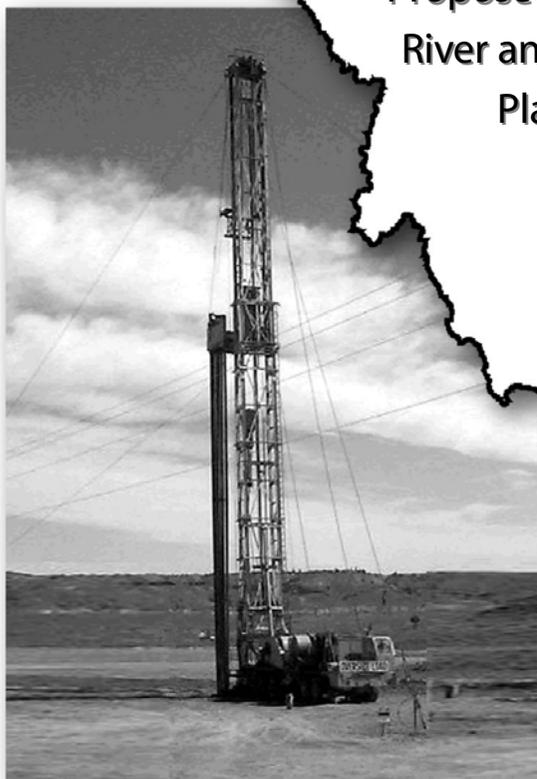
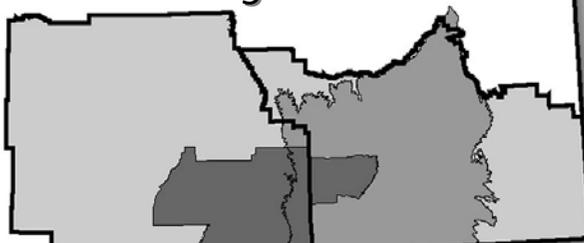


MONTANA

Record of Decision for the Final Supplement
to the Montana Statewide Oil and Gas
Environmental Impact Statement and
Proposed Amendment of the Powder
River and Billings Resource Management
Plans



December 2008



Record of Decision

Miles City Field Office



The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times. Management is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation; rangelands; timber; minerals; watershed; fish and wildlife; wilderness; air; and scenic, scientific, and cultural values.

BLM/MT/PL-09/001



United States Department of the Interior



BUREAU OF LAND MANAGEMENT

Montana State Office
5001 Southgate Drive
Billings, Montana 59101-4669

<http://www.blm.gov/mt>
http://www.blm.gov/mt/milescity_seis/

IN REPLY TO: 1610

December 30, 2008

Dear Reader:

In accordance with the National Environmental Policy Act of 1969, as amended (NEPA), and the Federal Land Policy and Management Act of 1976 (FLPMA), the Bureau of Land Management (BLM) has prepared the *Record of Decision* (ROD) for the *Final Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans* (SEIS). The ROD approves BLM's proposed decisions in the Final SEIS.

The ROD is a result of U.S. District Court issued orders, dated February 25, 2005, and April 5, 2005, requiring BLM to prepare a Supplemental EIS to evaluate a phased development alternative for coal bed natural gas production.

BLM consulted with the Montana Governor on the FSEIS. The Governor's review did not result in substantive changes to the plan amendment.

The ROD serves as the Department of Interior's decision to be implemented by the BLM. Since the ROD contains no implementation decisions, no further administrative remedies are available. Additional project-level NEPA analyses will be conducted prior to BLM's approval of individual and project proposals, and subsequent on-the-ground implementation.

There are a limited number of hard-copy books available upon request. If you would like a book, or have any questions, please contact the BLM Miles City Field Office at (406) 233-2800.

Sincerely,

Gene R. Terland
State Director, Montana/Dakotas

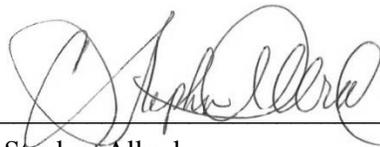
RECORD OF DECISION

MONTANA STATEWIDE OIL AND GAS ENVIRONMENTAL IMPACT STATEMENT AND AMENDMENT OF THE POWDER RIVER AND BILLINGS RESOURCE MANAGEMENT PLANS

Prepared by:
United States Department of the Interior
Bureau of Land Management
Miles City Field Office
Miles City, Montana

Cooperating Agencies: Bureau of Indian Affairs; Crow Tribe; Department of Energy; Environmental Protection Agency; Lower Brule Sioux Tribe; Montana Board of Oil and Gas Conservation; Montana Department of Environmental Quality; U.S. Army Corps of Engineers; and Big Horn, Carbon, Golden Valley, Musselshell, Powder River, Rosebud, Treasure, and Yellowstone counties, Montana

Approved by: _____



C. Stephen Allred
Assistant Secretary Land and Minerals Management
Department of the Interior

Date: December 30, 2008

Record of Decision
Supplement to the Montana Statewide Oil and Gas
Environmental Impact Statement and Amendment of the Powder River and Billings
Resource Management Plans

Lead Agency: U.S. Department of the Interior, Bureau of Land Management (BLM)

Type of Action: Administrative

Jurisdiction (Planning Area): The planning area encompasses BLM-administered lands and minerals in the Powder River Resource Management Plan (RMP) area - Powder River, Carter, and Treasure counties and portions of Big Horn, Custer and Rosebud counties; and the Billings RMP area - Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Wheatland, and Yellowstone counties and the remaining portion of Big Horn County. The planning area contains about 1,506,011 acres of federally managed surface, and 5,009,784 acres of federal mineral estate.

Abstract: As a result of lawsuits, the U.S. District Court issued orders, dated February 25, 2005, and April 5, 2005, that required the BLM to prepare a Supplemental Environmental Impact Statement (SEIS) to evaluate a phased development alternative for coal bed natural gas (CBNG) production. The U.S. District Court's February 25, 2005, order also advised the BLM to include the proposed Tongue River Railroad in the cumulative impact analysis and analyze the effectiveness of water well mitigation agreements.

Alternative H is the Approved Alternative. The Approved Alternative provides a comprehensive framework for managing oil and gas resources on public lands in the planning area. This alternative amends the Powder River and Billings RMPs and provides for CBNG exploration and development while minimizing impacts on environmental resources.

Further information regarding this ROD is available via the contact below or at the BLM website (http://www.blm.gov/eis/mt/milescity_seis/).

Bureau of Land Management
Miles City Field Office
111 Garryowen Road
Miles City, MT 59301
Telephone (406) 233-2800

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ABBREVIATIONS AND ACRONYMS

7Q10	Statistical measure for the lowest flow expected for a continuous 7-day period in 10 years	IWG	Interagency Work Group
APD	Application for Permit to Drill	MBOGC	Montana Board of Oil and Gas Conservation
BLM	Bureau of Land Management	MDEQ	Montana Department of Environmental Quality
BMP	Best Management Practice	MFWP	Montana Fish, Wildlife and Parks
CAA	Clean Air Act	MPDES	Montana Pollutant Discharge Elimination System
CBNG	Coal Bed Natural Gas	NEPA	National Environmental Policy Act
COA	Condition of Approval	POD	Plan of Development
DNRC	Department of Natural Resources and Conservation	RMP	Resource Management Plan
DSEIS	Draft Supplemental EIS	ROD	Record of Decision
EIS	Environmental Impact Statement	ROW	Right-of-Way
ESA	Endangered Species Act	SEIS	Supplemental EIS
FLPMA	Federal Land Policy and Management Act	TMDL	Total Maximum Daily Load
FSEIS	Final Supplemental EIS	UIC	Underground Injection Control
FWS	Fish and Wildlife Service	WMPP	Wildlife Monitoring and Protection Plan

RECORD OF DECISION

DECISION

The decision is hereby made to approve Alternative H and all Appendixes from the Bureau of Land Management's (BLM's) 2008 *Final Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans* (FSEIS). The FSEIS was prepared under the regulations implementing the Federal Land Policy and Management Act (FLPMA) (43 Code of Federal Regulations [CFR] Part 1600) and the National Environmental Policy Act (NEPA). The decision applies to BLM-administered lands and minerals only. The BLM is responsible for implementation of the Record of Decision (ROD).

ALTERNATIVES

The following eight management alternatives were considered in the development of the FSEIS: The No Action Alternative (Existing coal bed natural gas [CBNG] Management) and seven action alternatives for managing oil and gas resources—specifically CBNG exploration and production—throughout the Planning Area.

Alternative A –the “no action” alternative. Under existing management, APDs for CBNG wells would be approved on a case-by-case basis only in specific geographic areas where little or no CBNG data is available. The APDs would only authorize the drilling and testing of wells and associated construction activities. CBNG production would not be authorized nor would the operator be allowed to discharge waters into state or U.S. streams or drainages. All current leasing stipulations regulating mitigation measures would be applied to new leases and enforced on current leases.

Alternative B – BLM would review and approve CBNG activities with an emphasis on the natural and cultural resources. Certain mitigation measures would be implemented to minimize environmental impacts including: generators and compressors would have to be powered by natural gas-fired engines; water from producing wells would be injected into a different aquifer with the same or lesser quality water; co-location by spacing unit, of single-seam development wells on the same well pad would be required; and roads to wells and compressor sites would be limited to single lane width with turnouts.

Alternative C – BLM would review and approve CBNG activities with an emphasis on facilitating production of CBNG. BLM would use the least restrictive mitigation measures to minimize or eliminate adverse impacts to other resources. Operators could use diesel engines with Best Available Control Technology to reduce emissions. Roads and utility corridors would be positioned to use existing disturbances as much as possible and operators would not be required to drill directional or horizontal CBNG wells. Furthermore, water management would be based on a combination of beneficial use and surface discharge.

Alternative D – BLM would review and approve CBNG activities while maintaining existing land uses and protecting downstream water consumers. The number of wells connected to each compressor would be maximized to reduce the overall number of field compressors required. All produced water (depending on water quality) would be treated prior to surface discharge or pumping into holding facilities such as impoundments, pits, and ponds. Transportation of treated water for discharge would be via a constructed drainage system or pipeline to the nearest perennial watercourse if possible. Use of CBNG-related roads would be limited to industry, and enforcement would be increased through the use of additional fences and gates to reduce public access and overuse. In addition, wildlife surveys would be conducted prior to the approval of APDs.

Alternative E – This alternative provides management options to facilitate CBNG exploration and development while sustaining resource and social values, and existing land uses. Exploration and development of CBNG resources on BLM minerals are subject to agency decisions, lease stipulations, permit requirements, and surface owner agreements. Operators would be required to submit a project Plan of Development (POD) outlining the proposed development of an area when requesting CBNG well densities greater than 1 well per 640 acres. The project POD would be developed in consultation with the affected tribes, affected surface owner(s), and other involved permitting agencies. Alternative E combines water management options so that there would be no unnecessary or undue degradation as defined by the Montana Department of Environmental Quality (MDEQ) of water quality allowed in any watershed.

Alternative F – Under this alternative, development of CBNG on federal leases in the Billings and Powder River Resource Management Plan (RMP) areas would

be done in a phased manner through restrictions imposed by BLM. BLM would limit the number of federal APDs approved each year cumulatively (both state and federal APDs combined) and in each fourth order watershed. BLM would also limit the percentage of disturbance on BLM surface or on private surface overlying federal minerals within each identified crucial habitat area. Finally, BLM would place a limit on the volume of untreated water discharged to surface waters from federal CBNG wells within each fourth order watershed. The cumulative limit placed on federal APDs would be based on 5 percent (910 wells) of the total number of state, private, and federal wells (18,225 wells) predicted to be drilled in the Planning Area.

Alternative G – Under this alternative, development of CBNG on federal leases in the Billings and Powder River RMP areas would be done following the same management actions as described under Alternative F; however, development would be limited to the low range of predicted wells (6,470) from the reasonably foreseeable development scenario.

Alternative H – BLM’s approved alternative. Development in the Billings and Powder River RMP areas would be done in a phased manner through restrictions imposed by BLM.

The phased approach is intended to reduce the overall cumulative impacts to any resource by managing the pace and place as well as the density and intensity of federal CBNG development. In addition to the standard POD review, four evaluation screens for water, wildlife, Native American concerns, and air would be applied. The screens would be used when reviewing proposals to identify impacts, develop mitigation measures and guide the decision making process. The process BLM would follow when reviewing PODs involves reviewing the POD, making permit decisions, monitoring and assessing impacts and adjusting operations, mitigation measures, and thresholds. Thresholds would be adjusted when monitoring data justify a change.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

Alternative A, the no action alternative, is the environmentally preferred alternative [40 CFR 1505.2 (b)]. Only a limited number of wells could be approved resulting in fewer impacts than the other alternatives analyzed. Although Alternative A would result in fewer impacts, the alternative does not provide for the continued use of public minerals for oil and gas development consistent with FLPMA, the Energy Policy Development Group recommendations, and Executive Order 13212.

MANAGEMENT CONSIDERATIONS

The ROD fully complies with BLM’s multiple use mission while considering and providing for responsible development of important oil and gas resources as described in the FLPMA.

The ROD considers the use and protection of the resources managed by BLM, including important energy and natural resources present in the planning area. While the ROD supports the development of oil and gas resources, it also includes the application of mitigation measures to minimize or avoid impacts to resources or land uses from oil and gas activities and to prevent unnecessary or undue degradation. In addition to the mitigation measures, existing lease stipulations may be applied to protect critical resource values. Other protective measures, such as COAs, may be required at the APD stage to mitigate site-specific impacts.

The ROD takes into account statutory and national policy considerations. The analyses in the FSEIS were based on evaluation of the Powder River and Billings RMP areas for oil and gas development, identifying sensitive natural and cultural resources, evaluating the effects of surface disturbance to these resources and identifying successful protection measures. The constraints placed on oil and gas development were reviewed in light of resource protection and where possible, major conflicts were resolved to provide a balance between protection of sensitive resources, and sound practices for development of oil and gas resources. The decision was also based on input from the public, industry, and other federal and state agencies. Through the review process, many practicable methods to reduce environmental harm were incorporated into the FSEIS and carried forward in this ROD.

Impacts anticipated from future actions taken in accordance with the approved plan are acceptable for the following reasons: 1) as the nation’s largest land manager, the Department of the Interior, through the BLM, plays a major role in implementing the National Energy Policy; 2) the National Energy Policy promotes the production of reliable, affordable and environmentally clean energy; 3) among the Nation’s most pressing concerns is to reduce our reliance on foreign oil and gas while protecting the environment; 4) BLM-administered lands contain world-class energy and mineral resources, vital to the national interest; 5) the vast energy and mineral resources under BLM’s jurisdiction places the agency in the key role of ensuring an adequate supply of energy necessary for the safety and security of our families, our communities and our nation; 6) CBNG is available on public lands and BLM has a multiple use mission under FLPMA; 7) the approved decision is an environmentally sound alternative; and 8) the

approved alternative complies with all applicable laws and regulations.

MITIGATION

The following mitigation measures are being adopted into the ROD and will be applied. These represent practicable means to avoid or minimize environmental harm from the approved decision.

Air Quality

Roads and well locations constructed on soils susceptible to wind erosion will be appropriately designed to reduce the amount of fugitive dust generated by traffic or other activities. Dust inhibitors (i.e., surfacing materials, non-saline dust suppressants, water, etc.) will be used as necessary on unpaved collector, local, and resource roads, which present a fugitive dust problem. To further reduce fugitive dust, operators will establish and enforce speed limits (i.e., 15 mph) on all project-required roads in and adjacent to the project area.

Potential emission reduction measures (USDI BLM 1999d) are available to further limit the oxides of nitrogen and other pollutant emissions. The appropriate level of control will be determined and required by the applicable air quality regulatory agencies during the preconstruction permit process. Visibility impacts will be mitigated by reducing emissions of particulate matter less than 2.5 microns in diameter, nitrogen dioxide and sulfur dioxide through implementation of the air quality screen.

Cultural Resources

Cultural resource reviews or surveys will be conducted as required prior to the approval of permits and commencement of construction or other surface disturbing activities authorized by BLM. Guidance for application of this requirement can be found in NTL-MSO-85-1.

Results of cultural resource surveys will be presented as part of the permit review or approval process. Decisions regarding relocation of proposed access roads or well pads, data recovery, and excavation will be made to protect the cultural or historical sites.

Fire

Operators are required to comply with BLM-imposed conditions during times of high fire danger. Such conditions may include restrictions on types of activities allowed, hours of operation, and requirements for maintaining certain fire suppression equipment at the

work site. Operators must maintain a current fire suppression plan.

Hydrology

Water well and spring mitigation agreements will be used to facilitate the replacement of groundwater that may be lost to drawdown. Replacement water may require supply from offsite sources.

Indian Trust and Other Interests

The tribes will be invited to participate in the IWG responsible for developing and recommending the monitoring and mitigation measures needed for each agency to ensure its actions achieve compliance with applicable air and water quality standards across jurisdictional boundaries. Mitigation measures for potential impacts to the Northern Cheyenne Tribe trust resources and other interests are included in the ROD Appendix B.

Lands and Realty

Corridors will be required for placement of roads, pipelines, and utility lines in a common area of disturbance wherever possible.

Livestock Grazing

Damaged gates and fences will be repaired or replaced according to landowner requirements at the operator's expense. When working on or near grazing lands, project-related construction equipment and vehicle movement will be minimized to avoid disturbance of grazing lands. Responsibilities for fence, gate, and cattle guard maintenance and noxious weed control will be defined in APDs, BLM approvals, or right-of-way (ROW) grants. Facilities will be placed to avoid or minimize impacts on livestock water.

Paleontology

BLM APD COAs provide guidance for notifying BLM and mitigating damage to paleontological resources discovered during oil and gas construction activities. Limitations include restricted use of explosives for geophysical exploration, monitoring requirements, and work stoppages for discovered resources.

Recreation

Exploration activities will be coordinated for timing to minimize conflicts during peak use periods.

Solid and Hazardous Waste

Site clearance surveys will be conducted prior to surface disturbance commencement. Solid and hazardous wastes generated as a result of oil and gas lease operations will be disposed of in a manner and at a site approved by the appropriate regulating agency.

Soils

Areas with steep topography will be developed in accordance with the BLM Gold Book (United States Department of the Interior and United States Department of Agriculture 2006) requirements. Lease roads and constructed facilities will be located in accordance with the approved APD. In areas of construction, topsoil will be stockpiled separately from other material, and be reused in reclamation of the disturbed areas. Unused portions of the producing well site will have topsoil spread over it and will be reseeded.

Construction activities will be restricted during wet or muddy conditions and will be designed following BMPs to control erosion and sedimentation. If porous subsurface materials are encountered during pit construction, all onsite fluid pits will be lined. During road and utility ROW construction, surface soils will be stockpiled adjacent to the cuts and fills.

Stream crossings will be designed to minimize impacts and not impede stream flow. Erosion control measures will be maintained and continued until adequate vegetation cover (as defined by BLM on a case-by-case basis) is reestablished. Vegetation will be removed only when necessary. Water bars will be constructed on slopes of 3:1 or steeper.

Erosion control and site restoration measures will be initiated as soon as a particular area is no longer needed for exploration, production, staging, or access. Disturbed areas will be recontoured to provide proper drainage.

Topsoil piles may be required to be seeded following the BLM seeding policy.

Displaced farmland, whether in crop production or not, will be reclaimed to original soil productivity through adoption of standard reclamation procedures.

Vegetation

It is the responsibility of the operator to develop a noxious weed prevention plan outlining ways to control noxious weeds on lands disturbed in association with oil and gas lease operations. Lease-associated weed control strategies are to be coordinated with any involved surface owners and local weed control boards. A pesticide-use proposal must be reviewed and approved by BLM prior to any

herbicide application on lands disturbed by federal oil and gas lease operations. A pesticide application record must be made within 24 hours after completion of application of herbicides. Additional measures may be required to prevent the spread of noxious weeds.

The noxious weed prevention plan must include measures to prevent the spread of weed seeds from any vehicles and equipment traveling from or prior to mobilizing it to, the project area.

Disturbed areas resulting from any construction will be seeded in accordance with the BLM seeding policy (USDI BLM, 1999c) or surface owner's requirements. Depending on surface ownership, seeding is usually required during the fall or spring.

Should the reseeded of sagebrush be required, different seeding times and techniques will be required. To the extent practicable, vegetation will be preserved and protected from construction operations and equipment except where clearing operations are required to conduct oil and gas operations, such as for roads, well pads, pipelines, power lines, utility lines, and structures. Clearing of vegetation will be restricted to the minimum area needed for construction and equipment.

To the maximum extent practicable, all maintenance yards, field offices, and staging areas will be arranged to minimize disturbance to trees, shrubs, and other native vegetation and situated to avoid disturbance to important vegetative species, such as sagebrush.

Cuts and fills for new roads will be sloped to minimize erosion and to facilitate revegetation. Riparian zones will be protected by federal lease stipulations and permit mitigation measures. The BLM seeding policy will be followed for all reclamation and reseeded activities.

During reclamation activities, early succession plants will be used for revegetation to provide a fast growing cover crop to minimize and compete against noxious weeds.

Operator reclamation plans will be developed in consultation with the surface owner. Reclaimed areas reseeded with native species will require a certified weed-free seed mix. The seed mix used on private surface will be developed in consultation with the surface owner. Successful revegetation will usually require at least two growing seasons to ensure a self-sustaining stand of seeded species.

Visual Resource Management

Camouflage of all wellheads on federal surface in Class II Visual Resource Management Areas will be required to preserve the viewshed. Camouflage will consist of paint chosen to blend in with the background and placement of wellheads to reduce visual intrusions.

Wilderness Study Areas

Laws and regulations established to protect Wilderness Study Areas prohibit leasing of these lands for resource extraction. Existing oil and gas leases in Wilderness Study Areas will be developed in accordance with the BLM policy for interim management of lands under wilderness review.

Wildlife and Aquatics

Temporary and permanent access roads will be avoided on south-facing slopes within designated crucial big game winter range, where practicable.

The planting of grasses, forbs, trees, or shrubs beneficial to wildlife will follow the BLM seeding policy. When needed, BLM will require installation of erosion and sedimentation control measures, such as riprap, erosion mats, mulch, bales, dikes or water bars. Riprap material and placement must be approved by the appropriate agency.

All above-ground electrical poles and lines will be raptor-proofed to avoid electrocution following the criteria and outlined in the Avian Power Line Interaction Committee (2006).

Activities such as stream crossings that could directly impact sensitive or protected fish species will be undertaken during non-spawning periods for these species. In the unlikely event that multiple, sensitive, or protected fish species with back-to-back spawning periods are present in the same stream reach, one of the following options will be exercised: selecting a nearby, alternative stream crossing site that does not provide suitable spawning habitat for the fish species of concern; using a nearby, existing stream crossing over the channel to avoid instream disturbances; or using shore-based equipment to position and extend the pipeline or other item (e.g., temporary bridge) across the stream, thereby avoiding in-channel activities.

MONITORING

This section describes the monitoring that will be conducted during implementation of the decision.

Land Use Plan Monitoring

Land use plan monitoring will be conducted by BLM. The BLM will monitor the plan to 1) ensure compliance with decisions; 2) measure the effectiveness or success of decisions; and 3) evaluate the validity of decisions.

Project Monitoring

At the project level, inspections will consist of physical onsite examination of oil and gas operations, disturbance areas, verification sampling at water quality monitoring points, environmental sampling and analysis of produced water, evaluation of construction and reclamation techniques and results. Inspections will be conducted more frequently during periods of intense activity, in areas of critical or sensitive resources, or where problems have been noted and corrective measures are being implemented.

Resource Monitoring

For each resource, a series of items will be monitored (see Appendix C of the ROD). Each item is evaluated by location, technique for data gathering, unit of measure, and frequency and duration of data gathering. When a duration is not specified, the duration is for the next 20 years. The monitoring plan states the event that will be evaluated and lists the key resources that will be monitored. If an adverse impact can be corrected by a management action within the scope of this plan, the change will be implemented. If the adverse impact can be corrected only by a management action that is outside the scope of this plan, the Billings (USDI BLM, 1983a) or Powder River (USDI BLM, 1985) RMPs will be formally amended.

The Montana Department of Natural Resources and Conservation (DNRC) Technical Advisory Committee for the Powder River Basin Controlled Groundwater Area has proposed a groundwater monitoring plan for CBNG development. The monitoring recommendations are incorporated into the monitoring table. For a complete copy of that plan, see the FSEIS (BLM, 2008). Much of this plan has been adopted and put in place (see reports at <http://www.mt.blm.gov/mcfo/cbng/CBNG-Monitoring.htm>).

The BLM, U.S. Fish and Wildlife Service (FWS), and the State of Montana have developed a Wildlife Monitoring and Protection Plan (WMPP, see ROD Appendix A).

PUBLIC INVOLVEMENT

The FSEIS was prepared by an interdisciplinary team of specialists from the BLM's Miles City and Billings field offices, and the BLM Montana State Office.

Preparation of the document began in August 2005. The BLM solicited comments from agencies and the public using a variety of tools to announce the beginning of the SEIS process. Public participation activities included public scoping meetings, informal meetings, SEIS website information, and newsletters. Biweekly

teleconference calls were also hosted by the BLM to provide ongoing communication with cooperating agencies and collaborators.

The BLM prepared a public participation plan to guide project management and team efforts to develop the SEIS and to ensure public involvement during the entire SEIS preparation process. During the scoping for and preparation of the Draft SEIS (DSEIS), formal and informal public input was solicited.

The 30-day scoping period began with the *Federal Register* Notice of Intent published on August 5, 2005 (Vol. 70, No. 150, Page 45417). The scoping period and the availability of planning criteria were announced in a legal notice, newspaper advertisements, and media releases. During the scoping period, the BLM received written comments in the form of letters, comment forms, and emails.

Public scoping meetings were held in four towns within the Planning Area. Total attendance was 126 people, with some people attending more than one meeting.

More than 500 comments were submitted during the scoping meetings and in written communications. Many comments were received in several categories, including air quality, oil and gas, phased development, water resources, and wildlife.

Following the public scoping period, the BLM held an alternative development meeting with cooperating agencies and other collaborators on September 21, 2005, in Miles City. As a result of this meeting, a preliminary phased development alternative was developed and distributed to the cooperating agencies and collaborators for comment. Based on cooperating agency and other collaborator comments, and further consideration of scoping comments, the BLM revised the alternative.

The revised phased development alternative was then summarized in an October 2005 project newsletter. More than 1,800 copies of the newsletter were sent to interested parties. The phased development alternative presented in the newsletter was based on the proposed high range of development identified in the original Reasonably Foreseeable Development report. In response to several comments received as a result of the newsletter, the BLM developed a second phased development alternative based on the low range of predicted development.

On November 9, 2005, another meeting was held in Miles City with cooperating agencies and other collaborators. Both the high and low range phased development alternatives were presented for discussion and feedback. As a result of this meeting, the two alternatives were refined.

On February 2, 2007, a Notice of Availability was published in the *Federal Register* announcing the

availability of the DSEIS and beginning a 90-day public comment period which ended on May 2, 2007. Approximately 1510 copies of the DSEIS were distributed to the public for comment. Additionally, a copy was posted on the BLM-Miles City Field Office SEIS website for downloading by the public.

Public meetings were held at five locations within the Planning Area to gather comments on and answer questions concerning the DSEIS. The meetings were attended by a total of 161 members of the public. Comments were received both in writing and orally.

The *Federal Register* Notice of Availability announcing the release of a Supplemental Air Quality Analysis for the DSEIS was published December 12, 2007. A public meeting was held at Miles City, Montana on February 20, 2008. The meeting was attended by 12 members of the public. Comments were received both in writing and orally. The 90-day public comment period for the air supplement ended on March 13, 2008.

The Assistant Secretary, Land and Minerals Management, in the Department of the Interior is the responsible official for the land use plan amendment. As such, the FSEIS/Amendment was not subject to administrative review (protest) under the BLM or Departmental regulations (43 CFR 1610.5-2). FLPMA and its implementing regulations provide land use planning authority to the Secretary, as delegated to the Assistant Secretary.

Tribal Consultation

The BLM has consulted with the Crow Tribe of Indians, the Northern Cheyenne and the Lower Brule Sioux tribal governments throughout the preparation of the SEIS. A chronology of the consultation process with Native American Tribes is in Chapter 5 of the FSEIS.

U.S. Fish and Wildlife Service Consultation

As required by Section 7 of the ESA of 1973, the BLM prepared and submitted a biological assessment to the FWS. The document defined potential impacts on threatened and endangered species as a result of management actions proposed in the FSEIS. A letter received March 25, 2007, from the FWS states:

—The Service concurs with your determination that the proposed action may affect, but is not likely to adversely affect the grizzly bear, bald eagle, pallid sturgeon, black-footed ferret, least tern, and Canada lynx. Formal consultation is not required at this time.” A copy of the letter is included in the Wildlife Appendix of the FSEIS.

APPROVED RESOURCE MANAGEMENT PLAN AMENDMENT

INTRODUCTION

The purpose of this document is to amend the RMPs by analyzing federal CBNG phased development in accordance with the U.S. District Court's directive for supplementing the BLM 2003 Final Montana Statewide Oil and Gas EIS and Proposed Amendment of the Powder River and Billings RMPs (Statewide Document).

In 2003, the BLM and the state of Montana jointly prepared the Statewide Document. The Statewide Document consisted of an analysis of the environmental impacts associated with the exploration and development of oil and gas resources, including CBNG in the Powder River and Billings RMP areas. The BLM ROD for the Statewide Document was approved on April 30, 2003 (USDI BLM, 2003g).

As a result of lawsuits filed against BLM's ROD, the U.S. District Court issued orders, dated February 25, 2005, and April 5, 2005, that required BLM to prepare an SEIS to evaluate a phased development alternative for CBNG production. The U.S. District Court also advised the BLM to include the proposed Tongue River Railroad in the cumulative impact analysis and analyze the effectiveness of water well mitigation agreements. This FSEIS provides additional information and analyses regarding the topics identified by the U.S. District Court. Additionally, this FSEIS updates the Statewide Document with new information and reflects any changes in policies, regulations, or activities since that document was approved.

Several federal agencies, sovereign tribal governments, and state agencies, as well as local county governments, were involved in the development and preparation of this FSEIS. Cooperating agencies include the Bureau of Indian Affairs, Department of Energy, EPA, U.S. Army Corps of Engineers, MDEQ, MBOGC, and the following counties: Big Horn, Carbon, Golden Valley, Musselshell, Powder River, Rosebud, Treasure, and Yellowstone. The Crow Tribe of Indians and the Lower Brule Sioux Tribe signed Memoranda of Understanding with BLM to participate as cooperating agencies. The Northern Cheyenne Tribe also helped to prepare the FSEIS.

The planning area for the ROD applies to BLM administered lands and minerals in the Powder River and Billings RMP areas (Map 1-1). The Powder River RMP Area encompasses the southeastern corner of Montana,

including Powder River and Treasure counties, and portions of Big Horn, Carter, Custer, and Rosebud counties (approximately 1,080,675 acres of federally managed surface and 4,103,700 acres of federal mineral estate). The Billings RMP Area comprises the south-central portion of Montana consisting of Carbon, Golden Valley, Musselshell, Stillwater, Sweet Grass, Wheatland, and Yellowstone counties and the remaining portion of Big Horn County (approximately 425,336 acres of federally managed surface and 906,084 acres of federal mineral estate).

In May 2001, the President's National Energy Policy Development Group issued recommendations for developing and implementing a comprehensive long-term strategy to promote dependable, affordable, and environmentally sound energy for the future. At the same time the President issued Executive Order 13212, "Actions to Expedite Energy-Related Projects" in which agencies are ordered to "take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections."

The FLPMA [43 USC 1701.102 (a) (7)] directs BLM to manage public lands "in a manner which recognizes the Nation's need for domestic sources of minerals, food, timber and fiber from the public lands including implementation of the Mining and Minerals Policy Act of 1970 (84 Stat. 1876, 30 U.S.C. 21a) as it pertains to the public lands..."

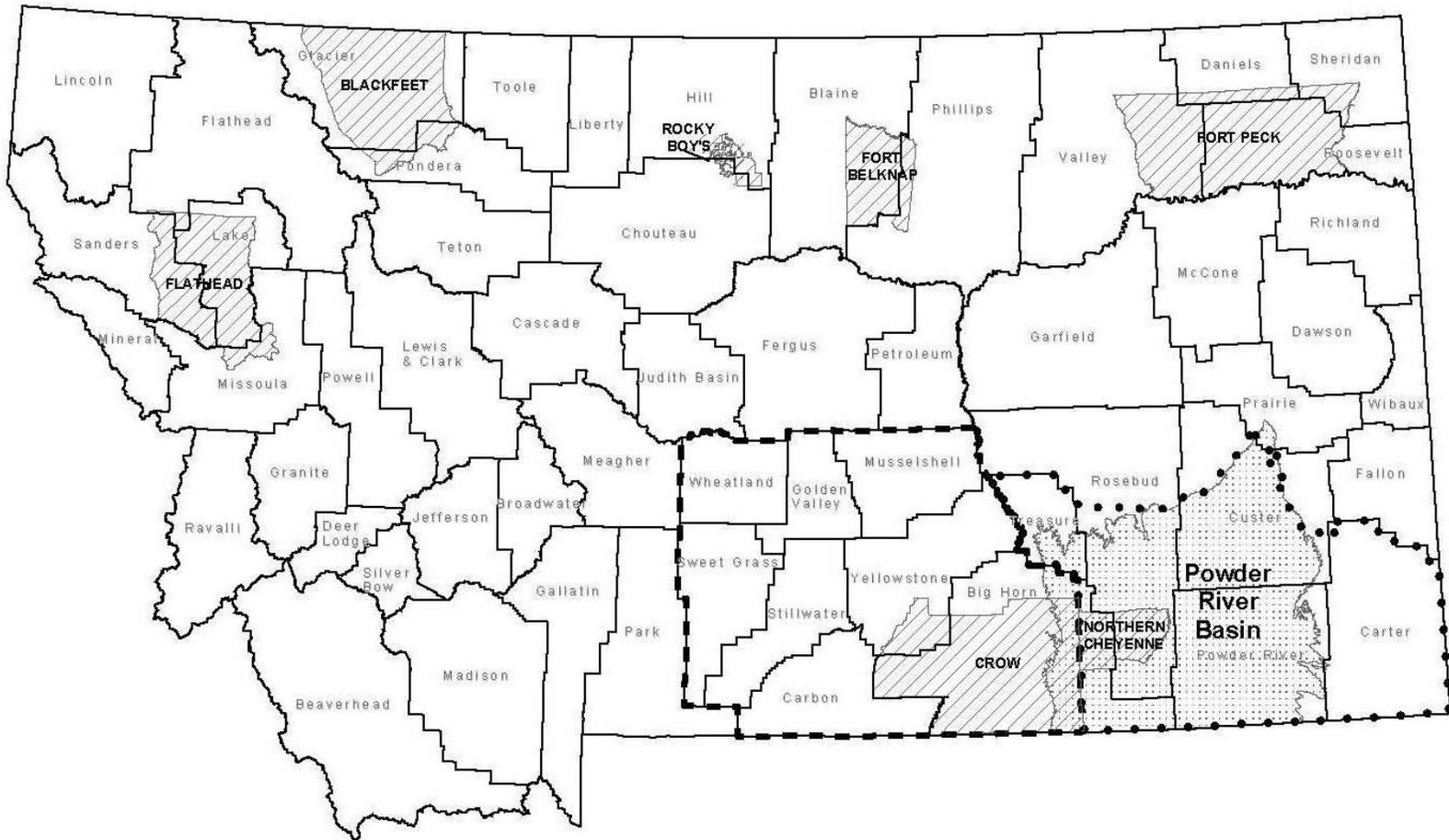
The use of public lands and federal mineral estate for the development of reliable domestic sources of energy is consistent with the recommendations of the Energy Policy Development Group, Executive Order 13212, and FLPMA. The FSEIS was used to analyze options for BLM to change its planning decision by considering oil and gas management options, including mitigating measures, that will help address the environmental and social impacts related to CBNG activities.

ISSUES

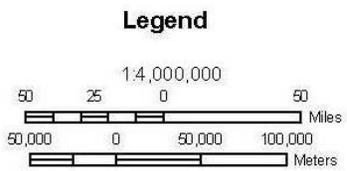
Issues Identified for the Statewide Document

This section presents planning issues identified through the public scoping process held in January 2000 and the BLM and state planning activities. The issues raised were in relation to

Map 1-1: Planning Area - Billings and Powder River RMP Areas



-  Billings RMP Area
-  Powder River RMP Area
-  Native American Reservations
-  Powder River Geologic Basin



DATA SOURCES:
 Counties: 1:100,000 scale, counties, Montana State Library/NRIS, Helena, Montana.
 Reservations: 1:100,000 scale, counties, Montana State Library/NRIS, Helena, Montana.
 Powder River Geologic Basin: 1:250,000 scale, USGS Professional Paper 1625a.

CBNG development and were included in the initial Statewide Document.

Air Quality and Climate

- Reduction in visibility as a result of emission increases impacting the Northern Cheyenne Indian Reservation Class I area
- Air quality impacts from oil- and gas-related activities
- Dust and emissions associated with road and drill pad construction, drilling operations, production, and compression
- Creation or release of harmful gases (hydrogen sulfide) and venting
- Consistency with the air quality model currently being developed for the Powder River EIS through the BLM Buffalo Field Office, Wyoming
- Release of greenhouse gases and effect on global warming
- Changes in ambient air quality and how this relates to objectives for minimizing regional haze based on the “Regional Haze Rule”
- Changes in climate associated with CBNG development

Cultural Resources

- Avoidance of direct and indirect disturbances to cultural resources may precipitate the development of targeted inventory and evaluation strategies in the planning stages of field development
- Impacts on the qualities of a cultural resource site affecting its eligibility for the National Register of Historic Places
- Increased access for oil and gas exploration and development may result in inadvertent, indirect, and cumulative effects to cultural resources
- Identification of specific districts or localities in which oil and gas development may be incompatible with existing cultural values
- Identification of areas of critical environmental concern

Geology and Minerals

- Re-establish hydrologic balance and functionality after CBNG development so that adjacent or nearby coal companies can recover their bonds and

determine effects on aquifer reconstruction in coal mine areas

- Discharge of CBNG-produced waters could affect new coal mines if entering the mine permit boundaries
- Effects on oil and gas development from other resource protection measures
- Loss of methane resource because of venting from coal mines
- Drainage of methane from federal minerals from offsetting state and private wells
- Quantity of methane recovered
- Effect of over-pumping CBNG water on gas recovery
- Subsurface coal fires
- Potential loss of coal production due to CBNG development

Hazardous Materials and Waste Management

- Use of hazardous materials and potential for misuse as a part of CBNG development

Hydrology

Groundwater

- Produced water quality and appropriate beneficial reuses
- Drawdown of aquifers and drying up of natural springs due to CBNG production
- Appropriate water management alternatives
- Water quality impacts
- Water rights conflicts
- Changes in pumping rate and cumulative drawdown due to CBNG development
- Impacts on down- and up-gradient water resources in both confined and unconfined aquifers
- Long-term effects of CBNG pumping on aquifer recharge and groundwater resources
- Effects on DNRC established Powder River Basin Controlled Groundwater Area
- Shallow (Class V) and deep (Class II) injection of produced water opportunities

Surface Water

- Effect of high sodium adsorption ratio (SAR) and increased flow rates on eroding stream channels
- Impacts on water quality from produced water
- Impacts on biota from water quality changes
- Montana Pollutant Discharge Elimination System (MPDES) discharge analysis for CBNG-produced waters
- Cumulative impacts on water quality and quantity
- Impacts on irrigated cropland
- Indian Trust Resources and Native American Concerns
- Unique Native American concerns and social impact on Native Americans
- The effects of discharged water on agriculture, fishing, hunting, and gathering of native and sacred plants as they relate to traditional values held by the tribes
- Protection of Indian trust assets with regard to resource drainage and reduction of usable assets
- Water quality preservation agreement with the Northern Cheyenne
- Effects to reservation Prevention of Significant Deterioration Class I area classification and nonattainment area
- Impacts on sites with traditional cultural importance to Native Americans in areas on and adjoining the reservations
- Increased use of public facilities and services on reservations
- Cultural and socioeconomic impacts on tribal members associated with CBNG development

Lands and Realty

- Construction effects from drilling, roads, pipelines, and water disposal facilities
- Infrastructure needed to accommodate CBNG development would require numerous road, power line, and pipeline ROWs

Livestock Grazing

- Impacts on grazing lands from discharge of high salinity water

- Effects on livestock and ranching operations from the increased availability of water
- Displacement of grazing lands from the development of CBNG well pads and loss of natural forage
- Change in vegetative communities to more salt-tolerant species that are generally not preferred by livestock

Paleontological Resources

- Impacts from vandalism and unpermitted collectors as a result of increased access to remote areas
- Impacts on paleontological localities from oil and gas development

Recreation

- Effects on hiking, hunting, and other recreational activities from CBNG development
- Displacement and disturbance of wildlife and habitat will affect hunting, hiking, and other recreational activities

Social and Economic Values

- Increased levels of background noise and what noise mitigation would be conducted
- Impacts on social service agencies and local economics from increased population
- Decreased land values
- Escalated real estate prices
- Agricultural job loss
- Economic effect on local communities, including potential increased wage income, lower unemployment, increased local business, and potential costs of a “boom and bust” scenario
- Cost to residents from potential CBNG production affects on springs, livestock watering, and domestic water
- Social structure impacts through direct impacts on the local economy
- Revenue associated with the amount of methane recovered
- Tax revenue to local, state, and federal entities
- Effects on local economies and lifestyle from royalties to the state and federal government

- Royalties to local landowners who own mineral rights and surface disturbance payments to landowners who do not own mineral rights
- Lack of royalties or tax revenues available for Tribes from non-Indian oil and gas leases.
- Benefits from more abundant clean energy
- Effect from Wyoming CBNG development (cumulative)
- Economics of mitigation strategies
- Socioeconomic effect from lowering the water table
- Quantity of economical oil and gas resources and market implications
- Effects to agricultural productivity from sodium adsorption ratio (SAR) levels
- Effects to agriculture from air, soil, and water contamination
- Private surface owner notification prior to work
- Mechanism needed for land owner input on drilling, and leasing and mineral estate issues

Environmental Justice

- Make distributive justice analysis part of the public comment and decision process
- Northern Cheyenne Tribal Government's reliance on operator lease fees from tribal ranchers and irrigators operating on private and reservation lands

Soils

- High sodium effects: dispersion of soil colloids, reduced water infiltration, vegetative composition and population changes, mud pits and bogs, change in crop production yields, and changes in crops grown because of salinity tolerance levels
- Effects on soils from surface discharge flow changes: erosion on stream banks and in ephemeral drainages if these are the discharge points (increased erosion where dispersion occurs)
- Effects on irrigated soils: changes in salt content in soil profile, changes in salt composition, saline seeps downgradient from irrigated soils, dispersion of soil colloids (reduction of soil permeability and increased erosion), and changes to micro-organism populations and composition

- Development effects: disturbance during drilling at pads (exposure to wind and water erosion), and road development (loss of soil used to develop road beds, and packing soil in undeveloped roads, leading to wind erosion)
- Effects on irrigation and crop management practices: addition of additional water for leaching fraction, potential for water logging soils, modification of irrigation systems, change in cropping equipment, and effects on crops
- Effects from land subsidence and disturbance

Vegetation

- Effect of surface discharge of high sodium or SAR water on native vegetation species that are salt intolerant, as well as on streamside vegetation
- Change in vegetative communities to more salt-tolerant species
- Loss of surface vegetation from construction
- Invasion of exotic and noxious plant species in disturbed areas
- Loss of plant productivity from development
- Protection of grasslands within the Powder River Basin
- Agricultural land withdrawal for CBNG production

Special Status Species

- Mitigation measures or avoidance needed to manage and protect candidate and sensitive species
- Loss of threatened and endangered species from development

Visual Resource Management

- Visual degradation from construction of production facilities, roads, powerlines, and pipelines
- Visual pollution

Wilderness Study Areas

- Effects on wilderness study areas from CBNG exploration and development

Wildlife

- Impacts from infrastructure development, including powerlines, and increased human disturbance on wildlife habitat availability, quality and integrity,

escape habitat, and management plans of Montana Fish, Wildlife and Parks (MFWP)

- Fragmentation of wildlife habitat
- Effects from water availability, quality, and quantity
- Loss of animals from hazards to the habitat, such as vehicles, equipment, and increased human access
- Effects on major waterways, such as the Tongue and Powder rivers, and to aquatic ecosystems, including fisheries
- Effect on migration patterns
- Change in vegetative communities to species that are generally not preferred by wildlife
- Effects from increased noise levels

Issues Identified for the SEIS

The following issues were identified during the public scoping process held in August and September 2005. The issues raised were in relation to CBNG phased development. These issues have been expressed in the form of questions.

Air Quality/Climate

- How will air quality, including visibility, be protected and mitigated, especially when considering all existing and proposed sources within the region? Concerns include general air quality, visibility, and potential adverse effects to public health from cumulative emissions of fine particles and fine particle precursors.
- How will air quality, including visibility, be protected within the Northern Cheyenne Indian Reservation airshed and other Class I airsheds?
- How will impacts on water chemistry be prevented in high altitude lakes with little acid neutralizing capacity?
- How will potential for fires from the migration of methane be avoided?
- What additional impacts will the Tongue River Railroad have on regional air quality?

Cultural Resources

- How will culturally important springs and other traditional cultural properties be affected and protected? These include all traditional cultural properties identified by the Northern Cheyenne

Tribe as important such as the Rosebud and Wolf Mountains Battlefield sites and Northern Cheyenne Homestead sites in the Tongue River Valley.

- What traditional cultural properties in the RMP areas may be affected by CBNG development, and how will they be managed?

Native American Concerns

- How will unique environmental, social, economic, and cultural impacts to Native Americans be addressed by phased development?
- How will phased development provide an economic base to benefit tribal members, while not leading to another boom-and-bust cycle?
- How will subsistence hunting, fishing, and gathering be affected and protected?
- How will phased development help BLM to fulfill its Native American treaty trust obligations?
- How will phased development provide protection to tribal reserved water rights?
- How will phased development include coordination and consultation with tribal representatives?

Oil and Gas

- How will phased development be structured to address the national supply and demand situation and reduce U.S. dependence on foreign energy resources?
- How will RMP or landscape-scale effects be addressed by phased development?
- How will lease stipulations be used to mitigate for effects from phased development?
- How will phased development be structured to minimize infrastructure development (to reduce both costs and impacts), including coordination with neighboring landowners?
- How will reclamation and restoration be addressed by phased development?

Phased Development

- How will phased development be planned to account for and protect other resources?

- How will resource impacts from development and other CBNG activities be evaluated and addressed throughout the implementation of phased development?
- How will phased development minimize fluctuations in populations, air quality impacts, overburdening of infrastructure and services, and increases in secondary development?
- How will drainage of federal gas resources and impacts to federal lessees be addressed or affected by phased development?

Socioeconomics

- How will social and cultural changes be addressed by phased development? Specific concerns include infrastructure and service costs borne by state, local, and tribal governments, increased population, social pathologies (crime, alcoholism, drug use, etc.), and environmental exploitation.
- How will revenues (income lessees and state and local taxes) be affected by phased development, and how will these effects differ for reservation and off-reservation communities?
- How will phased development affect jobs, job security, local economy, and farming and ranching activities, and how will these effects differ for reservation and off-reservation communities?

Vegetation

- How will phased development address impacts to and reclamation of sagebrush steppe and grassland ecosystems?
- How will phased development account for the relatively slow vegetative response to changes in groundwater or surface water characteristics?
- How will phased development address the spread of non-native species in affected areas?
- How will phased development affect medicinal and ceremonial native plants important to Native Americans?

Water Resources

- How will produced water be managed by phased development?
- How will groundwater impacts be addressed by phased development? Concerns include

- What phased development implementation strategy or strategies will be included (e.g., restrictions on location [specific area or coal seam], timing, or number of wells)?
- Will more than one phased development alternative be addressed in the FSEIS?
- How will phased development reduce impacts, improve mitigation options, or protect multiple-use of resources?

groundwater drawdown in area or neighboring aquifers, effects on drinking water and stock watering wells, natural springs, and approved water rights.

- How will phased development address surface water effects and mitigation? Concerns include the consequences of changing surface water quality and transforming ephemeral or intermittent streams into perennial water bodies.
- How will effects from development outside the Planning Area be addressed by phased development?
- How will water well mitigation agreements mitigate the effects of aquifer drawdown and methane migration?
- How will phased development affect surface and groundwater quality?

Wildlife

- How will phased development address impacts on wildlife (particularly fish and other aquatic species) and habitat from changes to water quality?
- How will phased development address impacts (both site-specific and at the RMP, landscape, or ecosystem scale) on terrestrial wildlife species (and associated habitats), including song birds, burrowing owls, and bald eagles, but especially sage-grouse and prairie dogs? Particular concerns included habitat fragmentation and cumulative effects from development outside the Planning Area (especially the Wyoming Powder River Basin) and the ability to assign and quantify impacts from various anthropogenic influences.
- How will phased development address potential effects on big game and other subsistence wildlife populations relative to tribal hunting and fishing rights?

- How will phased development affect ESA-listed or potentially listed species?

Issues or Alternatives Considered But Not Analyzed in Detail

The issues and alternatives below were considered but were not analyzed in detail because of technical, legal, or other constraints.

Leasing

BLM oil and gas leasing decisions and lease stipulations, including those applicable to CBNG, were previously analyzed in the BLM 1992 *Final Oil and Gas RMP/EIS Amendment* (BLM 1992). Those decisions were approved in the project's ROD published in February 1994. During that process, the public was invited and encouraged to participate. Analyzing new federal lease decisions, such as closing federal areas of oil and gas estate in the Powder River and Billings RMP areas, are therefore beyond the scope of this plan. The existing lease stipulations approved in the 1994 ROD continue to be applicable to all CBNG development and have been included in Table MIN-5 of the FSEIS Minerals Appendix. CBNG is part of the oil and gas estate. Existing oil and gas leases include the right to explore and develop CBNG. Issuing separate leases for conventional oil and gas and separate leases for CBNG would require a regulatory change.

The purpose of the SEIS was to amend the RMPs by analyzing federal CBNG phased development in accordance with the U.S. District Court's directive for supplementing the BLM 2003 Final Montana Statewide Oil and Gas EIS and Proposed Amendment of the Powder River and Billings RMPs (Statewide Document). The SEIS analyzed alternatives including different levels of producing CBNG wells between the low range in Alternative A to the high range in alternatives E, F and H. The SEIS also analyzed different mitigation measures or restrictions that BLM can impose as requirements with approved permits. In addition, Alternatives F, G and H allowed analysis of phased mechanisms that BLM can use to affect the pace and place of CBNG development on federal leases, as well as the density and intensity of cumulative CBNG development. Mitigation measures and a process to evaluate projects to determine if restrictions are necessary to alter the pace or place of federal development are included in alternatives F, G and H (the Preferred Alternative). The evaluation would be conducted during the permit review process and during the production phase.

Bonding

Establishing bond amounts specifically for CBNG development activities that cover the full cost of CBNG development was not analyzed in detail. The MBOGC and BLM regulations set minimum amounts of bonding required before approving drilling permits. The regulations allow agencies to raise the bond amount required depending on such factors as the number and type of wells, type and amount of reclamation necessary and operator history. Bond increases cannot exceed the total of estimated costs of plugging and reclamation for reclamation bonds, or the amount of uncollected royalties due and monies owed because of outstanding violations for lease bonds.

Omega Alternative

The Omega Alternative to drill a large-diameter well through the coals and from the base of that shaft to directionally drill upward into the various coal seams in a circular pattern is an experimental technology not yet proven for CBNG. If this technology becomes viable for CBNG extraction in the future, further consideration would be given to it.

Alternate Sources of Energy

The purpose of the FSEIS was to consider federal CBNG phased development. Considering alternate sources of energy such as wind power and fuel cells was therefore beyond the scope of the FSEIS.

Re-Injection of Produced Water into the Same Aquifer Alternative

Re-injection of produced formation water is an accepted practice in conventional oil fields, but its use in CBNG fields would be counterproductive if the produced water was re-injected or could migrate into the CBNG producing formation. In conventional oil fields, operators have re-injected produced water since the 1920s to help maintain reservoir energy and to increase ultimate production efficiency, or to move oil preferentially to producing wells. When produced water is re-injected, original reservoir pressures are maintained; this can significantly increase the percentage of original oil in place that is produced before the field's economic limit is reached (Thomas et al. 1987). Re-injection can also sweep oil out of the reservoir toward producing wells in a waterflood, also increasing production efficiency. In these scenarios, water production is neither desired nor absolutely necessary; it is a nuisance that can be minimized with standard engineering practice. In the history of many

oil fields, oil is produced water-free for months or even years before water is seen in producing wells.

In CBNG production, formation water must be produced before reservoir pressures are sufficiently reduced for the adsorbed methane to be liberated. Water production is unavoidable and pre-requisite to CBNG production. As water is produced from the coal seam, the pressure in the seam is reduced. Research by the BLM's Casper, Wyoming, Field Office suggests that methane production begins after 20 percent of the virgin reservoir pressure is depleted; significant production does not begin until 40 percent of the pressure is depleted (Crockett and Meyer 2001). Work by Jones et al. (1992) corroborates this relationship. If methane production is directly related to depletion of reservoir pressure, then re-injection of produced water within the confines of the CBNG field will directly result in the decrease of methane production. Re-injection of CBNG-produced water into the producing formation is not a reasonable option for management of produced water. When and if this technology becomes viable, a more detailed analysis would be conducted for further consideration.

It would be reasonable to inject produced water into non-productive coal seams that were geologically separated from the CBNG field. Separation could be the result of faulting or erosion, isolating coals in the injection area even from stratigraphically equivalent productive coal seams in the CBNG field. Under Alternative B the injection of produced water into either non-productive coal seams or aquifers with water of lesser quality is analyzed. This type of injection results in preservation of the produced water resource, whether of high or low quality. The permit process could mitigate impacts to groundwater so that the quality of the injected water is matched to the quality of the formation water in the prospective injection zone.

Recently there have been discussions suggesting the mandatory injection of all CBNG-produced water. In fact, a petition was forwarded to the Montana Board of Environmental Review for consideration of this topic. In preparation of this board debate, a report entitled the "Potential Effects to Ground Water Systems Resulting from Subsurface Injection of CBM Production Water" was drafted by the Montana Bureau of Mines and Geology (Wheaton and Reddish 2005). The report states that, overall, the approach of injecting water into Fort Union Formation aquifers of the Powder River Basin has not been widely tested. Areas where favorable conditions exist appear to be limited to approximately 9 percent of the total area. Mandating injection does not mean it is technically feasible, regardless of economics. In some areas that have

suitable aquifers, injection may be technically and economically feasible, as well as a means of conserving the water resource. Injection cannot, however, be regarded as appropriate in all settings. Further, mandated injection may force the use of the deeper Madison Group geologic formation that has water of lower quality than the CBNG produced water. If CBNG produced water was injected into the Madison formation, the quality of the water might make it unsuitable for beneficial uses without treatment.

Phased Development (other than Alternatives F, G and H)

Comments received during the public scoping period varied substantially in their interpretation of what constitutes "phased development." While BLM has analyzed phased development under alternatives F, G and H, several proposed elements of phasing were not analyzed in detail. Those proposed elements and BLM's rationale for not analyzing them in detail are addressed below.

*Fully develop one area while resting others.
Subsequent development occurs as earlier areas
are completed and restored.*

While BLM could authorize development for one watershed or specific area at a time, the purpose would be defeated by state and private development occurring in all areas or specific areas, which is not controlled by BLM actions. In the FSEIS, Table Min-1 in the Minerals Appendix indicates that more than one half of the wells projected in the Reasonably Foreseeable Development scenario would be state approved (9700 state approved to 8400 federal approved). The BLM does not control the approval or drilling of the state and private wells. This is illustrated by the number of state and private wells that have been drilled while the BLM was preparing the Statewide Plan (BLM 2003) and the SEIS (as of January 2008, approximately 950 CBNG wells have been developed under state authorization in Big Horn County, the most active CBNG county in the planning area). In addition, BLM has contacted the MBOGC in regard to CBNG management. They state:

"The Board of Oil and Gas has no underlying statutory authority to direct the development of oil and gas resources; those resources are managed by their owners. The Board does have a statutory mandate to prevent the drilling of unnecessary wells, prevent economic and physical waste, and protect the correlative rights of competing mineral owners by establishing well location and set-back rules, and reservoir

spacing rules. We do not envision the implementation of a management technique that would be less protective of competing property rights and more likely to result in waste of natural gas, and the drilling of unnecessary wells."

Based on the projection of the number and location of wells, the mixed mineral ownership, and the statutory authority of the Montana Board of Oil and Gas Conservation it is reasonable to assume that development of state and private wells would not conform to specific areas identified for the development of federal wells. Therefore, it is not reasonable to fully develop one area while resting others followed by subsequent development in other specific areas when initial development areas are completed, because limiting state and private development to specific areas is not achievable.

Areas where CBNG development cannot avoid creating significant environmental impacts should be identified and closed to leasing. Those areas that require lease stipulations in order to reduce environmental impacts to an acceptable level should also be identified.

The rationale for not analyzing oil and gas leasing is provided in this section (see "Leasing" above). The Preferred Alternative (H) uses adaptive management to help prevent significant effects. The Monitoring Plan in the ROD Appendix C identifies resources to be monitored and BLM's management options should a threshold be met.

Consider a phased development alternative that allows for the development of only certain coal seams at a time. When the initial zones have been depleted, produced water from other coal seams, developed in subsequent development phases could be re-injected into these depleted coal seams by converting the original wells into reinjection wells.

The rationale for not analyzing reinjecting produced water into the same aquifer is addressed in this section (see "Re-Injection of Produced Water into the Same Aquifer" above).

Stop issuing drilling permits during construction phases of other projects to reduce the effects of impacts associated with the other projects.

Much of the development occurring in Montana occurs in a phased manner. Practical constraints, especially infrastructure to get the product out and state and federal permitting requirements all dictate industry's proposed development occur in phases.

PLANNING CRITERIA

Introduction

Planning criteria are the constraints or ground rules used by the BLM to guide and direct the development of the RMP. Planning criteria guide the resource specialists in the collection and use of inventory information, and in analyzing the management situation, defining and analyzing the alternatives, and selecting the Preferred Alternative. Planning criteria have been developed for the SEIS. They ensure that the plan is tailored to the identified issues, and unnecessary data collection and analyses are avoided. Planning criteria are based on applicable laws and regulations; agency guidance; and results of consultation and coordination with the public, other federal, state, and local agencies, and Native American tribes.

Overall Considerations

1. The FSEIS supplements the Statewide Document. As a supplement to the Statewide Document, the FSEIS references the *Oil and Gas Final EIS and Proposed Amendment of the Billings, Powder River and South Dakota RMPs*, *Wyodak Coal Bed Methane Project Final EIS*, and *Board of Oil and Gas Conservation Oil and Gas Drilling and Production in Montana EIS*.
2. The FSEIS is in compliance with the FLPMA, NEPA, and all other applicable laws.
3. The FSEIS incorporates the requirements of BLM Handbook H-1624-1, *Planning for Fluid Minerals*, when considering a phased development alternative.
4. The format for the FSEIS follows the format from the Statewide Document.
5. The FSEIS has been prepared by an interdisciplinary team with specialists for recreation, fisheries, economics, sociology, archaeology, air quality, wildlife, hydrology, botany, soils, realty, minerals, and range management.
6. The Planning Area for BLM is the BLM-administered oil and gas estate in Wheatland, Golden Valley, Musselshell, Sweet Grass, Stillwater, Yellowstone, Carbon, Big Horn, Treasure, Powder River, and portions of Carter, Custer, and Rosebud counties. The Planning Area excludes those

- lands administered by other agencies (for example, Forest Service or Indian reservations).
7. The analysis area is any land that may be affected, regardless of ownership.
 8. Data acquisition consists of projecting and compiling existing data, supplemented with data collected and acquired via research conducted since the Statewide Document was issued, data not available for the Statewide Document analyses, and appropriate literature search.
 9. The SEIS considers and analyzes the effects from CBNG phased development; the cumulative effects from CBNG production, including from the proposed Tongue River Railroad; and a discussion on how private water well mitigation agreements will help alleviate the impacts from groundwater drawdown and methane migration.
 10. The alternatives chosen will be economically and technically feasible. Those alternatives, or components of those alternatives, found not to be economically or technically feasible or viable will be dropped from or modified for consideration in the range of alternatives.
 11. Scoping for the FSEIS helped define phased development, and the alternative(s) chosen are reasonable, achievable, and measurable. The theme for the alternative(s) considered follows those in the Statewide Document. Those alternatives, or components of those alternatives, found not to be reasonable, achievable, and/or measurable have been considered and dropped from further analysis.
 12. Assumptions for the analyses, including the reasonably foreseeable development scenario and the reasonably foreseeable future actions from the Statewide Document are carried forward in the FSEIS. Cumulative projects evaluated are carried forward with one known exception: the discussion was modified to include the cumulative effects from the proposed Tongue River Railroad.
 13. The management and mitigation measures instituted since the Statewide Document ROD was signed are carried forward as features of the phased development alternatives in the FSEIS.
 14. Native American consultation and coordination with the Crow and Northern Cheyenne Indian tribes located within the Planning Area as well as the Lower Brule Sioux Tribe have taken place in accordance with BLM Handbook 8120 (USDI BLM, 2004c) *Guidelines for Conducting Tribal Consultations*. The intent of consultation and coordination is to ensure that tribal needs, and those of any other affected tribes, are considered and that BLM fulfills its trust responsibilities. Consultation is government-to-government between BLM and the tribes.
 15. Interagency consultation occurs as necessary to comply with regulations, rules, and BLM policy.
 16. New decisions in the ROD that are based on the FSEIS are intended to be compatible with existing plans and policies of adjacent local, state, tribal, and federal agencies, as long as the adjacent jurisdictional decisions conform with the legal mandates for management of public lands.
 17. Any new decision or new mitigation measures required by the FSEIS must be enforceable, reasonable, achievable, and measurable and have to lend themselves to monitoring.
 18. Current management guidance will be expanded to reflect recent resource regulations and guidelines pertaining to oil and gas operations.
 19. To the extent practicable, this document will be consistent with adjoining Forest Service lands and leases.
 20. Decisions will comply with Rangeland Health Standards.
 21. A biological assessment will be prepared based on the preferred alternative and submitted to the FWS.

WHAT'S BEING AMENDED IN THE POWDER RIVER AND BILLINGS RMPs

General Management

The BLM has responsibility for managing the federally owned oil and gas estate. After lease issuance, oil and gas operations may occur with an approved permit. The operator must file an Application for Permit to Drill (APD) or Sundry Notice that must comply with (1) lease

stipulations; (2) onshore oil and gas orders; and (3) regulations and laws. Upon application approval, the proposed drilling and associated operations can begin. The steps required to obtain approval to drill and conduct surface operations are summarized in Appendix A of the 1992 Final Oil and Gas RMP/EIS Amendment and in the Minerals Appendix of the BLM's Big Dry RMP (USDI BLM, 1995).

Oil and gas operators on federal leases must submit certification that a surface use agreement has been reached with surface owners of split estate lands. These are lands involving private surface overlying federal minerals.

BLM does not consider an APD or sundry notice complete until the federal lessee or operator has certified that an agreement with the surface owner exists, and the lessee or operator complies with Onshore Oil and Gas Order 1 (USDI BLM, 2007). Compliance with Onshore Oil and Gas Order 1 requires the federal mineral lessee or operator to enter into good-faith negotiations with the private surface owner to reach an agreement for protection of surface resources and reclamation of disturbed areas, or payment in lieu thereof, to compensate the surface owner for loss of crops or grazing and damages to tangible improvements, if any. If such an agreement between the surface owner and lessee or operator cannot be reached, a bond is required to protect against covered damages in the absence of an agreement.

The Stockraising Homestead Act of December 29, 1916 (43 U.S.C. 299) and regulations at 43 CFR 3814.1(c) clearly limit covered damages to grazing and associated tangible improvements. Onshore Oil and Gas Order 1 states that compensation is based on the law that reserved the mineral estate. It also states the amount of such a bond must be a minimum of \$1,000 and be sufficient to: 1) pay for loss or damages; or 2) otherwise comply with the provisions of the law that reserved the mineral estate.

Under requirements of the Clean Air Act (CAA) and the FLPMA, any activity the BLM authorizes (including oil and gas development) must comply with all applicable local, state, tribal and federal air quality laws, regulations, standards, increments and implementation plans. Therefore, land use authorizations will specify that operating conditions (i.e., air pollutant emissions limits, control measures, effective stack heights, etc.) must be consistent with the applicable air regulatory agency's requirements.

Current regulations set minimum amounts (financial) of bonding required. BLM may require an increase to any bond (43 CFR 3104.5b), whenever it is determined the operator poses a risk due to factors including, but not limited to, the number and type of wells, type and amount

of reclamation necessary and operator history. The increase in bond amount can be to any level BLM specifies, but it cannot exceed the total amount of uncollected royalties due, monies owed because of outstanding violations and estimated well plugging and reclamation costs.

CBNG development has the potential to impact groundwater by decreasing the pressure within the coal aquifers (drawdown). As such, it is the subject of Montana Code Annotated 82-11-175, which was enacted by the Montana Legislature in 2003 and the Montana Board of Oil and Gas Conservation (MBOGC) Order 99-99 (as revised by MBOGC Order 151-2008). This order describes the authorities that pertain to CBNG development. A copy of the order is included as an appendix to the Water Resources Technical Report (ALL 2001b). The order outlines water rights issues, mitigation, monitoring plans and jurisdiction.

Montana Code Annotated 82-11-175 requires that CBNG operators offer a reasonable mitigation agreement to each appropriator of water who holds an appropriation right or a permit to appropriate groundwater. This requirement is in effect if the point of diversion is within 1 mile of the CBNG well, or 0.5 mile of a water source that is adversely affected by the coal bed natural gas well.

Mitigation agreements must address the reduction or loss of water resources and must provide for prompt supplementation or replacement of water from any natural spring or water well adversely affected by the coal bed natural gas well.

For development of federal minerals, BLM will require operators to certify that water well mitigation agreements for the proposed federal wells have been offered in accordance with Montana Code Annotated 81-22-175. These water mitigation agreements will also have to contain language addressing how an operator will respond to water wells being rendered unusable or unsafe due to methane migration and how health- and safety-related impacts will be monitored and mitigated.

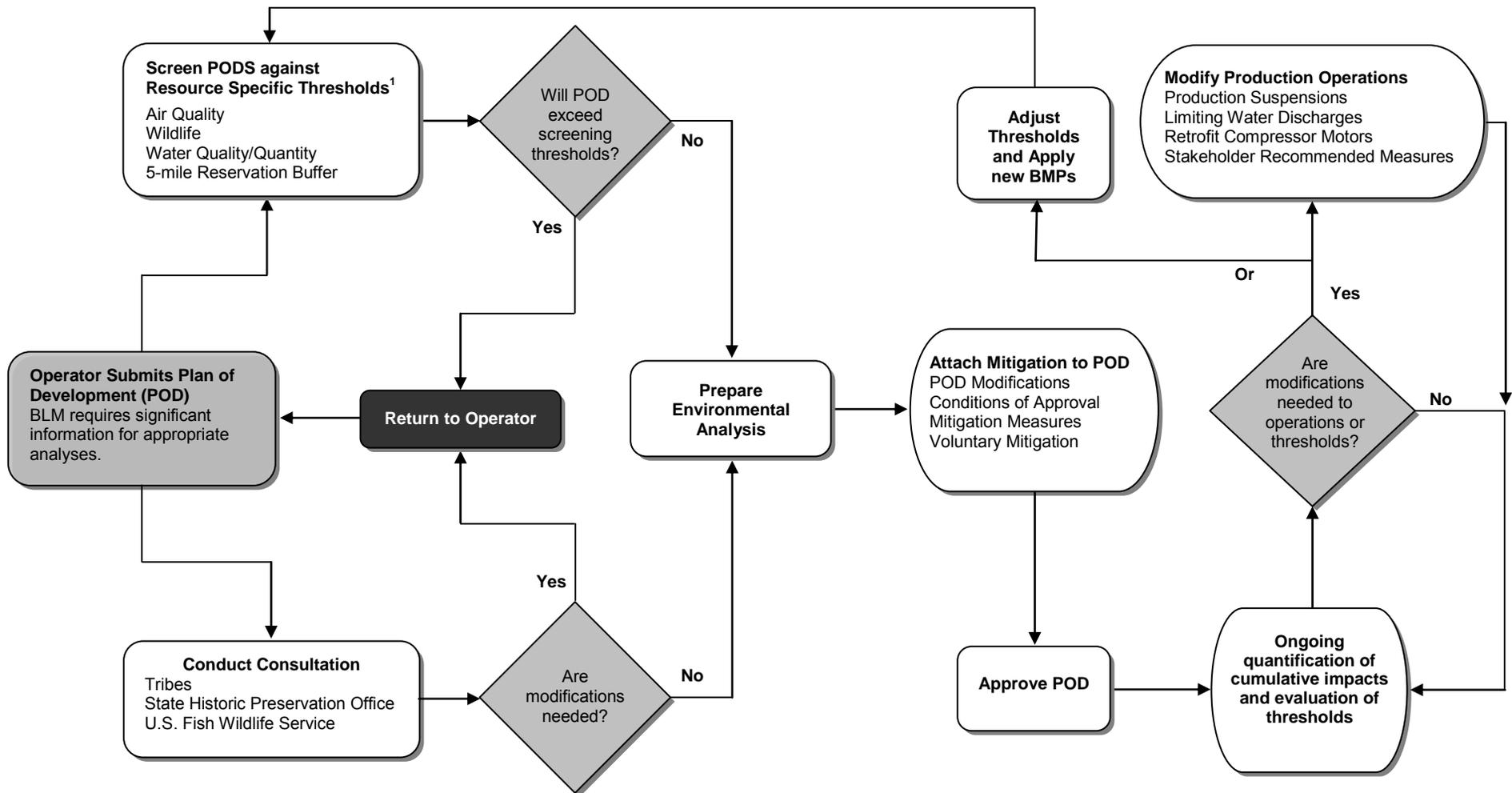
The existing lease stipulations approved in the 1994 ROD continue to be applicable to all CBNG development and have been included in Table MIN-5 of the FSEIS Minerals Appendix.

APPROVED ALTERNATIVE H MANAGEMENT

Development in the Billings and Powder River RMP areas will be done in a phased manner through restrictions and mitigation imposed by BLM.

Figure 1 illustrates the process BLM will follow when reviewing PODs. This process involves reviewing the POD, making a permit decision, monitoring and assessing

FIGURE 1 - Decision Flow Chart



¹ Thresholds are displayed in Appendix C.

impacts and adjusting operations, implementing mitigation measures and reviewing thresholds. As part of the POD review, evaluation screens for water, wildlife, Native American concerns and air will be applied. Thresholds will be adjusted when monitoring data justifies a change (e.g. see "sage-grouse" in the ROD Appendix C and the WMPP in the ROD Appendix A.)

If slower development rates (fewer wells approved and drilled each year) result from the use of these screens, the overall time required for extraction of the CBNG resources may be extended. If monitoring data indicate impacts to resources are being mitigated, the pace of development may continue or increase.

Screens to be Applied

Four evaluation screens will be used when reviewing proposals to identify impacts, develop mitigation measures and guide the decision making process.

Water Screen

BLM recognizes the MDEQ has the lead role in managing water resources. BLM will coordinate all water monitoring efforts with MDEQ. While Onshore Order 7 reinforces BLM's approval authority for produced water disposal, it does not provide BLM with primacy for the management of water within the State of Montana. Therefore, BLM will apply the water quality screen in close coordination and under the lead of MDEQ. Close coordination will avoid duplication of effort and ensure each agency fulfills its roles relative to resource management.

If proposed untreated discharges within a watershed are projected to exceed 10 percent of the 7Q10 flow, BLM will coordinate with MDEQ to prepare an annual cumulative surface water monitoring report for that watershed. The 7Q10 is a statistical measure for the lowest flow expected for a continuous 7-day period in 10 years. This report will incorporate the U.S. Geological Survey and Discharge Monitoring Report data, and other acceptable data collected within that watershed and evaluate the data against the applicable surface water quality standards. The United States Geological Survey collects data on a wide variety of parameters and Discharge Monitoring Reports are required for discharges to surface waters under MPDES permits. MDEQ determines the parameters reported in Discharge Monitoring Reports. If the results of analysis indicate CBNG discharges have the potential to cause exceedances of surface water quality standards, BLM will coordinate with MDEQ to develop appropriate mitigation measures to prevent exceedances.

In addition, if surface water monitoring indicates permitted levels of CBNG discharge would have a potential to cause water quality standards to be exceeded, no future untreated discharge of CBNG water will be allowed from federal wells unless the regional surface water monitoring stations above and below the proposed discharge are active. If CBNG discharges cause surface water quality standards or land health standards (i.e., excessive erosion) to be exceeded, even if discharges do not exceed the 10 percent of 7Q10 threshold, no additional CBNG discharges will be allowed from federal wells upstream of the exceedances. Previously approved water management plans will be modified if monitoring indicates unacceptable impacts are occurring. Surface water monitoring requirements are detailed in the ROD Appendix C.

Wildlife Screen

To meet the objectives of conserving wildlife habitat and the sagebrush steppe/mixed grass prairie complex in the FSEIS planning area, BLM will implement adaptive management based on available science and monitoring information. BLM will require BMP measures and alternative development schemes as permit COAs. See the WMPP in the ROD Appendix A for the current list of specific COAs and BMPs. BLM will work with CBNG operators, surface owners, Native American tribes, the FWS and MFWP to identify any additional protection measures necessary. On split estate lands, BLM recognizes that achieving the objectives of this alternative will require cooperation with surface owners.

All Wildlife Species

Data on potentially impacted wildlife habitat will be provided before, or in association with, the operator's POD. The POD will clearly identify how development activities will be designed to minimize impacts to wildlife habitat and maintain wildlife populations within the proposed POD area.

To help protect wildlife species that rely seasonally or year-long on crucial habitats (e.g., mule deer, pronghorns, sage-grouse, other sagebrush obligates), BLM will manage disturbance in such crucial habitats (e.g., crucial brood rearing, breeding and wintering habitat) where federal mineral ownership occurs. Crucial habitat for additional species, particularly Tier 1 species identified in the Montana Comprehensive Fish and Wildlife Strategy (MFWP, 2005d), may be identified and existing crucial habitats may be modified based on additional habitat monitoring surveys, wildlife population surveys and other information provided by industry, BLM and MFWP. With more information, the crucial areas may be modified or new areas identified. If crucial habitats are

identified for species not presently addressed in this plan, additional environmental analysis and planning may be necessary.

Monitoring is described in the WMPP (including the defined methodology, responsibility and frequency). To use adaptive management and make meaningful determinations on the impact of development on wildlife habitat, up to 10 years of monitoring may be needed (see ROD appendices A and C). If science and monitoring indicate changes in development practices are warranted, these changes will be coordinated with MFWP.

BLM's management actions will be designed to affect the location and timing, as well as the density and intensity, of CBNG activities. Management may be modified if science and/or monitoring data indicate a change in

wildlife species populations within crucial habitats on or adjacent to POD areas. For example, authorizations will not be given, or the pace of development will be restricted, in crucial habitat areas that approach or exceed population change thresholds. Other examples of management actions BLM could impose include reducing the number of seasonal and/or yearlong authorized vehicle trips in existing areas of development, securing road access to limit vehicles not associated with development, and modifying reclamation requirements for disturbed sites. If the population trend is downward, but has not yet reached the threshold, interim changes in management could occur. Similarly, if populations remain consistent with adjacent trend areas or increase, development may be less restricted, or the pace of development could be increased. Other factors such as wildfire, agricultural practices, recreational activities, and disease will also be considered in determining the management for crucial habitat areas.

For mule deer and pronghorn habitat, the following thresholds will be used to initiate change:

- A 30 percent or more decline (based on MFWP adaptive harvest thresholds) in mule deer or pronghorn populations over a 3-year period relative to baseline and/or adjacent populations. Similarly, if populations remained consistent with adjacent trend areas or increase, development may be less restricted.

These population thresholds, as well as population thresholds for other species, may be modified or established prior to POD approval based on relevant science, as well as suggestions from agency partners, such as MFWP and FWS.

Sage-Grouse Habitat

The general approach described in the All Wildlife Species section will also apply to sage-grouse habitat.

Additionally, BLM will manage sage-grouse habitat to meet the following objectives:

- Maintain the connectivity of habitats.
- Manage habitat to maintain healthy sage grouse populations to serve as source populations.
- In crucial habitat areas, maintain sage-grouse habitat so that population trends follow the general magnitude of decline or increase on control leks. Changes in management of future development will occur if male attendance on leks within two miles of CBNG development declines by 25 percent over a 5-year increment. Changes may also be made if lesser declines occur in a period of less than 5 years, when compared with predetermined control leks. Management actions will include not authorizing or limiting the number of federal well sites, roads, and infrastructure and not authorizing or restricting the timing of operations conducted on federal leases. Similarly, if populations remain comparable with the control leks or increase over a 5-year monitoring period, management of development may be modified to be less restrictive, or the pace of development may be increased.

These thresholds could be further refined before POD approval based on monitoring, relevant science, as well as suggestions from agency partners such as MFWP and FWS.

When development is proposed within crucial sage-grouse habitat, BLM will rely on science, professional judgment and monitoring data to determine the acceptable level of disturbance.

The objectives for crucial sage-grouse habitat will be to maintain sage-grouse populations on the northern end of the Powder River Basin, permit genetic exchange with other populations, and ensure source populations will remain available for areas where sage-grouse may have been reduced or displaced due to CBNG development or other factors.

Sage-grouse habitat (leks, nesting, brood rearing and wintering) outside the crucial sage-grouse habitat boundaries will be managed to maintain connectivity by reducing habitat fragmentation. Management will focus on minimizing disturbance on seasonal habitats. BMPs will be used to minimize surface disturbance and these measures may be the basis for COAs. If management actions, COAs and/or BMPs are insufficient or overly restrictive, BLM will make the needed changes in order to maintain sage-grouse populations. Science and monitoring data will provide the basis for formulating

alternative development scenarios and decisions will be coordinated with MFWP.

To meet the objectives for sage-grouse habitat management, PODs will have to demonstrate specific actions to conserve sage-grouse. Actual placement of wells will depend on the operator's ability to outline a strategy where effects to sage-grouse will be minimized and where sage-grouse will not be displaced from any of the crucial habitat as a result of these actions. The following examples illustrate the types of measures that should be developed and included in the PODs:

- Within 1 mile of a lek, surface disturbance proposals will be sited to meet objectives for sage-grouse habitat management, including: avoid the loss of sagebrush, especially in linear routes (roads, flowlines and buried powerlines); avoid installation of perching structures; and keep noise disturbance levels at leks to less than 10 decibels above background noise on active leks. Special attention will be paid to proposals that will result in increased human presence, opportunities for increased predation, or loss of nesting and brood rearing habitat and function. This will not necessarily translate into no development within 1 mile of a lek, but will suggest special attention should be paid to features resulting in increased human presence, opportunities for increased predation, and loss of nesting and brood rearing habitat and function.
- Proposals for storage ponds or produced water discharge into vegetated drainages in summer sage-grouse habitat will be designed to minimize the potential for outbreaks of West Nile Virus.
- The operator will be required to map and avoid seasonal habitats when proposing placement of infrastructure.

Crucial habitat areas have been identified in only a portion of the ROD planning area. BLM will continue to identify crucial habitat areas as necessary. New areas will be managed per this section. As research and monitoring continue, BLM and partners may develop new COAs and BMPs to supplement those already contained in the WMPP and other BLM publications.

Native American Concerns Screen

The Crow and Northern Cheyenne tribes consider groundwater and air to be critical resources for their tribal health and welfare. Tribal CBNG is an Indian trust asset. Groundwater is used on the reservations for stock watering and drinking water supplies. The tribes highly value air resources, as well. In response to these concerns,

BLM will require federal lease operators to protect groundwater, CBNG, and air quality.

As development proceeds, BLM will monitor the effects to air, water and other resources of concern to the Native American tribes. BLM will approve additional APDs only if available monitoring and evaluation of new proposals indicate effects will not exceed state or federal regulatory standards and are not substantially greater than those anticipated in the FSEIS (see Table MON-1 in the ROD Appendix C.)

For proposed federal CBNG development within 5 miles of the Northern Cheyenne and Crow reservations, BLM, in consultation with the tribes, will require site-specific groundwater and air analyses (see ROD Appendix B – “Northern Cheyenne Mitigation” for details). These analyses will be submitted as part of the operator's POD submissions. The operator's analyses must demonstrate that development associated with the proposed POD will be protective of Indian trust assets (groundwater and CBNG) and air quality. BLM could disapprove additional CBNG APDs if available monitoring and modeling of new proposals indicate effects that violate state or federal regulatory standards. In such cases BLM will first consider mitigation measures that will reduce impacts so that actions will comply with such standards. If implementation-level analyses, conducted in coordination with the State of Montana, indicate that unacceptable levels of impairment to these resources will occur and could not be mitigated, BLM could disapprove the APDs. Unacceptable levels of impairment to the resources will be determined by BLM in consultation with the affected tribe(s), as appropriate. BLM may require operator(s) to install groundwater monitoring wells and air monitoring stations between the development area and the reservations to confirm the initial findings of the analyses. Modeling and monitoring groundwater will also provide critical data to determine if CBNG or other resources are being affected.

BLM will consult with affected tribes on individual PODs to identify areas of religious and cultural concern and/or traditional cultural properties. Special consideration will be provided when the operator's proposed actions are near identified traditional cultural properties such as the Rosebud Battlefield, the Wolf Mountain Battlefield, Weatherman Draw, and Sacrifice Cliff. Consultation could result in the development of mitigation measures which offset impacts to traditional cultural properties and/or places of religious or cultural concern.

Air Quality Impact Screen

MDEQ has permitting authority over emission sources. The Environmental Protection Agency (EPA) has permitting authority in the adjacent areas of Indian Country. BLM will conduct an annual review of available monitoring data collected in designated Class I areas (Northern Cheyenne Reservation) and federally mandated Class I areas (wilderness areas) within the Montana portion of the Powder River Basin.

In addition, MDEQ has agreed to complete an annual cumulative air quality impact model to track air quality impacts of CBNG development, including relevant CBNG development in Wyoming. The MDEQ will use the current EPA-approved method depending on the size of the area being analyzed, such as AERMOD or CALPUFF. The MDEQ requires all major sources (>25 tons/year) and all oxides of nitrogen emitting sources, in counties which make up the CBNG development area, to perform near-field air quality modeling. An evaluation of potential cumulative effects for each proposed air quality permit is also required (see description of Additional Air Quality Modeling Studies in Chapter 3 of the FSEIS).

If observed effects and modeled impacts completed for the annual review by MDEQ show state or federal regulatory standards or applicable thresholds for air quality related values will be exceeded, BLM will require additional mitigation measures on development. BLM could disapprove additional CBNG APDs if available monitoring and air modeling of new proposals indicate effects that violate state or federal regulatory standards. In such cases BLM will first consider mitigation measures that will reduce impacts so that actions will comply with such standards.

To minimize potential air impacts from CBNG operations, the number of wells connected to each compressor will be maximized and natural-gas-fired or electrical compressors or generators will be required. When compressors or generators are located close to noise sensitive areas (such as occupied residences or sage grouse strutting grounds), a maximum noise level of 50 decibels measured 0.25 miles from the compressor will be required, except at sage-grouse leks. At sage-grouse leks, no more than 10 decibels above background measured at the lek will be required.

To reduce dust, operators of federal leases will have to post and enforce speed limits for their employees and contractors. Operators will work with local government to use dust suppression techniques on roads.

Given the potential for the level of development to vary, BLM and MDEQ will perform additional visibility modeling to better assess the visibility impacts as

development proceeds (e.g., when exploration programs help define the limits of development within the Montana portion of the Powder River Basin). The potential for project wells to impact visibility is due to emissions of sulfur dioxide and oxides of nitrogen from compressor engines. The total potential for emissions of oxides of nitrogen from compressor engines is based on horsepower requirements, which for the high-end development scenario of 18,225 project wells drilled will be 297,680 horsepower. The visibility modeling will be performed when horsepower requirements for CBNG wells in the Montana portion of the Powder River Basin exceed 133,956. Current modeling results indicate 0 days of visibility impacts will occur on the Class I Northern Cheyenne area up to a horsepower level of 148,840. BLM has selected 90% of this value as the visibility screening threshold to ensure appropriate actions can be taken in time to mitigate visibility impacts, if needed. The Class I Northern Cheyenne area was selected as the “trigger Class I area” due to its proximity to the CBNG development, and the sensitivity to CBNG development of this Class I area when compared to other Class I areas in the region.

The visibility modeling effort will provide an updated prediction for future impacts, and assumptions will be verified or modified to properly characterize actual conditions and technological changes. The conditions that may change or become more certain as development proceeds include:

- the total number and type of wells (type – single zone completion vs. multi-zone or commingled completions);
- the pace of development;
- Best Available Control Technology and the effect on compressor emission rates;
- compressor locations;
- Compressor to well ratios; and
- limits of high development potential.

If the subsequent modeling work indicates unacceptable impacts will occur at a future point in the Powder River Basin development, the modeling work will then include mitigation scenarios that will investigate mitigation measures. Mitigation efforts will focus on compressor motors and the extent of operating compressors because it appears that gas-fired compressor motors account for approximately 90% of the overall project emissions and visibility impacts.

STANDARD OPERATING PROCEDURES AND BEST MANAGEMENT PRACTICES

BMPs will be used, as appropriate, in CBNG development. BMP guidance is found in the Western Governors' Association April 2006 –Coal Bed Methane Best Management Practices,” the –Surface Operating Standards for Oil and Gas Exploration and Development, Fourth Edition” (Gold Book) and BLM's national web site at <http://www.blm.gov/bmp>. The EPA has also developed BMPs for the prevention of methane emissions. These are known as the Gas STAR BMPs. The Gas STAR BMP guidance is found at <http://www.epa.gov/gasstar>.

In addition to applying BMPs, CBNG operators will submit a project POD outlining the proposed development of an area when requesting CBNG well densities greater than one well per 640 acres. The project POD will be drafted in consultation with the affected tribes, affected surface owner(s), and permitting agencies.

POD Requirements

The operator is responsible for submitting a complete project POD consisting of the following. See the POD Manual (BLM 2003f) online at http://www.blm.gov/mt/st/en/fo/miles_city_field_office/cbng.html for a full description of each POD component.

- Master Drilling Plan
- Master Surface Use Plan
- Water Management Plan with evaluation of water management options
- Cultural Resource Inventory Plan or completed inventory
- Wildlife Monitoring and Mitigation Plan
- Reclamation Plan for surface disturbance
- Digital project maps depicting all infrastructure installations necessary for the project, etc.
- APD (Form 3160-3) for each federal well
- List of all permitting agencies involved
- Certification of surface use agreements
- Certification that water well mitigation agreements have been offered
- A cover letter naming the project area and requesting approval
- A list of all known existing wells in the project area, including monitoring wells
- A list of all potentially affected surface owners within the project area
- Any additional information required by the rules of MBOGC

Individual well APDs (those located at one well per 640 acres) will be accepted and processed without a project POD in accordance with requirements of Onshore Order 1. A project POD will be required before processing and approving APDs for multiple wells from an operator in the same geographic area. BLM will complete processing the project POD and individual APDs once they are technically and administratively complete and have met all BLM requirements.

The operator is responsible for implementing the approved PODs and individual well APDs.

On-site inspections will be conducted at the proposed federal well sites and associated infrastructure before any ground-disturbing actions are approved.

PODs that include development within the crucial sage-grouse habitat areas must include information that clearly demonstrates how the proposal will not displace sage-grouse from this habitat. This information will be based on recent research and science, monitoring data, and may also include alternative development schemes within these habitat areas.

Wells and Well Pads

CBNG well spacing rules are set by the MBOGC on state and private lands. The process for spacing on federal lands is described in a Memorandum of Understanding between BLM and MBOGC. The MBOGC, however, has no authority on Indian lands. A well pad may contain multiple wells (one well per coal seam), or a single well could produce from multiple seams. Wells may be directionally or vertically drilled, depending on the surface location and desired bottomhole location.

Coal Mines

There will be no buffer zone excluding CBNG production around active coal mines (BLM, 2006). BLM advocates the extraction of oil and gas resource, including methane, before mining and promotes the development of multiple mineral resources.

Roads, Pipelines and Other Infrastructure

Corridors are required for placement of roads, pipelines, and utility lines in a common area of disturbance, wherever possible. Proposed roads, pipeline routes and utility line routes, will be located to follow existing routes, or areas of previous surface disturbance, or to minimize disturbance to important habitats, where possible. In the POD, the operator will also address how the surface owner, BLM, and adjacent oil and gas operators and

infrastructure companies were consulted for input into the location of roads, pipelines, and utility line routes.

There will be minimal road construction. Before approving a road, the operator, surface landowner, BLM and adjacent landowners and gas leaseholders will coordinate long-term planning for roads in the area. Discussions with affected parties will take place to help meet the transportation corridor requirement to minimize new roads.

Low-voltage (440-v) distribution powerlines will be buried. The authorized officer will approve above-ground, low-voltage distribution powerlines only if the operator can demonstrate it will not be feasible or will be impractical to bury them (technically impossible, etc.). The authorized officer can approve proposed high-voltage, aerial powerlines by application. All aerial powerlines will be constructed according to the Avian Power Line Interaction Committee (APLIC) Guidelines, 2006.

Produced Water Management

A water management plan will be required for exploratory wells and for each project POD. The water management plan will be submitted with the APD(s). The water management plan must comply with all federal, state and local laws and regulations, including the CAA, the Montana Water Quality Act, and Onshore Order 7. The water management plan must be prepared in accordance with the Miles City CBNG POD Guidebook. The basic elements of a water management plan include the following:

- Water quality data for the produced water
- A copy of any needed discharge or injection permit(s) or applications for such permits
- Applications for unlined impoundments proposed as part of the Water Management Plan that must demonstrate that the infiltration of water will not degrade the quality of surface or subsurface waters in the area (Onshore Oil and Gas Order Number 7, Section III.D.2.)
- A water balance projection showing the anticipated rate of water production over time, the proposed water management practices (preferably beneficial uses) and the amount of water that will be managed by each of the practices over time

The operator will have to list the water management options available and provide a brief rationale for using or not using each method. At a minimum, the following will have to be addressed: injection; treatment; surface discharge; the use of infiltration, storage, or evaporation pits or reservoirs; and beneficial uses, such as wildlife and livestock watering, dust control and managed irrigation.

Wildlife Monitoring Program and Mitigation Measures

On BLM-administered lands, impacts to wildlife will be monitored and addressed following procedures in the WMPP, in addition to applying mitigating measures that are part of the standard APD review and approval process. Impacts to wildlife, including those species on public lands and adjacent to reservations, will be monitored and addressed in accordance with the WMPP (see ROD Appendix A).

Bald Eagles

- If a dead or injured bald eagle is located during construction or operation, the FWS Montana Field Office (406-449-5225) or the Billings Suboffice (406-247-7366) and the Service's Law Enforcement Office (406-247-7355) must be notified within 24 hours or by the end of the next working day.
- The WMPP (ROD Appendix A) of the Powder River and Billings RMPs will be implemented.
- Surveys for active bald eagle nests and winter roost sites will be conducted before APD approval. Surveys will be conducted within a 1.0 mile radius of proposed development for bald eagles and their nests and within a 1-mile radius for roosts. If the proposed CBNG site is found to be within a nesting or winter foraging area, CBNG related activities will be halted until the nest is no longer active or until winter has passed and the foraging eagles have migrated.
- The BLM leasing stipulations pertaining to bald eagles will apply and be implemented. This includes no surface occupancy within 0.5 mile of nests active within the past 7 years and within 0.5 mile of roost sites.
- Raptor inventories including bald eagles, will be conducted over the entire CBNG project area every 5 years by BLM, MFWP, or by a BLM-approved biologist.
- Nest productivity surveys will be conducted by BLM or a BLM-approved biologist in areas with one or more well locations per section and within 1 mile of the project area. Active nests within 1 mile of project-related disturbance areas will be monitored between March 1 and mid-July to determine nesting success (i.e., number of nestlings or fledglings per nest).
- A seasonal, minimum-disturbance-free buffer zone of 0.5 mile will be established for all bald eagle

nest sites (February 15 to August 15). These spatial and timing restrictions may be adjusted based on site-specific criteria with written approval from FWS.

- Signing, speed limits, or speed bumps will be placed on all project access roads to reduce mortality caused by vehicle traffic.

Mountain Plover

- If a dead or injured mountain plover is located during construction or operation, the FWS Montana Field Office (406- 449-5225) or the Billings Suboffice (406-247-7367) and the Service's Law Enforcement Office (406-247- 7355) must be notified within 24 hours or by the end of the next working day.
- Per FWS, listing the mountain plover under the Endangered Species Act (ESA) is not warranted at this time. BLM will continue monitoring to help prevent the need to list the bird in the future.
- FWS will provide operators and BLM with educational material illustrating and describing the mountain plover, its habitat needs, life history, threats and gas development activities that may lead to the incidental taking of eggs, chicks, or adults. These materials will be provided with the requirement they be posted in common areas, circulated in a memorandum, and discussed among employees and service providers.
- BLM will determine the acreage of occupied black-tailed and white-tailed prairie dog habitat within suitable mountain plover habitat on federally managed surface and mineral estate lands. Further, a reasonable effort should be made to estimate the actual impacts, including habitat loss, that CBNG development will have on occupied black-tailed and white-tailed prairie dog acres within suitable mountain plover habitat over the entire project area. The BLM, FWS and cooperators will develop a survey protocol that may include prioritization of subsets of the project area to be analyzed.
- In areas of suitable mountain plover habitat, surveys will be conducted by BLM or by a BLM-approved biologist using the FWS protocol at a specific project area, plus a 0.5 mile buffer. Efforts will be made to identify mountain plover nesting areas not subject to CBNG development to be used as reference sites. Comparisons will be made of the trends in mountain plover nesting occupancy between these reference areas and areas experiencing CBNG development.

- Surveys for nesting mountain plovers will be conducted by appropriately trained personnel if ground-disturbing activities are anticipated to occur between April 10 and July 10. A disturbance-free buffer zone of 0.25-mile will be established around all mountain plover nesting locations between April 1 and July 31.
- No ground-disturbing activities will occur in suitable nesting habitat before surveys are conducted in compliance with FWS's Mountain Plover Survey Guidelines (FWS 2002c or more recent version, FSEIS Wildlife Appendix and Biological Assessment), regardless of the timing of the disturbance. The amount and nature of ground-disturbing activity must be limited in identified mountain plover nesting areas to avoid the abandonment of these areas.

Sage-grouse

- A BLM, MFWP or a BLM-approved biologist will conduct sage-grouse lek inventories over the CBNG project area with high potential for development every five years. Surveys of different areas may occur during different years, with the high potential CBNG project areas surveyed at least every five years. Inventories and protocol will be consistent with the *Montana Sage Grouse Conservation Plan*, coordinated by the BLM and MFWP. In areas of development, aerial or ground inventories will be conducted annually on affected sections, two mile buffers, and selected undeveloped reference areas. Surveys may be conducted aerially or on the ground, as deemed appropriate by the BLM and MFWP. Operator may provide financial assistance.
- Reference leks are leks located in similar habitat and within close proximity to areas currently being developed. These "reference leks" will be identified by BLM and MFWP.
- Aerial or ground surveys will be used for determining lek locations. A BLM, MFWP or a BLM-approved biologist will monitor sage-grouse lek attendance within two miles of areas of development, such that all leks on these areas are surveyed annually. Data collected during these surveys will be recorded on BLM and MFWP approved data sheets and entered into the approved database. The number of males/lek in areas of development will be compared to reference leks.
- Sage-grouse winter use surveys of suitable winter habitat within two miles of a project area will be coordinated by the BLM and conducted

from November through February as deemed appropriate by these agencies. Results will be provided in interim and/or annual reports. Historical information of winter sage-grouse locations will be useful in focusing efforts in areas suspected of providing winter habitat.

Big Game

- Elk, mule deer, white-tailed deer and pronghorn are the common big game species that occur within parts or all of the CBNG planning area. Annual big game seasonal habitat use data will be collected and made available to operators, tribes and landowners. Big game use of seasonal habitats is highly dependent upon a combination of environmental factors including terrain, forage quality, and snow depth. Therefore, it is difficult to attribute changes in habitat use to a single factor. Comparisons in trends between big game seasonal habitat reference areas and seasonal habitats associated with CBNG development may provide some insight into the response of big game to CBNG development.

CONSISTENCY WITH APPLICABLE POLICIES, PLANS AND PROGRAMS

The BLM's planning regulations require RMPs to be consistent with officially approved or adopted resource related plans, and the policies and programs contained therein, of other federal agencies, state and local governments, and Indian Tribes, so long as the guidance and resource management plans are also consistent with the purposes, policies and programs applicable to public lands..." (43 CFR 1610.3-2).

Federal, state and local agencies and tribal councils were requested to review the SEIS and to inform the BLM of any inconsistencies.

The Governor of Montana responded to BLM via a letter dated December 22, 2008. The State identified "areas of potential conflict" between the FSEIS and the State of Montana's policies and procedures. BLM's response and the ROD clarify how the areas of concern are addressed.

Based on these reviews, it is concluded that Alternative H is fully consistent with all applicable policies, plans and programs of other federal agencies, state and local governments and tribes. If it is determined through monitoring or other means that such policies, plans, or programs are not being met, this decision will be modified to bring it into compliance.

Achieving Air and Water Quality Program Requirements

Oil and gas, including CBNG, exploration and development on BLM-managed lands must comply with the federal and state Clean Air and Clean Water acts. Responsibility for permitting and enforcement of the federal Clean Air and Clean Water acts has been delegated to the MDEQ. In addition, the state has its own air quality and water quality protective requirements.

Review and approval of CBNG APDs, or PODs, by BLM will be coordinated with the MDEQ in order to ensure that operating requirements needed to comply with any air and water quality standards are implemented. BLM will also work with the MBOGC, EPA, tribes, and other surface management agencies to address concerns over impacts to air and water quality in their respective jurisdictions.

Interagency Work Group (IWG)

The BLM will continue to work with the EPA, National Park Service, Forest Service, and other federal, state, and tribal authorities via the IWG for CBNG development in the Powder River Basin. The working group is responsible for developing and recommending the monitoring and mitigation measures needed for each agency to ensure its actions achieve compliance with applicable air and water quality standards across jurisdictional boundaries. In order to ensure consistency, the IWG will also coordinate with other work groups established to address CBNG development in Wyoming.

The IWG will, of necessity, depend on the regulatory and management policies of the MDEQ as the agency with air and water quality primacy. Each agency within the working group will maintain its regulatory authorities throughout the process.

ROLES, RESPONSIBILITIES AND REGULATORY PROCESS

Several federal agencies, sovereign tribal governments, and state agencies, as well as local county governments, were involved in the development and preparation of the FSEIS. Cooperating agencies include the Bureau of Indian Affairs, Department of Energy, EPA, U.S. Army Corps of Engineers, MDEQ, MBOGC, and the following counties: Big Horn, Carbon, Golden Valley, Musselshell, Powder River, Rosebud, Treasure, and Yellowstone. The Crow Tribe of Indians and the Lower Brule Sioux Tribe signed Memoranda of Understanding with BLM to participate

as cooperating agencies. The Northern Cheyenne Tribe also helped to prepare the SEIS. BLM has the responsibility and the authority for preparation of the SEIS.

The cooperating agencies' and collaborators' roles were to participate in the review process of all technical reports and the preliminary draft and final SEIS. These agencies and tribal governments also attended numerous meetings both public and project-specific to discuss and enumerate concerns and comments.

The BLM's authority and decisions, related to oil and gas development in the planning area are limited to the agency's stewardship, resource conservation, and resource protection responsibilities for federal lands and minerals. As conservator of the federal surface and mineral estate, the BLM has responsibility for ensuring that the federal mineral resource is conserved (not wasted) and is developed in a safe and environmentally sound manner.

Drilling oil and gas exploration and production wells on lands where mineral rights are administered by the federal government must be conducted under an approved APD issued by the BLM. In considering whether to approve applications for a permit to drill and other lease activities, the BLM must consider the possible impacts from typical exploration and development activities, and cumulative environmental effects, to ensure compliance with NEPA. The SEIS, in combination with the Statewide Document, was prepared to meet those requirements. As part of the permit process, BLM requires that adequate bond coverage is in place prior to approval of drilling activity on federal minerals.

Much of the planning area contains lands known as "split estate." These are lands where the surface ownership is different from the mineral ownership. Management of federal oil and gas on these lands is somewhat different from management on lands where both surface and mineral ownership are federal. On split estate lands where surface ownership is private, and BLM administers the minerals, BLM places necessary restrictions and requirements on permitted activities and works in cooperation with the surface owner. BLM has established policies for the management of federal oil and gas resources under the following statutes: FLPMA, NEPA, National Historic Preservation Act, and ESA (see BLM 1992, under "Split Estate" for more information).

Regulatory areas where the BLM has shared responsibilities or consultation requirements with other federal or state agencies include the following:

- Oil and gas drilling—FLPMA of 1976, 43 U.S.C. 1701 *et seq.* as amended (Public Law 94-579), and the Mineral Leasing Act of 1920, as amended, (Public Law 93-153). This is a shared responsibility with the MBOGC.
- Activities that would impact waters of the U.S. from the discharge of produced waters—BLM must comply with the Clean Water Act as provided by Sections 313 (33 U.S.C. 1323) and 401 (33 U.S.C. 1341). The National Pollutant Discharge Elimination System permits and 401 certifications are issued by the State of Montana for actions involving the discharge of water from point sources on non-Indian lands. For actions involving the discharge of water from point sources, BLM works with MDEQ on private and public lands, and with EPA on Indian lands. The BLM will not allow for the discharge of produced waters until approval is given by the state or EPA.
- Activities disturbing more than 1 acre (stormwater permitting)—The lessees must comply with Section 402 of the Clean Water Act, and with the Montana Water Quality Act (Administrative Rules of Montana, Title 17, Chapter 30, Subchapter 11). For actions involving the disturbance of more than 1 acre, BLM works with MDEQ on private and public lands, and with EPA on Indian lands. The BLM will not allow for the discharge of produced waters until approval is given by the state or EPA.
- Activities that would impact waters of the U.S. from the placement of fill materials—The U.S. Army Corps of Engineers has the responsibility in Montana for dredge and fill permits associated with CBNG activities under Section 404, General Permit No. 404. This covers activities that impact waters of the U.S. as a result of placing fill in either waters of the U.S. or jurisdictional wetlands. See 33 CFR Part 320 and 40 CFR Part 230—Section 404(b)(1) Guidelines for the Specification or Disposal Sites for Dredged and Fill Materials.
- Special status species of plants or animals—ESA, U.S.C. 1531 *et seq.* This is a shared responsibility with the FWS and MFWP.
- Cultural or historical resources—National Historic Preservation Act, 16 U.S.C. 470. BLM is required to consult with the Montana State Historic Preservation Office and Advisory Council on Historic Preservation in accordance with regulations found at 36 CFR 800 or through alternative procedures as specified through Programmatic Agreements. The BLM in Montana operates under a National Programmatic Agreement and a state-wide Protocol to meet its

requirements under the National Historic Preservation Act.

- Air Quality Impacts—The CAA (42 U.S.C. 7401 *et seq.*) as amended, requires that BLM comply with all applicable local, state, and federal air quality laws, regulations, standards, increments, and implementation plans regarding property under its jurisdiction or activities in which it engages (42 U.S.C. 7418). Local, state, and tribal requirements may be more (but not less) stringent than federal requirements. The implementation of federal requirements for non-reservation lands in Montana is delegated to the MDEQ. EPA regulates air quality on Indian reservations in Montana. The BLM meets its obligations under the CAA by requiring operators on federal leases to obtain all applicable emissions permits and to comply with all applicable air quality regulations, implementation plans, and standards. See also 43 U.S.C. 1732(c).
- Surface water diversions, stream channel modifications, construction of new reservoirs, reservoir supply, or dam modifications to existing reservoirs, Montana Dam Safety Act, 85-15-207 (dams greater than 50 acre-feet). This is a shared responsibility with the Montana Department of Natural Resources and Conservation, Water Resources.
- Oil and gas well spacing—Memorandum of Understanding between BLM and the MBOGC concerning Oil and Gas Well Spacing/Well Location Jurisdiction, and the Montana Oil and Gas Conservation Act, Statute 82-11-201, Establishment of Well Spacing Units. This is a shared responsibility with the MBOGC.
- Consultation with Tribal Governments—Under Executive Order 13175, BLM will provide a meaningful opportunity for input by tribal officials where the action would have tribal implications. The Executive Order reflects the federal government's trust responsibility to federally recognized Indian tribes. Pursuant to this trust responsibility, the federal government establishes regular and meaningful consultation and collaboration with tribes on a government-to-government basis when federal activities may affect Indian tribes.

STATE OF MONTANA

Air Quality Program

The MDEQ has delegated responsibilities under the federal CAA that requires the state to operate an approved ambient air quality monitoring network for

the purpose of evaluating compliance with the National Ambient Air Quality Standards, to report air quality monitoring information to EPA, and to prepare plans for controlling air pollution. Under the CAA of Montana, the state is required to provide a coordinated statewide program of air pollution prevention, abatement and control.

Regulatory Processes

For Prevention of Significant Deterioration of air quality, modeled and monitored results for particulate matter less than 10 microns in diameter and nitrogen dioxide will be evaluated against the Class I and Class II increments to determine if additional mitigation is required.

When specific locations and operation requirements for gas compression facilities associated with CBNG development are determined, permit applications will be submitted to MDEQ. At that time, additional site-specific air quality analyses may be performed, such as Best Available Control Technology analyses and Prevention of Significant Deterioration increment analysis.

The air quality permitting process will be used by MDEQ to analyze emission sources at the project level for CBNG activities and to develop necessary mitigating measures. BLM will require operators to obtain all necessary state air quality permits for lease operations on BLM-administered lands.

BLM will take appropriate enforcement action against operators upon finding a violation of an approved federal APD or Sundry Notice. MDEQ, however, will have the responsibility of enforcing its regulations and terms of its permits.

State Agreements and Policies

The air quality monitoring and analysis will be conducted across the Powder River Basin. The IWG will be the forum to determine the need for specific agreements between the states of Wyoming and Montana, EPA and the tribes, to facilitate regional monitoring, analysis and mitigation.

The BLM will participate in the IWG to consider management options over time in response to new air information. This process will include development of monitoring plans to track regional cumulative impacts to air quality and the establishment of programmatic mitigation at predetermined action levels, as determined appropriate by the state and EPA.

Water Quality Program

State Roles and Responsibilities

The MDEQ has the responsibility under the federal Clean Water Act and the Montana Water Quality Act to monitor and assess the quality of Montana surface waters for pollutants, to prepare plans to control pollution, to assess water quality conditions and trends, to report then to EPA and Congress, and to identify impaired or threatened stream segments and lakes. Furthermore, the state administers a program for prevention, abatement, and control of water pollution by issuing MPDES permits.

The Montana Board of Environmental Review (Board) adopted standards for electrical conductivity and sodium adsorption ratio for Powder River Basin streams in 2003. On March 23, 2006 the Board amended portions of ARM 17.30.670, the electrical conductivity and sodium adsorption ratio standards pertaining to the non-degradation category. This ruling changed electrical conductivity and sodium adsorption ratio to "harmful parameters", which modified the non-degradation non-significance criteria. Both of these revisions were subsequently approved by the EPA. Therefore they have Clean Water Act standing and water management strategies approved by the Wyoming Department of Environmental Quality are subject to these standards at the state line.

In accordance with Section 303(d) of the federal Clean Water Act the MDEQ has prepared a list of impaired or threatened waters. This "303(d)" list identified lakes, rivers and streams that are not meeting water quality standards and establishes priorities for Total Maximum Daily Load (TMDL) development. The surface waters likely to be affected by CBNG development are located in the state's Tongue, Powder and Rosebud TMDL planning areas. The TMDLs for these areas are underway.

Regulatory Processes

When site-specific CBNG development proposals are submitted to BLM, the operator must include a Water Management Plan that describes how produced water would be managed to meet state water quality requirements. Operators are responsible for obtaining any necessary permits from MDEQ for management, treatment, or discharge of produced water.

The MPDES permitting process will be used by MDEQ to analyze discharges at the project level for CBNG activities and to develop necessary permit conditions. Operations that would violate state water quality requirements will not be permitted by BLM.

BLM will require operators to obtain all necessary state water quality permits or authorizations, reviews in lieu of permit when one is not required, or certifications for federal lease operations. These state permits or authorizations, reviews and certifications will provide documentation of compliance with state water quality requirements.

State Agreements and Policies

The IWG is the forum to determine the need for specific agreements between the states, the tribes, EPA and the surface management agencies to facilitate regional monitoring, analysis and mitigation. The IWG will also review existing agreements and make recommendations regarding their continuation or revision. While BLM will participate in the IWG, the development of a final agreement between Wyoming and Montana is primarily a state function.

The BLM will participate in the IWG to consider management options in response to new water quality information. This process will include development of monitoring plans to track regional cumulative impacts to water quality and the establishment of programmatic mitigation at predetermined action levels as determined appropriate by the state and EPA. BLM will also participate in the IWG to address development of TMDLs for the state's Tongue and Powder rivers and Rosebud Creek TMDL planning areas.

BLM

Steps to Obtain Approval to Drill

The BLM has responsibility for managing the federally owned oil and gas estate. After lease issuance, operations may be conducted consistent with an approved permit. Proposed drilling and associated activities must be approved before beginning operations. The operator must file an APD or Sundry Notice that complies with (1) lease stipulations; (2) onshore oil and gas orders; and (3) regulations and laws. All actions must also be consistent with the Powder River and Billings RMPs, unless requiring such consistency would cause a breach of existing lease rights. In such a case, an amendment to the RMP(s) will be necessary. The steps required to obtain approval to drill and conduct surface operations are as follows:

- Before drilling an oil or gas well on federal minerals, a Notice of Staking or APD must be filed by the lessee or operator for approval with the appropriate BLM office. The Notice of Staking notifies BLM that a proposed well site

has been staked and signals the need for a site inspection. Filing of the Notice of Staking starts the required 30 day public posting period.

- An APD must be submitted following submission of the Notice of Staking. The APD includes the proposed drilling and surface use plans, maps, statement of bond coverage, operator statements of certification, and a water management plan.

An APD can be submitted without filing a Notice of Staking, in which case the posting of the APD begins the 30 day public posting period.

During the 30 day public posting period, BLM conducts a site inspection, reviews the APD for completeness and accuracy, and conducts an environmental analysis of the proposal including coordination with other applicable permitting agencies.

When the proposed action is on privately owned surface, BLM invites the surface owner to attend the site inspection and to provide information or requirements that can be used in the environmental analysis. BLM's review also includes coordination with the MBOGC to determine if the proposed well location conforms to state well spacing rules or if a spacing exception needs to be approved by MBOGC. BLM notifies the State Historic Preservation Office about the results of cultural and historic resource surveys conducted for the proposal. BLM also consults with other state agencies, such as MDEQ, if actions proposed in the APD would require permits issued by MDEQ. BLM processes the APD after completion of the environmental analysis and evaluating if the APD requirements have been fulfilled. The operator is required to demonstrate that a surface use agreement was offered to the surface owner to protect against losses or that an adequate bond has been secured.

Before approving full-field development of CBNG on federal minerals, a POD must be filed by the lessee or operator for approval with the appropriate BLM office. BLM will work with other agencies that have authority for permitting proposed activities in the review of the

POD. BLM and MBOGC will develop procedures to coordinate the review and approval of PODs that involve federal, state and private minerals.

The POD must depict the proposed location of well sites, access roads and production facilities. The POD must include a water management plan, a wildlife monitoring and mitigation plan and cultural resource inventory plan along with an APD for each proposed federal well which will be posted for the 30 day public review period. The water management plan will be approved in consultation with the affected surface owner. See the discussion on the POD review process under "Decision" at the beginning of the ROD.

If the proposed action may affect Tribal resources, BLM will consult with the Tribe. BLM will consult with MBOGC about well spacing rules during the POD review process. BLM will also consult with MBOGC if the operator proposes disposal of produced water into pits under the jurisdiction of MBOGC, needs a UIC permit issued by MBOGC and when an operator needs to offer a mitigation agreement in accordance with MBOGC Order 151-2008 and Montana Code Annotated 82-11-175. If the operator needs a UIC permit issued by EPA, BLM will consult with EPA during the POD review process.

BLM will consult and coordinate with MDEQ when air emissions and water discharge or land application permits issued by MDEQ are needed. BLM will also consult with DNRC when a permit is needed for beneficial use of groundwater and surface water. Coordination will also occur with County Weed Districts to ensure proposed weed control plans comply with laws and regulations. BLM will make decisions for the APDs after completion of the environmental analysis and evaluating if the APD requirements have been fulfilled, and will make decisions for the POD activities for which BLM has authority after completion of the environmental analysis process and evaluating if the POD requirements have been fulfilled.

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APPENDIX A

WILDLIFE MONITORING AND PROTECTION PLAN

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INTRODUCTION

This Wildlife Monitoring and Protection Plan (WMPP) was prepared in conjunction with the Statewide Oil and Gas Draft Environmental Impact Statement (DEIS) and Amendment of the Powder River and Billings Resource Management Plans (RMPs) (BLM, 2001). The DEIS and Amendment addresses future exploration for and development of BLM and state of Montana (state) managed CBNG resources and conventional oil and gas resources. The planning area excludes those lands administered by the Forest Service, the Crow, Northern Cheyenne, and other Indian lands. The WMPP will be implemented on federal lands, including split estate, in cooperation with state agencies, federal agencies, tribal representatives, operators, and landowners. If owners and managers of state and private mineral development are willing to incorporate this guidance into management of their CBNG activities, they may become a partner by entering into a Cooperative Agreement.

A variety of planning issues related to wildlife were identified during preparation of the DEIS. The goal of the WMPP is to avoid or minimize impacts to wildlife and serve as a communication tool to foster cooperative relationships among the CBNG and conventional oil and gas industry (i.e., operators), resource management agencies, landowners and adjacent tribal governments. Because this plan addresses a large geographic area composed of diverse wildlife habitats and unique situations, it must be programmatic in nature. However, the need to provide management recommendations and guidance to conserve species and habitats remains. Regional or site specific monitoring and protection plans which follow the guidance provided in this programmatic document will be required as part of each CBNG Project Plan. Implementation of this plan during the course of project development and operations should promote wildlife conservation and allow land managers and project personnel to maintain wildlife populations and productivity levels simultaneously with the development of natural oil and gas resources.

PLAN PURPOSE

Oil and gas leasing decisions and lease stipulations were previously analyzed in the BLM 1992 *Final Oil and Gas RMP/EIS Amendment* (BLM 1992). Wildlife stipulations attached to leases offer protective measures: 1) for certain species, 2) during a particular time period, or 3) within a specific area. These stipulations may not address other concerns related to special status species or water/habitat related issues caused by direct and indirect impacts from CBNG exploration and development. Because it is purely speculative to predict how all wildlife will react or how development will proceed, it is difficult to develop prescriptive mitigation standards across the entire planning area. Even though BLM has some adaptive management strategies in place (e.g., COAs and compliance inspections), these mechanisms do not give us the information necessary to understand cause and effect relationships across a landscape. Therefore, the purpose of this plan is to acquire baseline wildlife information, monitor populations, and assess stipulations for effectiveness. The WMPP will facilitate our ability to pinpoint problems (including the evaluation of other contributing factors), design project plans which include conservation for declining species, monitor the effectiveness of decisions, and make recommendations to adjust management to address specific situations.

AREA AND OBJECTIVES

The WMPP document is the framework for wildlife monitoring and protection across the Powder River and Billings RMP areas (approximately 6.5 million acres) and provides a template for regional and/or project specific WMPP development. The BLM, MFWP, and FWS will work cooperatively to implement portions of the WMPP over the planning area. There are two basic layers of analysis, the Plan of Development (POD), and the Powder River Basin in Montana.

As energy development begins, POD specific WMPPs, following the same template as this document, will be written in cooperation with other agencies, operators, landowners and other interests. The POD analysis will include wildlife impacts from the POD area, and also the cumulative impacts from other PODs (including those of other companies) as well as other activities in the area. The objectives of the program are to:

- Establish a framework for cooperation among agencies, operators, landowners, tribal governments and interest groups;
- Provide a process for data collection, data management and reporting ;
- Determine needs for inventory, monitoring and protection measures;
- Provide guidance and recommendations for the conservation of wildlife species;
- Establish protocols for biological clearances of Special Status Species;
- Meet the terms and conditions of the Biological Opinion;

- Determine if management practices to conserve wildlife species and habitat in lease stipulations and conservation measures contained in the BLM Record of Decision, CBNG Project Plans or Oil and Gas APDs are meeting specified objectives;
- Develop recommendations to adjust management actions based on field observations and monitoring.

Implementation of the WMPP will begin with the issuance of the *Record of Decision* and will remain in effect for the life of the project (approximately 25 years). Guidance for the conservation of special status species will be incorporated into the *Project Plan of Development Preparation Guide*. Signatories on an Interagency Cooperative Agreement will serve as the *Steering Committee (Interagency Working Group)*. A *Core Team* (i.e., agency biologists) will oversee the implementation of the programmatic elements of the WMPP. As energy development is initiated within the Montana portion of the Powder River Basin, operator-funded biologists, approved by the BLM, will write area-specific monitoring and protection plans. These plans will be reviewed by the BLM resource specialists for completeness and content.

The programmatic template will undergo an annual review, at least initially, for effectiveness. A major review will be conducted every 5 years, or as determined by members of the *Core Team, Wildlife, and Aquatic Task Groups*. The various cooperators will meet annually (or more often as needed) to evaluate the progress of the various POD inventory and monitoring efforts.

IMPLEMENTATION PROTOCOL

This section provides preliminary wildlife inventory, monitoring, and protection protocol. Required actions for inventory, monitoring and protection vary by species and development intensity. In areas of development with greater than 1 well location per section, additional actions in Table 3 become applicable. Standard protocol for APD and right-of-way (ROW) application field reviews are provided in Table 2. Alternative measures and protocols will be developed as determined by *Core Team* members in response to specific needs identified in annual reports. This document provides methods for a number of wildlife species/categories. Additional species/categories may be added based on needs identified in annual wildlife reports. The wildlife species/categories for which specific inventory, monitoring, and protection procedures will be applied were developed based on input provided by the public, other agencies, and the BLM during preparation of the DEIS.

Considerable efforts will be required by agency and operator personnel for plan implementation. Many of the annually proposed agency data collection activities are consistent with current agency activities. Additionally, agency cost-sharing approaches will be considered such that public demands and statutory directives are achieved.

ANNUAL REPORTS AND MEETINGS

State and federal agencies will cooperate to implement the programmatic elements of inventory, monitoring and protection actions associated with CBNG development in the Powder River and Billings RMP areas. The Montana participants in the Interagency Working Group will oversee implementation across the planning area and summarize information from work achieved in various PODs.

During project development (i.e., 25 years), to include habitat restoration or rehabilitation efforts, operators will annually provide an updated inventory and description of all existing project features (i.e., location, size, and associated level of human activity at each feature), as well as those tentatively proposed for development during the next 12 months. These data will be coupled with annual wildlife inventory, monitoring, and protection data obtained for the previous year and included in annual reports. Annual reports will be prepared by the BLM. Annual wildlife inventory, monitoring, and protection data gathered by parties other than the BLM (e.g., operators, MFWP) should provide data/summaries to the BLM using current format standards. Upon receipt of this information, annual reports will be completed in draft form by the BLM and submitted to the operators, FWS, MFWP, and other parties. A one-day meeting of the *Core Team* will be organized by the BLM and held in early December of each year to discuss and modify, as necessary, proposed wildlife inventory, monitoring, and protection protocol for the subsequent year. Additional meetings will be scheduled as necessary.

Discussions regarding annual operator-specific financing and personnel requirements will occur at these meetings. A formula for determining these requirements will be developed at the first year's meeting (i.e., size of development, anticipated impacts, amount of public land, etc.). A protocol regarding how to accommodate previously unidentified development sites will also be determined during the annual meeting. Final decisions will be made by the BLM based on the input of all affected parties.

A final annual report will be issued by BLM to all potentially affected individuals and groups by early February of each year. Annual reports will summarize annual wildlife inventory and monitoring results, note any trends across years, identify and assess protection measures implemented during past years, specify monitoring and protection measures proposed for the

upcoming year, and recommend modifications to the existing WMPP based on the effectiveness and/or ineffectiveness of past years (i.e., identification of additional species/categories to be monitored). Where possible, data presented in reports will be used to identify potential correlations between development and wildlife productivity and/or abundance. The BLM will be the custodian of the data and stored in BLM's Geographic Information System (GIS) for retrieval and planning unless otherwise agreed to by BLM, MFWP and FWS. Raw data collected each year will be provided to other management agencies (e.g., FWS, MFWP) at the request of these agencies. In addition, sources of potential disturbance to wildlife will be identified, where practical (e.g., development activities, weather conditions, etc.). Inventory and monitoring data will be shared on a timely basis by all cooperating agencies.

Additional reports may be prepared in any year, as necessary, to comply with other relevant wildlife laws, rules, and regulations (e.g., black-footed ferret survey reports, mountain plover, sage grouse lek counts and bald eagle habitat loss reports).

ANNUAL INVENTORY AND MONITORING

This document outlines the inventory and monitoring protocol for a number of selected wildlife species/categories. Protocol will be unchanged except as authorized by the BLM or specified in this plan. Additional wildlife species/categories and associated surveys may be added or wildlife species/categories and surveys may be omitted in future years, depending on the results presented in the coordinated review of annual wildlife reports. MFWP will be contacted during the coordination of survey and other data acquisition phases. Opportunistic wildlife observations may be made throughout the year by agency and operator personnel.

The frequency of inventory and monitoring will be dependent upon the level of development. In general, inventory and monitoring frequency will increase with increased levels of development. The level of effort should also be determined by species presence and development projection. Inventory and monitoring results may lead to further currently unidentifiable studies (i.e., cause and effect). The following sections identify the level of effort required by the WMPP. Site and species-specific surveys will continue to be conducted in association with APD and ROW application or CBNG project field reviews.

RAPTORS (INCLUDING BALD EAGLE AND BURROWING OWL)

Raptor inventories will be conducted over the entire CBNG project area every 5 years with financial assistance being provided by proponents. In potentially affected areas, baseline inventory should be conducted prior to the commencement of development to determine the location of raptor nests/territories and their activity status by the BLM, with operator financial assistance. These inventories should be repeated every 5 years (in areas with 1 or less well locations/section) thereafter for the Life-of-the-Project (LOP) to monitor trends in habitat use. These surveys may be implemented aerially or from the ground. Operators may provide financial assistance for some work. Data collected during the surveys (both inventory and monitoring) will be recorded on BLM approved data sheets and entered into the BLM GIS database. Standardized, recommended wildlife survey protocols are identified in "Wildlife Survey Protocol for Coal Bed Natural Gas Development, Powder River Basin Wildlife Taskforce" and/or as referenced in this appendix. BLM should be contacted prior to commencement of wildlife surveys to insure proper survey protocols are being utilized.

Nest productivity monitoring will be conducted by the BLM or a BLM-approved biologist. Active nests located within 1 mile of project-related disturbance areas will be monitored between March 1 and mid-July to determine nesting success (i.e., number of nestlings/fledglings per nest). These surveys generally will be conducted from the ground. However, some nests may be difficult to observe from the ground due to steep and rugged topography and may require aerial surveys. Operators may provide financial assistance for aircraft rental as necessary. Attempts will be made to determine the cause of any documented nest failure (e.g., abandonment, predation).

Additional raptor nest activity and productivity monitoring measures will be applied in areas with development (i.e., areas with greater than 1 well locations/section) on and within 1 mile of the project area. Inventory/monitoring efforts in these areas, as well as selected undeveloped reference areas will be conducted annually during April and May, followed by nest productivity monitoring. Site and species-specific nest inventories will also continue to be conducted as necessary in association with all APD and ROW application field reviews.

All raptor nest/productivity surveys will be conducted using procedures that minimize potential adverse effects to nesting raptors. Specific survey protocol for reducing detrimental effects are listed in Grier and Fyfe (1987) and Call (1978) and include the following:

- Nest visits will be delayed for as long as possible during the nesting season.

- Nests will be approached cautiously, and their status (i.e., number of nestling/fledglings) will be determined from a distance with binoculars or a spotting scope.
- Nests will be approached tangentially and in an obvious manner to avoid startling adults.
- Nests will not be visited during adverse weather conditions (e.g., extreme cold, precipitation events, windy periods, or during the hottest part of the day).
- Visits will be kept as brief as possible.
- Inventories will be coordinated by the BLM.
- The number of nest visits in any year will be kept to a minimum.

Ferruginous Hawk: Timing of surveys is very important in documenting the territory, occupancy, success and productivity of ferruginous hawk populations. The accepted survey and monitoring guidelines for ferruginous hawk are taken from the *Survey and Monitoring Guidelines for Ferruginous Hawks in Montana, 1995*.

Bald Eagle: Inventory and monitoring protocol for the bald eagle will be as described for raptors, with the following additions. Operators will indicate the presence of eagle habitat (nesting, foraging, roosting, winter) as previously defined on their application. Prior to CBNG development or construction, surveys of the wooded riparian corridors within 1.0 mile of a project area will be conducted in the winter and/or spring by BLM biologists and/or BLM-approved biologists to determine the occurrence of winter bald eagle roost sites/territories. Surveys will be conducted from daybreak to 2 hours after sunrise and/or from 2 hours before sunset to 1 hour after sunset by fixed-wing aircraft. Follow-up ground surveys, if necessary, will be conducted during the same time frame. Surveys will be at least 7 days apart. The location, activity, number, and age class (immature, mature) of any bald eagles observed will be recorded. If a roost or suspected roost is identified, BLM, FWS, and MFWP will be notified and a GPS record of the roost/suspected roost will be obtained and entered into the BLM GIS database. There will be No Surface Occupancy within 0.5 miles of any identified bald eagle roost site/territories.

Nest productivity will be conducted by the BLM or a BLM-approved biologist in areas with one or more well locations per section and within 1 mile of the project area. Active nests located within one mile of project-related disturbance areas (well sites, pipelines, roads, compressor stations, and other infrastructure) will be monitored on an annual basis between March 1 and mid-July to determine nesting success (i.e., number of nestlings/fledglings per nest).

Burrowing owl: Operators should indicate the presence of prairie dog towns on their application. The presence of sensitive habitat does not indicate burrowing owls are present. It does, however, alert the company and BLM that a field review and surveys may be required to process the permit or initiate action. In association with APD and ROW application field reviews, prairie dog colonies within 0.5 miles of a proposed project or any other suitable habitat within a 0.5 mile radius area, will be surveyed for western burrowing owls by BLM biologists or a BLM-approved operator-financed biologist twice yearly from June through August to determine the presence/absence of nesting owls. Efforts will be made to determine reproductive success (no. of fledglings/nest).

THREATENED, ENDANGERED, CANDIDATE, AND OTHER SPECIES OF CONCERN

Operators must identify and map the presence of cottonwood riparian, herbaceous riparian or wet meadows, permanent water or wetlands, prairie dog towns, or rock outcrops, ridges or knolls on their application. The presence of sensitive habitat may not indicate a species is present. It does, however, alert the company and BLM that a field review and surveys may be required to process the permit or initiate action. The level of effort associated with the inventory and monitoring required for threatened, endangered, candidate, and other species of concern (TEC&SC) will be commensurate with established protocol for the potentially affected species. Methodologies and results of these surveys will be included in annual reports or provided in separate supplemental reports. As TEC&SC species are added to or withdrawn from FWS and/or BLM lists, appropriate modifications will be incorporated to this plan and specified in annual reports.

TEC&SC data collected during the surveys will be provided only as necessary to those requiring the data for specific management and/or project development needs. Site- and species-specific TEC&SC surveys will continue to be conducted as necessary in association with all APD and ROW application field reviews. Data will be collected on BLM approved data sheets and entered into the BLM GIS database.

Black-footed Ferret

Operators should indicate the presence of prairie dog towns on their application. The presence of sensitive habitat does not necessarily indicate suitable black-footed ferret habitat is present. It does, however, alert the company and BLM that a field review and surveys may be required to process the permit or initiate action. BLM biologists and/or BLM-approved operator-financed biologists will determine the presence/absence of prairie dog colonies within 0.5 miles of proposed activity during APD and ROW application field reviews. Prairie dog colonies on the area will be mapped to determine overall size following the approved methodology. Colony acreage will be determined using GIS applications. Colonies that meet FWS size criteria as potential black-footed ferret habitat (FWS 1989) will be surveyed to determine active burrow density using the methods described by Biggins et al. (1993) or other BLM- and FWS-approved methodology.

Project activity will be located to avoid impacts to prairie dog colonies that meet FWS criteria as black-footed ferret habitat (FWS 1989). If avoidance is not possible, all colonies meeting the FWS size criteria and any colonies for which density estimates are not obtained will be surveyed for black-footed ferrets by an operator-financed, FWS-certified surveyor prior to, but no more than 1 year in advance of disturbance to these colonies. Black-footed ferret surveys will be conducted in accordance with FWS guidelines (FWS 1989) and will be conducted on a site-specific basis, depending on the areas proposed for disturbance in a given year as specified in the annual report. If a black-footed ferret or its sign is found during a survey, all development activity would be subject to recommendations from the *Montana Black-footed Ferret Survey Guidelines, Draft Managing Oil and Gas Activities in Prairie Dog Ecosystems with Potential for Black-footed ferret Reintroduction* and re-initiation of Section 7 Consultation with FWS.

Black-tailed and White-tailed Prairie Dog

The BLM will determine the acreage of occupied black-tailed and/or white-tailed prairie dog habitat within suitable mountain plover habitat on federally managed surface acres and federal mineral estate lands. Further, a reasonable effort should be made to estimate actual impacts, including habitat loss, CBNG development will have on occupied black-tailed and white-tailed prairie dog acres within suitable mountain plover habitat over the entire project area.

Prairie dog towns on BLM lands within 0.5 miles of a specific project area will be identified, mapped, and surveyed as described in the black-footed ferret section. On an annual basis, the BLM and/or a BLM-approved operator-financed biologist will survey, at least a portion of, the prairie dog colonies, including the reference colonies. Prairie dog populations are subject to drastic population fluctuations primarily due to disease (plague). Therefore, efforts will be made to compare the data from the reference colonies with that obtained from the project areas, in order to monitor the response of prairie dog populations to CBNG development.

Mountain Plover

Surface use is prohibited within 1/4 mile of active mountain plover nest sites. Disturbance to prairie dog towns will be avoided where possible. Any active prairie dog town occupied by mountain plover will have Controlled Surface Use between April 1 and July 31, which may be reduced to Controlled Surface Use within 1/4 mile of an active nest, once nesting has been confirmed. An exception may be granted by the authorized officer after the BLM consults with the FWS on a case-by-case basis and the operator agrees to adhere to the new operational constraints.

On federally managed surface acres, black-tailed and white-tailed prairie dog towns greater than 80 acres in size within suitable mountain plover habitat will have a no surface use stipulation from May 1 through June 15. Prior to permit approval, habitat suitability will be determined. The BLM, FWS and MFWP will estimate potential mountain plover habitat across the CBNG area using a predictive habitat model. Over the next 5 years, information will be refined by field validation using most current FWS mountain plover survey guidelines (FWS 2002c) to determine the presence/absence of potentially suitable mountain plover habitat. In areas of suitable mountain plover habitat, surveys will be conducted prior to ground disturbance activities by the BLM or a BLM-approved operator biologist, using the FWS protocol at the project area, plus a 0.5 mile buffer. Efforts will be made to identify mountain plover nesting areas not subject to CBNG development, to be used as reference sites. Comparisons will be made of the trends in mountain plover nesting occupancy between these reference areas and areas experiencing CBNG development.

The BLM shall monitor loss of mountain plover habitat associated with all portions of this action (operators will indicate the presence of prairie dog towns or other mountain plover habitat indicators on their application). Suitable mountain plover habitat has been defined under 'critical habitat' for the mountain plover in FWS' Statewide Biological Opinion. The actual measurement of disturbed habitat will be the responsibility of the BLM or their agent (consultant, contractor, etc) with a

written summary provided to the FWS' Montana Field Office, upon project completion or immediately, if the anticipated impact area is exceeded.

Gray Wolf

According to the *Biological Assessment for Coalbed Methane Production in Montana*, state lands and counties (Gallatin and Park counties) bordering Yellowstone National Park would be surveyed in the spring for wolves, occupied dens, or scat prior to development. These surveys could be conducted from the air or from the ground. Areas in which wolves are observed would continue to be surveyed annually until reintroduction objectives are met. Efforts will be made to compare production and/or occupancy trends in wolf populations in these areas to a reference population in order to gain more reliable information regarding the response of wolves to CBNG development.

Sage-Grouse

Sage grouse lek inventories will be conducted over the CBNG project area every 5 years to determine lek locations. Surveys of different areas may occur during different years with the intent the high potential CBNG project areas will be covered at least once every 5 years. Inventories and protocol will be consistent with the *Montana Sage Grouse Conservation Plan*, coordinated by the BLM and MFWP. In areas with development, aerial inventories will be conducted annually on affected sections, 3 mile buffers, and selected undeveloped reference areas. Surveys may be conducted aerially or on the ground, as deemed appropriate by the BLM and MFWP. Operator may provide financial assistance.

Reference leks are leks located in similar habitat and within close proximity to areas currently being developed. These "reference leks" will be identified by BLM and MFWP.

Aerial surveys will be used for determining lek locations. BLM, MFWP or BLM-approved operator-financed biologist will monitor sage-grouse lek attendance within 3 miles of areas having development such that all leks on these areas are surveyed at least once every 3 years. Data collected during these surveys will be recorded on BLM and MFWP approved data sheets and entered into the approved database. An effort should also be made to compare trends of the number of males/lek to reference leks.

Sage-grouse winter use surveys of suitable winter habitat within 3 miles of a project area will be coordinated by the BLM and implemented during November through February as deemed appropriate by these agencies, and results will be provided in interim and/or annual reports. Historical information of winter sage-grouse locations will be useful in focusing efforts in areas suspected of providing winter habitat. Sage-grouse winter habitat use surveys will be conducted when suitable conditions exist.

BIG GAME

Elk, mule deer, white-tailed deer, and pronghorn are the common big game species that occur within parts or all of the CBNG planning area. Annual big game seasonal habitat use data will be collected and made available to operators, Tribes and landowners. Big game use of seasonal habitats is highly dependent upon a combination of environmental factors including terrain, forage quality and snow depth. Therefore, it is difficult to attribute changes in habitat use to a single factor. Comparisons in trends between big game seasonal habitat reference areas and seasonal habitats associated with CBNG development may provide some insight into the response of big game to CBNG development.

GENERAL WILDLIFE

Wildlife mortality observed in pits will be documented, reported to the BLM and FWS, and measures will be taken to prevent future mortality. If the dead animals are birds, they will be collected and kept for identification by someone with an appropriate salvage permit. Also, the pits would need to be "spot checked" by appropriate BLM or FWS personnel in insure compliance. In no cases would operators or other workers be allowed to be in possession of migratory bird carcasses. Well field access roads and other roads with project-related traffic increases will be monitored for wildlife mortality so that specific mitigation can be designed and implemented as deemed necessary by BLM, in consultation with MFWP.

AQUATIC SPECIES

Baseline aquatic inventories will be conducted in potentially affected areas with operator financial assistance, prior to development, in an effort to determine occurrence, abundance, and population diversity of the aquatic community. These inventories should be repeated as necessary in selected intermittent/perennial streams associated with produced water

discharge, as well as selected intermittent/perennial streams associated with no produced water discharge (control sample site).

Natural fluctuations in species occurrence, abundance, and population diversity will be determined by comparing changes in control sample sites to baseline inventories. Changes in occurrence, abundance, and population diversity of the aquatic community in streams associated with produced water discharge may then be possible by comparing to the natural fluctuations.

Detection of a retraction in the range of a species, a downward trend in abundance, or reduced population diversity in systems with produced water discharge shall warrant a review of Project Plans and possible recommendations for adjustment of management to address the specific problems.

Aquatic groups to be inventoried and monitored will include:

- Benthic macroinvertebrates** - Determine population diversity using Hess/kick net sampling protocol to measure species abundance and establish a diversity index.
- Amphibians and aquatic reptiles** - Determine population diversity and abundance utilizing sampling methodologies being developed for prairie species.
- Non-game fish** - Determine population diversity using electrofishing and seining.
- Algae (periphyton)** – Determine population diversity.

PROTECTION MEASURES

Wildlife protection measures have been put in place through lease stipulations. The following sections from the FWS' Biological Opinion describe stipulations or mitigation that restrict activities through lease agreements or terms and conditions to reduce the likelihood of "take" of a federally listed species. For all stipulations and mitigation measures that include protection of specific habitats (e.g., sage-grouse winter habitat), identification of the specific habitat areas will be based on the best available science. This may include BLM surveys or information from other sources. For example, researchers at the University of Montana and Montana State University are developing sage-grouse habitat models that should provide better information on sage-grouse habitat areas than is currently available.

Lease Stipulations and Mitigation Measures

The lease stipulations were approved in the 1994 BLM Oil and Gas EIS. These are mandatory measures or actions developed as a result of wildlife research and input from agencies and operators. Avoidance of important breeding, nesting, and seasonal habitats is the primary protection measure that will reduce the possibility of CBNG and Oil and Gas development having an impact on wildlife populations, productivity, or habitat use. Additional conservation measures will be incorporated through the Project Plan design or as Conditions of Approval. Data collected during monitoring efforts and analyzed will be used to determine the appropriateness and the effectiveness of these measures throughout the CBNG project area. Based on the results of the monitoring data, these measures will be reviewed by the *Core Team*. As monitoring data are collected over time, it is likely some protection measures will be added, while others will be modified or removed in cooperation with other agencies and the *Core Team*. All changes in these protection measures will be reported, with a justification for the change, in annual reports. An RMP amendment may be required depending on the recommended change.

“Waivers” A lease stipulation may be waived by the Authorized Officer if a determination is made by the BLM, in consultation with MFWP and/or FWS, that the proposed action will not adversely affect the species in question.

“Exceptions” to protection measure may be granted by the Authorized Officer, in coordination with FWS for T&E species and MFWP, if the operator submits a plan that demonstrates impacts from the proposed action will not be significant, or can be adequately mitigated.

“Modifications” may be made by the Authorized Officer if it is determined portions of the area do not include habitat protected by the stipulation.

Raptors

From March 1 – August 1, all surface disturbing activities are prohibited within ½ mile of active raptor nest sites except ferruginous hawk, bald eagle and peregrine falcon nest sites. For ferruginous hawks and bald eagles, no surface occupancy or

use will be allowed within ½ mile of known active nest sites. No surface occupancy or use is authorized within 1 mile of identified peregrine falcon nests. Active raptor nests are defined as those used within the last two years.

Big Game

Surface use is prohibited to avoid disturbance of white-tailed deer, mule deer, elk, pronghorn antelope, moose, and bighorn sheep during the winter use season, December 1 - March 31. This stipulation does not apply to the operation and maintenance of production facilities.

Elk Parturition Range

In order to protect identified elk parturition range, surface use is prohibited from April 1 to June 15 within established spring calving range. This protection measure does not apply to the operation and maintenance of production facilities.

Bighorn Sheep – Powder River Breaks

No surface occupancy or use is allowed in the designated Powder River Bighorn Sheep Range. In crucial winter range outside of the designated area, surface use is prohibited from December 1 to March 31.

Sage and Sharptailed Grouse

Lek sites

In order to minimize impacts to sharptailed and sage-grouse leks, surface occupancy within ¼ mile of leks is prohibited. The measure may be waived if the authorized officer, in coordination with MFWP, determines the entire leasehold can be occupied without adversely affecting grouse lek sites, or if the lek sites within ¼ mile of the leasehold have not been attended for 5 consecutive years.

Nesting area

Surface use is prohibited from March 1 – June 15 in grouse nesting habitat within 2 miles of a known lek. This measure does not apply to the operation and maintenance of production facilities. This measure will be implemented to protect sharptailed and sage-grouse nesting habitat from disturbance during spring and early summer in order to maximize annual production of young, and to minimize disturbance to nesting activities adjacent to nesting sites for the long-term maintenance of grouse populations in the area.

Winter range

Surface use is prohibited from December 1 through March 31 within designated crucial winter range to protect sage-grouse from disturbance during winter season use.

Control of West Nile Virus

Manage produced water to reduce the spread of West Nile virus within sage-grouse habitat areas. Implement the following impoundment construction techniques to eliminate water sources that support breeding mosquitoes:

- Overbuild the size of ponds to accommodate a greater volume of water than is discharged. This will result in non-vegetated and muddy shorelines that breeding mosquitoes avoid.
- Build steep shorelines to reduce shallow water and aquatic vegetation around the perimeter of impoundments. Construction of steep shorelines also will increase wave action that deters mosquito production. Use of this construction technique could be harmful to certain wildlife species such as birds, and would require consideration on a case-by-case basis.
- Maintain the water level below rooted vegetation for a muddy shoreline that is unfavorable habitat for mosquito larvae. Rooted vegetation includes both aquatic and upland vegetative types. Always avoid flooding terrestrial vegetation in flat terrain or low lying areas.
- Construct dams or impoundments that restrict down slope seepage or overflow. Seepage and overflow results in down-grade accumulation of vegetated shallow water areas that support breeding mosquitoes.

- Line the channel where discharge water flows into the pond with crushed rock, or use a horizontal pipe to discharge inflow directly into existing open water, thus precluding shallow surface inflow and accumulation of sediment that promotes aquatic vegetation.
- Line the overflow spillway with crushed rock, and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation.
- Fence pond site to restrict access by livestock and other wild ungulates that trample and disturb shorelines, enrich sediments with manure and create hoof print pockets of water that are attractive to breeding mosquitoes.

The following measures will also be employed for impoundments storing produced water:

- Use adulticides to target adult mosquito populations and larvicides to control the hatching of mosquito larvae, using approved pesticides and utilizing licensed applicators with a PUP.
- Introduce native fish species, such as fathead minnow or sand shiner, that would feed on mosquito larvae.
- Use electric, solar, or wind-powered fountains or aerators, which would create a ripple disturbance in the water surface and dissuade mosquitoes from laying eggs. This would also have the added effect of aerating the water to support a fish population and help prevent against winter fish die-off.
- Use a vertical discharge pipe in the center of the impoundment to create a ripple effect and aerate the water to support a fish population.

Prairie Dog Towns and Associated Black-footed Ferret Habitat

Prior to surface-disturbing activities, prairie dog colonies and complexes 80 acres or more in size and containing at least 5 burrows per acre will be examined to determine the presence or absence of black-footed ferrets. The findings of this examination may result in some restrictions to the operator's plans or may even preclude use and occupancy.

The lessee or operator may, at their own option, conduct an examination on the leased lands to determine if black-footed ferrets are present if the proposed activity would have an adverse effect or if the area can be block cleared. This examination must be done by, or under the supervision of, a qualified resource specialist approved by the BLM. An acceptable report must be provided documenting the presence or absence of black-footed ferrets and identifying the anticipated effects of the proposed action on the black-footed ferret and its habitat. This stipulation does not apply to the operation and maintenance of production facilities.

Interior Least Tern

The interior least tern is listed as an endangered species under the ESA. Birds occupy sandbars and graveled islands in eastern Montana and along the Yellowstone and Missouri Rivers. Surface occupancy and will be prohibited within 1/4 mile of wetlands identified as interior least tern habitat.

Terms and Conditions from Section 7 Consultation

In order to be exempt from the prohibitions of Section 9 of the ESA, the Bureau must comply with the following terms and conditions, which implement the reasonable and prudent measures described and outlined in the Biological Opinion. **These terms and conditions are nondiscretionary.**

All Species

In the event wildlife species (dead or injured) are located during construction and operation, the FWS' Billings Sub-Office of the Montana Field Office (406-247-7366) and Law Enforcement Office (406-247-7355) will be notified within 24 hours. If the dead animals are birds, they will be collected and kept for identification by someone with an appropriate salvage permit. Also, the pits would need to be "spot checked" by appropriate BLM or FWS personnel in insure compliance. In no cases would operators or other workers be allowed to be in possession of migratory bird carcasses. The action agency must provide for monitoring the actual number of individuals taken. Because of difficulty in identification, all small birds found dead should be stored in a freezer for the FWS to identify.

The Bureau shall monitor all loss of bald eagle (nesting, potential nesting and roost sites) and suitable mountain plover habitat associated with all actions covered under the *Montana Statewide Draft Oil and Gas EIS and Amendment of the Powder River and*

Billings RMPs and ROD. Bald eagle nesting, potential nesting and roost sites, and suitable mountain plover habitat have been defined under ‘habitat use’ and ‘critical habitat’ respectively, for each species in the Biological Opinion. The actual measurement of disturbed habitat can be the responsibility of the BLM or their agent (consultant, contractor, etc), with a written summary provided to the FWS’ Montana Field Office upon project completion. The report will include the location and acres of habitat loss, field survey reports, what stipulations were applied, and a record of any variance granted to timing and/or spatial buffers. The monitoring of habitat loss for these species will commence from the date the Record of Decision (ROD) is signed. The actual measurement of disturbed habitat can be the responsibility of the Bureau’s agent (consultant, contractor, etc.) with a written summary provided to the FWS’ Montana Field Office semi-annually, or immediately if the Bureau determines the action (*i.e.* APD, pipeline, compressor station) will adversely affect a listed species. It is the responsibility of the Bureau to ensure the semi-annual reports are complete and filed with the FWS in a timely manner. The semi-annual report will include field survey reports for endangered, threatened, proposed and candidate species for all actions covered under the *Montana Statewide Draft Oil and Gas EIS and Amendment of the Powder River and Billings RMPs* and ROD. The semi-annual reports will include all actions completed under this Biological Opinion up to 30 days prior to the reporting date. The first report will be due 6 months from the signing of the ROD and on the anniversary date of the signing of the ROD. Reporting will continue for the life of the project.

As outlined in the guidance and conservation measures in the WMPP for the Statewide Oil and Gas EIS and Amendment of the Powder River and Billings RMPs, “All new roads required for the proposed project will be appropriately constructed, improved, maintained, and signed to minimize potential wildlife/vehicle collisions. Appropriate speed limits will be adhered to on all project area roads, and operators will advise employees and contractors regarding these speed limits.”

Bald Eagle

The Bureau shall require implementation of all conservation measures/mitigation measures identified in the Biological Assessment prepared for the project and dated October 2006, and the wildlife inventory, monitoring, and protection protocol identified in the WMPP. The Bureau shall monitor for compliance with the measures and protocol. They are as follows:

- The appropriate standard seasonal or year-long stipulations for raptors or no surface occupancy for bald eagles as identified in the Billings RMP (BLM 1983), Powder River RMP (BLM 1984), and Oil and Gas RMP/EIS Amendment (BLM 1992) will be applied. This includes No Surface Occupancy within ½ mile of nests active in the last 7 years and ½ mile of roost sites.
- Inventory and monitoring protocol for the bald eagle will be as described for raptors, with the following additions. Operators will indicate the presence of eagle habitat as previously defined, on their application. Prior to CBNG development or construction, surveys of the wooded riparian corridors within 1.0 mile of a project area will be conducted in the winter and/or spring by BLM biologists and/or BLM-approved biologists to determine the occurrence of winter bald eagle roosts. Surveys will be conducted from daybreak to 2 hours after sunrise and/or from 2 hours before sunset to 1 hour after sunset by aircraft. Follow-up ground surveys, if necessary, will be conducted during the same time frame. Surveys will be at least 7 days apart. The location, activity, number, and age class (immature, mature) of any bald eagles observed will be recorded and if a roost or suspected roost is identified, BLM, FWS, and MFWP will be notified and a GPS record of the roost/suspected roost will be entered into the approved database. No Surface Occupancy will be applied within 0.5 miles of any identified bald eagle roost sites.
- Nest productivity will be conducted by the BLM or a BLM approved biologist in areas with development (*i.e.*, areas with greater than 1 well locations/section) and within 1 mile of the project area. Active nests located within one mile of project-related disturbance areas will be monitored between March 1 and mid-July to determine nesting success (*i.e.*, number of nestlings/fledglings per nest).
- No new above-ground power line should be constructed within ½ mile of an active eagle nest or nest occupied within the recent past. No surface occupancy or use is allowed within 0.5 miles of known bald eagle nest sites which have been active within the past 7 years. All other actions will be consistent with the *Montana Bald Eagle Management Plan - July 1994*.
- Power lines will be built to standards identified by the Power Line Interaction Committee (2006) to minimize electrocution potential. The FWS has more specific recommendations that reaffirm and complement those presented in the *Suggested Practices*. It should be noted these measures vary in their effectiveness to minimize mortality, and may be modified as they are tested. Local habitat conditions should be considered in their use. The FWS does not endorse any specific product that can be used to prevent and/or minimize mortality; however, we are providing a list of Major Manufacturers of Products to Reduce Animal Interactions on Electrical Utility Facilities.

New Distribution Lines and Facilities

The following represents areas where the raptor protection measures will be applied when designing new distribution line construction:

- 1.1 Bury distribution lines where feasible.
- 1.2 Raptor-safe structures (e.g., with increased conductor-conductor spacing) are to be used (i.e., minimum 60" for bald eagles would cover all species).
- 1.3 Equipment installations (overhead service transformers, capacitors, reclosers, etc.) are to be made raptor safe (e.g., by insulating the bushing conductor terminations and by using covered jumper conductors).
- 1.4 Jumper conductor installations (e.g., corner, tap structures, etc) are to be made raptor safe by using covered jumpers or providing adequate separation.
- 1.5 Employ covers for arrestors and cutouts.
- 1.6 Lines should avoid high avian use areas such as wetlands, prairie dog towns, and grouse leks. If not avoidable, use anti-perching devices to discourage perching in sensitive habitats such as grouse leks, prairie dog towns and wetlands to decrease predation and decrease loss of avian predators to electrocution.

Modification of Existing Facilities

Raptor protection measures to be applied when retrofitting existing distribution lines in an effort to reduce raptor mortality. Problem structures may include dead ends, tap or junction poles, transformers, reclosers and capacitor banks or other structures with less than 60" between conductors or a conductor and ground. The following modifications will be made:

- 2.1 Cover exposed jumpers.
- 2.3 Gap any pole top ground wires.
- 2.4 Isolate grounded guy wires by installing insulating link.
- 2.5 On transformers, install insulated bushing covers, covered jumpers, cutout covers and arrestor covers.
- 2.6 When raptor mortalities occur on existing lines and structures, raptor protection measures are to be applied (e.g., modify for raptor-safe construction, install perches, perching deterrents, nesting platforms, nest deterrent devices, etc).
- 2.7 Use anti-perching devices to discourage perching in sensitive habitats such as grouse leks, prairie dog towns and wetlands to decrease predation, and decrease loss of avian predators to electrocution.
- 2.8 In areas where midspan collisions are a problem, install effective line-marking devices. All transmission lines that span streams and rivers or in known or discovered raptor migration areas, should maintain proper spacing and have markers installed.

These additional standards to minimize migratory bird mortalities associated with utility transmission lines will be incorporated into the Terms and Conditions for all APDs and stipulations for ROW applications.

Mountain Plover

The Bureau shall require implementation of the conservation measures for mountain plover as identified in the Biological Assessment dated October 2006, and the wildlife inventory, monitoring, and protection protocol addressed in the *WMPP*. The Bureau shall monitor for compliance with the measures and protocol. They are as follows:

- Surface use is prohibited within 1/4 mile of active mountain plover nest sites. Disturbance to prairie dog towns will be avoided where possible. Any active prairie dog town occupied by mountain plovers will have a Controlled Surface Use stipulation applied between April 1 and July 31. This area may be reduced to No Surface Use within 1/4 mile of an active nest once nesting has been confirmed. An exception may be granted by the authorized officer after the BLM consults with the FWS and the operator agrees to adhere to the new operational constraints.
- Due to the declining status of mountain plover in the analysis area and the need to retain the most important and limited nesting habitat, all active prairie dog colonies on federal surface within suitable mountain plover habitat will have No Surface Occupancy applied. This No Surface Occupancy may be modified through an amendment to the biological opinion after analysis of impacts to this preferred nesting habitat is completed.
- BLM will determine the acreage of occupied black-tailed and white-tailed prairie dog habitat within suitable mountain plover habitat on federally managed surface and mineral estate lands. Further, a reasonable effort should be made to estimate the actual impacts, including habitat loss, CBNG development will have on occupied black-tailed and white-tailed prairie dog

acres within suitable mountain plover habitat over the entire project area. The BLM, FWS, and cooperators will develop a survey protocol that may include prioritization of subsets of the project area to be analyzed. Based on the results of such analysis, No Surface Occupancy on active prairie dog habitat within suitable mountain plover habitat may be modified utilizing an amendment to the biological opinion.

- Prior to permit approval, habitat suitability will be determined. The BLM, FWS or MFWP will estimate potential mountain plover habitat across the CBNG area using a predictive habitat model. Over the next 5 years, information will be refined by field validation using most current FWS mountain plover survey guidelines (FWS 2002c) to determine the presence/absence of potentially suitable mountain plover habitat. In areas of suitable mountain plover habitat, surveys will be conducted prior to ground disturbance activities by the BLM or a BLM-approved biologist using the FWS protocol at a specific project area plus a 0.5 mile buffer. Efforts will be made to identify mountain plover nesting areas not subject to CBNG development as reference sites. Comparisons will be made of the trends in mountain plover nesting occupancy between these reference areas and areas experiencing CBNG development.
- BLM shall monitor all loss of mountain plover habitat associated with this action (operators will indicate the presence of prairie dog towns or other mountain plover habitat indicators on their application). Suitable mountain plover habitat has been defined under 'critical habitat' for the mountain plover in the Biological Opinion. The actual measurement of disturbed habitat can be the responsibility of the BLM, its agent (consultant, contractor, etc) with a written summary provided to the FWS' Montana Field Office upon completion or immediately if the anticipated impact area is exceeded relative to the estimated surface disturbances defined in the SEIS.
- If suitable mountain plover habitat is present, surveys for nesting mountain plovers will be conducted prior to ground disturbance activities, if ground disturbing activities are anticipated to occur between April 10 and July 10. Disturbance occurring outside this period is permitted, but any loss of mountain plover suitable habitat must be documented. Sites must be surveyed 3 times between the April 10 and July 10 period, with each survey separated by at least 14 days. The earlier date will facilitate detection of early-breeding plovers. A disturbance-free buffer zone of 1/4 mile will be established around all mountain plover nesting locations between April 1 and July 31. If an active nest is found in the survey area, the planned activity should be delayed 37 days, or seven days post-hatching. If a brood of flightless chicks is observed, activities should be delayed at least seven days (FWS 2002). Exceptions and/or waiver to stipulations can be made by the BLM through consultation with the FWS.
- Roads will be located outside of nesting plover habitat where possible. Apply mitigation measures to reduce mountain plover mortality caused by increased vehicle traffic. Construct speed bumps, use signing or post speed limits as necessary to reduce vehicle speeds near mountain plover habitat.
- Creation of hunting perches will be minimized within 1/2 mile of occupied nesting areas. Utilize perch inhibitors (perch guards) to deter predator use.
- Native seed mixes will be used to re-establish short grass vegetation during reclamation.
- There will be No Surface Occupancy of ancillary facilities (e.g., compressor stations, processing plants) within 1/2 mile of known nesting areas. Variance may be granted after consultation with the FWS.
- In habitat known to be occupied by mountain plover, no dogs will be permitted at work sites to reduce the potential for harassment of plovers.
- The FWS will provide operators and the BLM with educational material illustrating and describing the mountain plover, its habitat needs, life history, threats, and development activities that may lead to incidental take of eggs, chicks, or adults. This information will be required to be posted in common areas and circulated in a memorandum among all employees and service providers.

Programmatic Guidance for the Development of Project Plans

Guidance for developing Project Plans and/or conservation measures applied as COAs provide a full range of practicable means to avoid or minimize harm to wildlife species or their habitats. Operators will minimize impacts to wildlife by incorporating applicable WMPP programmatic guidance into project plans. Not all measures may apply to each site-specific development area and means to reduce harm are not limited to those identified in the WMPP. This guidance may change over time if new conservation strategies become available for Special Status Species or if monitoring indicates the measure is not effective or unnecessary.

BLM and MFWP will work together to collect baseline information about wildlife and sensitive habitats possibly containing special status species. During the project development phase, operators will identify potentially sensitive habitats and coordinate with BLM to determine which species or habitats are of concern within or adjacent to the project area. In areas where required site-specific wildlife inventories have not been completed, operators and BLM will work cooperatively to achieve this. BLM's responsibilities under NEPA and ESA essentially are the same on split estate as they are with federal surface. BLM and operators will seek input from the private surface owner to include conservation measures in split estate situations.

The following guidance and conservation measures are considered "features" or project "design criteria" to be used during Project Plan preparation. The design of projects can incorporate conservation needs for wildlife species or measures can be added as COAs. These types of conservation actions offer flexibility for local situations and help minimize or eliminate impacts to the species of interest.

1. Use the best available information for siting structures (e.g., storage facilities, generators and holding tanks) outside the zone of impact in important wildlife breeding, brood-rearing and winter habitat based on the following considerations:
 - a. size of the structure(s),
 - b. level/type of anticipated disturbance
 - c. life of the operation, and
 - d. extent to which impacts would be minimized by topography.
2. Concentrate energy-related facilities when practicable.
3. Encourage development in incremental stages to stagger disturbance; design schedules that include long-term strategies to localize disturbance and recovery within established zones over a staggered time frame.
4. Prioritize areas relative to their need for protection, ranging from complete protection to moderate to high levels of energy development.
5. Develop a comprehensive Project Plan prior to POD or full field development activities to minimize road densities.
6. To reduce additional surface disturbance, existing roads and two-tracks on and adjacent to the CBNG project area will be used to the extent possible and will be upgraded as necessary.
7. Minimize stream channel disturbances and related sediment problems during construction of road and installation of stream crossing structures. Do not place erodible material into stream channels. Remove stockpiled material from high water zones. Locate temporary construction bypass roads in locations where the stream course will have minimal disturbance. Time construction activities to protect fisheries and water quality.
8. Design stream-crossings for adequate passage of fish (if potential exists). Minimize impacts on water quality and, at a minimum, the 25-year frequency runoff. Consider oversized pipe when debris loading may pose problems. Ensure sizing provides adequate length to allow for depth of road fill.
9. Use corridors to the maximum extent possible: roads, power, gas and water lines should use the same corridor whenever possible.
10. Avoid, where possible, locating roads in crucial sage-grouse breeding, nesting and wintering areas and mountain plover habitats. Develop roads utilizing topography, vegetative cover, site distance, etc. to effectively protect identified wildlife habitats.
11. Conduct all road and stream crossing construction and maintenance activities in accordance with agency approved mitigation measures and BMPs.
12. Utilize remote monitoring technologies whenever possible to reduce site visits thereby reducing wildlife disturbance and mortalities.
13. All new roads required for the proposed project will be appropriately constructed, improved, maintained, and signed to minimize potential wildlife/vehicle collisions and facilitate wildlife movement through the project area. Appropriate speed limits will be adhered to on all project area roads, and operators will advise employees and contractors regarding these speed limits.
14. Road closures may be implemented during crucial periods (e.g., extreme winter conditions, and calving/fawning seasons). Personnel will be advised to minimize stopping and exiting their vehicles in big game winter range.
15. Roads no longer required for operations or other uses will be reclaimed if required by the surface owner or surface management agency. Reclamation will be conducted as soon as practical.
16. Operator personnel and contractors will use existing state and county roads and approved access routes, unless an exception is authorized by the surface management agency.
17. Use minimal surface disturbance to install roads and pipelines. Reclaim sites of abandoned wells to restore native plant communities.

18. Reclamation of disturbed areas will be initiated as soon as practical. Native species will be used in the reclamation of important wildlife habitat. Wildlife habitat needs will be considered during seed mix formulation.
19. Locate storage facilities, generators, and holding tanks outside the line of sight and sound of important sage-grouse breeding habitat.
20. Minimize ground disturbance in sagebrush stands with documented use by sage-grouse:
 - (a) breeding habitat – the lek and associated sagebrush;
 - (b) nesting habitat – sagebrush within 4 miles of a lek; and
 - (c) wintering habitat – sagebrush with documented winter use by sage-grouse.
21. Site new power lines and pipelines in disturbed areas wherever possible; remove overhead powerlines when use is complete.
22. Minimize the number of new overhead power lines in sage-grouse or mountain plover habitat. Use the best available information for siting powerlines in important sage-grouse breeding, brood-rearing, and winter habitat. Bury lines in sage-grouse and mountain plover habitat, when feasible.
23. Restrict timing for powerline installation to prevent disturbance during critical sage-grouse periods (breeding March 1 – June 15; winter December 1 –March 31).
24. If above ground powerline siting is required within 2 miles of important sage-grouse breeding, brood-rearing, and winter habitat, emphasize options for preventing raptor perch sites utilizing Avian Powerline Action Committee 2006 guidelines.
25. Encourage monitoring of avian mortalities by entering into a Memorandum of Understanding with FWS and the state agencies to establish procedures and policies to be employed by the parties to lessen industry’s liability concerns about the “take” of migratory birds.
26. Remove unneeded structures and associated infrastructure when project is completed.
27. Restrict maintenance and related activities in sage-grouse breeding/nesting complexes; 15 March -15 June, between the hours of 4:00-8:00 am and 7:00-10:00 pm.
28. Restrict noise levels from production facilities to 50 decibels (10 dBa above background noise at the lek).
29. Restrict use of heavy equipment that exceeds 50 dBa within 2 miles of a lek from 4-8am and 7-10pm during April 1 – June 30.
30. Protect, to the extent possible, natural springs from disturbance or degradation.
31. Design and manage produced water storage impoundments so as not to degrade or inundate sage-grouse leks, nesting sites and wintering sites, prairie dog towns or other Special Status Species habitats.
32. CBNG produced water should not be stored in shallow, closed impoundments or playas. Impoundments designed as flow through systems will lessen the likelihood selenium will bioaccumulate to levels adversely affecting other wildlife.
33. Develop offsite mitigation strategies in situations where fragmentation or degradation of Special Status Species habitat is unavoidable.
34. Protect reserve, workover, and production pits potentially hazardous to wildlife by netting and/or fencing as directed by the BLM to prevent wildlife access and minimize the potential for migratory bird mortality.
35. Reduce potential increases in poaching through employee and contractor education regarding wildlife laws. Operators should report violations to BLM and MFWP.
36. Operator employees and their contractors will be discouraged from possessing firearms while working.

Measures 3, 4, 20, 21, 24, 25, 29, and 30 were added for the SEIS/Amendment from the Management Plan and Conservation Strategies for sage-grouse in Montana (Montana Sage Grouse Work Group 2005).

Table 1. Summary of General Wildlife Reporting, Inventory, and Monitoring, CBNG Development; Powder River and Billings Resource Management Plans, CBNG Amendment (2002)

Action	Dates	Responsible Entity
Plans of development for outcoming years, showing general location of proposed development	Annually	Team (BLM, FWS, MFWP, operators)
Annual reports summarizing findings and presenting necessary protection measures	Annually	BLM with reviews MFWP, FWS, operators, and other interested parties
Meeting to finalize future year's inventory, monitoring, and protection measures	Annually	BLM with participation by FWS, MFWP, operators, and other interested parties
Inventory and Monitoring		
Big game use monitoring	When Applicable	BLM with assistance
Determine mountain plover habitat suitability	Prior to permit approval	BLM & operator assistance
In areas of suitable mountain plover habitat, conduct nest surveys in project area, plus a .5 mile buffer	Prior to ground disturbing activities	BLM & operator assistance
In areas of suitable mountain plover habitat, map active black-tailed prairie dog colonies on federal mineral estate.	Prior to permit approval	BLM & operator assistance
Active prairie dog colonies within .5 mile of a specific project area will be identified, mapped and surveyed	Prior to permit approval	BLM with operator assistance
Raptor nest inventories (POD areas plus 1 mile buffer; burrowing owls excluded)	Every 5 years during April and May but prior to permit approval	BLM with operator assistance
In areas with potential bald eagle winter roost sites/territories, conduct surveys within one mile of project area	Prior to ground disturbing activities	BLM & operator assistance
Conduct bald eagle nest inventories within one mile buffer of project area	Between March 1 and mid-July	BLM & operator assistance
Monitor productivity at active bald eagle nests within one mile of project-related disturbance	Between March 1 and mid-July	BLM & operator assistance
Raptor next productivity monitoring at active nests within one mile of project disturbance area	Annually March to mid-July	BLM with operator assistance
Sage-grouse lek inventories (project area plus two mile buffer)	Every 5 years	BLM with operator assistance
Sage-grouse lek attendance monitoring on and within 2 miles of the POD boundary	Annually	BLM with operator assistance will visit selected leks each year so that all leks will be visited annually
Threatened, Endangered & Sensitive species inventory/monitoring within selected CBNG development areas	When Applicable	BLM with operator assistance
Other wildlife species inventory/monitoring within selected CBNG development areas	When Applicable	BLM with operator assistance

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Table 2. Summary of APD/ROW Survey and Protection Measures, CBNG Development within the Powder River and Billings Resource Management Plans

Protection Measure	Dates
Bald eagle nest surveys within 1 mile of project area	Yearlong
Bald eagle nest avoidance within 0.5 mile of active nests	No Surface Use or Occupancy
Bald Eagle Winter Roost surveys within 1 mile of project area	December 1 to April 1
Bald Eagle Winter Roost avoidance within 0.5 miles of roost site	No Surface Use or Occupancy
Black-footed ferret surveys	Prairie dog colonies > 80 acres
Mountain plover surveys within 0.5 miles of project area	May 1 to June 15
Active prairie dog colonies on federal surface in mountain plover habitat	BLM & operator assistance
Mountain plover nest/brood avoidance within .25 miles of project area	April 1 to July 31
Peregrine falcon nest avoidance within 1 mile of active nest	No Surface Use or Occupancy
Threatened, Endangered & Sensitive species surveys	As necessary
Threatened, Endangered & Sensitive species avoidance	As necessary
Big game crucial winter range avoidance	December 1 – March 31
Elk Parturition Range avoidance	April 1 – June 15
Big Horn Sheep – Powder River Breaks	No Surface Use or Occupancy
Prairie dog colony mapping and burrow density determinations	Yearlong
Raptor next survey/inventory within 0.5 miles of project area	Yearlong
Raptor nest avoidance within 0.5 miles of active nests	March 1 – August 1
Sage-grouse nesting habitat avoidance on areas within 2.0 miles of a lek	April 1 – June 30
Sage-grouse and sharp-tailed grouse lek avoidance within 0.25 miles of a lek	No Surface Use or Occupancy
Sharp-tailed grouse nesting habitat avoidance on areas within 2 miles of a lek	March 1 – June 15
Western burrowing owl surveys (prairie dog colonies within 0.5 miles of disturbance)	June – August
General wildlife avoidance/protection	As necessary

Table 3. Additional Wildlife Inventory and Monitoring Measures On and Adjacent to Areas with High Levels of Development (4 Locations/Section), Powder River and Billings Resource Management Plans, CBNG Amendment (2001)

Action	Dates	Responsible Entity
Raptor nest inventory/monitoring on areas with development, plus a 1-mile buffer.	Annually during April and May	BLM surveyor with operator-provided financial assistance
Raptor productivity monitoring on areas with development, plus a 1-mile buffer.	Annually during March-July	BLM surveyor with operator-provided financial assistance for BLM volunteer support
Selected TEC&SC inventory/monitoring on suitable habitats in areas with development, plus a 1-mile buffer	Annually during spring and summer	BLM or operator-financed BLM-approved biologist
Collect baseline information for benthic macroinvertebrates, amphibians and aquatic reptiles, algae and non-game fish. Monitor changes on selected streams	Baseline 1 – 2 years prior and annually over the life of the project	BLM surveyor with operator-provided financial assistance
Sage-grouse lek inventory on areas of development plus a 2-mile buffer and selected undeveloped comparison areas	Every 5 years, mid-March to mid-May	BLM surveyor with operator-provided financial assistance
Sage-grouse lek attendance monitoring on areas of development plus a 2-mile buffer and selected undeveloped comparison areas	Annually, mid-March to mid-May	Each known lek will be visited at least once annually by the BLM and/or operator-financed BLM-approved biologist; subsequent visits will occur at BLM-selected leks by the BLM, and/or operator-financed BLM-approved biologist
Others studies on areas with development and selected undeveloped comparison areas		FWS and/or BLM with operator- and other party-provided financial assistance

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APPENDIX B

NORTHERN CHEYENNE MITIGATION APPENDIX

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NORTHERN CHEYENNE MITIGATION

BLM will use the following mitigation actions to protect Northern Cheyenne Tribal trust resources or to protect other area resource values of importance to the Tribe. These mitigating measures will be imposed on operators at the APD approval stage of development as needed on a case-by-case basis. The mitigation measures will only be applied on those lands or minerals where BLM has authority.

Air - Operators will be required to provide the information necessary for BLM to conduct an analysis of air quality impacts for all relevant parameters when submitting their exploration APDs or field development project plans. BLM will use the information to determine the individual and cumulative impact on the Reservation's air quality; disclose the analysis results in the appropriate NEPA document; and consult with the Tribe when the analysis shows impacts from a specific drilling or development proposal.

Approval of exploration APDs and field development plans will include an analysis of the individual and cumulative impacts to air quality and be conditioned to prevent violations of applicable air quality laws, regulations, and standards. Mitigating measures may include surfacing roads and well locations; applying dust suppressants; requiring operators to develop and enforce speed limits on project roads; minimizing construction of roads; requiring use of natural gas-fired and electric compressors; and optimizing the number of wells connected to one compressor.

Operators in the vicinity of the Reservation may be required to restrict the timing or location of CBNG development if monitoring or modeling by the air quality regulatory authority finds their CBNG development is causing or threatening to cause non-compliance with applicable local, state, tribal, and federal air quality laws, regulations, standards, and implementation plans.

Cultural - Operators will be required to include review of Northern Cheyenne homestead records and evaluation for homesteads in the cultural resource surveys where land records indicate Northern Cheyenne homesteading activity. Specific measures to mitigate impacts to these homesteads will be developed at the APD approval phase.

A review of land and mineral ownership maps indicate that one homestead location listed in Appendix C of BLM's 2002 Ethnographic Report may be located on an area open to fluid mineral leasing. The location is on private surface and federal minerals. Prior to any land disturbing activity permitted by the BLM in this location, and with landowner permission, BLM will work with the Northern Cheyenne Tribe and the operator to develop the requirements for inventorying, recording, and evaluating the homestead site.

Operators will be required to consult with the Northern Cheyenne Cultural Commission to determine the location of any important hunting, fishing, and plant gathering sites. APD approvals would include measures to avoid impacts to these resources using standard terms and conditions.

Operators will be required to inventory BLM-administered lands for traditional plant gathering sites around the proposed drilling locations. APD approvals may include avoidance or timing restrictions to prevent impacts to identified important hunting, fishing and plant gathering sites.

Operators will be required to conduct a plant inventory on BLM-administered lands proposed for disturbance near Poker Jim Butte. Impacts on medicinal and ceremonial plant gathering areas could then be mitigated using standard terms and conditions.

Operators will be required to inventory all springs supplied by the coal seam producing CBNG within the anticipated drawdown radius of their proposed operation.

The Northern Cheyenne Cultural Commission will be consulted about the appropriate mitigation if culturally significant springs are located within the anticipated drawdown radius of the operator's proposed development.

Operators may be required to avoid impacting culturally significant springs as part of the mitigation plan developed under Section 106 of the National Historic Preservation Act.

Operators could be required to monitor the condition of culturally significant springs where there is the potential for production activities to impact the springs. This requirement will be triggered by the results of the site specific hydrologic evaluation associated with the APD approval.

Operators must modify federal CBNG production if monitoring data shows production is affecting culturally important springs. Operators must implement mitigating measures that will maintain the spring flow prior to resuming full production.

Operators will be required to have a discovery plan as part of their POD. The discovery plan would include suspension of operations and notification requirements for state, private, and federal lands in the event human remains are discovered during project construction.

Should human remains be discovered during construction the county coroner shall be called and briefed on the circumstances of the discovery and all construction activities shall be stopped in the immediate vicinity of the human remains. A reasonable good faith effort shall then be made to identify whether the remains are Native American or belong to another ethnic group. In all cases the remains shall be treated with respect and dignity. If the remains are Native American and located on federal lands BLM shall consult with the appropriate Native American tribe(s) in accordance with the provisions of the Native American Protection and Repatriation Act (NAGPRA). If on state and private lands BLM shall follow the procedures identified in the Human Skeletal Remains and Burial Site Protection Act, a Montana statute.

The BLM will further consult with the affected tribe(s) on the appropriate distance between the project and the gravesite.

BLM will share data with the Northern Cheyenne's THPO from cultural resource investigations associated with CBNG development. This information could then be used for tribal educational and outreach efforts.

When tribally affiliated properties would be affected by CBNG developments, BLM may require monitoring to be conducted by a tribal monitor. Under most normal circumstances, cultural resource work does not require a monitor.

Avoidance is BLM's standard policy for not adversely affecting historic properties. All cultural properties that cannot be avoided by construction activities will be evaluated for their eligibility to the National Register of Historic Places. BLM will consult with the Northern Cheyenne Tribe when properties are evaluated as Traditional Cultural Properties.

BLM's report standards are found in the BLM's 8100 Manual and Handbooks and are augmented by current professional standards. When reports contain data that would be of interest to the Tribe or the public, BLM may require the operator's consulting archaeologist to prepare a public narrative of their work.

BLM will provide the Tribe a copy of BLM's annual cultural resources report, which will summarize CBNG related cultural resource activities.

CBNG - The interests of the Tribe will be considered prior to authorization of federal production that may potentially drain Reservation CBNG resources. In establishing well spacing on federal lands, protection against drainage of Reservation CBNG resources will be a priority. If monitoring or reservoir modeling indicates drainage of CBNG resources is occurring, the BLM will enter negotiations with the operator and the Tribe to protect the rights of the Tribe. BLM requirements could include reducing production rates, shutting in the well, establishing communitization agreements, or requiring the operator to pay compensatory royalty.

BLM will use its existing regulations (43 CFR 3160) to require operators to provide the production data and analysis needed for BLM to determine if drainage of Reservation CBNG is occurring.

Operators will be required to provide an analysis prior to field development in areas of potential drainage of Reservation CBNG resources. In this analysis, operators must demonstrate that CBNG production is not likely to drain Reservation CBNG resources.

Specific evaluations will be required for CBNG wells drilled in areas that could potentially drain Reservation CBNG. Such evaluations would include modeling of CBNG reservoirs to calculate the potential for drainage of Reservation CBNG. All evaluations would be made available to the Tribe.

Operators may be required to provide updated information for reservoir modeling during production in order to monitor the potential for drainage of CBNG resources from the Reservation.

The BLM will work with the MBOGC under its existing Memorandum of Understanding to protect Tribal resources that may be affected by state or private permits or establishment of CBNG spacing units adjacent to Tribal resources. In order to protect the rights of the Tribe, the BLM will represent the Tribe at MBOGC hearings that set spacing units for the production of CBNG resources, including state and private lands.

Vegetation - The operator will be responsible for the training of employees in noxious weed awareness and prevention. Training would be one required component of the operator's noxious weed prevention plans.

Water - The 14-mile buffer zone proposed by the Northern Cheyenne Tribe would not be applied. This buffer zone is based on a theoretical maximum drawdown radius assuming uniform geologic and hydrologic conditions in a 2D model. Groundwater modeling that accounts for geologic faults, irregularities, and vertical leakage was prepared for the Final EIS. The modeling predicts a drawdown radius of 4 to 5 miles (in the Hanging Woman Creek drainage). These results more accurately represent anticipated site conditions and are consistent with the DNRC, Water Resources Division, Technical Advisory Committee recommended minimum of 3-miles.

To protect Reservation groundwater the operator will be required to conduct geologic and hydrologic evaluations for CBNG production wells to be located in areas that may have hydrologic connectivity with Reservation groundwater. Groundwater modeling that accounts for geologic faults, irregularities, and vertical leakage was prepared for the Final EIS. The modeling predicts a drawdown radius of 4 to 5 miles. When the site-specific studies determine there will be an effect to Reservation groundwater, the operator must develop and apply measures to prevent the impact of groundwater withdrawal and monitor the effectiveness of such measures.

The Powder River Basin Controlled Groundwater Area standards will be enforced by BLM on federal leases. In addition, the BLM, as a member of the technical advisory committee administered by the DNRC Water Management Division, would make recommendations to the MBOGC on the Tribe's behalf regarding monitoring requirements and mitigation of impacts.

BLM will require operators to modify federal CBNG production if monitoring shows production is affecting groundwater on the Reservation. BLM requirements could include reducing production rates, shutting in the well, or requiring the operator to provide compensation to the Tribe. The operator must mitigate the impact of groundwater withdrawal prior to resuming full production.

For CBNG wells located in aquifers with hydrologic connectivity to Reservation groundwater, the operator will be required to conduct a geologic and hydrologic evaluation prior to field development that identifies the potential for CBNG production to affect Reservation groundwater resources.

CBNG PODs must include measures to prevent the impact of CBNG production on Reservation groundwater. Where there is a potential for affecting Reservation groundwater, monitoring plans would be developed by the operator and approved by BLM in consultation with the Tribe. When determined necessary by BLM, operators will be required to install monitoring wells to verify the effect of CBNG production on Reservation groundwater resources. Monitoring wells placed on the Reservation would be subject to approval by the Tribal government. All results of groundwater monitoring would become public information.

Specific operator monitoring plans must include a hydrologic evaluation; describe the well location(s), aquifer(s) monitored, parameters monitored, baseline data acquisition, and response actions to adverse monitoring results.

Operators will be required to monitor the impact of CBNG production on groundwater throughout the well life and after closure, if necessary.

BLM may approve CBNG production upon completion of the geologic and hydrologic evaluation, and installation and equipping of any required monitoring wells.

Operators may be required to expand their monitoring plans as production continues if a decline in Reservation groundwater levels occurs that is attributable to their operations.

BLM will not approve produced water management applications until any necessary state, EPA, or Tribal permits required for water management actions are obtained.

Wildlife - The results of the WMPP will be used to adjust COAs at the APD stage. This includes measures needed to protect Reservation wildlife from the impacts of CBNG development.

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APPENDIX C

RESOURCE MONITORING

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TABLE MON - 1

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
AIR QUALITY	Gaseous and particulate critical air pollutants	area-wide	air quality modeling and ambient air samples	µg/m ³ and parts per million concentrations as (µg/m ³)	hourly to 24 hr samples as per standards	predicted or measured exceedances of National Ambient Air Quality Standards and/or Prevention of Significant Deterioration increments by MDEQ	implement additional emission controls or operating limits
	Gaseous and particulate critical air pollutants	Birney/Broadus area	ambient air samples	µg/m ³ and parts per million concentrations as (µg/m ³)	hourly to 24 hr samples as per standards	before expanded development activity	implement additional emission controls or operating limits
	Gaseous and particulate critical air pollutants	area-wide	emission inventory	lbs/hr and tons/yr	annually	continuous	require submittal of annual reports
	Cumulative compressor horsepower	area-wide	tracking	horsepower	continuous	when horsepower requirements for CBNG wells in the Montana portion of the Powder River Basin exceed 133,956	subsequent visibility modeling; if it indicates unacceptable impacts would occur at a future point in the Powder River Basin development, the modeling work would include mitigation scenarios
CLIMATE	Climate	areas affected by land disturbance	RAWS or COOP Stations	bulk precipitation	daily during the growing season	extremes affecting revegetation operations	
CULTURAL RESOURCES	Area of Critical Environmental Concern (ACECs)	area-wide	site inspection	site, surrounding area	annually	any noticeable trend indicating increased disturbance—natural or human-caused	increase frequency of monitoring to ensure ACEC values are not being impaired

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TABLE MON - 1

Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
CULTURAL RESOURCES (continued)	20% of National Register eligible sites	CBNG emphasis area	site inspection	site, surrounding area	annually	impacts to sites from unauthorized uses affecting qualities that make sites eligible for listing on National Register of Historic Places	halt activity affecting eligible sites. Increase monitoring of nearby eligible sites. Evaluate damage to sites.
	random sample of 50 sites	CBNG emphasis area	site inspection	site, surrounding area	annually	any noticeable trend indicating increased disturbance—natural or human-caused	increase frequency and number of sites monitored if sites are being impacted by CBNG-related activities. Evaluate damage to sites.
HYDROLOGY	surface water quality and quantity	Regionally at the monitoring stations identified by the IWG (see 2005 report in the ROD Appendix C.)	as determined by the IWG	as determined by the IWG	as determined by the IWG	exceedance of any parameter above applicable surface water quality standards, or the identified BLM thresholds	report exceedances to MDEQ, who will determine cause, and take appropriate actions If monitoring indicates that BLM thresholds have been met or exceeded, untreated discharge of CBNG water from federal well will no longer be allowed upstream from that station. Previous approvals may be modified.

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
HYDROLOGY (continued)	groundwater drawdown	regionally at locations determined by the IWG (see Technical Advisory Committee report later in this Appendix.)	monitoring wells would be finished in bedrock units; especially coal seams expected to be developed for CBNG.	depth to water reported in hundredths of feet	depth to water measurements will be made approximately monthly to establish an initial baseline. Measurements will be made approximately quarterly thereafter, unless a greater frequency is determined to be necessary. Monitoring will continue until at least 80% recovery of static water level has been achieved	a 20-foot decrease in static water level from seasonally adjusted mean static water level (determined from baseline data)	if falling water levels are determined to be caused by CBNG activity, operators must offer water well mitigation agreements to all landowners with water sources in the defined drawdown area (20 feet or greater drawdown) of their development. Hydrologic barriers, such as injection wells, may be an option in some cases to prevent drainage of Native American gas and water resources.
	groundwater quality and quantity	alluvial groundwater would be monitored in stream valleys topographically down gradient from CBNG surface discharge points	monitoring wells would be finished in the alluvium. Depth to water measurements and water quality parameters, including but not limited to pH, EC, water temperature, common ions (Na, Mg, Ca, K, HCO ₃ , Cl, SO ₄), and would be obtained.	standard quantitative measurements of water quality and static water level (mg/l, °C, µS/cm, and hundredths of feet)	depth to water measurements will be made approximately monthly to establish an initial baseline. Depth to water will then be collected approximately quarterly thereafter. Water quality samples will be taken approximately annually, unless more frequent monitoring is needed. Monitoring will continue until at least 80% recovery of static water level has been achieved	A change in groundwater chemistry that affects its class of use Rise in static groundwater levels of 5-feet or more that may cause impacts at the ground surface	if impacts are determined to result from CBNG development, direct discharge of CBNG water into waterways in the watershed may be discontinued until modified Water Management Plans are submitted and approved

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
<p>HYDROLOGY (continued)</p>	<p>groundwater quality and quantity</p>	<p>operators will install monitoring wells adjacent to impoundments</p>	<p>a monitoring well will be installed within the first permeable unit and within the first groundwater encountered, up to 50 feet total depth, to determine effectiveness of infiltration or if evaporation basins are leaking a water quality sample of the first groundwater (if encountered) will be collected to determine class of use.</p>	<p>depth to water (feet to water reported in hundredths of feet). Water quality samples will be collected if rises in groundwater are observed or if water is observed in a previously dry zone.</p>	<p>wells will be gauged monthly for the first year and quarterly thereafter unless a rise is observed. If a rise is observed monitoring will be monthly. Water quality samples will be collected quarterly while water levels are 1 foot or more above baseline. Monitoring will continue at least until the end of CBNG water discharge into the impoundment</p>	<p>a rise of 1-foot or more in static water levels above seasonally adjusted mean water levels or a change in the class of use in the groundwater</p>	<p>Any change in class of use will be reported to MDEQ. Operators may be required to install additional monitoring wells further downgradient, or discharge into impoundments may be required to cease until a revised Water Management Plan is submitted and approved</p>
	<p>springs</p>	<p>a network of springs which are determined to be fed by the regional flow system will be identified along coal outcrops in the CBNG development area</p>	<p>spring discharge and water quality parameters, including but not limited to pH, EC, water temperature, common ions (Na, Mg, Ca, K, HCO₃, Cl, SO₄), will be determined from existing springs</p>	<p>discharge (cfs), pH, EC (μS/cm), and water temperature (°C) will be determined in the field. Standard quantitative measurements of water quality also will be used (mg/l)</p>	<p>Field measurement of discharge, pH, EC, and water temperature will be determined approximately quarterly. An initial water quality sample will be collected; additional samples will be analyzed if substantial changes in the field parameters are observed.</p>	<p>a 50% decrease in spring discharge below seasonally adjusted mean (determined in the first 3 years), or a significant change in water quality that affects its beneficial use</p>	<p>if decreased spring discharges or water quality are determined to result from CBNG activity, operators must offer spring mitigation agreements to landowners who use the spring. If impacted spring is identified as important wildlife habitat, adaptive management practices will be used at the landscape level to improve spring ecosystems. Hydrologic barriers, such as injection wells, may be an option in some cases to prevent drainage of Native American gas and water resources.</p>

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
INDIAN TRUST	groundwater	adjacent to the Northern Cheyenne and Crow reservations	sampling of dedicated monitoring wells in the zones of extraction and zones above and below the expected activity—wells are to be placed in the affected areas to areas unaffected by management activities	standard quantitative measurements of water quality— measurement of depth in feet	field measurements 6 times yearly prior to production activities, continue throughout the activity period and for the duration of 95% of the recovery of pre-development conditions	where site-specific studies show a potential to affect Reservation groundwater, the Tribe would be consulted as to appropriate protection measures and if continuous monitoring shows a drawdown of groundwater that is attributed to CBNG production	BLM would require the operators to modify federal CBNG production. Mitigation options include reducing production rates, shutting in the well or wells, establishing a hydrologic barrier, or providing compensation to the affected Tribe.
			monitoring wells will be established near the mouth of streams that contain alluvium	measurements of depth in feet	water level measurements will be taken monthly prior to production activity and during the development - water quality measurements will be taken 4 times per year	a 20% rise in the water table above its seasonally adjusted elevation, or a 2 unit increase in the SAR value	Discontinuance of CBNG evaporative ponds in that watershed, or require ponds to be lined
	natural gas	area-wide	drainage evaluation	radius of drainage	as needed	gas drainage where radius of drainage affects Indian Minerals	a communitization agreement, requiring operators to reduce production rates, shut-in wells, change spacing, or establish a hydrologic barrier to protect the Indian minerals from drainage

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
LANDS AND REALTY	ROWs	area-wide	site inspection	ROW	minimum of once during or for construction within 2 years of issuance for MLA reviews and within 5 years of issuance for FLPMA reviews; then in the 20 th year after issuance and every 10 years thereafter	nonuse of ROW or violation of ROW grant stipulations	require compliance with ROW grant stipulations with possible suspension and/or termination for noncompliance or nonuse
MINERALS Oil and Gas	Geophysical Notice of Intent	area-wide	line or area inspection	operations conducted in compliance with Notice of Intent	minimum of once during operations	violation of regulations, change from approved Notice of Intent, unnecessary or undue degradation	require operator to follow Notice of Intent
	Geophysical Notice of Completion	area-wide	line or area inspection	operations conducted in compliance with Notice of Completion	minimum of once during plugging, once after reclamation	violation of regulations, change from approved Notice of Completion unnecessary or undue degradation	require operator to correct violation
	APD	area-wide	site inspection	operations conducted in compliance with APD	minimum of once and as necessary	violation of regulations, change from approved APD	issue an incidence of noncompliance with timeframe to correct or shut-in drilling operations
	Sundry Notice	area-wide	site inspection	operations conducted in compliance with Sundry Notice	as necessary	violation of regulations, change from approved Sundry Notice unnecessary or undue degradation	issue an incidence of noncompliance with timeframe to correct

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
MINERALS Oil and Gas (continued)	natural gas	area-wide	drainage evaluation	radius of drainage	as needed	if gas drainage is occurring, there would be a communitization agreement, drilling of protective wells on federal lands, or different spacing, to protect the federal minerals from drainage	certified letter to lessee requiring protection, compensation royalty, relinquishment
	produced water disposal	area-wide	site inspection	operations conducted in compliance with permit	minimum of once annually or as necessary	violation of regulations, change from approved permit, unnecessary or undue degradation	issue an INC with timeframe to correct or shut-in operations
	spill	area-wide	site inspection	area cleaned up, reclaimed	minimum of once after event and as necessary	violation of regulations, change from approved permit, unnecessary or undue degradation	issue an INC and operator cleanup required
	plugged, abandoned wells	area-wide	site inspection	operations conducted in compliance with permit	minimum of once during operations	violation of regulations, change from approved permit, unnecessary or undue degradation	issue an INC correction required
	abandoned well reclamation	area-wide	site inspection	operations conducted in compliance with permit	minimum of once and as necessary until reclamation complete	violation of regulations, change from approved permit, unnecessary or undue degradation	issue an INC/certified letter requiring proper operator rehabilitation

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
PALEONTOLOGY	significant paleontological localities, ACECs	area-wide	inspection of area disturbed	degradation caused by human or natural activities that lead to loss of significant fossil resources	once yearly	loss or damage to significant fossil resources	closure of areas surrounding site to prevent further disturbance to significant fossil resources
RECREATION	general recreation use	area-wide with emphasis on dispersed use of undeveloped recreation sites	area inspections to look for vandalism, resource abuse, and install photo points	site condition	biannual (June and October); photograph annually	user conflicts, resource degradation, or safety hazards	avoid location of oil and gas facilities in undeveloped recreation sites having concentrated use, and coordinate timing of exploration activities to minimize conflicts during peak periods of use
	concentrated recreation use	special recreation management areas, sites with recreation facilities	visitor registration, traffic counters estimates, photo points	visitor days, site condition	visitor registration boxes, counters checked once monthly at the minimum, weekly or biweekly during heavy use periods, photograph annually	increased visitor use per year or sustained use that requires additional or improved facilities	avoid location of oil and gas facilities in developed recreation sites having concentrated use, and coordinate timing of exploration activities to minimize conflicts during periods of use
		area-wide commercial, competitive activities	administrative review, site inspection for complexes with permit stipulations	permit stipulations, resource condition success of reclamation	on site during competitive events, periodic site inspection for commercial operations, administrative review annually	irreparable resource damage, compromise of visitor safety, recreation experience	avoid location of oil and gas facilities in areas where know commercially permitted recreation activities are occurring and coordinate timing of exploration activities to minimize conflicts during peak periods of use

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
SOILS	soil erosion, uplands	area-wide where management activities are occurring or expected to occur	visual observation and surveyed erosion pins	soil loss in tons per acre	site will be visually examined quarterly. Where erosion is deemed excessive, measurements of site characteristics will be taken to determine rate of soil loss.	visual evidence of rill, gully, or sheet erosion. Loss of soil exceeding 10 tons per acre	report exceedance to BLM, MDEQ, or EPA. If caused by CBNG discharge or activities, enforcement action will be taken.
	soil erosion, streambank, and floodplain	area-wide along rivers and tributaries where management activities are occurring or expected to occur	visual observation and surveyed erosion pins	area effected in square feet or acres	site will be visually examined quarterly. Where streambank erosion is deemed excessive, measurements of site characteristics will be taken to determine soil loss.	a 10% increase in streambank loss	report exceedance to BLM, MDEQ, or EPA. If caused by CBNG discharge or activities, enforcement action will be taken.
	soil salinization	area-wide where management activities are occurring or expected to occur	visual observation, measurement of soil characteristics such as pH, EC, SAR	area effected in square feet or acres	site will be visually examined quarterly. Where salinity levels show an increase because of vegetation or soil effects, measurements of site characteristics will be taken to determine salinity levels.	a 20% increase in conductivity levels	report exceedance to BLM, MDEQ, or EPA. If caused by CBNG discharge or activities, enforcement action will be taken.
	compaction	areas affected by extraction activities	penetrometer or visual inspection	pounds per square inch	1 to 2 times yearly	10% increase in density	limit or block access to compacted sites

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
VEGETATION							
	ecological status	areas affected by disturbance through the pre-production, production, post-production processes	ecological site method in key areas	composition, production compared to potential natural community for each site	pre-development ecological status baseline data	status is reduced by 15% or a drop in class	ecological site integrity will be altered to increase status of ecological site index by 15% or an increase in ecological class
	trend	areas affected by disturbance through the pre-production, production, post-production processes	any suitable methods as described in TR 4400-4 or the National Range Handbook	apply to the technique selected, may include number of individuals per unit area, percent cover, percent frequency, or percent species composition	every 3 to 5 years after the collection of ecological status baseline data	a change in the direction of trend away from management	measure implementation of action put forth to mitigate reduction of ecological status using techniques listed in monitoring appendix for vegetative trend
Noxious Weeds	trend	areas affected by disturbance through the pre-production, production, post-production processes	Montana Noxious Weed Standards	acres, plants per square feet, species	yearly (through post production reclamation)	10% increase beyond objectives for the area/new species occurrence or infestation	operators will be required to contain and suppress noxious weeds. Conservation measures will be required in noxious weed sites to decrease population of noxious weeds and increase population of native plant community

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
Riparian/Wetlands	condition, trend, age class structure, streambank alteration	any federal action (including split estate)	photo plot, estimate key areas by sight inspection, Cole Browse Method, Key Forage Method, other methods found in Technical References (TR4400-3, TR4400-4, TR4400-7, TR1737-3, TR1737-8, TR1737-9) including MRWA (Montana Riparian Wetland Association) Riparian Inventory for areas not previously inventoried MRWA PFC on inventory areas	percent species composition, percent in each age class, percent utilization, height, percent of the streambank	based on activity plan schedule- a minimum of once every 5 years	trend away from objective or when no improvement occurs, in unsatisfactory habitat condition/functioning at risk with downward trend	oil and gas operators will be required to alter activities in order to provide environmental factors for increasing functionality or habitat conditions of the streams/wetlands. Oil and gas operators may be required to develop replacement wetlands in order to compensate for overall loss of wetlands according to Section 404 of Clean Water Act.
Special Status and Threatened and Endangered (T&E) Plant Species	condition	areas affected by disturbance through the pre-production, production, post-production processes	Montana Natural Heritage Program and visual inspection	presence and condition	once during the growing season, at a minimum	downward trend in plant condition caused by oil and gas activities	oil and gas operators will be required to alter their activities in order to benefit environmental factors required by special status or T&E plant species
WILDLIFE (see also Wildlife Monitoring and Protection Plan in Appendix A)							
Aquatic Biological Diversity (flora/fauna)	population diversity	intermittent/perennial streams associated with produced water discharge	stream sampling	diversity index	every 3 years	downward trend overall stream biological diversity	reduction or elimination of untreated produced water into drainage or watershed
Big Game	seasonal habitat use	project area plus 1-mile buffer	air/ground field inspection	occupancy	annually	downward trend in habitat occupancy caused by oil and gas activity	extension of timing stipulations or COAs, off-site habitat management or enhancement

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
Black-footed Ferret	occupancy	prairie dog towns larger than 80 acres located within 0.5 mile of proposed activity	ground inspection	occupancy	determined on a site-specific basis in coordination with FWS	habitat decline or prairie dog fatalities caused by oil and gas activities - occupancy of black-footed ferrets would be managed in a Black-Footed Ferret Management Plan	no incidental take; reinitiate consultation if new information shows black-footed ferrets may be effected
Burrowing Owl	active nest locations	specific project area plus 0.5-mile buffer (within active prairie dog town)	ground inspection	occupancy	twice yearly (June to August)	human-caused disturbance to owls related to oil and gas activities such as vandalism and harassment	extension of timing and/or increase of distance from nest; stipulations or COAs
Grey Wolf	occupancy	Billings RMP area	air/ground field surveys	number of sitings	annually until reintroduction objectives are met	1- to 3-year downward trend in production or occupancy	no incidental take; reinitiate consultation if new information shows it may be effected
Migratory Non-game Birds	occupancy	project area plus 0.25-mile buffer	ground observations	occupancy	periodically	documented fatalities caused by oil and gas activities	refinements in infrastructure planning (project plans), implementation of travel corridors, enhanced reclamation standards, and off-site habitat management or enhancement

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
Mountain Plover	active nest locations	specific project area plus 0.5-mile buffer (within areas less than 4-inch average vegetation height and prairie dog towns)	ground inspection	occupancy	twice yearly (April 15 to June 30)	human-caused disturbance to mountain plovers related to oil and gas activities such as vandalism and harassment	BLM received an exemption from the prohibitions of Section 9 of ESA regarding take by agreeing to terms and conditions in biological opinion (BO). Incidental take of habitat and individuals allowed up to level stated in BO. Take must be monitored. Reinitiation of Section 7 will occur before allowable take is exceeded.
Prairie Dog	active prairie dog colony	specific project area plus 0.5-mile buffer	air/ground inspection	occupancy	annually	documented prairie dog fatalities caused by oil and gas activities	establishment of no surface occupancy zones and/or establishment of timing restrictions within prairie dog towns
Raptors	active nest locations (excluding burrowing owls)	project area plus 1-mile buffer	air/ground field inspection	number of nests	every 3 years	downward trend in occupancy	extension of timing and/or increase in distance from nest; stipulations or COAs
	raptor productivity (including Burrowing owl)	active nests within 1-mile of project disturbance plus 1-mile buffer	air/ground field inspection	nest success/failure species productivity	annually	downward trend in nest success, overall productivity	extension of timing and/or increase in distance from nest; stipulations or COAs
	raptor productivity-selected undeveloped comparison area	project area	air/ground field inspection	nest success/failure species productivity	every 5 years	information used as support to determine downward trend	extension of timing and/or increase in distance from nest; stipulations or COAs

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Element	Item	Location	Technique	Unit of Measure	Frequency and Duration	Remedial Action Trigger	Management Options
WILDLIFE							
(continued)							
Sage Grouse	sage grouse lek location	CBNG overall project area	aerial field inspection	number, location of leks	every 5 years	downward trend in habitat occupancy	extension of timing and/or increase in distance from lek; stipulations or COAs; off-site habitat management/mitigation
	sage grouse lek attendance	specific project development areas plus 2-mile buffer	air/ground field inspection	number of males/lek	annually	downward trend in lek attendance (compared to control LEK)	extension of timing and/or increase in distance from lek; stipulations or COAs; off-site habitat management/mitigation
	sage grouse winter habitat	project area plus 2 mi. buffer	air/ground field inspection	occupancy	annually	downward trend in habitat occupancy or quality caused by oil and gas activities	extension of timing and/or increase in distance from lek; stipulations or COAs; off-site habitat management/mitigation
Special Status Species (BLM and Montana Natural Heritage Program lists)	occupancy	specific project area plus 1-mile buffer	ground field inspection	occupancy	annually at a minimum via species habitat requirements	downward trend in habitat occupancy or quality caused by oil and gas activities	establishment of timing and/or distance from breeding area through stipulations or COAs
	Threatened, Endangered and Proposed Species other than previously described	occupancy, productivity	CBNG overall project area	air/ground field inspection	occupancy	determined on a site-specific basis in coordination with FWS	habitat decline or fatalities caused by oil and gas activities; occupancy of species would be managed in a site-specific Management Plan

Prepared in cooperation with the Montana Department of Environmental Quality

Surface-Water Monitoring in Watersheds of the Powder River Basin, 2005

Powder River Basin Interagency Working Group

The Powder River Basin (PRB) is a geologic structural basin that contains an extensive natural gas resource associated with regional coal deposits. This coalbed natural gas (CBNG) is located beneath millions of acres of private and public land in southeastern Montana and northeastern Wyoming (fig. 1). The PRB Interagency Working Group (IWG) was established in June 2003 as a forum to identify, discuss, and find solutions to issues of common concern to government agencies involved in permitting and monitoring CBNG development. The PRB IWG is led by the Bureau of Land Management (BLM) and is composed of managers and technical staff from local, State, tribal, and federal government agencies with land management, conservation, or regulatory responsibilities in the PRB, as well as agencies like the U.S. Geological Survey (USGS) that provide technical support.

The mission of the PRB IWG is to: (1) provide for environmentally sound energy development, (2) develop coordinated and complementary best management practices, guidelines, and programs related to CBNG activities to conserve and protect resources, (3) monitor the impact of CBNG activities and assess the effectiveness of mitigating measures, (4) develop and integrate the databases and scientific studies needed for effective resource management and planning, and to make that information readily available, and (5) promote compatibility in the application of each agency's mission.

In order to more effectively address the technical issues presented by CBNG development, Task Groups that are staffed by technical specialists from the member agencies of the PRB



IWG were formed to address specific resource issues. The Task Groups include Air, Aquatics, Water, and Wildlife. More information about the PRB IWG and Task Group activities is available at URL <http://www.wy.blm.gov/bfo/prbgroup/index.htm>.

Water Task Group

Substantial volumes of ground water are extracted from coalbeds in order to produce CBNG. The removal of ground water from aquifers and use or disposal of produced water on the surface have the potential to cause environmental impacts. One objective of the Water Task Group is to develop and implement monitoring plans for surface water and ground water at local and regional scales. This monitoring will help agencies make more informed decisions regarding CBNG permitting, and allow for dissemination of information to the public. This factsheet summarizes the surface-water-monitoring plan developed by the Water Task Group and describes the surface-water monitoring accomplished during 2005.

Surface-Water-Monitoring Plan

The surface-water-monitoring plan is a proposed sampling network that is generally composed of sites where PRB IWG member agencies have been conducting surface-water monitoring. Sampling sites may be located on mainstems or selected tributaries in each watershed (fig. 1, table 1). Proposed sampling frequencies vary with stream type and constituent class (table 2). The constituent classes recommended for monitoring include:

- Streamflow
- Field measurements—pH, dissolved oxygen, specific conductance, and temperature
- Major ions—dissolved calcium, magnesium, potassium, sodium, alkalinity, chloride, fluoride, sulfate, and silica; dissolved solids; and sodium-adsorption ratio
- Nutrients—total and dissolved nitrogen and phosphorus species
- Trace elements (primary)—total and dissolved aluminum, arsenic, barium, beryllium, iron, manganese, and selenium
- Trace elements (secondary)—total and dissolved cadmium, copper, chromium, lead, nickel, and zinc.
- Suspended sediment

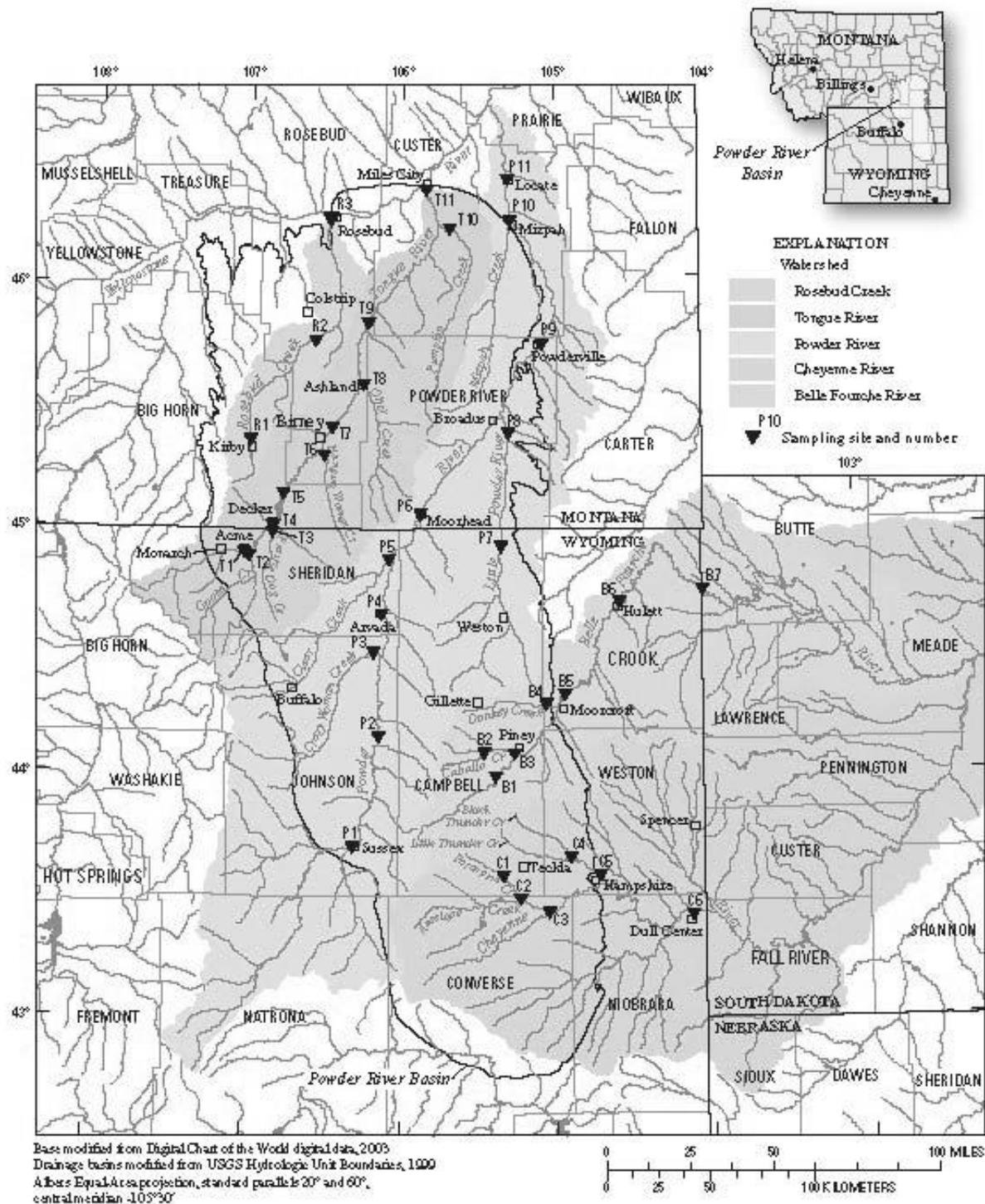


Figure 1. Location of sampling sites proposed in the Water Task Group's surface-water-monitoring plan for the Powder River Basin.

Table 1. Sampling sites proposed in the Water Task Group's surface-water-monitoring plan for the Powder River Basin.

Map number	U.S. Geological Survey site number	Site name	Stream type
R1	06295113	Rosebud Creek at reservation boundary near Kirby, Mont.	Mainstem
R2	06295250	Rosebud Creek near Colstrip, Mont.	Mainstem
R3	06296003	Rosebud Creek at mouth, near Rosebud, Mont.	Mainstem
T1	06299980	Tongue River at Monarch, Wyo.	Mainstem
T2	06305700	Goose Creek near Acme, Wyo.	Tributary
T3	06306250	Prairie Dog Creek near Acme, Wyo.	Tributary
T4	06306300	Tongue River at State line near Decker, Mont.	Mainstem
T5	06307500	Tongue River at Tongue River Dam, near Decker, Mont.	Mainstem
T6	06307600	Hanging Woman Creek near Birney, Mont.	Tributary
T7	06307616	Tongue River at Birney Day School Bridge, near Birney, Mont.	Mainstem
T8	06307740	Otter Creek at Ashland, Mont.	Tributary
T9	06307830	Tongue River below Brandenburg Bridge, near Ashland, Mont.	Mainstem
T10	06308400	Pumpkin Creek near Miles City, Mont.	Tributary
T11	06308500	Tongue River at Miles City, Mont.	Mainstem
P1	06313500	Powder River at Sussex, Wyo.	Mainstem
P2	06313605	Powder River below Burger Draw, near Buffalo, Wyo.	Mainstem
P3	06316400	Crazy Woman at Upper Station, near Arvada, Wyo.	Tributary
P4	06317000	Powder River at Arvada, Wyo.	Mainstem
P5	06324000	Clear Creek near Arvada, Wyo.	Tributary
P6	06324500	Powder River at Moorhead, Mont.	Mainstem
P7	06324970	Little Powder River above Dry Creek, near Weston, Wyo.	Tributary
P8	06325500	Little Powder River near Broadus, Mont.	Tributary
P9	06325650	Powder River near Powderville, Mont.	Mainstem
P10	06326300	Mizpah Creek near Mizpah, Mont.	Tributary
P11	06326500	Powder River near Locate, Mont.	Mainstem
C1	06364300	Porcupine Creek near Teckla, Wyo.	Tributary
C2	06364700	Antelope Creek near Teckla, Wyo.	Tributary
C3	06365900	Cheyenne River near Dull Center, Wyo.	Mainstem
C4	06375600	Little Thunder Creek near Hampshire, Wyo.	Tributary
C5	06376300	Black Thunder Creek near Hampshire, Wyo.	Tributary
C6	06386500	Cheyenne River near Spencer, Wyo.	Mainstem
B1	06425720	Belle Fourche River below Rattlesnake Creek near Piney, Wyo.	Mainstem
B2	06425800	Caballo Creek near Gillette, Wyo.	Tributary
B3	06425900	Caballo Creek at mouth, near Piney, Wyo.	Tributary
B4	06426400	Donkey Creek near Moorcroft, Wyo.	Tributary
B5	06426500	Belle Fourche River below Moorcroft, Wyo.	Mainstem
B6	06428050	Belle Fourche River below Hulett, Wyo.	Mainstem
B7	06428500	Belle Fourche River at Wyoming-South Dakota State line	Mainstem

Table 2. General sampling strategy proposed in the Water Task Group's surface-water-monitoring plan for the Powder River Basin.

Stream type	Sampling frequency	Constituent class
Mainstem	Continuous	Streamflow
	12 times per year	Field measurements
	12 times per year	Major ions
	2 times per year	Nutrients
Tributary	12 times per year	Trace elements, primary
	2 times per year	Trace elements, secondary
	12 times per year	Suspended sediment
	Continuous	Streamflow
Tributary	6 times per year	Field measurements
	6 times per year	Major ions
	2 times per year	Nutrients
	6 times per year	Trace elements, primary
	2 times per year	Trace elements, secondary
	6 times per year	Suspended sediment

Monitoring Summary, 2005

Because of funding shortfalls for surface-water monitoring, only part of the proposed sampling in the surface-water-monitoring plan was accomplished during 2005 (table 3). For the sites where the sampling was partially completed, either the sampling frequency was less than the proposed sampling frequency or not all of the constituent classes were analyzed. The Tongue River watershed was the only watershed where the sampling proposed in the surface-water-monitoring plan was fully completed.

Several of the agencies that participate on the PRB IWG contributed funding for monitoring and reporting, including:

- BLM,
- Montana Department of Environmental Quality,
- Montana Department of Natural Resources and Conservation,
- Northern Cheyenne Tribe,
- U.S. Environmental Protection Agency,
- USGS,
- Wyoming Department of Environmental Quality, and the
- Wyoming State Engineer's Office.

Streamflow data and water-quality samples were collected by USGS personnel using standard USGS field methods (<http://water.usgs.gov/owq/FieldManual/>). Samples were analyzed at the USGS National Water Quality Laboratory in Lakewood, Colorado.

Table 3. Monitoring accomplished for surface-water-monitoring plan during 2005.

●, completed; ○, partially completed; and ◯, not completed.]

Map number	Stream-flow	Field measurements	Major ions	Nutrients	Trace elements, primary	Trace elements, secondary	Suspended sediment
R1	●	●	●	●	●	○	●
R2	●	○	○	○	○	○	○
R3	●	○	○	○	○	○	○
T1	●	●	●	●	●	●	●
T2	●	●	●	●	●	●	●
T3	●	●	●	●	●	●	●
T4	●	●	●	●	●	●	●
T5	●	●	●	●	●	●	●
T6	●	●	●	●	●	●	●
T7	●	●	●	●	●	●	●
T8	●	●	●	●	●	●	●
T9	●	●	●	●	●	●	●
T10	●	●	●	●	●	●	●
T11	●	●	●	●	●	●	●
P1	●	●	●	○	○	○	○
P2	○	○	○	○	○	○	○
P3	●	●	●	●	○	○	○
P4	●	●	●	○	○	○	○
P5	●	●	●	○	○	○	○
P6	●	●	●	●	●	●	●
P7	●	●	●	●	○	○	○
P8	○	●	●	●	●	●	●
P9	○	○	○	○	○	○	○
P10	○	○	○	○	○	○	○
P11	●	●	●	●	●	●	●
C1	●	●	●	○	○	○	○
C2	○	●	●	○	○	○	○
C3	●	●	●	○	○	○	○
C4	○	●	●	○	○	○	○
C5	○	●	●	○	○	○	○
C6	●	●	●	○	○	○	○
B1	○	●	●	○	○	○	○
B2	○	●	○	○	○	○	○
B3	○	●	●	○	○	○	○
B4	○	●	●	○	○	○	○
B5	●	●	●	●	○	○	○
B6	○	●	●	●	○	○	○
B7	●	○	○	○	○	○	○

Data Availability

Data collected as part of Water Task Group surface-water-monitoring plan are stored electronically in the USGS National Water Information System. Continuous streamflow and water-quality data are available to the public at URL: <http://waterdata.usgs.gov/nwis/>. Other USGS data for Montana and Wyoming can be accessed at <http://mt.water.usgs.gov/>, <http://tonguervermonitoring.cr.usgs.gov/>, and <http://wy.water.usgs.gov/>.

Future Work

Another objective of the Water Task Group is to interpret the surface-water-monitoring data that are collected. Until more data are collected, much of the initial interpretive analysis may focus on sites with historical data that were collected for previous monitoring programs. For example, the Powder River at Arvada, Wyoming has been sampled for many years, and relations between constituents, such as specific conductance and the sodium-adsorption ratio, have been established (fig. 2). If the monitoring data indicate that water quality is changing, managers can use adaptive management and appropriate mitigation measures to address environmental concerns.

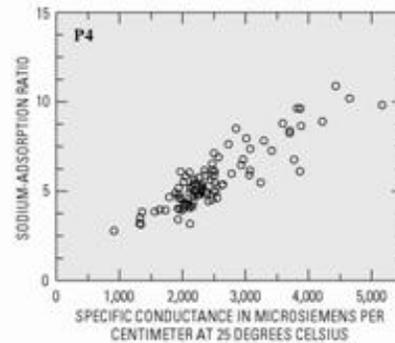


Figure 2. Specific conductance and sodium-adsorption ratio relation for the Powder River at Arvada, Wyo.

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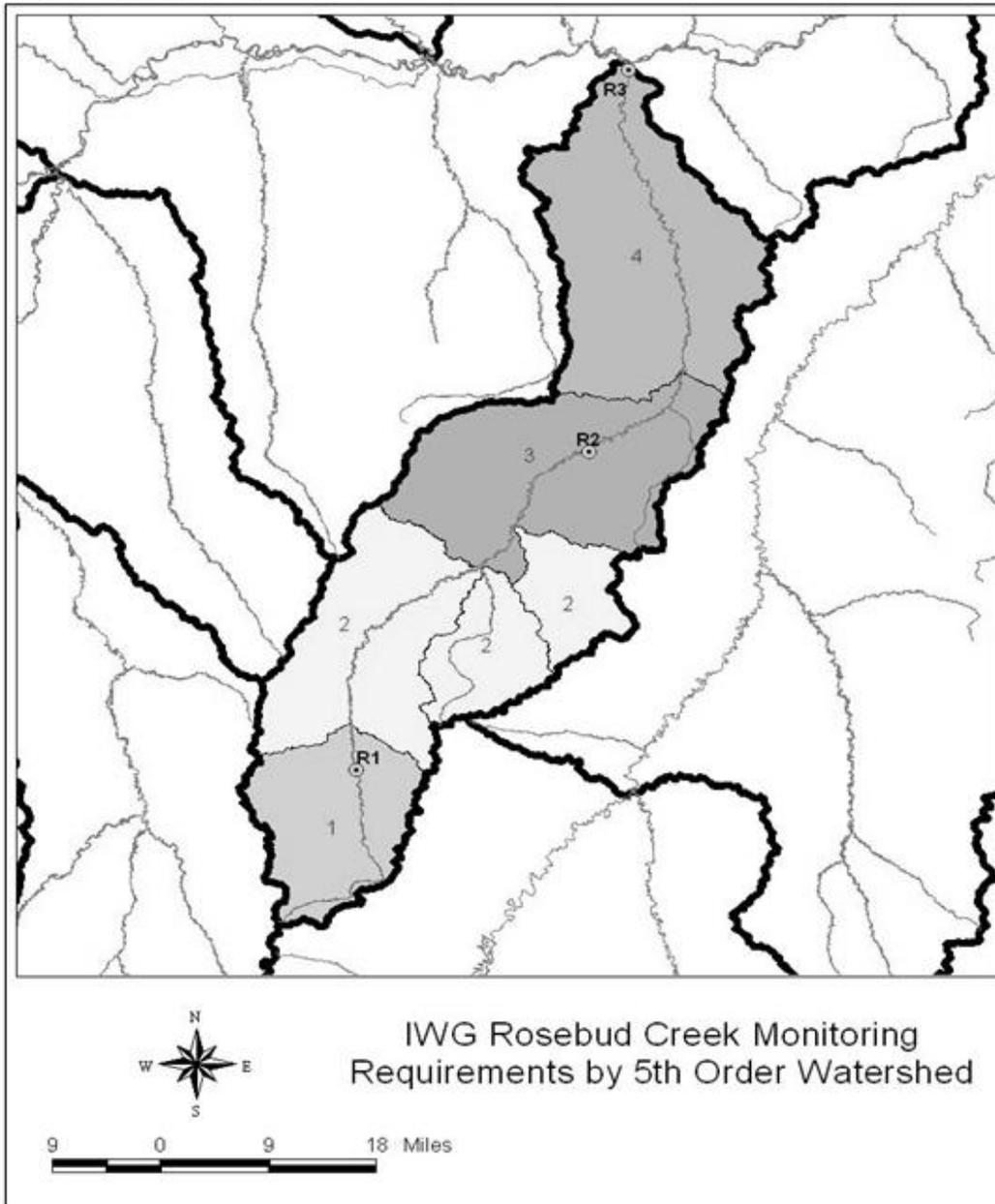
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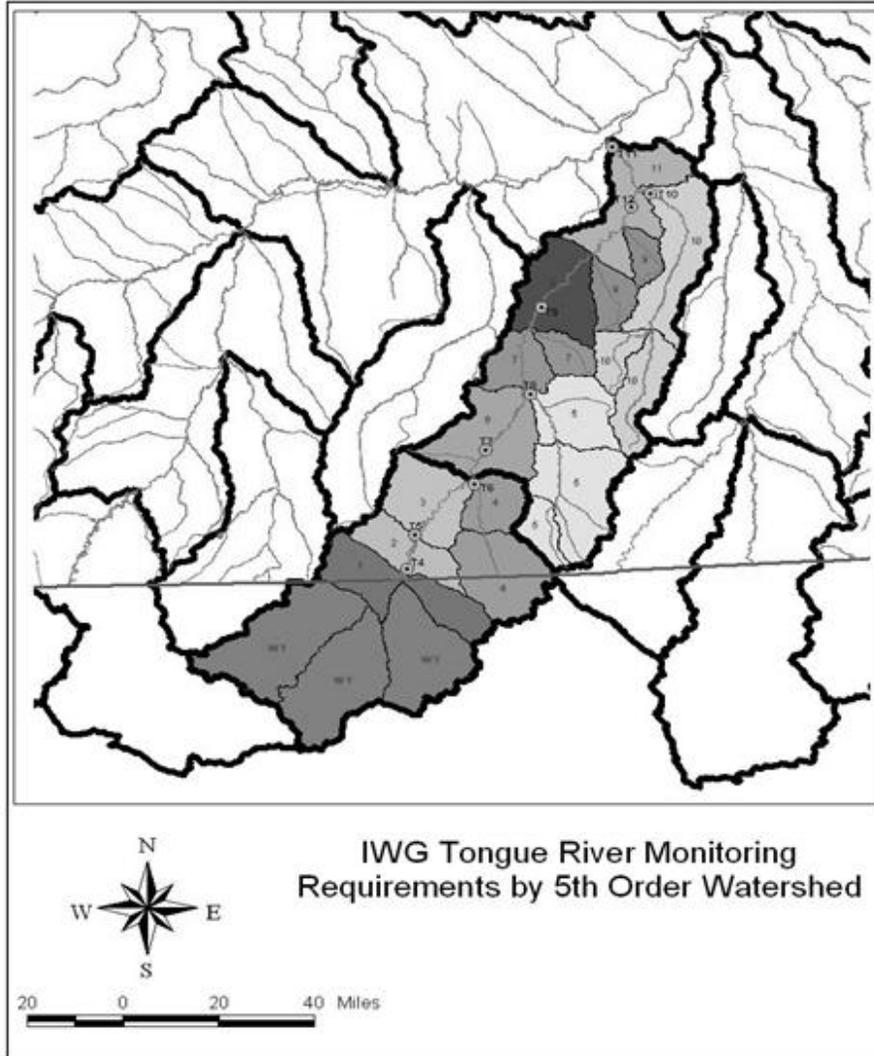
Layout by Suzanne C. Roberts

Rosebud	
Group	Monitoring Required
1	R1 or R1&R2
2	R1&R2
3	R1&R2 or R2&R3
4	R2&R3

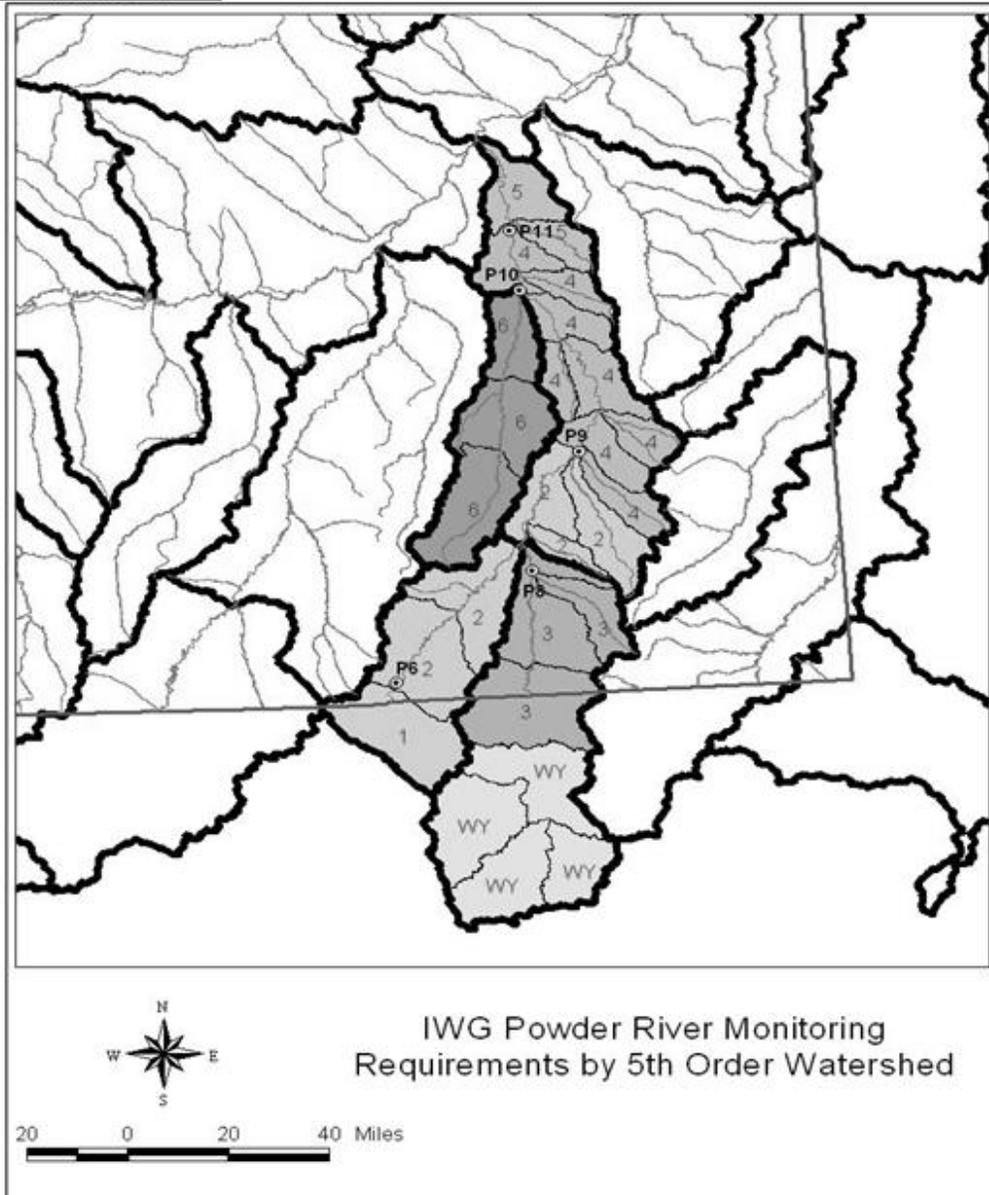


Tongue

Group	Monitoring Required
1	T4
2	T4&T5
3	T5&T7
4	T5,T6&T7
5	T7,T8,&T9
6	T5&T7 or T7&T9
7	T7&T8
8	T7&T9 or T9&T12
9	T9&T12
10	T10,T11&T12
11	T9&T12 or T12&T11



Powder	
Group	Monitoring Required
1	P6
2	P6&P9
3	P6,P8&P9
4	P9&P11
5	None
6	P9,P10&P11



REGIONAL-SCALE MONITORING OF POTENTIAL EFFECTS OF COAL BED METHANE DEVELOPMENT ON WATER RESOURCES

Prepared by the Technical Advisory Committee for the Powder River Basin Controlled Groundwater Area

INTRODUCTION

Coal bed natural gas (CBNG) is released from coal seams by pumping groundwater from coal seams to lower ground water pressures. The coal seams targeted for CBNG development in the Powder River Basin constitute important regional aquifers that provide water for domestic, livestock, agricultural, and industrial uses. Consequently, CBNG production will probably affect existing water uses in the Powder River Basin, although the extent and magnitude of effects are difficult to predict.

The Montana Board of Oil and Gas Conservation (MBOGC) requires, through its Order No. 99-99, that CBNG producers submit field development plans that include groundwater characterization and monitoring. In addition to complying with existing MBOGC rules for wildcat gas wells, CBNG producers are required to describe baseline hydrologic conditions, to inventory existing wells and springs, to offer water mitigation agreements to existing water users, and to monitor water production and shut-in water pressures within coal bed methane fields. Water mitigation agreements must be offered for a minimum of one-half mile (expanded to one mile in Mont. Code Ann. 85-2-521) from CBNG fields or greater distances if effects extend farther. The U.S. Environmental Protection Agency (EPA) requires monitoring under permits for Class V injection wells used to re-inject water produced during CBNG production. Specific requirements of Class V injection permits may include monitoring of injection pressure, injection rate and total volume at injection wells, and ground water elevations in monitoring wells.

There are no clear regulatory requirements for monitoring effects to ground water levels or spring flows outside the one-mile minimum specified by MBOGC or the area affected by Class V injection wells. Groundwater monitoring conducted by CBNG producers within and near CBNG fields, as required by MBOGC or the U.S. EPA, will not reveal broad regional effects. Therefore, regional-scale monitoring needs to be conducted outside areas of potential CBNG development to allow potential effects to be evaluated before, during, and after the period of CBNG production. In addition, the spacing of monitoring sites and the frequency of monitoring needs to be sufficient to distinguish potential effects attributed to CBNG development from potential effects attributed to other water users, and from ambient/seasonal variations in ground water levels and spring flows.

The purpose of this document is to establish design criteria for a regional-scale monitoring program intended to detect potential effects of CBNG development on existing water uses. The objectives of the regional scale monitoring program are to characterize baseline hydrologic conditions, detect changes in ground water levels and flows from springs attributable to CBNG development, and verify recovery of ground water levels after CBNG development ends. Regional-scale monitoring of wells and springs is intended to augment and compliment field-scale monitoring established under MBOGC Order No. 99-99 or EPA UIC Class V injection well permits.

Criteria for selecting locations and spacing for monitoring sites, consisting of wells and springs, and monitoring practices are proposed here to ensure that long-term monitoring is sufficiently comprehensive to detect effects that CBNG development might have on ground-water systems. Priorities are proposed to coordinate monitoring with the pace of development and the need to evaluate potential effects, and recommendations are presented for implementing monitoring and managing monitoring data. The criteria and monitoring recommendations described below are not meant as rigid rules, but rather are intended to guide qualified personnel in selecting monitoring locations and implementing monitoring that meet the objectives stated above.

The BLM, at its discretion, will administer the regional-scale monitoring program, while operators will be responsible for all in-field monitoring. The BLM has a commitment to maintaining the water monitoring of the PRB region, similar to their continued (25+ years) funding of the MBMG for coal mine water monitoring. The BLM will also partner with operators for in-field monitoring when federal gas is produced.

CRITERIA AND MONITORING PRACTICES

The portion of the Powder River Basin underlain by coals of the Tongue River Member of the Fort Union Formation is generally considered to have potential for CBNG development. Within this area, however, CBNG is less likely to be developed from coal seams with limited thickness and ambient ground water pressures; conditions that indicate limited potential for gas production. These areas, located primarily within 2 to 5 miles of coal outcrops, should be targeted for monitoring wells.

The Anderson-Dietz, Canyon, Wall, and Knobloch are the four primary coal seams within the Tongue River Member (Map 1). Separate monitoring sites located within 5 miles of the outcrops of each of these coal zones are proposed. Clusters of wells will be completed in different coal zones where outcrop areas overlap and, where present, springs will be monitored near each monitoring site. Monitoring wells will need to be completed in alluvial aquifers, in areas where water from CBNG production is discharged to surface impoundments, or in selected sandstone aquifers within coal outcrop areas or CBNG fields (when not required by MBOGC or the U.S. EPA). Springs that are current, historical, or potential sources of water but located away from established monitoring sites may also be monitored.

The focus of overall monitoring of the potential effects of CBNG development will change as CBNG fields mature, and gas production declines and eventually ends. Monitoring performed by CBNG operators that is required by MBOGC or the U.S. EPA, will gradually be discontinued as portions and eventually all of fields are played out. Abandoned producing wells or monitoring wells within CBNG fields should be incorporated into the regional monitoring program as field mature, in order to effectively monitor post-production groundwater recovery in affected areas.

The need for detailed information, and the cost of installing monitoring wells and monitoring ground water-levels and spring flows, will need to be balanced to determine the ultimate spacing between monitoring sites. At a minimum, one monitoring site will be located in every township that lies within 5 miles of the outcrop of a targeted coal. The ultimate spacing of monitoring sites might be greater, depending on site-specific conditions such as thickness of coal zone and importance of coal or sandstone aquifers, and priorities for monitoring outlined below.

Monitoring wells may be newly constructed wells, existing monitoring or water supply wells, or abandoned or transferred CBNG production wells. Ground-water levels in monitoring wells and flows of springs will need to be measured monthly to obtain a sufficient data record to characterize patterns of seasonal changes in ground-water level or spring flows, before the wells or springs can be affected by CBNG development. Typically two to three years of monitoring record is desirable. Monitoring frequency should be reduced once a sufficient record of baseline conditions is established.

PRIORITIES

The following priorities are proposed for initiating monitoring and selecting monitoring well density and frequency, to ensure that a regional ground water monitoring program is established in advance of anticipated CBNG development and before potential effects of CBNG development can occur.

- *Sequence of CBNG development*—Areas most likely to be affected by CBNG development first are the highest priority for initiating monitoring. CBNG development is expected to focus initially on the Anderson-Dietz coal zone and, therefore, monitoring near its outcrop should begin first. Records of exploration wells, pipeline plans, and identification of prospective coal zones can provide more specific information regarding the sequence of CBNG development.
- *Extent of water use*—Areas where water from coal-beds is heavily used are high priorities for monitoring. Within the general area of the Anderson-Dietz outcrop, areas of concentrated water use, such as the headwaters of Otter Creek, will need immediate and more intensive monitoring.
- *Proximity to political boundaries*—Monitoring should be established along political boundaries, specifically the Montana-Wyoming border and reservation boundaries, in order to detect potential effects from areas outside the regional monitoring network.
- *Sensitivity or hydrogeologic setting*—More intensive monitoring will be necessary where faulting or complex stratigraphy result in complex hydrogeologic settings.

- *Existing monitoring networks*—Monitoring should be re-established at monitoring wells near operating coal mines and coal mining prospects studied in the past. New monitoring well construction should focus on areas where wells are not available.
- *Land or mineral ownership*—Monitoring should be conducted at sites with stable land and/or mineral ownership. For example, federally owned land, or other land with long-term access easements provide more reliable long-term access for monitoring.

IMPLEMENTATION AND DATA MANAGEMENT

An important goal of the proposed regional monitoring program is to ensure that all monitoring data collected are made readily accessible to the public. The regional monitoring program can, and probably will, be conducted by more than one agency, with funding from various sources. However, one agency or interagency will need to coordinate or review all regional monitoring activities in order to assure that monitoring occurs where needed and to prevent duplication. Data from field-scale monitoring pursuant to MBOGC Order 99-99 and EPA UIC Class V injection well permits will need to be managed similarly. A further responsibility of the lead agency or group should be to ensure that regional- and field-scale monitoring data are compiled and made available to the public in the Ground-Water Information Center (GWIC) and the National Resource Information Systems (NRIS).

SUMMARY OF RECOMMENDATIONS

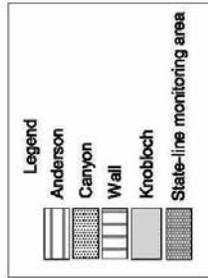
A regional-scale monitoring program is necessary to characterize baseline hydrologic conditions, to detect potential effects resulting from CBNG development, and to verify recovery of ground water levels after the period of CBNG development. The following constitutes the main elements of a regional-scale monitoring program that should accomplish these objectives:

- Monitoring is needed to augment and compliment field-scale monitoring established under MBOGC Order No. 99-99 and EPA UIC Class V injection permits.
- Groundwater levels need to be measured in wells in coals and overlying or underlying sandstone aquifers at locations near coal outcrops outside of areas of prospective CBNG development.
- Groundwater levels need to be measured in wells in alluvial aquifers in areas where water CBNG production is discharged to surface impoundments, or selected sandstone aquifers within CBNG fields.
- Flows from springs need to be monitored when they are near well monitoring sites or if they are important water sources.
- Groundwater levels need to be measured in abandoned or transferred CBNG wells as CBNG fields mature.
- Monitoring sites need to be located in every township near coal outcrops at a minimum.
- Groundwater levels in wells and flows from springs need to be measured monthly to characterize ambient seasonal patterns.
- Monitoring sites need to be established to ensure that the regional monitoring program is implemented in advance of localized CBNG development and, consequently, that potential effects can be detected.
- One oversight agency or interagency group responsible for collecting and compiling comprehensive and consistent data should implement the proposed regional monitoring program.
- Monitoring data need to be compiled and made available to the public through GWIC and NRIS.

Monitoring Appendix Map 1.

Conceptual map showing recommended areas for a regional-scale coal-bed methane monitoring program

Montana Department of Natural Resources
Technical Advisory Committee for the Powder River Basin Controlled Ground-Water Area



This map is part of a report prepared by the Montana Department of Natural Resources, Technical Advisory Committee for the Powder River Basin controlled ground-water area, titled: Regional-scale monitoring of potential effects of coal bed methane development on water resources. The Technical Advisory Committee proposes a minimum of 1 monitoring site in each township within three - five miles of coal outcrops. In addition, monitoring is proposed near the Montana-Wyoming border.

The Anderson, Canyon, Wall and Knobloch coal seams are the four primary seams within the Tongue River Member of the Fort Union Formation in the Montana portion of the Powder River Basin. Shaded zones represent areas that are generally 3 miles or less from these respective coal outcrops. Separate ground-water monitoring sites are proposed within each of these coal zones to study the potential effects of coal-bed methane development. Actual site locations will be based on detailed geology and field conditions.

