damage by cattle. Electronic flow devices or chart recorders will measure natural gas and water production.

Pinnacle has submitted a surface use plan, water management plan, and reclamation plan as required in the March 26, 2003 MBOGC Record of Decision. The POD for this project includes a number of maps and exhibits that are available for public inspection at the MBOGC offices in Helena and Billings.

Hearing Process and Public Involvement

The Pilot Project and the initial delineation and designation of the field boundaries were heard by the MBOGC at a public hearing on October 2, 2003 in Dockets 350-2003 and 351-2003 respectively. The Board approved the field designation in Order 279-2003 and approved the POD subject to an approved environmental assessment in Order 279-2003. The Coal Creek Field re-delineation and expansion was approved by the MBOGC on April 28, 2005 by Order 152-2005. The MBOGC 2003 Record of Decision (ROD) and MBOGC Order 99-99 apply to this proposed action. Order 99-99 was established by the MBOGC to recognize the Montana Department of Natural Resource (MDNRC) Controlled Ground Water Area for the Powder River Basin and to establish minimum requirements for information to be considered at a public hearing. Pinnacle's application complies with the information submission requirements of both the ROD and Order 99-99. However, the order requires that the operator prepare a groundwater monitoring plan and that the plan be approved by the Technical Advisory Committee.

Public Hearings are advertised in the statewide *Helena Independent Record* and the official newspaper of the county in which the proposed operations are to take place. In addition, notice of the public hearing is mailed to the MBOGC's mailing list and a notice is published on its web site. The applicant, in matters affecting the permanent spacing of wells, must give actual notice to affected owners no less than 20 days prior to the hearing; MBOGC Order 99-99 requires notice to water rights holders of record within one-half mile of the external boundaries of the proposed project area. The proposed project has fulfilled standard public notice requirements.

Other Regulatory Requirements

Table 1-1, page 1-14 of the Final Statewide Oil & Gas EIS identifies the applicable permits and reviews for CBNG activities and the agencies responsible for each; Table 1-2 of the same document identifies the permissible activities associated with CBNG development. Approval of PODs must be made by the BLM for federal interests and by the MBOGC for state and fee lands under the preferred alternative adopted by both agencies in the Final Statewide Oil & Gas EIS. In this case, the 48 proposed wells are under MBOGC jurisdiction and are located on fee minerals and surface. Water discharge permits, air quality permits and storm water discharge permits are the responsibility of the MDEQ.

Alternatives

Alternatives present different management options to address the relevant major issues related to the proposed action. A no action alternative was considered in the 2003 Montana Statewide EIS. Under this alternative no additional wells in the Coal Creek Field Area could be drilled. Taking no action on the current proposal would prohibit the lawful recovery of private property (i.e., natural gas). The 2003 Montana Statewide EIS also considered other alternatives, including a Preferred Alternative which is consistent with Pinnacle's proposed Coal Creek Field POD.

For the subject analysis, Alternative A is the "No Action" Alternative. In this alternative no approval would be issued for the POD and no new wells would be drilled or produced. This alternative was included to provide the required basis for comparison with Alternative B, the "Proposed Alternative."

Alternative B is the operator's proposed action. Under this alternative, Pinnacle's Coal Creek POD would be approved, including drilling and production of the 48 fee wells and construction of the associated infrastructure. This alternative was developed to analyze full implementation of Pinnacle's proposal, while incorporating mitigating measures identified during project review that would avoid or reduce impacts to area resources. Alternative B is the agencies' preferred alternative.

Table 1 presents a descriptive summary of the two alternatives considered.

Alternatives considered but eliminated from Detailed Analysis

The alternatives below were considered for resolving planning questions or issues, but were not analyzed in details because of technical, legal, or other constraints.

Injection of All Produced Effluent: This alternative was suggested as a means to reduce the amount of water requiring treatment or surface disposal. But the feasibility of re-injection of produced water is quite variable and site specific. Furthermore, the regulatory burden for injection into shallow, drinking water aquifers requires a lead time of a year or more before permit approval. For these reasons, injection of produced water is proposed as one of multiple water management techniques. During the development process the operator will seek to evaluate potential injection zones for technical and economic feasibility. Where appropriate, re-injection of produced water will be utilized as one of the water management options. Furthermore, all produced water is expected to be treated and discharged to the Tongue River. Re-injection of treated water does not appear to be necessary.

Phased Development: This alternative was suggested as a means to reduce the amount of environmental impact by spreading development over a long period of time. Phased development of CBNG was not considered because of several important concepts that are relevant to the CBNG industry, including the protection of correlative rights, prevention of waste, and because phased development is implicit in the permitting process. Discussion on each of these concepts is presented below:

- **Protection of Correlative Rights:** The Montana Board of Oil and Gas Conservation (MBOGC) is required to protect correlative rights so as to minimize drainage of minerals by off-lease drilling and production. Drainage can be prevented by minimum set-backs from lease boundaries and mirror-image locations off-setting location exceptions. Another way drainage is prevented is the express freedom to drill any legal locations. Two contiguous tracts must be equally drillable or drainage may occur by the first well to be drilled; if the offsetting well is delayed, such as by a phased development restriction on the number of CBNG wells per year, drainage could occur.
- **Prevention of Waste:** MCA Section 82-11-111(1) provides: "The board shall make such investigations as it considers proper to determine whether waste exists or is imminent or whether other facts exist which justify action by the board under the authority granted by this chapter with respect thereto." Waste is defined at 82-11-101(16) as follows:

(16) (a) "Waste" means:

(i) physical waste, as that term is generally understood in the oil and gas industry;

- (ii) the inefficient, excessive, or improper use of or the unnecessary dissipation of reservoir energy;
 - (iii) the location, spacing, drilling, equipping, operating, or producing of any oil or gas well or wells in a manner which causes or tends to cause reduction in the quantity of oil or gas ultimately recoverable from a pool under prudent and proper operations or which causes or tends to cause unnecessary or excessive surface loss or destruction of oil or gas; and
 - (iv) the inefficient storing of oil or gas. (The production of oil or gas from any pool or by any well to the full extent that the well or pool can be produced in accordance with methods designed to result in maximum ultimate recovery, as determined by the board, is not waste within the meaning of this definition.)
- (b) The loss of gas to the atmosphere during coal mining operations is not waste within the meaning of this definition.

The thrust of the Board's responsibility, as defined in the statutes quoted above, is to assure efficiency and prevent waste in the production of oil and gas resources. To the extent that requiring a particular operator or operators to phase production by deferring development in one or more areas could cause waste; in the case of CBNG development, restricting an operator's number of wells could cut the efficiency of the operator's dewatering plans and reduce ultimate CBNG recovery. The Board not only has no authority to enter such an order, the order would violate the Board's duties.

- **Implicit Phased Development:** The MBOGC as well as other state and federal regulatory agencies have CBNG permit mechanisms in place to cover drilling and pit construction that must be satisfied before development can occur. These permitting mechanisms require ongoing analysis to allow development to continue. The MBOGC's position is that these permitting mechanisms implicitly phase development of the resource. This implicit phasing of development, which comprise the Preferred Alternative, also achieves the board's objective of managing resource conservation and development.

Cumulative Actions

Cumulative effects are the result of impacts from other past, present, or reasonably foreseeable future actions that would overlap in time and locale with the direct effects of the proposed action or alternatives, thus resulting in "cumulative effects" distinctly different (greater or less) than the direct effects. The actions listed below have been considered as potential contributors to cumulative effects.

- **Decker Coal Mine:** The Decker Mine is a surface coal mine operated by Decker Coal Company, a Kiewit subsidiary. The East Decker Mine is located approximately five miles southwest of the Pinnacle project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 11,400 surface acres. The average annual coal production is 10 million short tons. The scope and nature of the Decker Coal Mine, as well as its proximity to the Pinnacle project creates only a minor potential for cumulative effects.

- **Spring Creek Coal Mine:** The Spring Creek Mine is a surface coal mine owned and operated by Spring Creek Coal Company. The mine is located approximately five miles west-southwest of the Pinnacle project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 7,000 surface acres. The average annual coal production is 11 million short tons. The scope and nature of the Spring Creek Coal Mine, as well as its proximity to the Pinnacle project creates only a minor potential for cumulative effects.
- **Absaloka Coal Mine:** The Absaloka Mine is a surface coal mine located adjacent to the Crow Reservation, owned and operated by Westmoreland Resources. The mine is located approximately thirty five miles northwest of the Coal Creek project area. The mining method consists of open pit strip mining of Crow Tribe mineral resources. The distance of the Absaloka Coal Mine from the Coal Creek project area makes it unlikely that there would be any cumulative effects to project area resources.
- **Conventional Oil and Gas Development:** A total of 1,991 conventional oil and gas wells have been drilled in Big Horn and Rosebud counties, approximately 22% are federal or Indian wells. The conventional oil and gas wells within approximately 20 miles of the PRG project area have been abandoned. Cumulative impacts from conventional oil and gas development are not likely.
- **Existing Montana CBNG Development:** According to MBOGC records as of June 29, 2004, approximately 495 CBNG wells have been drilled in Big Horn County; approximately 98 wells or less than 20% are Federal wells. Status of these wells includes drilling, shut-in, producing and plugged. Currently 456 CBNG wells, all in Big Horn County, are considered to be in production. This development is found in the CX Field, near Decker, Montana.

The CX Field, including Badger Hills Project area, is a CBNG producing field operated by Fidelity Exploration & Production Company. The field encompasses approximately 56 sections between the Montana/Wyoming state line and the Decker and Spring Creek coal mines. As of November 18, 2004, MBOGC website demonstrates the CX Field has 456 producing wells, 3 being drilled and 16 shut in. The existing CBNG producing wells are located approximately 7 miles south of the Pinnacle project area. The CBNG wells in the CX Field are completed in the Dietz 1, Dietz 2, Dietz 3, Monarch and Carney coal seams, different coal seams than those proposed for testing by the Pinnacle project. The scope and nature of the CX Field, as well as its distance from the PRG project creates little potential for cumulative effects to resources in the Pinnacle project area. Discharge of produced water from the CX Field to the Tongue River is accounted for in the surface water impact assessment prepared for the Pinnacle project.

- **Gravel/Scoria Pits:** Some gravel or scoria would be used to surface project area roads and would come from already permitted mineral material sites. Surface disturbance associated with gravel or scoria mining would not exceed existing permit limits. The potential for cumulative or connected impacts from mineral material excavation is minimal.

- **Existing Wyoming CBNG Development:** According to the Wyoming Oil and Gas Conservation Commission website, June 1, 2005, 26,353 CBNG wells have been drilled in the state. These wells range in status from spudded, producing through abandoned. Generally, in the State of Wyoming, CBNG development has occurred since the early 1990's, most located in the Powder River Basin of north central/eastern Wyoming. The CBNG development is primarily located between the cities of Gillette and Sheridan.

Specifically, according to the WOGCC from 2002 to 2005, the Upper Tongue River Basin has been predicted to cumulatively have 4,281 wells drilled and 63,630 acre feet of produced water (2002, 2003, 2004, and 2005 January to March, is actual data and 2005 from March on, is predicted).

The scope and nature of the Wyoming CBNG development, as well as its distance from the Pinnacle project, would not likely create cumulative impacts to resources in the Pinnacle project area.

- **Coal Creek Field (Dietz POD):** Pinnacle Gas Resources has submitted a proposal for the drilling and producing of an additional 132 CBNG wells, along with constructing and installing the associated infrastructure in an area of the Coal Creek Field and reclaiming disturbed areas. The project area is within the Coal Creek Field, immediately east of the Coal Creek field project. The 132 wells will be drilled on 42 sites. These CBNG wells will be completed in the Dietz, Smith and Anderson, Canyon and Cook, or the Lower Cook and Wall. The scope and nature of the Dietz POD to manage the produced water through storage, evaporation, treatment prior to discharge, or re-injection has little potential to cause cumulative effects to resources in the project area.
- **CX Field (Pond Creek POD):** Fidelity has disclosed an upcoming POD submittal called the Pond Creek Project Plan of Development. Although the details of the project are unknown, the general proposal is the drilling and producing of additional CBNG wells, and the constructing and installing of the associated infrastructure in an area of the CX Field. The tentative project area is immediately north and west of existing production in the CX field. Due to the distance of this project from the PRG project area, and the probable timing of activity, it does not appear likely that the Pond Creek POD would create cumulative effects to resources in the PRG project area.
- **CX Field (Deer Creek POD):** Fidelity has disclosed an upcoming POD submittal called the Deer Creek Project Plan of Development. Although the details of the project are unknown, the general proposal is the drilling and producing of additional CBNG wells, and the constructing and installing of the associated infrastructure in an area of the CX Field. The tentative project area is immediately north and east of existing production in the CX field. Due to the distance of this project from the PRG project area, and the probable timing of activity, it does not appear likely that the Pond Creek POD would create cumulative effects to resources in the PRG project area.
- **Yates Petroleum (Exploration Project):** Yates Petroleum has submitted applications to BLM for the drilling and testing of 14 wildcat CBNG wells scattered across an area from

10 miles west and 6 miles north of the Powder River Gas POD area. The proposal shows 1 well would be drilled at each well site, with 640 acre spacing. Due to the scope and nature of the Yates exploration project, as well as its distance from the PRG project area, no cumulative effects are likely to occur.

- **Castle Rock-Stevens POD:** Powder River Gas has submitted a proposal to the MBOGC for development of an additional 284 CBNG wells in Powder River County, along with constructing and installing the associated infrastructure and reclaiming disturbed areas. The project area is approximately 45 miles east-northeast of the Coal Creek field project. The 284 wells will be drilled on 71 sites. These CBNG wells will be completed in the Cook/Otter, Pawnee, Sawyer Knobloch, or the Terret/Stag. Due to the distance of this project from the project area, it does not appear likely that the Castle Rock-Stevens POD would create cumulative effects to resources in the project area.
- **Wolf Mountain Coal:** Wolf Mountain Coal, Inc. proposes to build a coal processing plant on private land for retail sales of coal in Lot 1, Section 18, T. 8 S., R. 40 E. BLM recently issued them a right-of-way (MTM93074) for a power line across Federal surface in the NE¹/₄SE¹/₄, Section 13, T. 8 S., R. 39 E., to provide power to the proposed site. Due to the distance of the Wolf Mountain plant from the PRG project, and the probable timing of the exploration activity, it does not appear likely that the processing plant would create cumulative effects to resources in the PRG project area.
- **Tongue River Railroad:** The Surface Transportation Board has published a Draft Supplemental Environmental Impact Statement for the Tongue River Railroad Company's (TRRC) proposed rail line construction in Rosebud and Big Horn Counties, Montana. The document analyzes the proposed 17.3 mile "Western Alignment" route, which had been preceded by two related applications that were considered and approved by the Board in 1986 and 1996, respectively. The proposed Western Alignment is an alternative route for the southernmost portion of the 41-mile Ashland to Decker alignment; known as the Four Mile Creek Alternative. The proposed Western Alignment bypasses the Four Mile Creek alignment, which is generally located from the Birney Road (Hwy 566) and the Tongue River Canyon junction, running west to Hwy 314, then south to the Decker Mine. The Western Alignment would continue south along the Tongue River on the ridge, but paralleling the river and ending around the Spring Creek Mine area. If ever approved, this proposed route could intersect the PRG-Coal Creek project area, by crossing through Section 6, north and west of two federal well sites. Although the PRG project is near or adjacent to the proposed TRRC Four Mile Creek and Western Alignment routes, the two projects would not be constructed or operated simultaneously. The PRG exploration project would be completed within 6 months after project approval, which would be in advance of a final decision regarding the proposed Western Alignment route and any construction associated with TRR. Because impacts from the two actions would not occur in the same area at the same time, no cumulative impacts are anticipated to occur from the TRR and the PRG POD.

Affected Environment and Environmental Consequences

Pinnacle Gas Resource's Coal Creek Field Plan of Development covers lands in southern Big Horn County, Montana. The area is in the northwestern portion of the Powder River Basin and

lies in the upper Tongue River drainage basin. The project is located in the area immediately north and east of the Tongue River Reservoir. Surface use agreements and water well mitigation agreements have been accepted by or offered to, all private landowners in the project area.

Air Quality

Ambient air quality in the project area is good. Coal mining operations in the area may cause localized elevation in suspended particulates or Sulfur Dioxide. The West Decker, East Decker, and the Spring Creek mine are south and west of the proposed project area.

Air pollution is regulated under the federal Clean Air Act and under Montana laws implemented by the Montana Department of Environmental Quality (MDEQ). The southern boundary of the Northern Cheyenne Reservation lies approximately 12.5 miles north of the proposed Coal Creek Field Project and is the closest PSD (Prevention of Significant Deterioration) Class I area; the project area is in a PSD Class II area, which allows for moderate, controlled air impacts.

Air quality could be impacted by suspended particulate matter generated during drilling and production primarily due to dust associated with travel on unimproved roads; emissions from drilling rig engines, field and main compressor facilities, and venting gas during testing of wells prior to hookup. The produced natural gas in Coal Creek Field contains no Hydrogen Sulfide (H₂S), and is very nearly pure methane (CH₄).

Air quality regulations require certain new or existing modified air pollution emission sources (including CBM compression facilities) to undergo a permitting review before construction can commence. The MDEQ has the primary authority to review and require permits and/or control devices prior to construction. A source emitting less than 25 tons of any regulated pollutant, excluding hazardous air pollutants, without controls does not require a permit. This proposed POD, however, anticipates the addition of one (1) new compressor to meet the anticipated compression requirements of the project. At this level of compression, it does not appear that a MAQP would be required. However, if additional compression is needed, the operator may need to obtain a MAQP for applicable emissions.

Mitigation proposed by the operator includes implementation of speed limits on unpaved roads to reduce dust emissions, installation of equipment to minimize travel to individual well sites, and use of natural gas to fire compressor engines. Gas venting is minimized by a MBOGC regulatory requirement prohibiting venting of commercial quantities of gas. Because substantial infrastructure already exists in the pilot area of the Coal Creek field, extensive well testing prior to pipeline hookup is not anticipated. Some gas emission from boreholes drilled as monitor wells, mineral exploration holes and other holes of unknown origin may occur. The operator is required to plug such emission sources, and Pinnacle has demonstrated its willingness to promptly report and plug these sources.

The drilling of CBM wells, although a temporarily intense activity is of relatively minor concern for air impacts because of the limited time that drilling actually occurs. The water well rigs employed are smaller than those commonly used to drill shallow gas wells in the state and do not have high horsepower engines. Typically, no more than 1-2 days are required to drill a well to the depths proposed. Air Quality impacts are not expected to be significant and the operator's

proposed mitigation measures are adequate. MDEQ permitting requirements mitigate longer-term impacts from point sources such as compressor engines.

Water Quality and Quantity

The Coal Creek Field Project is in the upper Tongue River watershed in an area that receives an average of approximately 12 inches of annual precipitation. The project area is immediately northeast of the Tongue River Reservoir. As required in the MBOGC ROD, a water management plan for the project has been prepared by Western Lands Services, Inc. (WLSI) and is incorporated into this EA by reference.

Pinnacle expects the initial water production from the new wells proposed in this project will be approximately 25.5 gallons per minute (GPM) declining by approximately 40% per year based upon testing experience with existing wells in the area. The proposed 48 development wells will initially add a maximum of approximately 1,224 GPM of produced water. Pinnacle proposes three water management options for the Coal Creek Field Development POD project area: total containment/evaporation, storage retrieval/injection and storage/treatment/land application. Pinnacle will utilize one or a combination of these options after water quality and quantity values have been established. Each option will be developed and will be initiated to comply with Local, State, and Federal regulatory guidelines, rules and regulations. Any new storage or evaporation off-channel impoundments will be located in upland locations and sited to avoid interfering with natural runoff channels and to avoid capture of water that would otherwise travel to downstream water rights holders. Any discharge of treated water will be in accordance with an existing Montana Pollutant Discharge Elimination System (MPDES) discharge permit issued to Pinnacle in November 2004.

Water well mitigation agreements have been accepted by or offered to all owners of registered wells/springs within one mile of the project boundary. An inventory of springs and water wells is attached to the water management plan. According to state records, three water wells are located within the POD area and five wells and five springs are located within one mile of the POD boundary.

The Hydrology and Groundwater section of the Final Statewide Oil & Gas EIS discusses the Powder River Basin groundwater, surface water, and stratigraphy in detail. The stratigraphic section in the project area includes alluvial aquifers under and near stream channels, the coal aquifers, and the impermeable aquitards that impede or eliminate vertical movement of water between coal aquifers. Monitoring reports document the effect of CBNG water withdrawal as well as the compartmentalized nature of the coal aquifers due to faulting in the Powder River Basin of Montana. Many faults are visible at the surface and have been mapped by geological researchers. These down-to-the-basin faults have been shown to retard or prevent the movement of water (and gas) across the fault boundary; as a result, draw-downs of water pressure in the aquifer are not uniform. Local groundwater chemistry is described in the water management plan while regional groundwater quality is characterized in the Final Statewide Oil & Gas EIS.

The proposed water management plan relies on three methods of water management. The potential impacts of each are described in the Final Statewide Oil & Gas EIS. Water well mitigation agreements effectively guarantee replacement of water if the well owner is adversely

impacted. The nature of groundwater reservoirs in the project area minimize any potential impacts that water withdrawn from coal seams would have on users of shallow alluvial aquifers.

Water discharge is authorized by MDEQ, under the standards in place at the time the permit is issued; MBOGC's authorization for approval of the Coal Creek Field Project does not constitute approval to discharge or to discharge in excess of the amount authorized by MDEQ. Overall impacts to water quality due to discharge of CBM water to the Tongue River were thoroughly discussed in the Final Statewide Oil & Gas EIS. The Board of Environmental Review has adopted water quality standards for electrical conductivity (EC) and sodium absorption ratio (SAR). The CBM EIS analyzed a number of scenarios bracketing the current EC and SAR standards, and any future discharge permits would be required to meet the standards, therefore the approval of the proposed action will have minimal effect on surface water quality in the Tongue River.

Soils, Vegetation, Land Use

Fort Union and Wasatch Formations are at the surface in the project area; the Fort Union is the older of these two Tertiary-aged formations and is composed of sandstone, siltstone, clay-shale, impure limestone, and coal while the Wasatch Formation is composed of light colored massive sandstones, drab colored shale, and lignite. Erosion in the project area has created a rugged, badland topography where the more resistant sandstone and scoria ("clinker") form hills and buttes. Increased precipitation during Modern and Pleistocene climate episodes increased surface water flows and created isolated alluvial terraces and gravel-capped benches.

Soils in the project area are described in the Soils Appendix of the Final Statewide Oil & Gas EIS and consist primarily of shallow to very deep, well-drained soils formed in-situ of materials weathered from silty clay and silty shale bedrock. Due to the variability of topography and bedrock, soil groups vary throughout the project area. Soil K-factors for the project area indicate medium to high runoff and moderate to severe erosion potential for disturbed soils. Specific soil information and a soils map are included in the POD. Principle vegetation in the area includes grassland (approximately 70%), forest (approximately 20%), shrub-land (approximately 10%), and cottonwood riparian (less than 1%) in bottomlands near rivers and streams. Pinnacle proposes the possibility of utilizing managed irrigation as part of its water management plan.

The proposed CBNG development activity includes surface disturbance required to construct gas and water handling infrastructure, drill wells and construct access roads. Approximately 6.3 miles of new 2-track road will be constructed as described in the POD. Applicant has located proposed construction activities to avoid steep slopes and surface disturbance that would require removal of trees. Specific road locations, surfacing requirements and final or intermediate reclamation of disturbed areas and roads on private land is subject to consultation between Pinnacle and the landowner. However, MBOGC rules require stockpiling of topsoil as well as prompt re-vegetation of disturbed areas. Reseeding of disturbed areas will be done with a seed mix acceptable to the owner; without specific instructions from the landowner, BLM or National Resource Conservation Service (NRCS) recommended seed mixtures will be utilized. No important cumulative or irreversible impacts to existing land use or to soils are expected from the proposed action. The operator is responsible for construction of erosion /sedimentation controls during construction and production operations.

Health Hazards/Noise

CBNG produced in this area of Montana does not appear to contain H₂S or other contaminants that could impact public safety and health. The almost pure methane produced from Powder River Basin CBNG wells is lighter than air and does not accumulate in low areas; therefore there is little exposure hazard to the public. Closed buildings and frost-boxes around well-heads may allow accumulations of gas, however, these facilities are generally off-limits to the general public. CBNG operators have established strictly enforced no-smoking policies and other operating procedures to avoid fire or explosion hazards to their employees and authorized visitors. Tank batteries and compressor buildings are equipped with combustible gas detectors.

Noise due to drilling CBNG wells is of a short-term nature and of relatively low level as the water-well type drilling rigs used are smaller and have smaller engines than conventional oil or gas drilling rigs (the 1989 Programmatic EIS describes typical drilling rigs used in Montana). CBNG rigs commonly operate only during daylight hours. CBNG wells in the Montana portion of the Powder River Basin typically take only 1-2 days to drill. Field compressors are a source of noise and operate on a continuous basis. One compressor is proposed in this POD, although the actual number of compressors will depend on the level of gas production. The operator has voluntarily agreed to take reasonable precautions to locate compressors away from residences and beneficially utilize the natural topographic setting to minimize noise impacts to the area.

In addition to human residents, noise could affect wildlife. The Final Statewide Oil & Gas EIS and especially the Biological Opinion Appendix discuss impacts to Threatened and Endangered Species from noise disturbance. The relatively short duration drilling operation and construction activities may have noise levels that could impact noise sensitive populations; however, ongoing CBNG production and associated maintenance activities would have little noise impact. Pinnacle will locate battery facilities and field compressors to avoid identified sensitive habitat. The operator also agrees to avoid construction or drilling activities within a quarter-mile of sage grouse or sharp tail grouse leks during the nesting season to protect these species from noise disturbance during this critical period.

Wildlife/Recreation

Western Land Services of Sheridan, WY prepared the 2005 Wildlife and Habitat Review of the Coal Creek field POD area for Pinnacle. The MBOGC does not have authority to require private landowners to implement any special wildlife stipulations, acquiesce to third party surveys, or to provide habitat for wildlife. However, the operator has done a baseline survey that includes the entire project area. Bald Eagles have been observed along the Tongue River bottomland, using the large cottonwood trees for nesting and roosting; however, only one active Eagle nest is located in the project area. One proposed well is within one quarter-mile of this nest; this well will not be drilled during the nesting season.

There are no known sage grouse leks within the project area and mountain plover habitat appears rare in the POD area. Wells, roads, and batteries will be located to avoid disturbing sage grouse, sharp-tailed grouse, and mountain plover nesting sites in the project.

A small portion of the Tongue River reservoir, a recreational area, intersects a small portion of the project areas along the western portion of the POD boundary. Dispersed recreation may

occur along the Tongue River and in parts of the area during hunting season. Private surface owners control access to much of the area.

Historical/Cultural/ Paleontological Resources

The MBOGC cannot require archeological/cultural surveys on private property, as the underlying laws generally do not apply to private property. The Coal Creek pilot project included both fee and federally managed acreage and was surveyed (Gerber and LaBelle, 2004) as part of the permitting and environmental assessment (MT-020-2004058) process. The expansion project is located on fee lands, where the surface and mineral rights are held by private individuals.

The Ethnographic Overview of Southeast Montana prepared by Peterson and Deaver (2002) for the Final Statewide Oil & Gas EIS provides a current inventory of historical and cultural sites of the project area obtained from the Montana Historical Preservation Office database. Although the area has seen limited archeological reconnaissance, nine projects were undertaken between 1978-2005, four of which were recently completed and documented by Western Land Services for the Coal Creek field project (Western Land Services, April 1005).

The cultural inventories only identified one (1) site that could possibly be eligible for the National Register of Historic Places (NRHP). Direct impacts to this site can be avoided by keeping road and traffic needs to the south of the site. If the site cannot be avoided, then its NRHP eligibility will need to be assessed and suggestions for mitigation will need to be discussed. Indirect effects would include the increased possibility of impacting sites through collection activity and unanticipated discoveries made during installation of infrastructure for the project. Unanticipated discoveries found during construction of roads and other infrastructure would be addressed through voluntary monitoring of surface disturbances.

A feature associated with the Lee Homestead, a site listed on the NRHP, is partially within the southeast corner of the project area. It is opposite the outfall location of the pilot project, but would not be impacted since it is across the river.

Although few sites have been identified through surveys and the possibility of encountering cultural resources is rare, the operator agrees that if cultural or paleontological resources are discovered during construction, construction will be halted and the surface owner will be consulted as to the disposition of any resources found.

Social/Economic

Social and economic impacts of CBM development are discussed in the 2003 Statewide Oil & Gas EIS and in the Socioeconomic Appendix to the EIS. The proposed action involves expansion of an existing pilot project, additional demands on governmental services, impacts on county facilities and significant relocation or population increases are not expected to result from approval of the proposed action. Increase in natural gas production from the project area is likely, resulting in a significant increase in both state and county tax income. Royalty owners will also benefit from natural gas production. Natural gas is expected to increase in value due to potential market shortfalls and increasing demand for gas as both a space heating fuel and as a

fuel for generation of electricity. Approval of the proposed action will increase gas reserves and production in Big Horn County.

Remarks/Special Concerns

The proposed action involves drilling of a total of 48 wells, all of which are fee (on privately owned minerals) wells and the continued production of the existing 10 fee wells previously drilled and produced from the pilot project area. The Proposed action includes construction of infrastructure needed to produce the proposed wells.

Monitoring of water withdrawals and reporting of production is required as part of the MBOGC’s regulatory program. Additionally, key wells in the Coal Creek field POD area will be added to the monitoring requirements established for the original Coal Creek pilot project. The area will be included in the annual groundwater monitoring report and the data for the new wells added as it is obtained. The Technical Advisory Committee established by DNRC’s Controlled Groundwater Area for the Powder River Basin reviews the monitoring plan and report(s).

Sections [82-11-172](#) MCA, through [82-11-174](#), MCA, known as the "Coal Bed Methane Production Offset Act", requires the MBOGC to issue drilling permits to protect lands under its jurisdiction from drainage by wells permitted by agencies/lands not under its jurisdiction. This project area includes lands not under MBOGC jurisdiction (federal lands) that were tested during operation of the Coal Creek pilot project. Production from lands not under the jurisdiction of the MBOGC, such as federal wells, may cause drainage from Montana State and private landowners unless the offsetting protective wells are promptly permitted and drilled.

Summary: Evaluation of Impacts and Cumulative effects

The 2003 Statewide Oil & Gas EIS identified and analyzed the cumulative effects of CBNG development in the Powder River Basin region. The CX field and environs formed the analogue for analysis used in the EIS, as it is the only source of CBNG project level data available in Montana. The Coal Creek field is directly north and east of the CX field and lies within the same environmental setting. The EIS is directly applicable to the proposed action and accurately identifies impacts and mitigation appropriate to this analysis. The following table summarizes impacts and mitigation applicable to this project:

Resource	Summary of Impacts and Mitigation	
	Alternative A – No Action	Alternative B – Proposed Action
Air Quality	No change from existing conditions	Minimal impact from well drilling operations due to short duration; air permit requirements mitigate impacts from significant point sources: voluntary speed limits, minimization of traffic to individual wells mitigate fugitive dust impacts. This proposed action does not significantly increase air quality impacts.
Water Quality and Quantity	No change from existing conditions	Project does not increase surface discharge beyond that currently permitted. MDEQ has adopted

		<p>numeric standards for discharge to protect downstream uses should any additional discharge be proposed in the future. No new off channel impoundments are proposed although enlargement of existing impoundments may be required in the future. MBOGC inspectors will periodically monitor sites. Cumulative effects on water quantity are limited to the coal zones being produced; water well mitigation agreements protect groundwater appropriators; DNRC Controlled Ground Water Area order outlines jurisdiction and procedure for the area. Overall impacts to water quantity and quality are mitigated below the level of significance for the proposed action.</p>
Soils, Vegetation, Land Use	No change from existing conditions	<p>Short-term damage to vegetation and some disruption of existing land use is expected. The operator has proposed a minimum number of surfaced roads; MBOGC requirements for prompt re-vegetation of disturbed areas minimize overall and cumulative effects. Operator has negotiated surface use agreements that cover land uses proposed in the project area. No significant impact to these resources is expected.</p>
Health Hazards/Noise	No change from existing conditions	<p>No long-term impacts are expected due to operator's selection of sites to minimize impacts. Short-term impacts related to noise levels during drilling and construction activities are less than those described in the 1989 Programmatic EIS. Operator has substantive programs intended to protect safety of workers and public.</p>
Wildlife/ Recreation	No change from existing conditions	<p>Operator has moved well sites and infrastructure to avoid wildlife nesting/mating grounds. One well site is proposed within ½ mile of an active eagle nests, drilling at this well site will be avoided during nesting season. Operator will install devices to discourage raptor roosting on power poles within ¼ mile of active leks and will use raptor protective power line structure where underground utilities are not practical. Voluntary vehicle speed limits are also protective of wildlife. With the voluntary mitigation, wildlife impacts due to approval of the proposed action are not considered significant or long term.</p>
Historical/ Cultural/ Paleontological Resources	No change from existing conditions	<p>Cultural and historical resource surveys have been conducted on nearby lands as part of the pilot project for the area and as part of the 2003 Montana Statewide Oil & Gas EIS. Although antiquities laws generally do not apply to private landowners,</p>

		the operator has voluntarily agreed to consult with the surface owner and halt construction if resources are discovered on private land. Cultural resource inventories identified one site possibly eligible for National Register status in this area; with the voluntary mitigation, no significant impact on these resources is expected from the proposed action.
Social/ Economic	No change from existing conditions	Some short-term impacts to private landowner/residents of the area are expected; relocation or population increases are not expected. Positive impact to state and county tax base is likely. Royalty owners will benefit from the proposed action. Most adverse impacts occur during drilling and infrastructure construction and are short term. No significant increase in demand for local government services or long-term adverse impacts are likely from this project approval.
Remarks/ Special Concerns	No change from existing conditions	Key wells in the Coal Creek field POD area will be added to the monitoring requirements established for the original Coal Creek pilot project. The area will be included in the annual groundwater monitoring report and the data for the new wells added as it is obtained. The applicant has obtained surface use agreements and water well mitigation agreements for the project area, as required. Production from lands not under the jurisdiction of the MBOGC "Coal Bed Methane Production Offset Act", such as federal wells, may cause drainage from Montana State and private landowners unless the offsetting protective wells are promptly permitted and drilled.

The operator (Pinnacle) has proposed voluntary mitigation efforts that are intended to reduce overall impacts of the proposed project. This voluntary mitigation accompanied by the regulatory programs enforced by state and federal agencies reduce the long term, cumulative effects of the proposed action below the level of significance; therefore, I conclude that the approval of the Coal Creek Field Plan of Development (2005) does **not** constitute a major action of state government significantly affecting the quality of the human environment, and does **not** require the preparation of an environmental impact statement.

Approved by (MBOGC):

<Original signed>

Thomas P. Richmond, Administrator

Date: 8-19-05

Contacts and References:

- Final Statewide Oil and Gas EIS, adopted March 2003 (MBOGC, MDEQ, BLM)
- Final Programmatic EIS, Adopted December 1989 (MBOGC)
- Plan of Development – Coal Creek Federal CBNG Project, Pinnacle Gas Resources (formerly Powder River Gas, LLC), August 2003.
- Plan of Development – Coal Creek Field Project, Pinnacle Gas Resources (Formerly Powder River Gas, LLC), April 2005.
- Montana 2002 and 2003 Baseline Wildlife Inventory (Hayden-Wing Associates)
- Environmental Assessment Coal Creek Federal Project – July 2004.

Table 1. Pinnacle Gas Resources Coal Creek Field Project--Comparison of Alternatives

Project Component	Alternative A – No Action	Alternative B – Proposed Action with Additional Mitigation (preferred alternative)
Number and type of wells and drill sites	0 new Federal wells 0 new Fee wells 10 existing Fee wells at 5 well sites with no production	10 Fee wells (existing)/5 well site 48 Fee wells (proposed)/24 well sites
Drill site construction	No drill site construction	Well pad construction would be as described in the Coal Creek POD.
Drilling Operations	No drilling operations	48 new fee wells would be drilled in the same manner as described in the Coal Creek POD.
Disposal of drilling and water treatment wastes	No waste would be generated	<p>A 25 feet x 40 feet x 4 feet reserve pit for the disposal of drill waste with one reserve pit constructed at each well site. The reserve pits would be fenced.</p> <p>Reserve pit closure occurs within 90 days of well completion. After evaporation of fluids the pit is backfilled with soil and compacted to prevent settling as described in the Coal Creek POD.</p> <p>Garbage would be stored in containers at the well site and taken off site to an approved facility for disposal. Sewage is handled through portable toilets as described in the Coal Creek POD.</p> <p>Any excess brine or reject water that is not recycled to other beneficial uses would be transported and injected into a licensed Class I deep disposal well in Wyoming.</p>

Project Component	Alternative A – No Action	Alternative B – Proposed Action with Additional Mitigation (preferred alternative)
Gas & Water Pipelines & Electrical Lines	None constructed	<p>Approximately 0.65 miles of utility corridors would be built not within access routes, 4.56 miles of utility corridor will be built along existing 2-track roads, 1.05 miles of new corridor along existing county roads, and 5.26 miles of utility corridors will be built within new 2-track roads.</p> <p>Buried high density polyethylene flowline to carry gas from the 48 proposed private wells to the central distribution point.</p> <p>Produced water would be transported through buried high density polyethylene flowlines from each well site to the chosen water treatment option. If the treatment facility option is utilized the water would be transported through buried high density polyethylene flowline to the existing discharge point adjacent to the Tongue River.</p> <p>Electricity would be brought into the project area from an existing line in the southeastern portion of the POD. Electricity would be routed to drop points above ground on poles. At power drop points, electricity will be moved to underground cable for burial in trenches dug to well sites. Multiple wells will be serviced from each drop point.</p>
Road maintenance and use	Road maintenance and use would remain in the current condition.	<p>Access would be primarily by way of 16.27 miles of existing and 6.30 miles of new two track roads to access private wells, plus the use of 1.05 miles of all weather existing county roads. An additional 2.29 acres of crown and ditch roads will also be constructed.</p> <p>Earthen materials would come from adjacent locations owned by the landowner. Scoria would be used when necessary from permitted pits for surfacing material.</p> <p>All vehicle access will be negotiated with the land owners in the surface use agreement.</p>
Discharge of Produced Water	No water would be produced or discharged	Effluent produced from existing and proposed Fee wells will be treated and discharged into Tongue River (under MPDES Permit # MT-0030660) or land applied, Stored and Evaporated, and/or stored as ground water for future beneficial use

Project Component	Alternative A – No Action	Alternative B – Proposed Action with Additional Mitigation (preferred alternative)
Reclamation Measures	No reclamation needed	The surface would be reclaimed in accordance with the agreements with landowners. The disturbed areas would be seeded with a certified seed mix agreed to by the NRCS and the surface owner.
Reclamation Timeframes	No reclamation needed	Reclamation would take place as defined in the Coal Creek field project area.
Air Quality Monitoring	No effects	Per MDEQ permit requirements
Wildlife Monitoring	None required	Monitoring of specific wildlife species is not required on fee surface: The disturbed areas will be located to avoid disturbing sage grouse, sharp-tailed grouse, and mountain plover nesting sites, drilling activities will be avoided during bald eagle nesting season.
Soils Monitoring	None required	Sites would be monitored by onsite visits during various stages of development and reclamation to ensure accelerated erosion is not occurring.
Water Quality Monitoring	None required	Per MPDES requirements